सत्यमेव जयते

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

विषय: प्रचालन समन्वय उप-समिति की 233 वीं बैठक की कार्यसूची ।

Subject: Agenda of the 233rd OCC meeting.

प्रचालन समन्वय उप-समिति की **233** वीं बैठक का आयोजन वीडियो कॉन्फ्रेंसिंग के माध्यम से दिनांक **15.07.2025** को **10:30** बजे से किया जायेगा । उक्त बैठक की कार्यसूची उत्तर क्षेत्रीय विद्युत् समिति की वेबसाइट http://164.100.60.165 पर उपलब्ध है ।

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

कृपया बैठक में उपस्थित होने की सुविधा प्रदान करें।

The **233rd** meeting of the Operation Co-ordination sub-committee will be conducted through Video Conferencing on **15.07.2025** from **10:30 Hrs**. The agenda of this meeting has been uploaded on the NRPC web-site http://164.100.60.165.

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

Kindly make it convenient to attend the meeting.

(डी. के. मीना) 11/7/25
अधीक्षण अभियंता (प्रचालन)

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

18-ए, शहीदजीतसिंहमार्ग, कटवारियासराय, नईदिल्ली- 110016 फोन:011-26513265 ई-मेल: seo-nrpc@nic.in वेबसाईट: www.nrpc.gov.in
18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016 Phone: 011-26513265 e- mail: seo-nrpc@nic.in Website: www.nrpc.gov.in

List of addressee (via mail)

OCC Members for FY 2025-26			
S. No.	**OCC Member**	**Category**	**E-mail**
1	NLDC	National Load Despatch Centre	nomination awaited (susha@grid-india.in)
2	NRLDC	Northern Regional Load Despatch Centre	somara.lakra@grid-india.in
3	CTUIL	Central Transmission Utility	sandeepk@powergrid.in
4	PGCIL	Central Government owned Transmission Company	rtamc.nr1@powergrid.in rtamcjammu@powergrid.in cpcc.nr3@powergrid.in
5	NTPC	Central Generating Company	RAMESHSINGH@NTPC.CO.IN
6	BBMB		powerc@bbmb.nic.in
7	THDC		ravindrasrana@thdc.co.in
8	SJVN		sjvn.cso@sjvn.nic.in
9	NHPC		surendramishra@nhpc.nic.in
10	NPCIL		df@npcil.co.in
11	Delhi SLDC	State Load Despatch Centre	gmsldc@delhisldc.org
12	Haryana SLDC		cesocomml@hvpn.org.in
13	Rajasthan SLDC		ce.ld@rvpn.co.in
14	Uttar Pradesh SLDC		cepso@upsldc.org
15	Uttarakhand SLDC		se_sldc@ptcul.org
16	Punjab SLDC		ce-sldc@pstcl.org
17	Himachal Pradesh SLDC		cehpsldc@gmail.com
18	DTL	State Transmission Utility	bl.gujar@dtl.gov.in
19	HVPNL		cetspkl@hvpn.org.in
20	RRVPNL		ce.ppm@rvpn.co.in
21	UPPTCL		smart.saxena@gmail.com
22	PTCUL		ce_oandmk@ptcul.org
23	PSTCL		ce-tl@pstcl.org
24	HPPTCL		gmprojects.tcl@hpmail.in
25	IPGCL	State Generating Company	ncsharma@ipgcl-ppcl.nic.in
26	HPGCL		seom2.rgtpp@hpgcl.org.in
27	RRVUNL		ce.ppmcit@rrvun.com
28	UPRVUNL		cgm.to@uprvunl.org
29	UJVNL		gm_engg_ujvn@yahoo.co.in
30	HPPCL		gm_generation@hppcl.in
31	PSPCL	State Generating Company & State owned Distribution Company	ce-ppr@pspcl.in
32	DHBVN	State owned Distribution Company (alphabetical rotational basis/nominated by state govt.)	nomination awaited (md@dhbvn.org.in)
33	Ajmer Vidyut Vitran Nigam Ltd.		nomination awaited (md.avvnl@rajasthan.gov.in)
34	Purvanchal Vidyut Vitaran Nigam Ltd.		nomination awaited (mdpurvanchalvvnl@gmail.com)

35	UPCL		cgmupcl@yahoo.com
36	HPSEB		cesysophpsebl@gmail.com
37	Prayagraj Power Generation Co. Ltd.	IPP having more than 1000 MW installed capacity	sanjay.bhargava@tatapower.com
38	Aravali Power Company Pvt. Ltd		amit.hooda01@apcpl.co.in
39	Apraave Energy Ltd.,		niraj.gupta@apraava.com
40	Talwandi Sabo Power Ltd.		ravinder.thakur@vedanta.co.in
41	Nabha Power Limited		Durvesh.Yadav@larsentoubro.com
42	MEIL Anpara Energy Limited		arun.tholia@meilanparapower.com
43	Rosa Power Supply Company Ltd		Suvendu.Dey@relianceada.com
44	Lalitpur Power Generation Company Ltd		avinashkumar.ltp@lpgcl.com
45	MEJA Urja Nigam Ltd.		rsjuneja@ntpc.co.in
46	Adani Power Rajasthan Limited		manoj.taunk@adani.com
47	JSW Energy Ltd. (KWHEP)		roshan.zipta@jsw.in
48	Transition Cleantech Services Private Limited	IPP having less than 1000 MW installed capacity (alphabetical rotational basis)	nomination awaited (kswamidoss@evrenenergy.com)
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.	sojpdd@gmail.com
50	UT of Ladakh		cepdladakh@gmail.com
51	UT of Chandigarh		seelo-chd@nic.in
52	Tata Power Delhi Distribution Limited	Private Distribution Company in region (alphabetical rotational basis)	nomination awaited (sandeep.k@tatapower-ddl.com)
53	Gurgaon Palwal Transmission Limited	Private transmission licensee (nominated by central govt.)	(samriddhi.gogoi@indigrid.com)
54	PTC India Limited	Electricity Trader (nominated by central govt.)	nomination awaited (bibhuti.prakash@ptcindia.com)

Contents

खण्ड-क: उ.क्षे.वि.स. Part-A: NRPC

A.1. Confirmation of Minutes

232nd OCC meeting was held on 17.06.2025. Minutes of the meeting were issued vide letter dt. 08.07.2025. No comments received till date.

Decision required from Forum:

Forum may approve the minutes of 232nd OCC meeting.

A.2. Status of action taken on decisions of 232nd OCC meeting of NRPC

A.2.1. Status of action taken on decisions of 232nd OCC meeting is attached as **Annexure- A.I**.

A.3. Review of Grid operations

A.3.1. **Power Supply Position (Provisional) for June 2025**

Anticipated Power Supply Position v/s Actual Power Supply Position (Provisional) of Northern Region during the month of June-2025 is as under:

State / UT	Req. / Avl.	Energy (MU)			Peak (MW)		
		Anticipated	Actual	% Variation	Anticipated	Actual	% Variation
CHANDIGARH	(Avl)	190	214	12.6%	420	460	9.5%
	(Req)	246	214	-13.0%	481	460	-4.4%
DELHI	(Avl)	6055	4241	-30.0%	9116	8442	-7.4%
	(Req)	4750	4242	-10.7%	9000	8442	-6.2%
HARYANA	(Avl)	7440	7331	-1.5%	13182	13600	3.2%
	(Req)	8294	7364	-11.2%	15355	13600	-11.4%
HIMACHAL PRADESH	(Avl)	1272	1144	-10.1%	1945	1943	-0.1%
	(Req)	1254	1147	-8.5%	1919	1943	1.3%
J&K and LADAKH	(Avl)	1910	1668	-12.7%	3340	2869	-14.1%
	(Req)	1775	1672	-5.8%	3071	2869	-6.6%
PUNJAB	(Avl)	7860	9156	16.5%	15270	16754	9.7%
	(Req)	9177	9156	-0.2%	17097	16754	-2.0%
RAJASTHAN	(Avl)	10430	9487	-9.0%	19870	18509	-6.8%
	(Req)	10200	9487	-7.0%	17500	18509	5.8%
UTTAR PRADESH	(Avl)	18810	16905	-10.1%	32000	31486	-1.6%
	(Req)	18150	16908	-6.8%	32000	31486	-1.6%
UTTARAKHAN	(Avl)	1680	1573	-6.4%	2725	2910	6.8%

D	(Req)	1710	1574	-7.9%	2800	2910	3.9%
NORTHERN REGION	(Avl)	55647	51719	-7.1%	99200	90800	-8.5%
	(Req)	55556	51765	-6.8%	99600	91300	-8.3%

As per above, negative / significant variation (≥5%) in Actual Power Supply Position (Provisional) vis-à-vis Anticipated figures is observed for the month of June-2025 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, Rajasthan and UP. These states/UTs are requested to submit reason for such variations so that the same can be deliberated in the meeting.

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

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 August-2025 is scheduled on 14-July-2025 via Video Conferencing.

A.4.2. Outage Programme for Transmission Elements

The meeting on proposed outage programme of Transmission elements for the month of August-2025 is scheduled on 14-July-2025 via Video conferencing.

A.5. Planning of Grid Operation

A.5.1. Anticipated Power Supply Position in Northern Region for August 2025

The Anticipated Power Supply Position in Northern Region for August 2025 is as under:

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
CHANDIGARH	Availability	240	430	No Revision submitted
	Requirement	222	446	
	Surplus / Shortfall	18	-16	
	% Surplus / Shortfall	8.1%	-3.6%	

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
	Availability	4070	8840	
DELHI	Requirement	4260	7685	No Revision submitted
	Surplus / Shortfall	-190	1155	
	% Surplus / Shortfall	-4.5%	15.0%	
HARYANA	Availability	7260	13640	03-Jul-2025
	Requirement	7509	13751	
	Surplus / Shortfall	-249	-111	
	% Surplus / Shortfall	-3.3%	-0.8%	
HIMACHAL PRADESH	Availability	2570	3980	No Revision submitted
	Requirement	1226	1895	
	Surplus / Shortfall	1344	2085	
	% Surplus / Shortfall	109.6%	110.0%	
J&K and LADAKH	Availability	2050	3370	No Revision submitted
	Requirement	1740	3007	
	Surplus / Shortfall	310	363	
	% Surplus / Shortfall	17.8%	12.1%	
PUNJAB	Availability	9400	17060	No Revision submitted
	Requirement	10097	17053	
	Surplus / Shortfall	-697	7	
	% Surplus / Shortfall	-6.9%	0.0%	
RAJASTHAN	Availability	9960	19410	No Revision submitted
	Requirement	9920	17500	
	Surplus / Shortfall	40	1910	
	% Surplus / Shortfall	0.4%	10.9%	
UTTAR PRADESH	Availability	16585	30000	05-Jul-2025
	Requirement	16430	30000	
	Surplus / Shortfall	155	0	
	% Surplus / Shortfall	0.9%	0.0%	
UTTARAKHAND	Availability	1527	2500	07-Jul-2025
	Requirement	1550	2550	
	Surplus / Shortfall	-23	-50	
	% Surplus / Shortfall	-1.5%	-2.0%	

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
	Availability	53662	91900	
NORTHERN REGION	Requirement	52954	87000	
	Surplus / Shortfall	707	4900	
	% Surplus / Shortfall	1.3%	5.6%	

SLDCs are requested to update the anticipated power supply position of their respective state / UT for the month of August-2025 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.II**.

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.III.**

Members may kindly deliberate.

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

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

A.8.2 Accordingly, coal stock position of generating stations in northern region during current month (till 07th June 2025) is as follows:

Station	Capacity (MW)	PLF % (prev. months)	Normative Stock Reqd. (Days)	Actual Stock (Days)
ANPARA C TPS	1200	0.81	16	9.9
ANPARA TPS	2630	0.82	16	22.6
BARKHERA TPS	90	0.00	24	52.4
DADRI (NCTPP)	1820	0.40	24	25.1
GH TPS (LEH.MOH.)	920	0.88	24	21.0
GOINDWAL SAHIB TPP	540	0.68	24	22.0
HARDUAGANJ TPS	1265	0.39	24	44.5
INDIRA GANDHI STPP	1500	0.46	24	47.3
KAWAI TPS	1320	0.69	24	25.1
KHAMBARKHERA TPS	90	0.00	24	49.8

Station	Capacity (MW)	PLF % (prev. months)	Normative Stock Reqd. (Days)	Actual Stock (Days)
KOTA TPS	1240	0.47	24	28.1
KUNDARKI TPS	90	0.00	24	43.9
LALITPUR TPS	1980	0.71	24	21.2
MAHATMA GANDHI TPS	1320	0.71	24	31.3
MAQSOODPUR TPS	90	0.00	24	55.8
MEJA STPP	1320	0.70	24	22.0
OBRA TPS	1094	0.36	24	12.8
PANIPAT TPS	710	0.52	24	41.5
PARICHHA TPS	1140	0.64	24	17.3
PRAYAGRAJ TPP	1980	0.77	24	28.4
RAJIV GANDHI TPS	1200	0.68	24	36.5
RAJPURA TPP	1400	0.90	24	24.7
RIHAND STPS	3000	0.87	16	23.4
ROPAR TPS	840	0.61	24	33.4
ROSA TPP Ph-I	1200	0.67	24	30.5
SINGRAULI STPS	2000	0.82	16	14.7
SURATGARH TPS	1500	0.26	24	27.9
TALWANDI SABO TPP	1980	0.72	24	22.8
TANDA TPS	1760	0.54	24	32.2
UNCHAHAR TPS	1550	0.71	24	27.6
UTRAULA TPS	90	0.00	24	42.5
YAMUNA NAGAR TPS	600	0.59	24	27.0
CHHABRA-I PH-1 TPP	500	0.38	24	28.4
KALISINDH TPS	1200	0.36	24	23.2
SURATGARH STPS	1320	0.48	24	31.3
CHHABRA-I PH-2 TPP	500	0.79	24	21.5
CHHABRA-II TPP	1320	0.66	24	28.5
JAWAHARPUR STPP	660	0.05	24	28.0

A.9. Periodic testing of generators and FACTS/HVDC Devices (Agenda by NRPC Sectt.)

A.9.1. Regulation 40 (1) of CERC (IEGC) Regulations, 2023 stipulate that there shall be periodic tests, as required under clause (3) of this Regulation, carried out on power system elements for ascertaining the correctness of mathematical models used for simulation studies as well as ensuring desired performance during an event in the system.

A.9.2. The tests shall be performed once every five (5) years or whenever major retrofitting is done. If any adverse performance is observed during any grid event, then the tests shall be carried out even earlier, if advised by SLDC/RLDC/NLDC/RPC, as the case may be.

A.9.3. Further, Regulation 40(1)(b) stipulate that "All equipment owners shall submit a testing plan for the next year to the concerned RPC by 31st October to ensure proper coordination during testing as per the schedule. In case of any change in the schedule, the owners shall inform the concerned RPC in advance."

Extract of IEGC 2023 clause 40,

"40. PERIODIC TESTING

(1) There shall be periodic tests, as required under clause (3) of this Regulation, carried out on power system elements for ascertaining the correctness of mathematical models used for simulation studies as well as ensuring desired performance during an event in the system.

(2) General provisions

(a) The owner of the power system element shall be responsible for carrying out tests as specified in these regulations and for submitting reports to NLDC, RLDCs, CEA and CTU for all elements and to STUs and SLDCs for intra-State elements.

(b) ***All equipment owners shall submit a testing plan for the next year to the concerned RPC by 31st October to ensure proper coordination during testing as per the schedule****. In case of any change in the schedule, the owners shall inform the concerned RPC in advance.*

(c) The tests shall be performed once every five (5) years or whenever major retrofitting is done. If any adverse performance is observed during any grid event, then the tests shall be carried out even earlier, if so advised by SLDC, RLDC, NLDC, or RPC, as the case may be.

(d) The owners of the power system elements shall implement the recommendations, if any, suggested in the test reports in consultation with NLDC, RLDC, CEA, RPC and CTU.

(3) Testing requirements

The following tests shall be carried out on the respective power system elements:

TABLE 9 : TESTS REQUIRED FOR POWER SYSTEM ELEMENTS

Power System Elements	Tests	Applicability
Synchronous Generator	(1) Real and Reactive Power Capability assessment. (2) Assessment of Reactive Power Control Capability as per CEA Technical Standards for Connectivity (3) Model Validation and verification test for the complete Generator and Excitation System model including PSS. (4) Model Validation and verification of Turbine/Governor and Load Control or Active Power/ Frequency Control Functions. (5) Testing of Governor performance and Automatic Generation Control.	Individual Unit of rating 100MW and above for Coal/lignite, 50MW and above gas turbine and 25 MW and above for Hydro.
Non synchronous Generator (Solar/Wind)	(1) Real and Reactive Power Capability for Generator (2) Power Plant Controller Function Test (3) Frequency Response Test (4) Active Power Set Point change test. (5) Reactive Power (Voltage / Power Factor / Q) Set Point change test	Applicable as per CEA Technical Standards for Connectivity.
HVDC/FACTS Devices	(1) Reactive Power Controller (RPC) Capability for HVDC/FACTS (2) Filter bank adequacy assessment based on present grid condition, in consultation with NLDC. (3) Validation of response by FACTS devices as per settings.	To all ISTS HVDC as well as Intra-State HVDC/FACTS, as applicable

A.9.4. In accordance with above, Generators and HVDC/FACT owners were supposed to furnish the Testing schedule for 2025-26 by 31st October 2024.

A.9.5. In 73 NRPC meeting, NRPC forum asked all Generators and HVDC/FACT owners to furnish the Testing schedule for 2024-25 and 2045-26 to NRPC/NRLDC at the earliest. However, the same is still pending.

A.9.6. In 230th OCC meeting, MS NRPC asked Generators and HVDC/FACT owners to furnish Testing schedule for 2025-26 in the format attached at **Annexure-A.IV.** to seo-nrpc@nic.in.

A.9.7. In view of the above Generators and HVDC/FACT owners are requested to furnish Testing schedule for 2025-26 in the format attached as **Annexure-A.IV to seo-nrpc@nic.in .**

Utilities to update status.

A.10. Report of the Committee to Evolve a Mechanism for Ensuring Thermal Generation at Technical Minimum Level for Grid Stability and Renewable Energy Integration (Agenda by NRPC Secretariat)

A.10.1. During the meeting, dated 26.05.2025, Chairperson, CEA, observed that several thermal generators, particularly Central Sector owned units, were being scheduled below their technical minimum limits during daytime despite their requirement during non-solar/evening peak demand. NLDC also reported persistent high frequency operation and the need for limiting RE generation especially during weekends with

lower demand, by deployment of TRAS emergency provisions after exhausting the downward regulation capability from conventional sources.

A.10.2. To resolve the above issues, NPC Division vide letter dated 30.05.2025 constituted a committee under the chairmanship of the Member Secretary (NRPC) with representatives from RPCs, GM Division, CEA, CERC, NLDC ,RLDCs as Members and Member Secretary, NPC as the Member Convener.

A.10.3. The primary mandate of the Committee was to develop a common mechanism to ensure adequate scheduling of thermal generation during daytime hours upto technical minimum for ensuring sufficient ramp-up capabilities to maximize the thermal availability during evening/non-solar peak hours. This would ensure secure and reliable grid operations, support the integration of RE sources, and help avoid operational and commercial challenges for generating units nationwide.

A.10.4. The terms of reference of the meeting were as follows:

i. Review the current scheduling and dispatch practices of all thermal generators, particularly during Solar/high RE hours and propose mechanism for ensuring technical minimum schedule of thermal generators to support grid balancing and reliability during Non-Solar/evening hours.

ii. Assess operational constraints, technical minimum limit issues, and ramp-up/ramp-down capabilities of all thermal generators, to ensure the maximum availability during Non-Solar hours.

iii. Recommend a common mechanism for:

a) Ensuring all thermal units are scheduled above their technical minimum limits during solar hours and moderating other generation sources including RE for ensuring reliable grid operation during Non-Solar hours.

b) Maintaining sufficient ramp-up capability of thermal generating units to meet the Non-Solar/evening demand.

iv. Address commercial and regulatory aspects linked to the common mechanism being finalized for operation of thermal generating units.

A.10.5. The committee has recommended the following short term and long-term solutions to ensure Thermal Generation at Technical Minimum level for Grid Stability and RE Integration:

1. Short Term solutions (within 1 year):

a) Implementation of minimum technical load (MTL) level of 55% immediately on pan India basis and 40% as per phasing plan for all units, irrespective of their ownership at Intrastate/Interstate level and establishment of monitoring mechanism to ensure compliance with the CEA (Flexible Operation of Coal based Thermal Power Generating Units) Regulations, 2023. **Exemption, if any, may be granted by SERC/CERC on technical ground.**

b) **State Grid Codes shall be aligned** with the Central Electricity Authority (CEA) “Flexible Operation of Coal based Thermal Power Generating Units” regulation 2022, notified in January 2023 and IEGC 2023. Suitable directions need to be issued to SERCs by Ministry of Power/CEA to notify commercial compensation

mechanism as per CEA guidelines to ensure the MTL of 55%, which in force from 01.02.2024 as per CEA (Flexible Operation of Coal based Thermal Power Generating Units) Regulation 2023 **on sustained basis.**

c) Generators maintaining MTL of 40-45% may be given more preference (bypassing Merit Order when required for maintaining down reserves) and units may be kept on bar.

d) Directions from RPCs may be issued to existing PSPs to make all pumps operational and also use as a load during solar hours as envisaged in Optimal Generation Mix Report of CEA.

e) Time lines for scheduling for all Intra State generators also need to be streamlined/harmonized with CERC IEGC Regulation 2023 which will ensure equitable comparison and similar provisions of scheduling of power.

f) There is a need to create equitable balance between the supply obligation of generators under IEGC Regulation 2023 as well as offtake obligation of drawing entities/ beneficiaries of the generators. Beneficiaries requisitioning power during non-solar hours from an ISGS shall have Offtake obligations from those stations during solar hours. Beneficiaries may be mandated to maintain a minimum requisition as percentage of maximum requisition in a day, during the lean hours to ensure operationally reasonably schedule during lean hours and availability in non-solar hours. If the ratio cannot be maintained, one or more units from that station could be allowed to be taken under reserve shutdown to replenish down reserves. Once the unit is taken under reserve shut down, the aggregate requisition by beneficiaries in that station should be restricted to the declared capacity corresponding to the units on bar in that station. The **proposed ratio of minimum and maximum requisition by the beneficiary in a generating station during a day may be 40%.**

g) De-commitment of the Thermal units through SCUC is required to be included in regulatory provisions (CERC/SERC). The unit which is not committed under SCUC by NLDC 1500 hrs on day ahead and its schedule remains below MTL level by 2200 hrs on day ahead basis may be allowed to de-commit. The time between 1500 hrs and 2200 hrs would be the time available to the beneficiaries to revise their schedules to either support the unit by giving schedule above MTL or reduce their schedule from those units. **The de-committed unit will have no supply obligation while it will be able to maintain its DC.**

h) Optimal number of thermal units may be kept on bar during solar hours by NLDC/RLDC/SLDCs to meet non-solar hours demand. Excess generation is leading to frequency excursions. **Empowering NLDC/RLDC/SLDC to take out units under exigencies.**

i) Suitable provisions may be provided for **higher DSM charges on entities for over-injection or under-drawl by the entities when the grid frequency exceeds 50.05 Hz during solar hours/off-peak hours, irrespective of the nature (both RE and non-RE) of the entities**. However, **under-injection/over-drawl by the entities when the grid frequency exceeds 50.05 Hz during solar hours/off-peak hours, irrespective of the entity type (RE or non-RE),**

should attract a lesser penalty and incentivization may be considered. Further, during the schedule revision under TRAS Emergency provision, over injection may not be allowed and the volume limit may be made as Zero during such time period.

j) Necessary Regulatory provisions for participation of all ISTS & InSTS generators for giving Ancillary Service support to the Grid are required. Ancillary service regulations should be brought out by SERC for intra state level in line with CERC Ancillary Service Regulation. TRAS Shortfall & TRAS Emergency needs to be brought out by all SERC which may include backing down of RE as last resort. Suitable directions need to be issued to SERCs by Ministry of Power/CEA in this regard.

k) NTPC Ltd. shall develop and share Standards Operating Procedure for implementation of 55% minimum turn down level in intrastate thermal power stations. Training program to be conducted in NPTI with support from NTPC Ltd. for employees of state thermal generators/IPPs for running intra state plants upto 55% MTL.

l) Energy storage capacity to be created/ augmented in interstate as well as intra-state system. States may accelerate the commissioning of the required storage capacities.

2. Long Term solutions (Beyond 1 year):

a) Ensuring 40% MTL for all coal based thermal generators both at ISTS & InSTS on sustained basis. Other technological intervention may be considered by generators (storage etc.). Monitoring of the same has to be done rigorously.

b) Two shift operation/taking out units on weekends/holidays/high wind season needs to be implemented. Before implementation two shift operation of thermal Generating units must be performed on pilot basis in each region and potential damage including wear & tear, O&M, and plant life spans should be thoroughly examined before final implementation. Wear & tear, O&M, plant life spans and cost implications may be properly recorded during pilot two shift operation.

c) Peaking capacity may be considered with technical and commercial aspects with well-defined rules. This will further optimise number of units on bar, ensuring MTL at solar hours and also enable the states to meet the evening peak demand.

d) Energy storage (BESS, PSP etc.) need to be promoted rigorously to integrate the RE targets. BESS installation in existing thermal stations (Both Inter and Intra State thermal stations) may be one of the options for storing excess energy during solar hours.

e) Each control area needs to maintain the reserves (Up & Down) as calculated by NLDC in different timeframes to control and manage the deviations and other grid parameters.

f) Demand response needs to be promoted. Initially large industries with captive generation may be focused.

g) TOD tariff with lower tariff during solar hours and higher tariff during evening needs to be implemented by all SERCs.

Members may kindly note.

A.11. MoU between Powergrid and NTPC for O&M of 400 kV D/C Dadri – Harsh Vihar transmission lines and 400 kV Panipat-2 bays (Agenda by NTPC)

A.11.1. NTPC has informed about signing of the following MOU between Powergrid and NTPC:

1. Operation and Maintenance of NTPC-owned 400 kV Double Circuit (D/C) Dadri – Harsh Vihar transmission lines by Powergrid.
2. Operation and Maintenance of Powergrid-owned 400 kV Panipat-2 bays by NTPC.

A.11.2. NTPC has mentioned that approval for signing of the above MOU was accorded by the CMD-NTPC, on 22.02.2024. The approved drafts were subsequently shared with Powergrid on 24.02.2024 for formal signing.

A.11.3. Powergrid has conveyed their readiness to proceed with the signing of the MOU mentioned at Sl. No. 2, **O&M of Powergrid-owned 400 kV Panipat-2 bays by NTPC**. However, consent from Powergrid for the signing of MoU at Sl. No. 1, regarding **O&M of NTPC-owned 400 kV Double Circuit (D/C) Dadri – Harsh Vihar transmission lines by Powergrid**, is still awaited.

Members may kindly deliberate.

A.12. Unplanned Long shut down of 220kV Anta- RAPPC transmission line (Agenda by NPCIL)

A.12.1. NPCIL has submitted that 220 KV RAPP-C-Anta transmission line shutdown was planned from 09.06.2025 to 18.06.2025. But multiple times extension was taken & shut down was extended up to 01/07/2025 for NHAI diversion works.

A.12.2. RAPS-C (2x2220MW) and RAPS-D (RAPP-7, 700MW) start-up power is drawn from 220 KV RAPP-B to RAPP-C tie lines and RAPP-C-Anta line.

A.12.3. One of the start-up power sources was not available since long period (i.e. from 09.06.2025 onwards till 05.07.2025). On 05.07.2025 line has not resumed/charged and waiting for approval from CEA.

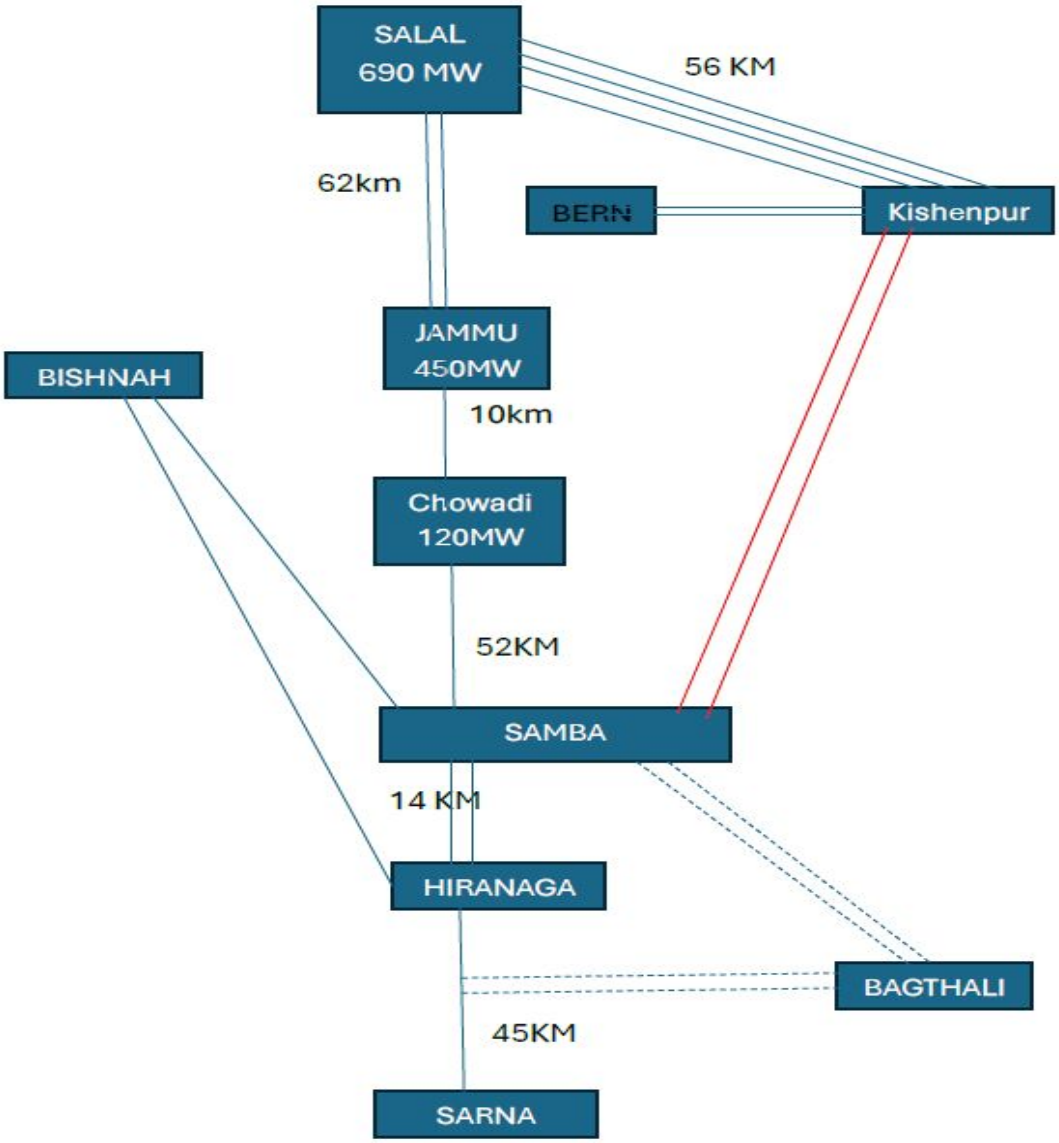
A.12.4. It put challenges on start-up power supply sources for Nuclear Power Plants, which is not a desirable condition.

Members may kindly deliberate.

A.13. N-1 Contingency violation in 220KV Lines feeding power to Jammu city (Agenda by Powergrid NR-II)

A.13.1. Powergrid NR-II has submitted that vide letter dated 20.06.2025, (Copy enclosed as **Annexure-A.V**) from Chief Engineer JKPTCL regarding urgent request for upgradation of 220 KV transmission lines to HTLS Conductors to address capacity constraints for Gladni and Chowadhi grid sub-stations.

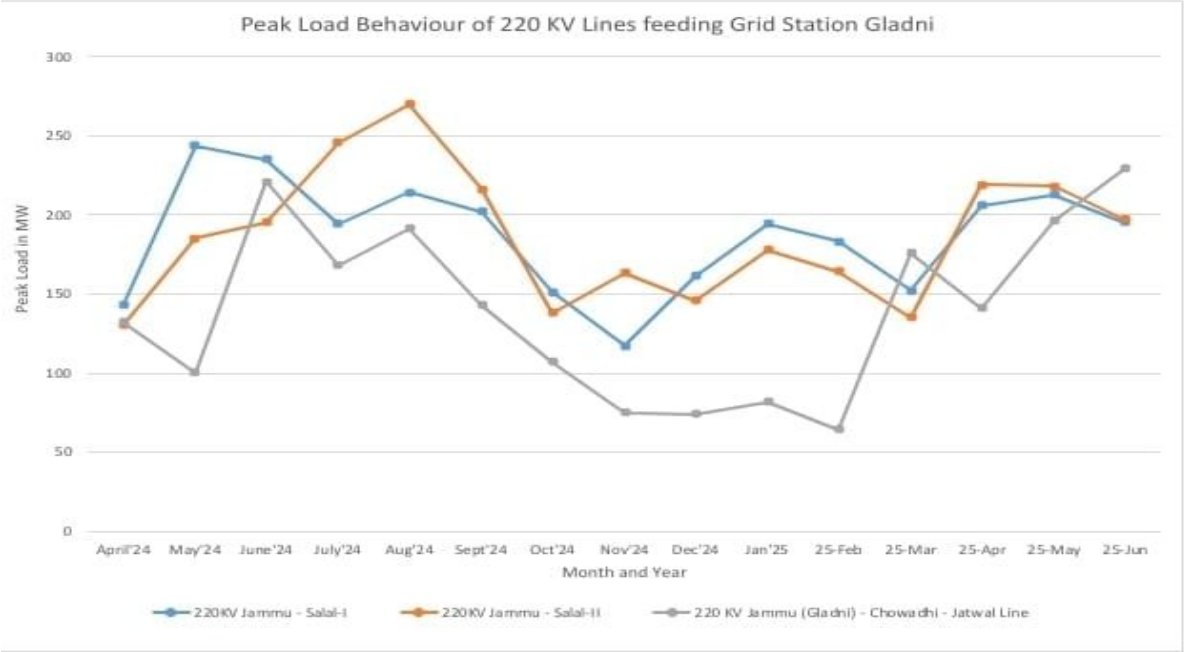
A.13.2. At present, draft connectivity diagram of Jammu city is as under:



A.13.3. As per above diagram, load requirements of Jammu city is fed through following Lines:

1. 220KV Salal Jammu-1, ACSR Zebra Conductor, thermal capacity 188MW
2. 220KV Salal Jammu-2, ACSR Moose conductor thermal capacity 211MW
3. 220KV Samba-Chowadi-Jammu, ACSR Zebra thermal capacity 188MW

A.13.4. Load flow through above lines for last 01 year is as under:



A.13.5. In view of above, Powergrid NR-II proposed reconductoring of following ISTS lines with HTLS Conductors (High capacity) as immediate relief to Address Capacity Constraints in the area:

1. 220KV Salal Jammu-1
2. 220KV Salal Jammu-2
3. 220KV Jammu-Chowadi
4. 220KV Chowadi-Samba
5. 220KV Samba Hiranagar
6. 220KV Hiranagar Sarna

A.13.6. Powergrid NR-II has proposed reconductoring of 220KV Samba Hiranagar and Hiranagar Sarna in compliance of MoM of 38th CMETS meeting held on 28-05-2025, wherein LILO of 220KV Sarna Hiranagar Line was also proposed by JKPTCL to meet load requirements of Industrial area at Bagthali Kathua. As Lines are more than 35 years old, hardware fitting and insulators are also required to be changed to maintain the healthiness/ reliability of these lines.

A.13.7. Further necessary upgradation in bay equipment, hardware fitting & Conductors may also be required matching HTLS conductor capacity.

Members may kindly deliberate.

A.14. Replenishment of 03 number of transformers issued to DTL, HVPNL & RVPNL (Agenda by Powergrid NR-II)

A.14.1. Powergrid NR-II has submitted that following transformers were issued from POWERGRID NR-2 to different utilities on replenishment basis as per request of Utilities:

Sr. No.	ICT Capacity (MVA)	Sent fron substation	Sent to Substation	Utility	Sent on
1	250	Moga	Nawada	HVPNL	23.03.2016
2	315	Ludhiana	Tikrikalan	DTL	19.04.2023
3	315	Ludhiana	GSS Surpura (Jodhpur)	RVPNL	06.11.2023

A.14.2. HVPNL, DTL & RVPNL may please share details of replenishment of above ICTs.

Members may kindly deliberate.

A.15. Shifting of 220kV Patti-Verpal Single Circuit from Verpal end to 400kV PGCIL Amritsar (Agenda by PSTCL)

A.15.1. PSTCL has highlighted that in line with the Clause 9 of the Indian electricity Grid Code (IEGC) 2023 that requires a connectivity agreement to be signed between the State Transmission Utility (STU), Central Transmission Utility (CTU), and transmission licensee for a new Inter-State Transmission System (ISTS) connectivity, PSTCL had submitted application (Number 2200000836) on NSWS portal on 23rd May 2024 for the relocation of the 220kV Patti-Verpal Single Circuit line from the 220 kV Verpal end to the 400kV substation PGCIL Amritsar (Balachak).

A.15.2. CTUIL had raised concerned about the single bus bar arrangement at the 220kV substation Patti and 2nd busbar cannot be laid in the station which is very old and having no space for erection of the same.

A.15.3. Further, the above matter was conveyed to NRPC forum in the 222nd OCC meeting, wherein NRPC was of the opinion that 220kV Substation Patti, being an existing substation, should not be an issue and the said agreement should have been cleared by the concerned agencies. NRPC advised PSTCL to approach CEA in this regard, so that transmission assets (where all erection related works have been completed) can be commissioned at the earliest.

A.15.4. PSTCL vide Demi-Official Letter no. 1/18/2011-EB(PR)/749 dated August 14, 2024 (**Annexure-A.VI)** addressed to Sh. G. Ravisankar Chairman, CTUIL had requested for the processing of the subject cited NSWS application and the subsequent draft connectivity agreement be expedited.

A.15.5. Accordingly, PSTCL on 30th Aug 2024 (**Annexure-A.VII**), had requested CEA for intervention of CEA in the matter regarding processing of the said NSWS application and issuance of draft agreements by CTUIL. And PSTCL vide email dated 22.10.2024, again requested CEA for the same.

A.15.6. Also, PSTCL vide Demi-Official Letter no. 1/18/2011-EB(PR)/1265 dated November 28, 2024 (**Annexure-A.VIII**) addressed to Sh. Abhay Choudhary Chairman, CTUIL

had once again requested for the processing of the subject cited NSWS application and the subsequent draft connectivity agreement be expedited.

A.15.7. On dated January 15, 2025 a meeting was held among CEA, NRPC, CTUIL and PSTCL (**Annexure-A.IX**) to discuss the issue regarding connectivity agreement of shifting of 220kV Rashiana-Verpal and 220kV Patti-Verpal single circuit lines to 400kV Substation PGCIL Amritsar (Balachak). The meeting was concluded with the following decision: -

A. At present CTUIL may grant the connectivity considering that Patti Substation was commissioned in 1989 much before notification of above-mentioned Regulations and space constraints at the Substation.

B. A team comprising of CEA, CTUIL, Grid-India, Power Grid and NRPC may visit the site to study the matter in details and to recommend the measures to be taken by PSTCL for ensuring the reliability of power supply and upgradation of the substation. CTUIL may co-ordinate the team visit.

A.15.8. Thereafter, vide various correspondences with CTUIL, the draft agreement for Shifting 220kV Patti-Verpal Single Circuit lines to 400kV Substation PGCIL Amritsar (Balachak) has yet not been issued by CTUIL.

A.15.9. Charging of 220kV Patti- Amritsar (Balachak) line is urgently needed to balance the loading conditions in the area of Amritsar. The works for the said lines stand completed since August 2024.

A.15.10. In view of the above, it is proposed by PSTCL that CTUIL may be requested to issue the draft agreement for Shifting 220kV Patti-Verpal Single Circuit lines to 400kV Substation PGCIL Amritsar (Balachak) at the earliest.

Members may kindly deliberate.

A.16. Retrofitting of Automatic Fire Fighting System (NIFPS) on 10MVA & above Rating Power Transformers in the State of Uttarakhand (Agenda by UPCL)

A.16.1. UPCL has mentioned that as per CEA safety regulation 2023, section 3(46), every transformer of 10MVA and above rating shall be provided with automatic fire fighting system as per relevant standards.

A.16.2. At present no automatic fire fighting system is installed in UPCL making most valuable asset (Power Transformer) in power system vulnerable and even imposing threat to Grid safety.

A.16.3. NIFPS can prevent oil tank explosions and ruptures, as well as fires caused by arcing due to internal or external faults.

A.16.4. This system offers cost effective and efficient solution for safeguarding power transformers and preventing potential damage and downtime.

A.16.5. More than 400 power transformers of 10MVA & above rating are available in UPCL.

A.16.6. In view of vulnerability of transformers to fire risks, accidents UPCL is considering to retrofit automatic fire fighting system (NIFPS – Nitrogen Injection Fire Prevention System) on above transformers.

A.16.7. UPCL has proposed 100% funding through PSDF for the project in the general interest of providing better supply to the consumers as UPCL is not financially sound and the project will enhance safety of Grid.

Sl. No.	Proposal No.	Utility/State	Name of Scheme	Tentative Cost of DPR
1		UPCL/Uttarakhand	Retrofitting Of Automatic Fire Fighting System (NIFPS) on 10MVA & above Rating Power Transformers in the State of Uttarakhand	Rs. 80 Crore

Members may kindly deliberate.

A.17. Installation of LT Capacitor Banks on Distribution Transformers in the State of Uttarakhand (Agenda by UPCL)

A.17.1. UPCL has submitted that the proposal of Installation of Reactive Power Solution on 33/11 KV substations in Uttarakhand was approved in 71st meeting of NRPC (Northern Regional Power Committee) held on 29.01.2024.

A.17.2. In the approval it was acknowledged that installation of capacitors will lead to real time PF improvement, better voltage profile, less technical losses and low infrastructure loading. It will further avoid unnecessary losses arising out of extra reactive power flow in the distribution and transmission network and posing threat to Grid health. These extra losses are basically national losses.

A.17.3. However, the project was returned by the PSDF due to insufficient funds in PSDF account.

A.17.4. As maximum benefit of Reactive Power Solution occurs when capacitors are placed closest to the load where reactive power is generated. Taking into account the benefits achieved and in order to further improve the power factor, voltage profile and overall grid health, Uttarakhand Power Corporation Limited (UPCL) proposes “Installation of LT Capacitor Banks on Distribution Transformers network in Uttarakhand”.

A.17.5. This initiative is expected to further minimize line losses and ensure a more reliable power supply to the increasing number of consumers.

A.17.6. UPCL has proposed 100% funding through PSDF for the project in the general interest of providing better supply to the consumers as UPCL is not financially sound and the project will enhance health and safety of Grid.

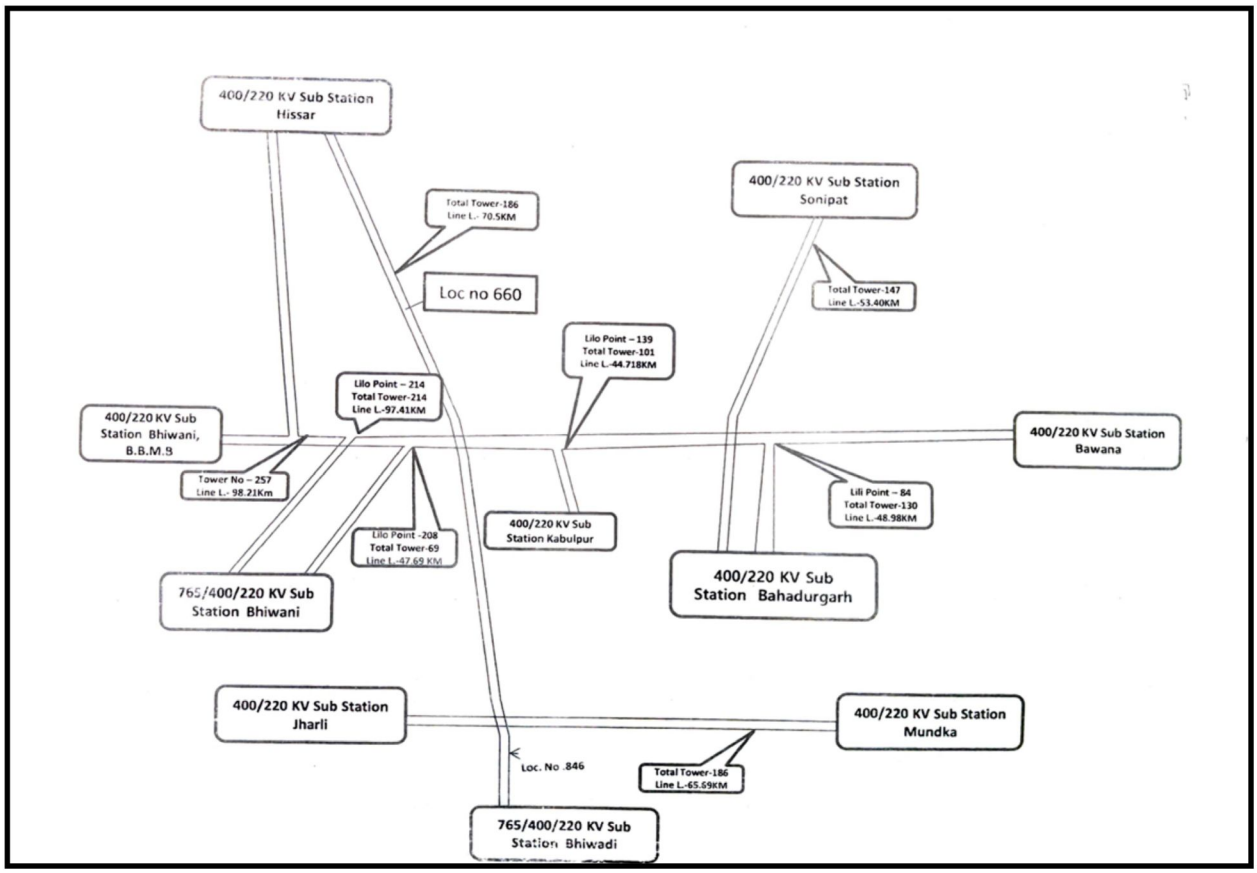
Sl. No.	Proposal No.	Utility/State	Name of Scheme	Tentative Cost of DPR
1		UPCL/Uttarakhand	Installation of LT Capacitor Banks on Distribution Transformers in the State of Uttarakhand	Rs. 147.11 Crore

Members may kindly deliberate.

A.18. Enhancement of capacity of 400 kV Hissar-BBMB-Bawana transmission system by replacement of existing moose conductor with HTLS conductor (Agenda by Powergrid NR-I)

A.18.1. Powergrid NR-I has submitted that 400 kV Hissar-BBMB-Bawana transmission system with 400 kV Hissar-Bawana & 400 kV Hissar-BBMB & 400 kV BBMB-Bawana system was commissioned in 1995 under Moga-Hissar-Bhiwani Transmission system. All the 400 kV transmission system lines were commissioned as twin moose configuration with power transmission capacity (thermal loading of 800 MW on each circuit).

A.18.2. Subsequently, the original transmission system has been LILO at several grid substations with enhancement of grid networks. The 400 kV Hissar-Bawana line has been LILO at Bhiwani Substation and 400 BBMB-Bawana Line has been LILO at Kabulpur & Bahadurgarh Substation. The connection of grid substations in the transmission corridor has resulted in increased power flow through the above transmission system.



A.18.3. This transmission system passes through heavily polluted areas having brick kilns throughout the route resulting in heavy chemical deposition on insulators & hardware fittings. The porcelain insulators have been replaced with polymer insulators around 15 years ago however pollution effect has weakened hardware fittings, conductors and mid span joint severely.

A.18.4. The maintenance of Towers including zinc rich painting on rusted tower members is being carried out on regular basis however given the concentration of brick clin on corridor, the members are rusting within span of 1-2 years. Further the extended rusting despite best maintenance strength has made around 30% of towers of corridor very weak and these are also required to be replaced to ensure any major disruption.


09 08 2023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A.18.5. Above pollution effect along with ageing and increased power flow has resulted in frequent breakdown of above transmission system feeding power to Delhi. Around 08 no breakdown due to hardware fittings & conductor failure has been reported in above line in last year which makes the system less reliable. As the reasons of failure is beyond reasonable control (ageing of conductors and towers due to pollution), replacement of existing corridor with HTLS conductor and replacement of defective towers at cost estimate of Rs 197 Crores is proposed to be considered for approval.

A.18.6. In view of the above, Powergrid has proposed that the existing twin moose conductor be replaced with HTLS conductor for increased power capacity and reliability of the system.

Members may kindly deliberate.

A.19. Review of Switchgear Adequacy and Proposal for Installation of Fault-Limiting Reactors at 400kV Meerut (PG) Substation (Agenda by Powergrid NR-I)

A.19.1. Powergrid NR-I has submitted that POWERGRID Meerut Substation has been in operation since 2002–03, with the original switchgear in the 400kV switchyard rated for 40kA. With the later integration of the 765kV system and energization of new transmission lines and ICTs, additional bays were commissioned with switchgear rated for 50kA. Recently, NRLDC published its Reactive Power Management document (December 2024), which indicates that the fault levels at the 400kV bus of Meerut Substation have reached as high as 63kA under various system conditions. Specifically, the fault level remains at 63kA during both summer peak and off-peak hours, and ranges between 58kA to 61kA during winter conditions.

Fault level at 400kV and above Buses in NR

400kV Sub Stations						
S.NO.	Bus name	Voltage Level (in kV)	Peak Scenario		Off-Peak Scenario	
			Fault Current (in kA)	Fault MVA	Fault Current (in kA)	Fault MVA
1	Meerut	400	63	43872	63	43874
2	Agra-Pg	400	61	42464	60	41824
3	Agra_Pg	400	61	42464	60	41824
4	Agra_Hvdc	400	61	42464	60	41824
5	Lucknow-Pg	400	57	39761	57	39794
6	Gurgaon-Pg	400	55	38341	55	38239
7	Gr. Noida 765	400	55	38214	55	38025
8	Lucknow765-Pg	400	55	38083	55	38111
9	Allahabad	400	55	38078	55	38021
10	Abdullapur	400	54	37477	54	37471

A.19.2. These fault levels clearly exceed the short-circuit withstand ratings of the existing switchgear at the 400kV switchyard, both for the older 40kA and the newer 50kA rated equipment. This situation presents a critical risk to the reliability and safety of system operations and necessitates urgent technical review and intervention.

A.19.3. In view of the forum is requested deliberate the adequate measures to be taken to ensure healthiness of switchyard equipment's & reliable operation of Meerut Substation in view of increased short circuit fault level.

A.19.4. Further in above referred NRLDC report, short circuit level at various NR substations has breached the limit of equipment ratings, hence mechanism for timely review of short circuit level of substations for implementation of corrective actions by CTU & Grid India may be institutionalised for timely corrective actions.

Members may kindly deliberate.

A.20. Proposal of Process bus-based solution for 400kV Switchyard of 400/220kV Bassi Substation (Agenda by Powergrid NR-I)

A.20.1. Powergrid has submitted that 400/220kV Bassi substation (Commissioned: 1988) is the oldest Substation of POWERGRID in Rajasthan. 400/220kV Bassi Substation has completed more than 25 years of life.

A.20.2. At 400/220kV Bassi substation, Control/Power cables laid in the trenches have depreciated largely due to wear and tear. Outer insulating layer and arm has been damaged due to ageing, and it causes multiple DC earth faults and mixing in rainy and foggy weather. Hence, process bus-based solution for 400kV Switchyard of 400/220kV Bassi Substation is proposed for 400/220kV Bassi substation. It is pertinent to mention that implementation of Process Bus for 220kV Switchyard of 400/220kV Bassi Substation is already approved under ADD CAP 2019-24.

A.20.3. As per the above-mentioned requirement, tentative estimated cost including supply and erection for implementation of process bus-based solution for 400kV Switchyard of 400/220kV Bassi Substation comes to approximately ₹21 crore for Supply, Services & F&I (excluding taxes and duties).

A.20.4. Powergrid NR-1 has submitted the proposal for implementation of process bus-based solution for 400kV Switchyard of 400/220kV Bassi Substation with a tentative cost estimate of ₹21 crore under ADD-CAP (2024-29) for approval of the forum.

Members may kindly deliberate.

A.21. Regarding Shutdown consent/Approval of Bus-1 & 2 at 400kV Ballabhgarh and 220kV System at Hisar for Jack Bus Replacement work (Agenda by Powergrid NR-I)

A.21.1. Powergrid NR-1 has mentioned that shutdown of Bus-1 & 2 at 400 kV Ballabhgarh is pending, linked to the commissioning of the LILO of Kadarpur–HVPNL line (Already charged). Similarly, the 220 kV system shutdown at Hisar requires further HVPNL approvals.

A.21.2. Existing jack buses are severely aged and deteriorated, posing risk of hotspots and outages, especially with rising summer temperatures.

A.21.3. Both substations are critical for power transmission to Delhi NCR and Haryana, urgent replacement of defective jack buses is essential to ensure reliable operation.

A.21.4. In view of the above, Powergrid has requested for following shutdown:

a. Shutdown consent for Bus-1 and Bus-2 at 400kV Ballabhgarh Substation for a duration of four (04) continuous days, to facilitate the safe and timely replacement of the jack bus.

b. Facilitate approval/consent for the shutdown of the 220kV system at Hisar Substation, also for a period of four (04) days, to enable the replacement of the existing jack bus with a twin conductor arrangement.

Members may kindly deliberate.

A.22. Returning of spare 400/220 kV 315 MVA ICT provided by POWERGRID to DTL & RVPNL (Agenda by Powergrid NR-I)

A.22.1. Powergrid NR-1 has submitted that 04 nos. 400/220 kV 315 MVA ICTs has been provided to DTL by POWERGRID in last 05 years as per request of DTL for ensuring load management in National Capital Delhi. 03 out of 04 ICTs provided were POWERGRID assets and 01 no ICT is RPC spare to meet regional contingencies. All the ICTs provided to DTL were on non-chargeable basis in view of critical situation of maintaining uninterrupted power supply in National Capital Delhi.

A.22.2. In additional to DTL, ICTs has been provided to other Utilities on non-chargeable basis. The present details of ICTs provided to other utilities is provided below:-

S. No.	ICT provided to other Utilities	Diverted from	Diverted to	Date	Status
1	BHEL Make 315 MVA 400/220 KV ICT	Ludhiana (POWERGRID)	Mundka (DTL)	Apr-23	Not returned.
2	BHEL Make 315 MVA 400/220 KV ICT	Ludhiana (POWERGRID)	Jodhpur GSS - Surpura (RVPNL)	Nov-23	Not returned.
3	CGL Make 315 MVA 400/220 KV ICT	Mandola (POWERGRID)	Bawana (DTL)	Jan-22	Not returned.
4	BHEL Make 315 MVA 400/220 KV ICT	Mandola (POWERGRID)	Tikrikalan (DTL)	Feb-20	Not returned.

5	BHEL Make 315 MVA 400/220 KV ICT	Ballabgarh (POWERGRID)	Tikrikalan (DTL)	Mar-24	Not returned.

A.22.3. In addition to ICTs provided to DTL, 01 no 400/220 kV 315 MVA ICT was provided to RVPNL from Ludhiana in Nov'23 as per request of RVPNL for ensuring load management in Western Rajasthan.

A.22.4. POWERGRID Northern Region operation encompasses approximately 58,805 Ckt. Kms of Transmission lines, 96 substations and transformation capacity of 2,11, 327 MVA. The Northern Region is critically important with substantial renewable capacity of around 69.9 GW. At present due to diversion of majority of spare 315 MVA ICT to DTL and other utilities, there are no spare transformer of similar capacity in Northern Region -I. This situation poses serious concern regarding the availability & reliability of ISTS Grid.

A.22.5. In the above context, returning of 04 nos. 400/220 kV 315 MVA ICTs provided to DTL & 01 no 400/220 kV 315 MVA ICT provided to RVPNL may be deliberated by forum for ensuring available of availability of spares for smooth operation of Northern Grid.

Members may kindly deliberate.

A.23. Implementation of Travelling Wave Fault Locator (TWFL) in Critical Renewable & NCR lines in Northern Region-I under Additional Capitalisation for tariff block 2024-29 (Agenda by Powergrid NR-I)

A.23.1 POWERGRID has mentioned that Travelling Wave Fault Locators (TWFL) devices have been installed in critical 765kV and Inter-regional lines in earlier phase before 2015. These devices detect fault location with greater accuracy within limit of one tower span or 0.5 km distance. The technique used by TWFL is not affected by transpositions, mutual coupling of parallel lines or changes in line construction. It generates high quality result for all types of faults, including high resistance ground faults and open circuits. Therefore, implementation of TWFL in lines will help in locating the faults accurately in case of line faults and in turn will result in quick restoration, lower outage, and better reliability of system.

A.23.2 In recent years with increased integration from Renewables, 765 kV Transmission lines corridors from Western Rajasthan up to NCR have been commissioned and evacuation RE power. Further fault location mismatch in numerical relays has been observed in 400 kV lines having length more than 200 Km due to inherent accuracy issues resulting in substantial time in restoration after faults. Timely fault location and rectification in the above lines is very critical for ensuring smooth evacuation.

A.23.3 Based on above mentioned criticality & other parameters like line terrain, power flow capacity, generator connectivity, tripping frequencies, Installation of TWFL in 765 kV transmission lines and critical 400 kV lines (12 nose 765 kV Lines, 10 no's 400 kV

lines & 03 no's 220 kV lines) in Northern Region -1 at estimated expenditure of Rs 6.91 Cr may be considered for approval.

A.23.4 List of lines proposed for installation of TWFL under Add Cap 2024-2029 is given below:

765kV Transmission lines for TWL Installation:

Sl. No.	Description of Line	Line Length (approx. in KM)	Criticality
1.	**765kV Transmission lines for TWL Installation**:		
1.1	Ajmer-Bhadla-2 Ckt-1&2	326	RE connected
1.2	Banaskantha-Chittorgarh Ckt-1&2	302	RE connected, Inter regional line
1.3	Bhadla2-Fatehgarh2 Ckt-1 & 2	185	RE connected
1.4	Bhadla2-Fatehgarh2 Ckt-3&4	185	RE connected
1.5	Moga-Bikaner Ckt-1&2	367	RE connected, Intern regional line
1.6	Bhadla-1-Fatehgarh-2 Ckt-1&2	185	RE connected
2.	**400kV Transmission lines for TWL Installation**		
2.1	Dadri-Panipat Ckt-1&2	122	Generator and both end other utilities
2.2	Dehradun-Baghpat S/C	164	Passing through forest area
2.3	Jaipur(S)-RAPP D S/C	122	Generator and both end other utilities
2.4	Dehradun-Roorkee S/C	79	Passing through forest area
2.5	Kota – Merta S/C	255	One end other utility
2.6	Kankroli – RAPP S/C	198	One end other utility
2.7	Saharanpur-Bagpat	120	Passing through

			forest area
2.8	Roorkee-Kashipur Ckt-1& 2	150	One end other utility
3.	**<u>220kV Transmission lines for TWL Installation</u>**		
3.1	Anta-Bhilwara Ckt-1&2	186	Both end other utilities
3.2	RAPP(B)-Debari	230	Generator and both end other utilities

A.23.5 In view of the above, Powergrid has requested that the proposal for installation of TWFL at an estimated cost of Rs. 6.91 Cr under Add Cap 2024-2029 may be approved.

Members may kindly deliberate.

A.24. Demolition and reconstruction of residential/ non-residential buildings in the substation premises at 400kV Bassi Substation through Additional Capitalization in Tariff Block 2024-29 (Agenda by Powergrid NR-I)

A.24.1 Powergrid has mentioned that the residential and non-residential buildings at Bassi substation were constructed under the Rihand Transmission System between (1992 -1993) and are currently in service. These assets shall complete approximately 32 years of useful service life during the 2024-29 Tariff Block. Total 65 nos. residential quarters, 01 no transit camp & 01 no recreation club was constructed at Bassi as residential & non-residential buildings.

A.24.2 Subsequently, the demolition and reconstruction of residential and non-residential buildings within the substation premises at Ballabhgarh, Bassi, Mandola and Hisar Substation were proposed during the 216th OCC meeting held on February 14, 2024, through Additional Capitalization in the 2019-24 Tariff Block.

A.24.3 During the meeting, MS, NRPC, recommended that

QUOTE

“He suggested that structural assessment of these projects may be carried out by an appropriate agency, such as NCCBM. Subsequently, the proposal may be taken up for approval in the NRPC meeting.”

UNQUOTE

A.24.4 NCCBM conducted an assessment at the Bassi substation, including the residential quarters, transit camp, and recreation center. The final assessment report was submitted to POWERGRID on 10th March 2025.

NCCBM's recommendation for Bassi Substation is provided based on the findings of the detailed assessment report.

QUOTE

"Considering the buildings are load bearing structures, these quarters buildings are not safe for living in its present condition. Also, it seems that if the repair of these buildings will be done, it won't increase the service life of the structures." (Detail assessment report of Bassi SS is attached as **Annexure-A.X**)

UNQUOTE

A.24.5 Considering the above, Powergrid has proposed to demolish the old and deteriorated residential quarters and non-residential buildings (Transit Camp and Recreational Centre) at the Bassi station and rebuild them under the Rihand Transmission System through Additional Capitalization in the 2024-29 Tariff Block with a tentative cost of ₹27.41 crore including of GST. Detail cost estimate will be submitted after approval.

Tentative cost estimate for demolition and reconstruction of residential and non-residential buildings at Bassi SS		
Residential building		
	No of quarter	Estimated cost in crore (Inclusive of GST)
Colony quarters (including demolition of old quarters & site development works)	23	22.66
Non- Residential building		
Transit camp	1	2.33
Recreation center	1	2.42
Total		27.41 Crore

A.24.6 Powergrid has proposed for demolishing and reconstructing the building at Bassi substation with a tentative cost estimate of ₹27.41 crore under ADD-CAP (2024-29) submitted to the OCC forum for approval.

Members may kindly deliberate.

A.25. Implementation of minimum clearance b/w conductor and road surface in the 220kV transmission line of POWERGRID (Agenda by Powergrid NR-III)

A.25.1 Powergrid NR-3 has mentioned that recently during routine CEA inspection of transmission assets under O&M, at some locations of the following transmission lines, clearances of the bottom conductor with the NH (National Highway) road surface are found less than the permissible limits of 12.52m as per recent CEA safety regulations 2023.

Sr no	Line name	Commissioned in the year	Span	Clearnce of bottom conductor with NH road surface (in m)
1	220 kV D/C Unchahar-Kanpur-1&2 line	**1999**	192-193 & 433-434	10.83m & 10.3m
2	220 kV D/C Unchahar-Kanpur-3&4	**2000**	195-196	7.74m
3	220 kV D/C Kanpur-Naubasta & Kanpur-Kidwainagar line	**2003**	38-39	9.1m

These lines were commissioned long year back as per prevailed applicable guidelines.

A.25.2 POWERGRID has submitted that it is ready to maintain road surface clearances as per recent CEA safety regulations 2023 **with the deemed outages and financial implications for supply & installations of new Towers etc. with O&M AddCap.**

Members may kindly deliberate.

A.26. Shifting of 220 KV line bays of 220 KV Kurukshetra(PGCIL) — Salempur D/C line from bay no. 05 & 06 to 07 & 08 at 800 KV Grid S/Stn. Kurukshetra PGCIL as well as modalities involved in connectivity agreement (Agenda by CTUIL)

A.26.1 HVPNL vide their letter dated 17.06.25 requested CTU to provide Permission for shifting of 220 KV line bays of 220 KV Kurukshetra (PGCIL) — Salempur D/C line from bay no. 05 & 06 to 07 & 08 at 800 KV Grid S/Stn. Kurukshetra PGCIL.

A.26.2 HVPNL submitted following in the letter

- That 220 KV Kurukshetra (PGCIL) — Salempur D/C line is running from 800 KV Grid S/ Stn. Kurukshetra PGCIL and connected at bay no. 05 & 06.
- At 800 KV Grid S/Stn. Kurukshetra PGCIL, 02 no. bays bay no. 07 & 08 are reserved for HVPNL for connecting 220 KV Kurukshetra — Ramana Ramani D/C line.
- To avoid crossing of existing 220 KV Kurukshetra(PGCIL) — Salempur D/C line with upcoming 220 KV Kurukshetra — Ramana Ramani D/C line, the 220kV Kurukshetra(PGCIL) — Salempur D/C line is required to be shifted at bay no. 07 & 08 from bay no 05 & 06 at 800 KV Grid S/Stn. Kurukshetra

PGCIL. It is pertinent to mention here that this office vide application no. 2200002035 for connecting 220 KV Kurukshetra — Ramana Ramani D/C line at 800 KV Grid S/Stn. Kurukshetra PGCIL has already applied to CTU for necessary approval.

- In view of the above, it is there for requested that necessary permission for shifting of 220 KV line bays of 220 KV Kurukshetra(PGCIL) — Salempur D/C line from bay no. 05 & 06 to 07 & 08 at 800 KV Grid S/Stn. Kurukshetra PGCIL may lease be granted to avoid unnecessary crossing of 02 no. 220 KV transmission lines.

A.26.3 Powergrid vide mail 08.07.25 to HVPN informed that the 220 kV GIS system at POWERGRID Kurukshetra Substation, comprising 12 bays (2 ICT + 8 line bays), was commissioned on 23.03.2017. During your recent visit on 17.06.2025, we had already conveyed that the substation is fully ready for line charging. From a technical standpoint, we have no objection to HVPNL's proposal for shifting the Ramana–Ramana D/C line to the existing Bay Nos. 209 & 210 (currently assigned to Salempur–1 & 2), and relocating the charged Salempur–1 & 2 lines to Bay Nos. 211 & 212. Powergrid requested to obtain the necessary approval from NRPC/NRLDC for the proposed modification.

A.26.4 Further, following the approval, and in addition to the bay shifting works, Powergrid has requested HVPNL to urgently carry out the following activities to facilitate line charging:

1. **Shifting of PLCC equipment** for the existing Salempur–1 & 2 lines.
2. **Commissioning of new PLCC panels** for the Ramana–Ramana D/C line.

A.26.5 NRLDC vide mail 10.07.25 informed HVPN to apply NRLLDC for first time charging for shifting of 220kv line bays of 220kv Kurukshetra- (PG)- Saleempur D/c line bay 5&6 to 7&8 at Kurukshetra S/s with standing committee meeting approval and connectvity agreement from CTU.

A.26.6 CTU has requested that matter may be deliberated for shifting of shifting of 220 KV line bays of 220 KV Kurukshetra(PGCIL) — Salempur D/C line from bay no. 05 & 06 to 07 & 08 at 800 KV Grid S/Stn. Kurukshetra PGCIL as well as modalities involved in connectivity agreement.

Members may kindly deliberate.

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

B.1. NR Grid Highlights for June 2025

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	460	12.06.25 at 14:00	9.28	12.06.25	7.13
2	Delhi	8442	12.06.25 at 23:09	174.03	12.06.25	140.87
3	Haryana	13499	23.06.25 at 14:00	281.94	13.06.25	244.63
4	H.P.	1943	11.06.25 at 10:00	42.55	11.06.25	38.26
5	J&K	2869	13.06.25 at 13:00	61.75	07.06.25	55.59
6	Punjab	16754	28.06.25 at 15:00	351.56	13.06.25	307.26
7	Rajasthan	18260	13.06.25 at 11:00	388.01	11.06.25	316.37
8	UP	31486	11.06.25 at 00:45	656.26	12.06.25	564.32
9	Uttarakhand	2910	11.06.25 at 22:00	62.41	12.06.25	52.94
***10**	**Northern Region**	**90850.3**	**12.06.25 at 15:45**	**2023**	**12.06.25**	**1727.37**

***As per SCADA**

- In June'25, the Maximum energy consumption of Northern Region was **2023 MUs** on 12th June'25 and it was 1.85% higher than June'24 (1986.1 MU 18th June'24)

- In June'25, the Average energy consumption per day of Northern Region was **1727.37 MUs** and it was 4.51% lower than June'24 (1809 MUs/day)

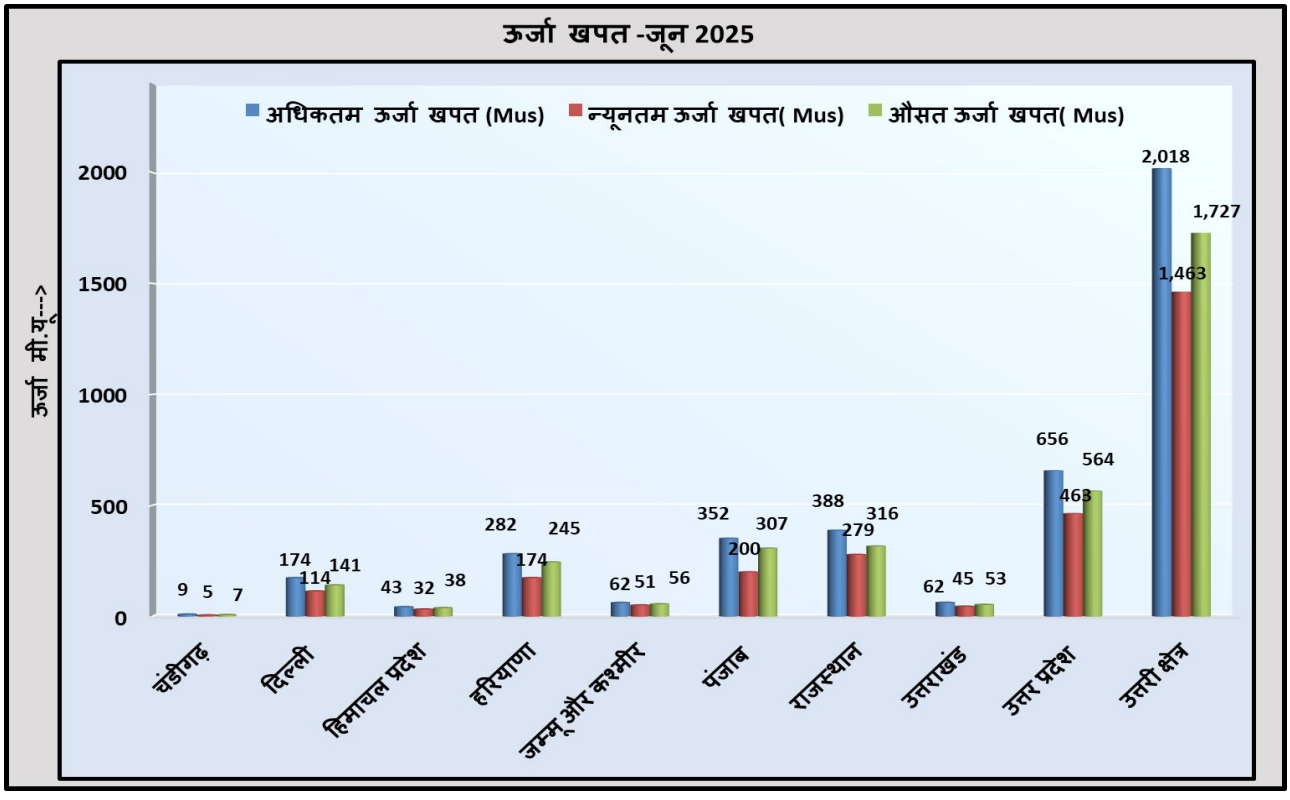
- In June'25, the Maximum Demand met of Northern Region was **90850 MW** on 12th June'25 @15:45 hours (*as per SCADA data)* as compared to 91234 MW on 19th June'24 @14:37hours.

Comparison of Average Energy Consumption (MUs/Day) - June'24 vs June'25

क्षेत्र/राज्य	जून- 2024	जून - 2025	% अंतर

चंडीगढ़	7.9	7.1	-9.7%
दिल्ली	151.8	140.9	-7.2%
हिमाचल प्रदेश	38.3	38.3	-0.1%
हरियाणा	259.6	244.6	-5.8%
जम्मू और कश्मीर	54.6	55.6	1.8%
पंजाब	293.2	307.3	4.8%
राजस्थान	344.8	316.4	-8.2%
उत्तराखंड	56.8	52.9	-6.8%
उत्तर प्रदेश	601.9	564.3	-6.2%
उत्तरी क्षेत्र	**1809.0**	**1727.4**	**-4.5%**

Energy Consumption



Northern Region all-time high value recorded in June'25:

States	Max. Demand Met (MW)	Date and time	Energy Consumption (MUs)	Date

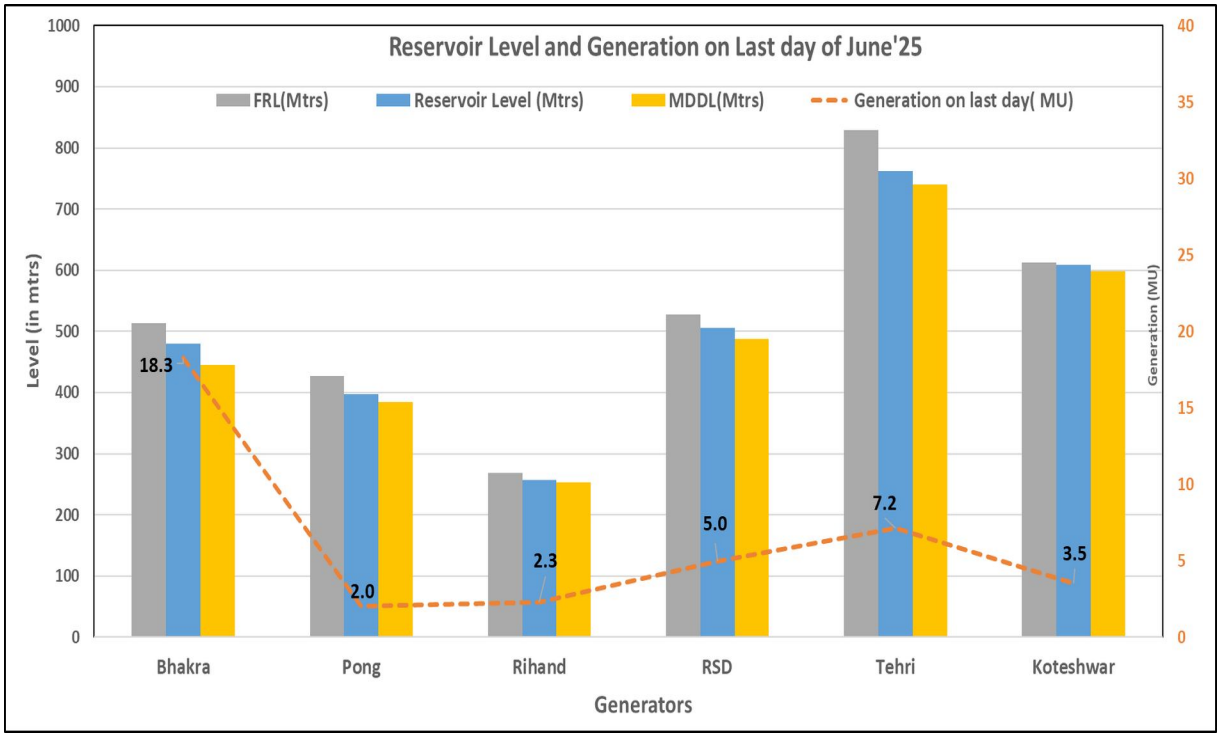
Chandigarh	**460**	**12.06.25 at 14:00**	**9.3**	**12.06.25**
Uttarakhand	**2910**	**11.06.25 at 22:00**	**62.4**	**12.06.25**
Punjab	**16754**	**28.06.25 at 15:00**		
U.P	**31486**	**11.06.25 at 00:45**		
Rajasthan			**388.0**	**11.06.25**
HP			**42.6**	**11.06.25**
Northern Region			**2023**	**12.06.25**

*As per Format28/hourly data submitted by states in PSP

Frequency profile

Month	Avg. Freq. (Hz)	Max. Freq. (Hz)	Min. Freq. (Hz)	<49.90 (% time)	49.90 – 50.05 (% time)	>50.05 (% time)
June' 25	50.002	50.381 *(29.06.25 at 13:48:50 hrs)*	49.549 *(29.06.25 at 22:10:40 hrs)*	7.56	71.85	20.60
June' 24	50.00	50.67 *(07.05.24 at 18:02:40 hrs)*	49.63 *(11.05.24 at 00:02:40 hrs)*	4.50	79.18	16.32

Reservoir Level and Generation on Last Day of Month



Reservoir Level on last day of June month (Low: -ve) (High: +ve)

Year	Bhakra	Pong	Rihand HPS	RSD	Tehri	Koteshwar
2025	480	398	258	505	763	609
2024	484	398	260	502	751	596
Diff (in m)	-3.3	-0.2	-2.4	3.2	11.4	13.1

Detailed presentation on grid highlights of June'2025 will be shared by NRLDC in OCC meeting.

B.2. State-wise transmission constraints in monsoon 2025

During the high demand season, the transmission system in Northern region remains heavily loaded. Transmission constraints observed in the grid during high demand period are regularly being highlighted in OCC meetings. Same is also being submitted to CTUIL and CEA through quarterly operational feedback.

Even after several follow-ups, it is observed that progress of several transmission elements are not upto the mark and expeditious actions from transmission utilities are required so that minimal issues are observed at transmission level during the high demand season.

State-wise anticipated issues and measures required thereof are listed below. Concerned transmission utilities are requested to provide update and ensure that these transmission elements are possibly commissioned before the high demand season.

Punjab:

During 232 OCC meeting,

NRLDC representative stated that the loading of 400/220kV ICTs supplying power to Punjab state is within the N-1 limits when import is close to the ATC limits and suggested that Punjab SLDC further reviews the ATC/TTC assessment for paddy 2025 for any further enhancement also considering other constraints at 220kV level.

NRLDC representative requested Punjab SLDC to share measures taken for minimizing outages of Talwandi Saboo thermal generating units. It was also mentioned that Unit-1 was under outage from 14.06.2025 to 16.06.2025 due to abnormal boiler sound.

Punjab SLDC representative stated that PSPCL has been taking up the matter with TSPL generating station. Punjab SLDC and PSPCL will further take up the matter with TSPL.

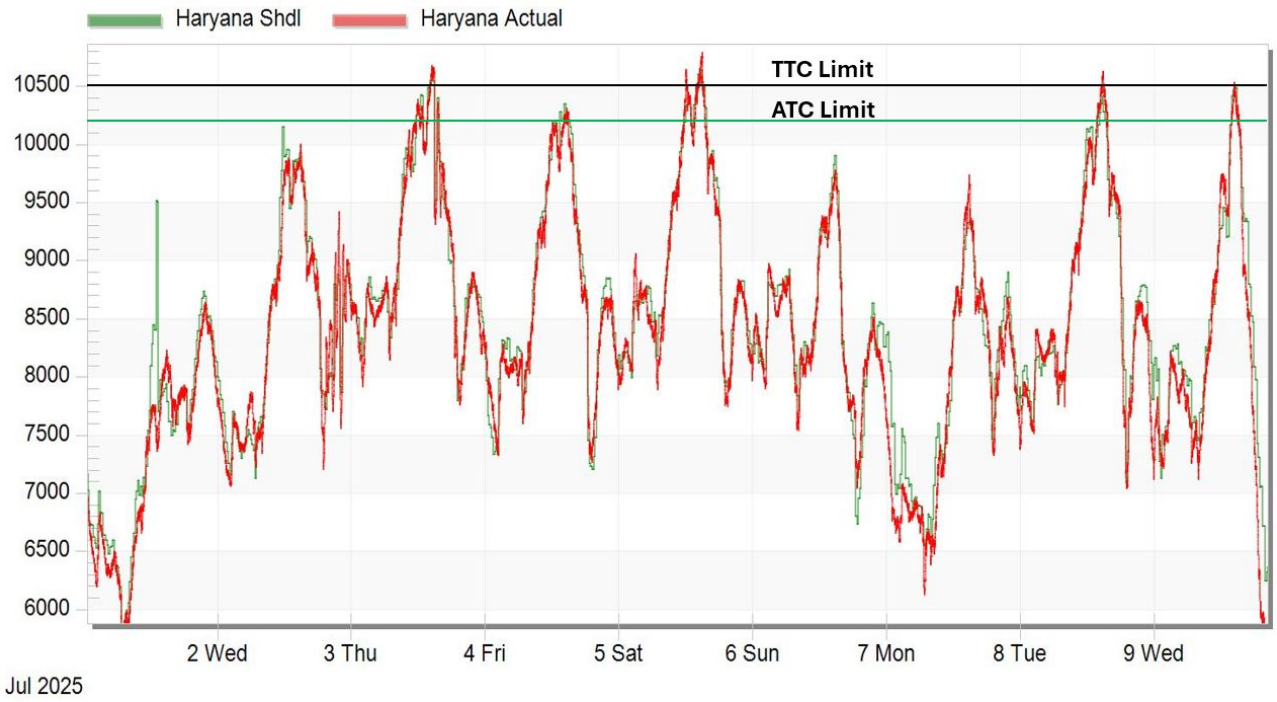
Punjab SLDC may provide update.

Haryana:

During 232 OCC meeting, NRLDC representative requested HVPN regarding:

- Action plan for N-1 non-compliance being observed in real-time at 765/400kV Bhiwani, 400/220kV Panipat (BBMB), Kabulpur, Hisar ICTs by Haryana SLDC.
- SPS implementation till ICT capacity augmentation.
- Measures required for minimising MVAR drawl from ISTS to avoid low voltages.

It may be noted that schedule as well as actual drawl by HVPNL is crossing the ATC/TTC limits during several time blocks.



There was separate meeting on 16.06.2025 between Haryana SLDC and NRLDC to review ATC/TTC of Haryana. Simulation studies were carried out keeping power order of Champa-Kurukshetra as 4500MW, Mundra-Mahendragarh HVDC as 2000MW and considering LILO of 220kV Samalkha-Mohana D/C at Sonepat(PG). Internal generation of Haryana state was considered around 3200MW.

After revival of 400kV Mahendragarh-Bhiwani D/C and 400kV Bhiwani-Babai D/C lines, following are ATC/TTC limits:

- 10200/10500MW

After implementation of SPS at 765/400kV Bhiwani(PG) and 400/220kV Hissar(PG), following would be tentative ATC/TTC limits:

- 10600/10900MW

Further, NRLDC recommended Haryana SLDC to maximise internal generation of Haryana and ensure drawl within the ATC/TTC limits.

Haryana SLDC may provide update.

Rajasthan:

Constrained location	Status as available with NRLDC
N-1 contingency of 3*315=945 MVA ICT at Bhiwadi(PG)	Additional 500MVA ICT approved in 29 CMETS on 17.05.2024
N-1 contingency of 2*315+500=1130 MVA ICT at Bassi(PG)	Additional 500MVA ICT has been approved. Same is anticipated by 14.12.2025.
N-1 contingency of 315+500=815 MVA ICT at Neemrana(PG)	Additional 500MVA ICT has been approved in 36 NR CMETS held on 15.01.2025.
N-1 contingency of 2*500=1000 MVA ICT at Jaipur South(PG)	Additional 500MVA ICT has been approved in 36 NR CMETS held on 15.01.2025.
N-1 contingency of 2*315+500=1130 MVA ICT at Sikar(PG)	ICT Augmentation may be taken up in discussion with CTUIL/RVPNL.
N-1 contingency of 3*315=945 MVA ICT at Kankroli(PG)	ICT-4 has been approved and is expected to be commissioned by 22.09.2025.
N-1 contingency of 2*315=630 MVA ICT at Kotputli(PG)	Augmentation by 400/220 kV 500 MVA (3rd) ICT at Kotputli (PG) is expected by 31.12.2025
N-1 contingency of 2*315=630 MVA ICT at Deedwana(RVPN)	As per latest status shared by Rajasthan SLDC order for 10 no. ICT has been placed recently. New 500MVA ICTs are expected to be commissioned at 400/220kV Merta, Ajmer and Bikaner by Sep 2025. SPS has been implemented as temporary measure for some of the stations such as Chittorgarh (RVPN), Ajmer (RVPN), Merta (RVPN), Bikaner (RVPN), Jodhpur (RVPN), Suratgarh(RVPN), Ratangarh(RVPN)
N-1 contingency of 3*250+315=1065 MVA ICT at Heerapura(RVPN)	
N-1 contingency of 3*315 =945 MVA ICT at Chittorgarh (RVPN)	
N-1 contingency of 2*315 =630 MVA ICT at Ajmer (RVPN)	
N-1 contingency of 2*315 =630 MVA ICT at Merta (RVPN)	
N-1 contingency of 2*315 =630 MVA ICT at Bikaner (RVPN)	
N-1 contingency of 2*315 =630 MVA ICT at Jodhpur (RVPN)	
N-1 contingency of 2*315=630 MVA ICT at Suratgarh(RVPN)	
N-1 contingency of 3*315=945 MVA ICT at Ratangarh(RVPN)	
N-1 contingency of 1*500+1*315 =815 MVA ICT at Bhilwara (RVPN)	

In 232 OCC meeting, RRVPNL representative informed that:

- Work order has been placed for improvement of condition of 400kV Bhadla-Bikaner D/C and also upgradation of terminal equipment. Work is expected to be completed by Dec 2025.
- Proposal of upgradation of terminal equipment for other lines is being prepared and order would be placed shortly.
- Supply of 100 no. total 5.43MVAr capacitors has been done and in next 1-2 months all the supplied capacitors would be commissioned.
- Proposal of 100no.s capacitor banks through PSDF funding are under development.
- Jaipur and Jodhpur DISCOMs have directly applied for PSDF funding. Ajmer DISCOM has already included proposal for capacitor under RDSS Scheme and is not going for additional capacitor banks
- New 500MVA ICTs are expected to be commissioned at 400/220kV Merta, Ajmer and Bikaner by Sep 2025.

Rajasthan SLDC may provide update.

Uttar Pradesh:

In 232 OCC meeting,

POWERGRID representative stated that around 4-5 months would further be required for commissioning of 500MVA ICT-4 at Allahabad due to constraint of material supply (220kV cable and associated termination & Jointing kit)

NRPC, UP SLDC and NRLDC representatives expressed concern on the same and POWERGRID was asked to ensure healthiness of SPS installed at 400/220kV Allahabad(PG)

NRLDC representative enquired from UP SLDC whether any issues were encountered when demand of state crossed 31GW recently. It was mentioned that there are 3 ICTs under outage at 400kV Obra and 1-ICT at 400kV Jaunpur.

UP SLDC informed that no major operational issues were observed. N-1 non-compliance was observed at 400/220kV Panki S/s for which SPS has already been proposed.

UP SLDC may provide update on implementation of SPS at 400/220kV Panki S/s.

In view of above transmission constraints for all states, it is requested that:

- All SLDCs to take actions such that loading of ICTs and lines in their control area are below their N-1 contingency limits.
- While requisitioning power from various sources, states should take care to limit their scheduled drawl as well as actual drawl in real time within the Available Transfer Capability (ATC) limits assessed by SLDC and NRLDC.
- SLDCs also need to ensure that their drawl from grid remains within these limits during real-time operation. In the past, it has been observed that some states have drawn power beyond their ATC limits as assessed by SLDCs and NRLDC.
- Further, all SLDCs need to make sure that loading of 220kV and below voltage level intrastate lines remain within safe limits during the high demand season.

Further, it may be noted that 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" which requires SLDCs to submit network data as well as PSSE basecases on M-12, M-6, M-1 basis. The monitoring of submission of these data by SLDCs is being done in OCC meetings on monthly basis where response of some of the states needs improvement.

February 2025 Mails						
	ATC/TTC Declaration				Interconnection Studies	
	M-1 (March-25)		M-12 (February-26)		M-6 (August-25)	
	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases
Chandigarh	No	No	No	No	No	No
Delhi	No	No	Yes	Yes	No	No
Haryana	No	No	No	No	No	No
Himachal	Yes	No	Yes	No	Yes	No
J &K	Yes	Yes	Yes	Yes	Yes	Yes
Ladakh	No	No	No	No	No	No
Punjab	No	No	Yes	Yes	Yes	Yes
Rajasthan	Yes	Yes	Yes	Yes	Yes	Yes
Uttar Pradesh	Yes	Yes	Yes	Yes	Yes	Yes
Uttarakhand	No	No	No	No	No	No

March 2025 Mails						
	ATC/TTC Declaration				Interconnection Studies	
	M-1 (April-25)		M-12 (March-26)		M-6 (September-25)	
	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases
Chandigarh	No	No	No	No	No	No
Delhi	No	No	Yes	Yes	No	No
Haryana	No	No	Yes	Yes	No	No
Himachal	Yes	No	Yes	No	Yes	No
J &K	Yes	No	Yes	Yes	Yes	No
Ladakh	No	No	No	No	No	No
Punjab	Yes	Yes	Yes	Yes	Yes	Yes
Rajasthan	Yes	Yes	Yes	Yes	Yes	Yes
Uttar Pradesh	Yes	Yes	Yes	Yes	Yes	Yes
Uttarakhand	No	No	No	No	No	No

April 2025 Mails						
	ATC/TTC Declaration				Interconnection Studies	
	M-1 (May-25)		M-12 (April-26)		M-6 (October-25)	
	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases
Chandigarh	No	No	No	No	No	No
Delhi	No	No	Yes	Yes	No	No
Haryana	Yes	Yes	Yes	Yes	Yes	Yes
Himachal	Yes	No	Yes	No	Yes	No
J &K	Yes	Yes	Yes	Yes	Yes	Yes
Ladakh	No	No	No	No	No	No
Punjab	Yes	Yes	Yes	Yes	Yes	Yes
Rajasthan	Yes	Yes	Yes	Yes	Yes	Yes
Uttar Pradesh	Yes	Yes	Yes	Yes	Yes	Yes
Uttarakhand	No	No	No	No	No	No

May 2025 Mails						
	ATC/TTC Declaration				Interconnection Studies	
	M-1 (June-25)		M-12 (May-26)		M-6 (November-25)	
	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases
Chandigarh	No	No	No	No	No	No
Delhi	No	No	Yes	Yes	No	No
Haryana	No	No	No	No	No	No
Himachal	Yes	No	Yes	No	Yes	No
J &K	Yes	Yes	Yes	Yes	Yes	Yes
Ladakh	No	No	No	No	No	No
Punjab	Yes	Yes	Yes	Yes	Yes	Yes
Rajasthan	No	No	No	No	No	No
Uttar Pradesh	Yes	Yes	Yes	Yes	Yes	Yes
Uttarakhand	No	No	No	No	No	No

Submitted with one month delay

June 2025 Mails						
	ATC/TTC Declaration				Interconnection Studies	
	M-1 (July-25)		M-12 (June-26)		M-6 (December-25)	
	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases
Chandigarh	No	No	No	No	No	No
Delhi	No	No	Yes	Yes	No	No
Haryana	No	No	No	No	No	No
Himachal	No	No	No	No	No	No
J &K	Yes	Yes	Yes	Yes	Yes	Yes
Ladakh	No	No	No	No	No	No
Punjab	Yes	Yes	Yes	Yes	Yes	Yes
Rajasthan	Yes	Yes	Yes	Yes	Yes	Yes
Uttar Pradesh	Yes	Yes	Yes	Yes	Yes	Yes
Uttarakhand	No	No	No	No	No	No

July 2025 Mails						
	ATC/TTC Declaration				Interconnection Studies	
	M-1 (August-25)		M-12 (July-26)		M-6 (January-26)	
	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases
Chandigarh						
Delhi						
Haryana						
Himachal						
J &K	Yes	Yes	Yes	Yes	Yes	Yes
Ladakh						
Punjab	Yes	Yes				
Rajasthan	Yes	Yes	Yes	Yes	Yes	Yes
Uttar Pradesh	Yes	Yes	Yes	Yes	Yes	Yes
Uttarakhand						

Haryana, HP, Delhi and Uttarakhand SLDCs are requested to provide update.

ATC/TTC limits of states for the month of Aug 2025 are attached as Annexure-B.I. Utilities are requested to go through these limits and provide comments.

Members may please discuss.

B.3. Expediting SPS implementation before summer 2025:

Very high demand in Northern region is experienced during the month of May-Sep months. During the high demand period, it is observed that often the transmission system remains heavily loaded and may become N-1 non-compliant on several occasions.

To overcome this N-1 non-compliance, planning for new transmission system is being carried out by CTUIL and CEA. However, it is observed that there are certain occasions when the transmission elements approved take considerable time for commissioning. Due to this delay, the existing transmission system may get overloaded.

To address the issue and avoid major contingency due to cascade tripping, SPS are being designed to minimize impact of outage of one or more transmission elements. As per clause 29.14 of IEGC 2023,

"NLDC, RLDCs, SLDCs, CTU, STUs or users may identify the requirement of System Protection Schemes (SPS) (including inter-tripping and run-back) in the power system to operate the transmission system within operating limits and to protect against situations such as voltage collapse, cascade tripping and tripping of important corridors/flow-gates. Any such SPS at the intra-regional level shall be finalized by the

concerned RPC. SPS at the inter-regional and cross-border levels shall be finalized by the NLDC in coordination with the concerned RPCs. SPS shall be installed and commissioned by the concerned users. SPS shall always be kept in service. If any SPS at the intra-regional level is to be taken out of service, the permission of the concerned RLDC shall be required. If any SPS at the inter-regional and cross-border levels is to be taken out of service, permission of NLDC shall be required."

As per NRLDC, SPS at following substations need to be commissioned at the earliest so as to avoid major contingency in case of outage of one or more transmission element.

Haryana

Separate meeting was organized recently on 27.06.2025 by NRPC under chairmanship of SE(O) NRPC with participants from NRLDC, Punjab SLDC, Haryana SLDC, Raj SLDC, BBMB, POWERGRID and HVPNL representatives.

After detailed discussions, it was agreed that:

For SPS at 765/400kV Bhiwani(PG) ICTs: 400/220kV Bhiwani(PG) ICT 1, ICT 2 and 400kV Bhiwani(PG)-Bhiwani(BBMB) to be wired in SPS logic. POWERGRID provided timeline of 10-15 days for SPS implementation. NRLDC had shared the proposed logic on 01.07.2025 for comments from stakeholders and would be included as part of MOM of meeting.

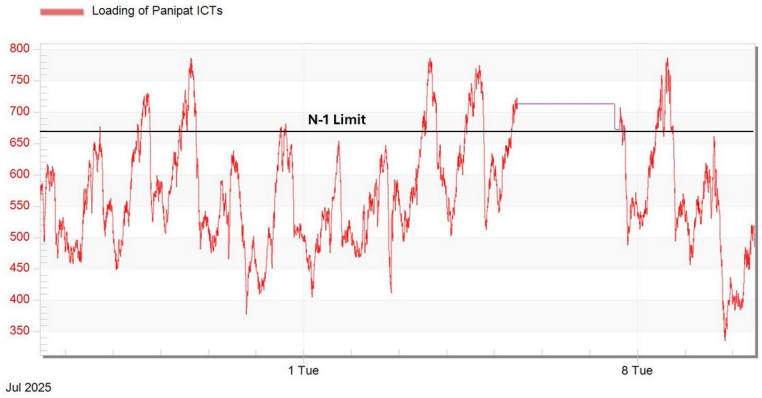
For SPS at 400/220kV Hissar(PG) ICTs: Haryana SLDC wanted to wire 220kV Hissar(BBMB)-220kV Sangrur D/C (supplying power to Punjab) and 220kV Hissar-Chirawa (supplying power to Rajasthan) lines in SPS. Punjab SLDC was assured from NRLDC side that there would not be impact on state ATC/TTC in case these feeders are wired, however, Punjab SLDC will need to take measures for managing loading of 220kV lines. Rajasthan SLDC agreed for wiring 220kV Hissar-Chirawa line in SPS logic.

POWERGRID informed that PLCC channel is not available for transferring signal from 220kV Hissar(PG)--->220kV Hissar(IA-HVPNL)--->220kV Hissar(BBMB) and it would require procurement of DTPC coupler for implementation of SPS. It was discussed that new 500MVA ICT is approved at Hissar(PG) but it may not be commissioned before next paddy season. Further, there are also loading issues in 220kV Hissar(PG)---220kV Hissar(IA-HVPNL)---220kV Hissar(BBMB) for most part of the year. Accordingly, SPS for N-1 contigency of 400/220kV Hissar(PG) ICTs and 220kV Hissar(PG)---220kV Hissar(IA-HVPNL)---220kV Hissar(BBMB) ckts is required. HVPNL and BBMB were asked to check at their respective substations regarding space for DTPC panel and also confirm feasibility of SPS implementation.

As a short term measure (till implementation of SPS at Hissar-PG), in case loading of 400/220kV Hissar(PG) ICTs crosses 90% of rated capacity, then NRLDC in consultation with BBMB, Haryana SLDC, Punjab SLDC and Rajasthan SLDC may ask BBMB to open 220kV Hissar(BBMB)-220kV Sangrur D/C (supplying power to Punjab) and 220kV Hissar-Chirawa (supplying power to Rajasthan) lines. Punjab SLDC and Rajasthan SLDC to ensure supply of these stations from other stations before disconnection from Hissar(BBMB).

Haryana SLDC was also asked to explore possibility of other 220kV feeders from 400/220kV Hissar(PG) for immediate implementation of SPS.

For SPS at 400/220kV Panipat ICTs: Haryana SLDC was asked by NRLDC to review the requirement of SPS as continuous N-1 violation is being observed in June 2025. Further, BBMB was asked to expedite new ICT approval/implementation process. Haryana SLDC assured that after LILO of 2nd ckt of 220kV Samalkha-Mohana at 400/220kV Sonepat(PG), loading would be under limits. NRLDC suggested to review the loading as soon as 2nd ckt is LILOed and take necessary actions in case loading is not within N-1 limit.
As per recent trends loading of 400/220kV Panipat ICTs is still on the higher side and there seems to be requirement of SPS till ICT capacity augmentation.



POWERGRID and Haryana SLDC may provide update.

Rajasthan

As discussed earlier on numerous occassions, majority of 400/220kV ICTs in Rajasthan state (both interstate as well as intrastate are N-1 non-compliant, RVPNL may identify feeders and discuss with POWERGRID for finalisation of SPS at interstate substations. For intrastate substations, where SPS have not been planned and implemented, the same may be taken up. List of N-1 non-compliant substations is shown below:

Constrained location	SPS Status as available with NRLDC
3*315=945 MVA ICT at Bhiwadi(PG)	Not planned
2*315+500=1130 MVA ICT at Bassi(PG)	Not planned
315+500=815 MVA ICT at Neemrana(PG)	Not planned
2*500=1000 MVA ICT at Jaipur South(PG)	Not planned
2*315+500=1130 MVA ICT at Sikar(PG)	Not planned
3*315=945 MVA ICT at Kankroli(PG)	Not planned
2*315=630 MVA ICT at Kotputli(PG)	Not planned
2*315=630 MVA ICT at Deedwana(RVPN)	Not planned
3*250+315=1065 MVA ICT at Heerapura(RVPN)	Not planned
3*315 =945 MVA ICT at Chittorgarh (RVPN)	Implemented
2*315 =630 MVA ICT at Ajmer (RVPN)	Implemented
2*315 =630 MVA ICT at Merta (RVPN)	Implemented
2*315 =630 MVA ICT at Bikaner (RVPN)	Implemented

2*315 =630 MVA ICT at Jodhpur (RVPN)	Implemented
2*315=630 MVA ICT at Suratgarh(RVPN)	Implemented
3*315=945 MVA ICT at Ratangarh(RVPN)	Implemented
1*500+1*315 =815 MVA ICT at Bhilwara (RVPN)	Implemented

During 231 OCC meeting, NRLDC representative stated that details of feeders to be wired under SPS is yet to be received from Rajasthan SLDC.

Rajasthan SLDC/RVPN were also requested to identify feeders for SPS at pending 400/220kV POWERGRID and RVPN substations supplying power to Rajasthan. While identification of feeders it needs to be ensured that in case of SPS operation and tripping of one/two feeders, any other element should not get overloaded (no cascade tripping).

During 232 OCC meeting, Rajasthan SLDC representative informed that proposal has been prepared for SPS at 400/220kV Heerapura and is under internal approval whereas ATIL has been asked to prepare SPS logic for 400/220kV Deedwana.

Rajasthan SLDC/RVPN were also requested to identify feeders for SPS at pending 400/220kV POWERGRID and RVPN substations supplying power to Rajasthan. While identification of feeders it needs to be ensured that in case of SPS operation and tripping of one/two feeders, any other element should not get overloaded (no cascade tripping).

NRPC and NRLDC representatives expressed concern on the slow progress for feeder identification exercise by Rajasthan SLDC and asked to expedite the same.

Rajasthan SLDC may provide update.

Delhi

POWERGRID may provide share mock testing report of SPS at 765/400kV Jhatikara ICTs (Dwarka-Bamnauli section as well as Mundka section).

Uttar Pradesh

NRLDC has also received a request from UP SLDC vide email dated 24.05.2025 regarding implementation of SPS at 400/220kV Agra(PG) ICTs. During 232 OCC meeting, UP SLDC stated that they will shortly convene a meeting with participation from POWERGRID and STU in next week and submit agenda for SPS proposal at 400/220kV Agra(PG) in upcoming Protection subcommittee meeting of NRPC.

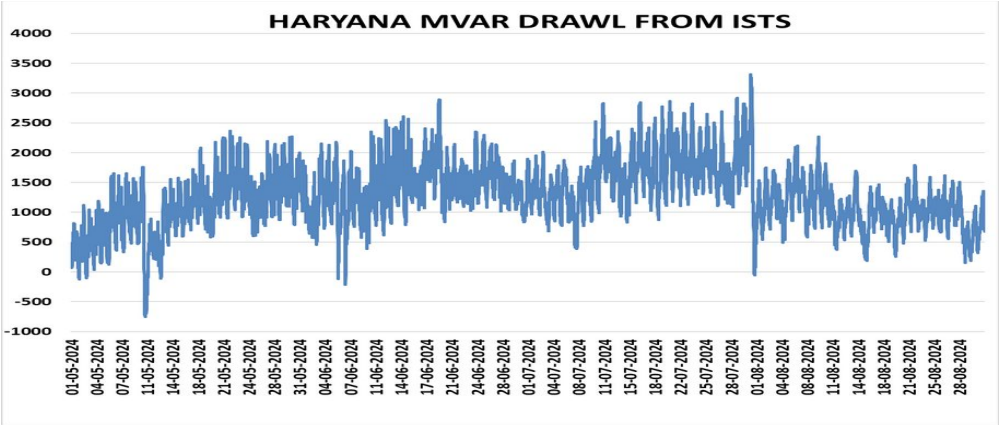
Concerned utilities are requested to provide update. Members may please discuss.

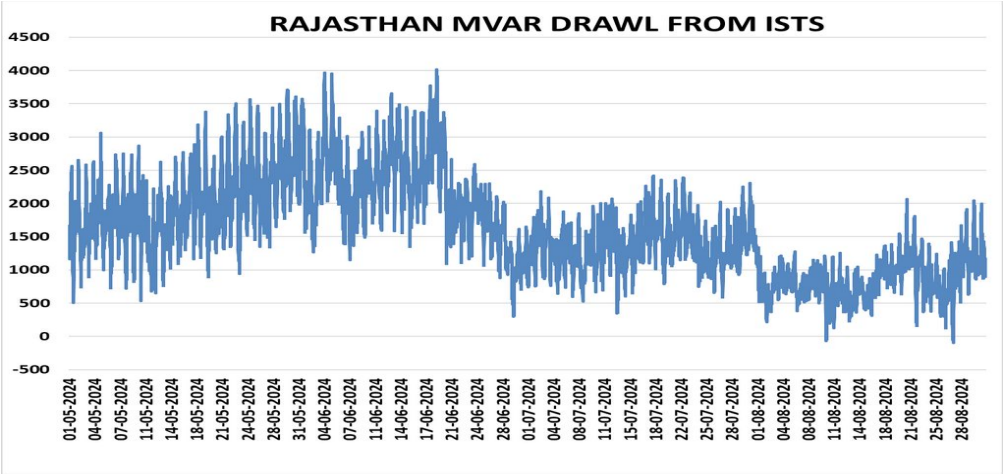
B.4. SPS for Champa-Kurukshetra HVDC and SOP actions in case of tripping

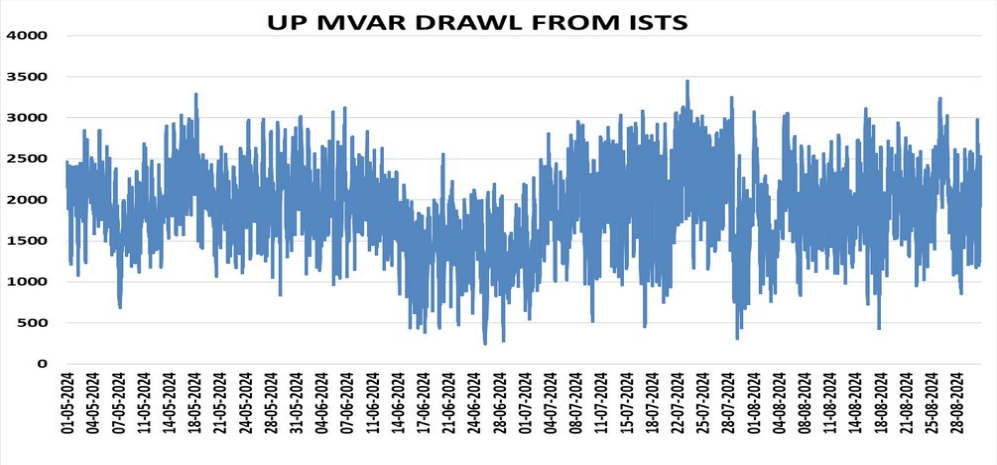
During high demand period of Northern region, NR imports high power from Western and Eastern region. To optimize flows on AC paths, HVDC power orders are accordingly modulated. Power order of Champa-Kurukshetra HVDC is also kept on

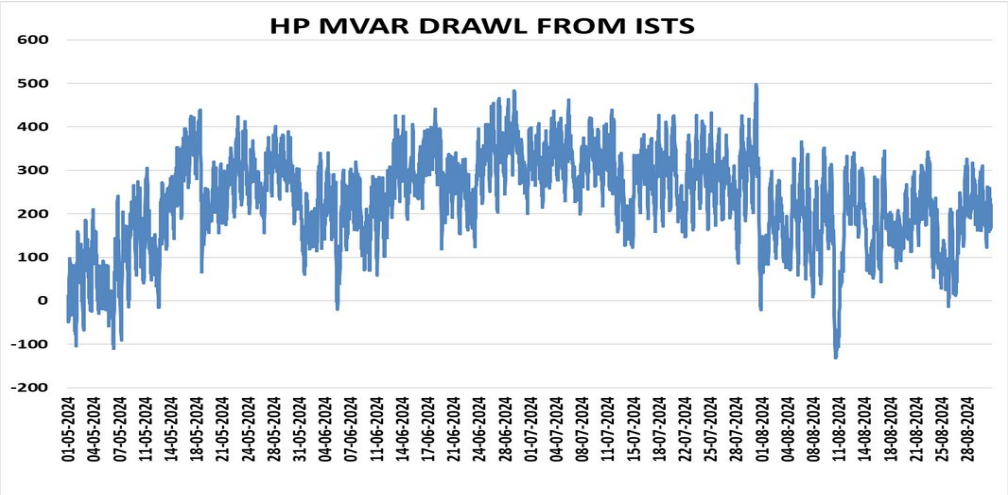
the higher side in summer months due to less demand in Western region and high demand in Northern region. However, there have been reliability issues related to Champa-Kurukshetra HVDC since long time. There have been events of simultaneous pole outages also, which creates stressful condition for grid and number of issues are observed in real-time. These effects are more pronounced when Champa-Kurukshetra poles trip simultaneously carrying huge power in antecedent condition. This switches out filter banks, increases power flow on parallel AC lines, increased loading reduces the grid voltages, further, due to increased distance for power to travel, the reactive power support requirement increases tremendously. This may lead to sudden dips in voltage and further load loss due to stalling of induction motor type load.

NRLDC has been continuously pursuing with NR states to take measures for reactive power support at local level so that reactive power exchange from ISTS is minimal. However, as per discussions held in 229-232 OCC meetings, no progress is being reported. From the plots presented by NRLDC in OCC meetings, it can be clearly seen that there is huge MVAR drawl by some of the states such as Haryana, Rajasthan, HP and UP during May-Sep months. These huge MVAR drawl leads to low voltages in the grid especially during the day-time as there is high agricultural as well as cooling load requirement during this time.









There have been two major events involving load loss with simultaneous all poles outage of Champa-Kurukshetra HVDC in last two years:

1. 16.5GW load loss event on 17.06.2024 due to tripping of Champa-Kurukshetra all poles carrying 4000MW with NR total load as 89.4GW
2. 0.9GW load loss event on 09.06.2025 due to tripping of Champa-Kurukshetra all poles carrying 4300MW with NR total load as 82.6GW

This year NR demand has been slightly on the lower side due to favorable weather conditions, however, prolonged dry spell may lead to sudden surge in demand and NR demand may again cross 85GW. It is expected that any incident of simultaneous outage of HVDC Champa-Kurukshetra poles may cause emergency conditions in the Grid. It is possible that voltages in NR stations may reach extremely low values as witnessed during similar incident which occurred on 17th Jun 2024.

Accordingly, it is proposed to implement a SPS scheme which can shed loads in case of simultaneous outage of all poles of HVDC Champa-Kurukshetra. Since, identification and wiring of new load groups may be difficult for implementation in short time frame and further utilities have also expressed concerns in identifying further new feeders for UFR or other load shedding schemes, it is suggested to utilise the wired loads of existing Agra-Gwalior or Rihand-Dadri SPS scheme. Signal of multiple HVDC pole outage can be extended from Kurukshetra station to Dadri/Agra SPS scheme and some load relief can be obtained. The automatic disconnection of wired loads post outage of multiple

HVDC Poles at Kurukshetra may provide some relief and may help in containing the voltages till suitable static and dynamic compensation devices are commissioned.

List of feeders for Agra-Gwalior/ Rihand-Dadri SPS scheme is attached as **Annexure-B.II**. Concerned states are requested to verify the load quantum mentioned against each feeder. NRLDC will then carry out simulation studies and in consultation with SLDCs/NLDC propose SPS logic for Champa-Kurukshetra HVDC. As some load is proposed to be shed in SPS scheme, corresponding generation backing down will also need to be taken up in Western region.

Recent letter from ED NLDC in this regard is also attached as **Annexure-B.III.**

This feeder review exercise becomes important as on 21.05.2025, at 20:21 hrs, 500kV HVDC Rihand-Dadri D/C tripped on commutation failure. Multiple elements tripped at 400kV Dadri(NTPC) during the event due to multiple faults. 500kV HVDC Rihand-Dadri D/C was carrying ~1150 MW before tripping.

As per SPS of 500kV HVDC Rihand-Dadri, Case-2 of SPS which is "Tripping of any or both poles resulting in power order reduction by 750 MW and above" operated during the event. As per SPS case-2 action, immediate load shed in load groups A, B, C & D and generation backdown at Singrauli / Rihand TPS by 500 MW should occur. However, no major load relief was observed based on demand pattern of states.

SOP for actions to be taken in real-time in case of tripping of HVDC Champa-Kurukshetra

Moreover, during 232 OCC meeting it was discussed that tripping of HVDC Champa-Kurukshetra is credible contingency and all NR states need to have SOP for taking actions in real-time in case of tripping of HVDC Champa-Kurukshetra and observance of low voltages in NR grid.

Accordingly, SOP has been prepared from NRLDC side and is attached as **Annexure-B.IV** for comments from OCC members. Members are requested to go through the SOP and provide comments.

Members may please discuss.

B.5. 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 2025. Latest available document is available at

https://drive.google.com/file/d/16HHfg_YbGHl9XuP4vkO9Drxy-rUZmUlA/view?usp=drive_link

As requested in 232 OCC meeting, all utilities are once again requested to provide their inputs/comments for any suggested changes in the document. It is requested that inputs/comments may be provided latest by 15th July 2025.

Members may please discuss.

B.6. Minimising deviation against scheduled drawl by state control area

It has been observed that some of the NR states have been under drawing from the grid in June 2025. The under drawl in Energy terms has reached 8-12 MUs on daily basis as per the Daily Operation Report published by NRLDC. With inclement weather leading to load crash and lower demand, high frequency grid operation has been observed recently. NRLDC has been advising constituents to maintain load generation balance and messages are also regularly issued from Real time operators to the under-drawing constituents. Further, NRLDC has been pro-actively carrying out hydro moderation of ISGS plants in addition to TRAS down support from NLDC to arrest high frequency.

The details of Grid frequency remaining above 50.05 Hz (above IEGC band), maximum frequency of the day, daily under-drawl (MU) and max. under-drawl based on 5 minutes average telemetered data i.r.o. Delhi and Rajasthan state control area is given below:

Rajasthan Deviation and grid frequency

Date	Max. Under-drawl in day (ACE in MW)	Daily Deviation (Under-drawl) (MU)	>50.05 (% of time in day)	Max. freq. of day (Hz)
1-Jun-25	1650	5.4	25.5	50.37
2-Jun-25	1325	8.5	24.1	50.31
4-Jun-25	1650	8.0	28.6	50.35
9-Jun-25	915	4.2	26.4	50.31
17-Jun-25	2000	5.4	29.1	50.36
20-Jun-25	1015	11.8	24.7	50.32
22-Jun-25	1382	9.8	21.8	50.34
23-Jun-25	1545	4.5	17.8	50.33
28-Jun-25	1603	6.3	20.7	50.32
29-Jun-25	1749	12.0	35.2	50.38

Delhi Deviation and grid frequency

Date	Max. Under-drawl in day (ACE in MW)	Daily Deviation (Under-drawl) (MU)	>50.05 (% of time in day)	Max. freq. of day (Hz)
1-Jun-25	350	5.7	25.5	50.37
2-Jun-25	605	4.5	24.1	50.31
4-Jun-25	580	1.2	28.6	50.35
9-Jun-25	650	7.0	26.4	50.31
17-Jun-25	1400	4.3	29.1	50.36
20-Jun-25	440	1.3	24.7	50.32
28-Jun-25	824	2.2	20.7	50.32
29-Jun-25	397	1.6	35.2	50.38

Such large deviations from schedule and high frequency operation are a threat to the system security.

To avoid continuous high frequency operation in the grid, following actions may be ensured during real-time grid operation and maintain their drawl close to schedule:

- Portfolio management through sale/purchase of power in T-GNA

- Lifting of planned load shedding, curtailments, if any
- Generation backing down in coal fired thermal stations to 55% of Maximum Continuous Rating (MCR) loading of the units on bar at the generating station after deducting the normative Auxiliary Energy Consumption plus Auxiliary Energy Consumption compensation as per the provisions of the Grid Code as per merit order based on variable charges
- Downward revision of requisitions from ISGS as per merit order on request of beneficiaries
- Generation reduction at hydro stations having storage capability

Members may please discuss.

B.7. Demand forecasting and resource adequacy related

Hon'ble CERC In the matter of Planning for safe, secure, and reliable integrated operation of the power system during critical periods arising on account of seasonal variations wherein the electricity demand increases rapidly by undertaking specific measures to mitigate the risks on the power system, under clause (h) of sub-section (1) of Section 79 of the Electricity Act, 2003 and the Regulation 31 of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2023 has issued suo-motto order 9/SM/2024 dated 07.10.2024.

Subsequently, a meeting was taken by Hon'ble CERC on 14.02.2025 with all NR SLDCs, NRLDC and NRPC to review the actions being taken at SLDC end on measures related to resource adequacy.

It is to be noted that CERC has also released "Report on Planning for safe, secure, and reliable integrated operation of the power system during critical periods arising on account of seasonal variations wherein the electricity demand increases rapidly by undertaking specific measures to mitigate the risks on the power system under Order dated 07.10.2024 in Suo-Moto Petition No. 9/SM/2024" on 29.04.2025.

In the report following actions have been suggested:

Area	Key Action
Power Procurement	Advance contracts, banking arrangements
Forecasting	Tool access, RLDC coordination, automation incase of manpower issue, Feedback from DISCOM,
Manpower	Approvals as per MoP guidelines, training
Reserve Management	Enforce obligations, clarify reserve norms
Thermal Generation	Enable operation at MTL, regulatory support from SERC
SAMAST	Ensure implementation within strict timelines

With reference to the Clause 31(2) of Central Electricity Regulatory Commission-IEGC Regulations, 2023 and the Operating Procedure of NRLDC prepared in accordance with the same, each SLDC has to furnish the demand estimation for day ahead, week ahead, month ahead (with time block wise granularity) and demand estimation for year ahead (with hour granularity). The sub-clause 31(2) (h) of IEGC-2023 states the following timeline for the submission of demand estimate data to RLDC.

Type of Demand Estimation	**Timeline**
Daily	10:00 hours of previous day
Weekly	First working day of previous week
Monthly	Fifth day of previous month
Yearly	30th September of previous year

Status of Day Ahead Forecasting, week ahead, month-ahead and year-ahead submission status for Jul-2025 as per Clause 31(4) (a) & (b) of IEGC-2023 is shown below:

State/Entity	Day Ahead (As on Jul-25)	Week Ahead	Month Ahead (Aug 2025)	Year-Ahead
Punjab	As per Format	Demand and Resource not as per timeline	Not received	Not received
Haryana	Demand and Resource not as per format	Only demand & irregular	Not received	Not received
Delhi	Demand and Resource not as per format	As per Format	As per Format	Only Demand
Rajasthan	As per Format but irregular	As per Format	Not received	Not received
Uttar Pradesh	As per Format	As per Format	As per Format	As per Format
Uttarakhand	Demand and Resource not as per format and irregular	As per Format	As per Format	Not received
Himachal Pradesh	Demand and Resource not as per format	As per Format	As per Format	As per Format
J&K and Ladakh (UT)	Demand and Resource not as per format & irregular	Not received	Not received	Not received
Chandigarh (UT)	As per Format	Not received	Not received	Not received

In accordance with above, all SLDCs are requested to timely furnish the demand estimation data along with generation adequacy data as per the formats available at *https://drive.google.com/drive/folders/1KWY4G9gTBLV5wTJkhGEIeRptKP-QbhjL?usp=drive_link* to NRLDC through mail (nrldcmis@grid-india.in) and FTP as per above timeline.

All SLDCs need to take actions at their end for timely submission of demand forecasting and resource adequacy data on day-ahead, week-ahead, month ahead and year ahead basis.

Self-audit related:

As per IEGC Clause 56.2(c), 'The self-audit reports by users, QCAs, and SNAs shall be submitted to the concerned RLDC or SLDC, as the case may be.' Failure to submit the self-audit report within the stipulated timeframe would be considered a non-compliance with IEGC regulations.

During the 228th OCC meeting, CGM, NRLDC, reiterated the importance of conducting the self-audit exercise within the timelines mandated by regulations. He informed that NRLDC has already submitted its self-audit report to CERC and urged all stakeholders to do the same.

Self-audit report has been received from NHPC and Koteshwar THDC for F.Y. 2023-24.

During 232 OCC meeting,

NRLDC representative stated that:

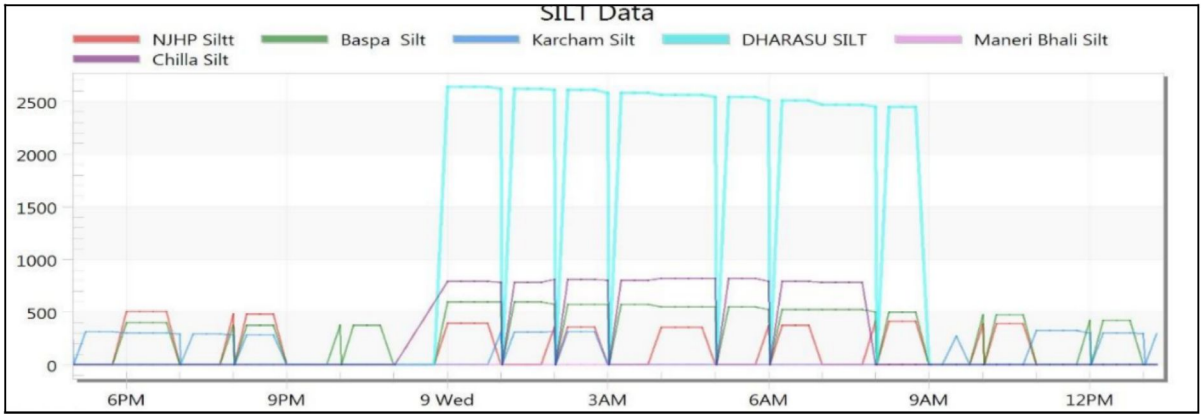
- Data on day ahead basis received from some of the states (as shown in table) is not as per NRLDC format. It was further mentioned that NRLDC is in process of developing a code/program for automation of day-ahead resource adequacy. Incase data is not received in formats circulated by NRLDC, it would not be possible to map/utilize the data submitted by states in the internal program being developed at NRLDC end.
- Self-audit report has been received from NHPC and Koteshwar THDC only for F.Y. 2023-24. As F.Y. 2024-25 has also completed recently, all utilities in Northern region are requested to carry out self-audit exercise and share report with NRLDC as per IEGC Clause 56.2(c).

OCC requested all the states to take actions at their end to ensure compliance of all regulations and guidelines w.r.t. resource adequacy framework. OCC forum asked all concerned utilities to carry out self-audit exercise as per IEGC Clause 56.2(c), and submit the report to NRLDC.

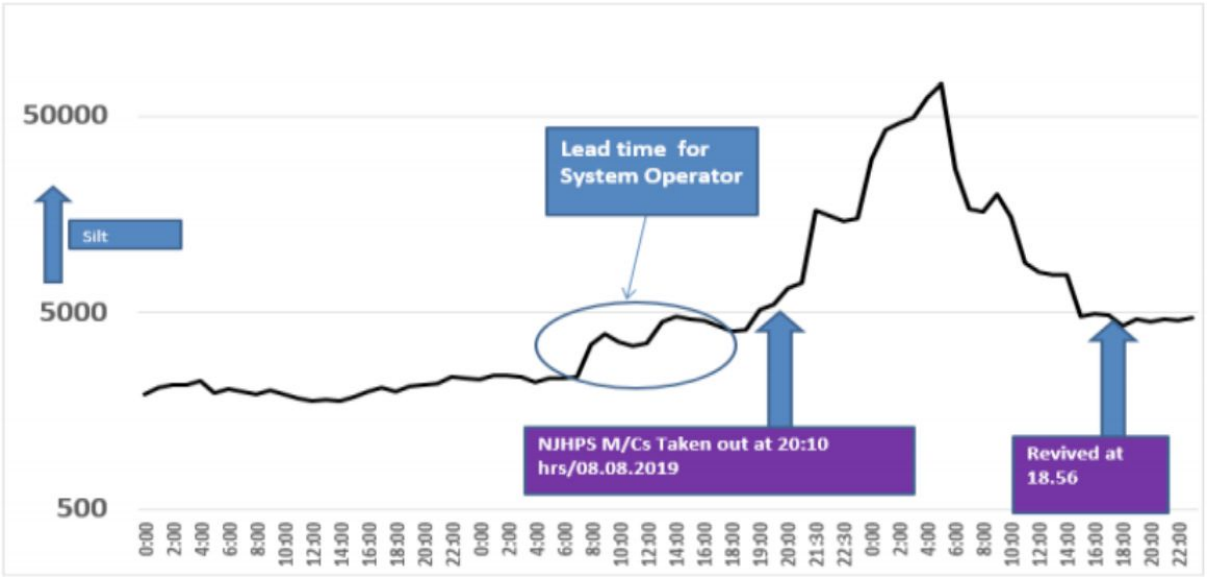
All SLDCs are requested to provide update. Members may please discuss.

B.8. Near real-time monitoring of silt at NRLDC for hydro generating stations

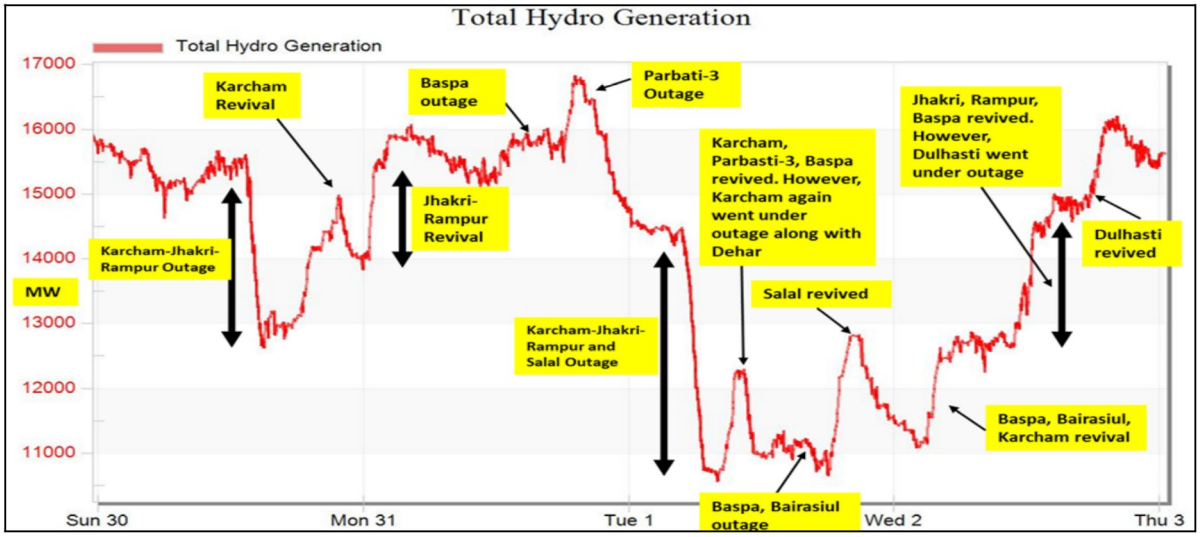
Availability of near real time silt measurement data to NRLDC/ SLDCs is helpful for real time system operation in view of frequent hydro generation outage due to silt. PPM numbers are being punched directly from the site/control room at NRLDC server providing silt measurement at NRLDC control room. During 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.



Sample plot showing outage of hydro generating stations due to high silt level leading sudden outage of hydro generating stations in Northern region is shown below:



Large hydro outage in short duration during monsoon on silt is a common phenomenon and the associated challenges have been highlighted in regular OCC/TCC meeting. The agreed action based on deliberation in various meetings are given below:

- Action for Generator
  - Silt monitoring/Silt forecasting for planned hydro outage [Advance information]
  - Reduction of Generation/Tripping of Units as per protocol (Staggering of units)
  - Slow ramping down of generation on the units to be closed as per protocol.

- Action by SLDC/Constituents
  - Generation reserve to be maintained
    - Own Generation
    - Contracted Generation from Other State/Traders
  - Load management to be planned

- Optimization of Hydro generation as per demand requirement

In view of upcoming silt scenario, all hydro stations are requested to furnish the silt forecast data (near-real time silt measurement) for operational planning measures to control centers (RLDCs/SLDCs) as this would help them gain some lead-time for better tackling of hydro generator outage on silt.

NRLDC has also developed a portal for sharing of silt-data by hydro generating stations with NRLDC. The portal is expected to go live withing a week and login credentials are being shared with all hydro generating stations for sharing of the data with NRLDC. NRLDC also plans to demonstrate the portal in 233 OCC meeting on 15.07.2025.

OCC forum may advise all hydro stations to timely share silt related information with NRLDC on newly developed portal and also follow protocol as approved by NRPC for taking units out in staggered manner in case of high silt.

B.9. Mock testing of islanding scheme and simulation studies

Following four islanding schemes are operational in the Northern Region: NAPP Islanding Scheme (Uttar Pradesh), RAPP Islanding Scheme (Rajasthan), Bawana Islanding Scheme (Delhi), and Unchahar Islanding Scheme (Uttar Pradesh).

During 232 OCC meeting, NRLDC representative presented the latest status of actions required on various islanding schemes.

Scheme	UFR testing done	Basecase shared	SCADA display made
NAPP Islanding scheme (UP)	✅ Yes	✅ Yes	✅ Yes
RAPP Islanding scheme (Raj)	✅ Yes	✅ Yes	✅ Yes
Bawana Islanding scheme (Delhi)	❌ No	✅ Yes	✅ Yes
Unchahar Islanding scheme(UP)	✅ Yes*	❌ No	❌ No

*Received at NRLDC on 16.06.2025.

It was also discussed that there have been recent directions from NPC and MoP also for islanding testing.

DTL representative stated that pending testing of ufr at POWERGRID will be carried out shortly.

NRLDC asked DTL to share comprehensive testing report of islanding scheme after completion of testing exercise.

Punjab SLDC was also asked to share timeline for revival of RSD-Pathankote islanding scheme. Punjab SLDC agreed to share timeline through email.

It was highlighted from NRLDC side that although SCADA displays have been made for islanding schemes, telemetry of site data to NRLDC is poor and most of the time, some or other data is missing.

It may be noted that ufr testing report has been submitted by UP SLDC for Unchahar islanding scheme, however, basecase details and SCADA display are yet to be received at NRLDC end.

Concerned SLDCs are requested to provide update.

B.10. Power Supply Data for Critical Infrastructure (Major Cities and Airports)

NRLDC is compiling a comprehensive database of power supply arrangements for critical national infrastructure and major load centres, which shall be displayed on a dedicated SCADA screen. This data is vital for enhancing our collective situational awareness and operational control. In the event of any grid disturbance, emergency, or black start condition, having this information readily available will be critical. It will allow for improved visibility and controllability of the grid and enable faster, more strategic decision-making during system restoration. This ensures the swift restoration of power to essential services like airports and major population centres.

The required data points are highlighted in the two tables provided:

1. For Airports (International and Domestic):

- Name of lines for power supply to the Airport
- Nearby 765, 400, 220 kV Substations

2. For Major Cities:

- Name of 765 kV or 400 kV stations feeding the city
- Embedded or nearest generating station

An email has also been sent from NRLDC side to all SLDCs requesting this data. It is requested that the data may be furnished to NRLDC at the earliest.

It is requested to provide the necessary information for respective state by filling in the blank columns in the attached Excel file as Annexure-B.V. Concerned SLDCs are requested to provide update.

B.11. Long outages of transmission elements

Several important transmission lines in the Northern Region are under prolonged outage due to tower collapse. The extended non-availability of these elements is impacting grid reliability, load transfer capability, and in some cases RE evacuation.

Sr. No.	Element	Owner	Outage Date	No. of Days Out	Reason
1	220 kV Gazipur (DTL) –	UPPT	30-	1158	Bending of tower no.

	Sahibabad (UP)	CL	04-2022		4
2	220kV Gazipur(DTL)-Noida Sec. 62				Tower tilted at location no. 10
3	220 kV Kishenpur (PG) – Mir Bazar (PDD) Ckt-1	JKPTCL	21-06-2024	375	Tower foundation damaged at loc. no. KP-196
4	400 kV Moradabad (UP) – Kashipur (UK) Ckt-1	PTCUL	18-04-2025	74	Tower collapse at loc. no. 94
5	400 kV Jaisalmer – Barmer (RS) Ckt-2	RRVPNL	01-05-2025	61	Tower collapse at 12 locations (Loc. no. 70–81)
6	400 kV Jaisalmer – Barmer (RS) Ckt-1		01-05-2025	61	
7	400 kV Babai (RS) – Bhiwani (PG) Ckt-1	NRSS 36	13-06-2025	18	Collapse of tower no. 300 & 301

Further, number of other transmission elements are also under prolonged outage such as:

S. No.	Element Name	Owner	Date	Reason / Remarks	Discussion in 232 OCC Meeting
1	400/220 kV 315 MVA ICT 1 at Muradnagar_1(UP)	UPPTCL	13-03-2020	Buccholz relay alarm and Local Breaker Backup protection operated.	To be replaced by new 500MVA ICT. ICT to be received on site in Sep 2025
2	220 KV SHAHJAHANPUR(PG)-HARDOI(UP) (UP) CKT-1	UPPTCL	05-06-2024	Tower collapse at loc no. 86 & 87	Expected to be revived by Jul 2025
3	400/220 kV 240 MVA ICT 3 at Moradabad(UP)	UPPTCL	13-12-2021	Due to high DGA values, Hydrogen gas is above permissible limit.	To be replaced by 31MVA ICT, expected to be revived by Sep 2025
4	400 KV Noida Sec 148-Noida Sec 123 (UP) Ckt-2	UPPTCL	09-03-2023	Flashover Y-phase earth switch compartment at Noida	Expected to be revived by Dec 2025

				Sector-148.	
5	400 KV UNNAO-PANKI (UP) CKT-1	UPPTCL	30-05-2025	Tower damaged at Loc. No. 108-112	Expected to be revived by 30th June 2025
6	400/220 kV 500 MVA ICT 1 at Rasra (UP)	UPPTCL	26-10-2023	Y-phase bushing has got damaged.	Expected to be revived by 31st July 2025
7	400/220 kV 315 MVA ICT 1 at Kabulpur(HV)	HVPNL	11-08-2024	Operation of transformer protection. Differential protection trip.	Expected to be revived by 15th Jul 2025

Number of Fixed Series capacitors (FSCs) are also under prolonged outage such as:

Name of Elements (Owner: POWERGRID)	Outage time/date	Reason of tripping
FSC of 400 KV Fatehpur-Mainpuri (PG) Ckt-1 at Mainpuri (PG)	21:07 / 24.10.21	BHEL breaker hydraulic pressure could not be developed in B phase and (loss of N2 pressure) doesn't allow the FSC-1 taken into service as reported by CPCC3. OEM support stopped
FSC of 400 KV Fatehpur-Mainpuri (PG) Ckt-2 at Mainpuri (PG)	08:25 / 29.10.21	VME protection system was blocking the FSC back in service as reported by CPCC3. OEM support stopped
FSC(40%) of 400 KV Kanpur-Ballabhgarh (PG) Ckt-2 at Ballabhgarh (PG)	10:25 / 23.09.22	DC earth fault in main power supply. Safety clearance required.
FSC(45%) of 400 KV Bareilly-Unnao (UP) Ckt-1 at Unnao(UP)	19:50 / 03.01.24	Problem in GTE card of R phase and also unbalancing of one capacitor of B phase.
FSC (40%) of 400 KV Kanpur-Ballabhgarh (PG) Ckt-3 at Ballabhgarh (PG)	11:58 / 14.02.25	For attending the capacitor unbalance alarm

It is requested to provide update regarding the likely revival date for these in the meeting/ NRLDC outage portal and expedite revival of these transmission elements. Members may please discuss.

B.12. Multiple element tripping events in Northern region in the month of June 2025:

A total of 21 grid events occurred in the month of June 2025 of which 09 are of GD-1 category 07 are of GI-2 Category and 05 are of GI-1 Category. The tripping report of all the events have been issued from NRLDC. A list of all these events along with the status of DR/EL & tripping detail submission is attached at **Annexure-B.VI.**

Maximum delayed clearance of fault observed in event of multiple elements tripping at 220/132kV Kaithal(HR) at 00:20 hrs on 10th June 2025, 2025 (As per PMU at Kaithal(PG), B-N phase to earth fault with fault clearing time of 120ms followed by Y-B phase to phase fault with delayed fault clearing time of 560ms is observed).

Delayed clearance of fault (more than 100ms for 400kV and 160ms for 220kV system) observed in total 05 events out of 21 grid events occurred in the month. In 04 (no.) of grid event, there was no fault in the grid.

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.

It is observed that DR/EL & tripping report of most of the grid events are not being submitted as per timeline specified in IEGC 2023. Non availability to tripping details further hampers the grid event analysis at RLDC level.

Members may take necessary preventive measures to avoid such grid incidents / disturbances in future and share the report of actions taken by respective utilities. 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 IEGC clause 37.2 (c) & (e).

Members may like to discuss.

B.13. Status of submission of DR/EL and tripping report of utilities for the month of June 2025:

The status of receipt of DR/EL and tripping report of utilities for the month of **June 2025** is attached at **Annexure-B.VII**. It is to be noted that as per the IEGC provision under clause 37.2 (c), the tripping report along with DR/EL has to be furnished within 24 hrs of the occurrence of the event. However, it is evident from the submitted data that reporting status of RE stations, SLDC-HR, SLDC-PS, SLDC-J&K, SLDC-HP, BBMB, POWERGRID(NR-1) and RAPS 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 "https://postda.nrldc.in/Default.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 (.cfg/.dat) may please also be submitted in tripping portal.

Members may like to discuss.

B.14. Frequency response performance for the reportable events of month of June 2025:

In the month of June 2025, 1 no. of reportable event was notified by NLDC for which FRC/ FRP need to be calculated. FEC/FRP computation along with the high-

resolution data need to be submitted to RLDC. Description of the event is as given in the Table below:

S. No.	Event Date	Time (In hrs.)	Event Description	Starting Frequency (in Hz)	Nadir Frequency (in Hz)	End Frequency (in Hz)	*Δf*	NR FRP during the event
1	12-Jun-25	13:34 hrs	As reported, at 13:34 hrs on 12th June 2025, generation loss event of 1633MW occurred in NR RE complex in Rajasthan. Hence generation loss of 1633 MW is considered for FRC/FRP Calculation.	50.006	49.822	49.944	-0.062	0.83
2	16-Jun-25	11:51 hrs	As reported, at 11:51 hrs on 16th June 2025, generation loss event of 1322MW occurred in Bhutan. Hence, generation loss of 1322 MW is considered for FRC/FRP Calculation.	49.963	49.863	49.920	-0.043	0.83

As per IEGC 2023 Clause 30.8, "The primary response of the generating units shall be verified by the Load Despatch Centres (LDCs) during grid events. The concerned generating station shall furnish the requisite data to the LDCs within two days of notification of reportable event by the NLDC."

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 as on 07th July 2025 is:

FRC computation and data submission status			
S. No	Control Area		
		12-06-2025	16-06-2025
1	Punjab	Received	Received
2	Haryana	Received	Received
3	Rajasthan	Received	Received
4	Delhi	Received	Not Received
5	Uttar Pradesh	Received	Received
6	Uttarakhand	Received	Received
7	Chandigarh*	NA	NA
8	Himachal Pradesh	Received	Received
9	J&K(UT) and Ladakh(UT)	Not Received	Not Received
10	Dadri -1 (TH)	Received	Received
11	Dadri -2 (TH)	Received	Received
12	Jhajjar (TH)	Received	Received
13	Rihand-1 (TH)	Received	Received
14	Rihand-2 (TH)	Received	Received
15	Rihand-3 (TH)	Received	Received
16	Shree Cement (TH)	Not Received	Not Received
17	Singrauli (TH)	Not Received	Not Received
18	Tanda-2 (TH)	Received	Received
19	Unchahar-I (TH)	Received	Received
20	Unchahar-II (TH)	Received	Received
21	Unchahar-III (TH)	Received	Received
22	Unchahar-IV (TH)	Received	Received
23	Anta (G)	Not Received	Not Received
24	Auraiya (G)	Not Received	Not Received
25	Dadri (G)	Not Received	Not Received
26	AD Hydro (H)	Received	Received
27	Bairasiul (H)	Received	Received
28	Bhakra (H)	Received	Received
29	Budhil (H)	Not Received	Not Received
30	Chamera-1 (H)	Received	Received
31	Chamera-2 (H)	Received	Received
32	Chamera-3 (H)	Received	Received
33	Dehar (H)	Received	Received
34	Dhauliganga (H)	Received	Received
35	Dulhasti (H)	Received	Received
36	Karcham (H)	Received	Received
37	Kishenganga	Received	Received
38	Koldam (H)	Received	Received
39	Koteshwar (H)	Received	Received
40	Malana-2 (H)	NA	NA
41	Nathpa Jhakri (H)	Received	Received

42	Parbati-2 (H)	Received	Received
43	Parbati-3 (H)	Received	Received
44	Pong (H)	Received	Received
45	Rampur (H)	Received	Received
46	Sainj (H)	Not Received	Not Received
47	Salal (H)	Received	Received
48	Sewa-II (H)	Received	Received
49	Singoli Bhatwari (H)	Not Received	Not Received
50	Sorang (H)	Not Received	Not Received
51	Tanakpur (H)	Received	Received
52	Tehri (H)	Received	Received
53	Uri-1 (H)	Received	Received
54	Uri-2 (H)	Not Received	Not Received

FRC/FRP computation sheet haven't received from Delhi, J&K, Shree Cement TPS, Singrauli TPS, Anta GPS, Auraiya GPS, Dadri GPS, Budhil HEP, Sainj HEP, Singoli Bhatwari HEP, Sorang HEP and Uri-2 HEP.

Frequency Response Performance (FRP) of generating stations for each reportable event are calculated based on the submitted high resolution data from generating stations. However, the generating stations for which data is not received till 07th April 2025, FRC/FRP as per NRLDC HDR data is used for computation of Average Monthly Frequency Response Performance, Beta 'β' for Generating Stations.

FRP values as considered (as per NRLDC HDR data/ generator high resolution data) for the event of June 2025 is as follows:

Frequency response Performance			
S. No	Control Area		
		12-06-2025	16-06-2025
1	Punjab	0.68	-0.25
2	Haryana	0.07	0.07
3	Rajasthan	0.05	0.83
4	Delhi	1.55	-1.01
5	Uttar Pradesh	0.56	0.00
6	Uttarakhand	3.31	-1.21
7	Chandigarh*	NA	NA
8	Himachal Pradesh	2.67	1.62
9	J&K(UT) and Ladakh(UT)	0.81	0.26
10	Dadri -1 (TH)	8.78	15.81
11	Dadri -2 (TH)	0.11	7.10
12	Jhajjar (TH)	2.59	15.06
13	Rihand-1 (TH)	2.88	8.85
14	Rihand-2 (TH)	6.52	12.32
15	Rihand-3 (TH)	3.69	11.09
16	Shree Cement (TH)	4.06	-0.01
17	Singrauli (TH)	2.75	0.78
18	Tanda-2 (TH)	5.02	9.35

19	Unchahar-I (TH)	4.00	5.90
20	Unchahar-II (TH)	8.98	14.77
21	Unchahar-III (TH)	7.75	12.53
22	Unchahar-IV (TH)	2.86	3.73
23	Anta (G)	1.09	No Gen
24	Auraiya (G)	3.79	No Gen
25	Dadri (G)	22.37	No Gen
26	AD Hydro (H)	-0.97	0.27
27	Bairasiul (H)	2.26	0.36
28	Bhakra (H)	0.02	0.02
29	Budhil (H)	0.20	0.00
30	Chamera-1 (H)	1.78	No Gen
31	Chamera-2 (H)	1.55	0.37
32	Chamera-3 (H)	0.00	0.00
33	Dehar (H)	0.04	0.01
34	Dhauliganga (H)	3.48	0.33
35	Dulhasti (H)	2.04	-0.20
36	Karcham (H)	4.45	0.49
37	Kishenganga	0.30	0.14
38	Koldam (H)	0.55	-0.45
39	Koteshwar (H)	3.27	1.91
40	Malana-2 (H)	NA	NA
41	Nathpa Jhakri (H)	0.41	0.41
42	Parbati-2 (H)	0.91	1.37
43	Parbati-3 (H)	13.75	1.72
44	Pong (H)	0.03	0.07
45	Rampur (H)	-4.33	-1.15
46	Sainj (H)	0.26	0.37
47	Salal (H)	-1.22	-0.43
48	Sewa-II (H)	No Gen	No Gen
49	Singoli Bhatwari (H)	0.21	0.31
50	Sorang (H)	0.07	0.28
51	Tanakpur (H)	-1.32	27.57
52	Tehri (H)	No Gen	No Gen
53	Uri-1 (H)	-3.04	-0.36
54	Uri-2 (H)	0.00	-2.33

From the FRP data, it is observed that FRP of many of the control areas are not satisfactory. Therefore, it is requested to review the FRC/FRP, governor actions of your respective control area, necessary actions may be taken for improvement in the FRC/FRP.

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 receicved is as follows:

Sl. No.	Entity	Capacity(MW)	Governor Mode (FGMO as	Droop setting (%)	Remarks (if any)

			per IEGC 2023) Yes or No		
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 of the droop w.r.t. their generating stations.

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 as per timeline for ensuring IEGC compliance.

Members may like to discuss.

B.15. Mock testing of System Protection Schemes (SPS) in Northern Region

As per IEGC clause 16.2

''For the operational SPS, RLDC or NLDC, as the case may be, in consultation with the concerned RPC(s) shall perform regular load flow and dynamic studies and mock testing for reviewing SPS parameters & functions, at least once in a year. RLDC or NLDC shall share the report of such studies and mock testing including any short comings to respective RPC(s). The data for such studies shall be provided by CTU to the concerned RPC, RLDC and NLDC.''

As per IEGC clause 16.3

''The users and SLDCs shall report about the operation of SPS immediately and detailed report shall be submitted within three days of operation to the concerned RPC and RLDC in the format specified by the respective RPCs.''

There are 56 numbers of System Protection Scheme (SPS) approved in Northern Region. These SPS are implemented at major generation complexes, important evacuating transmission lines and ICTs which are N-1 non-complaint. System Protection Scheme Document of Northern Region has been revised/updated on 31st January 2025. Revised version of the document is available on the NRLDC website in Document section and can be accessed at below link: https://newnr.nrldc.in/documents/Documents.

In this regard, communication was sent to constituents through NRLDC letter dated 01.05.2024, 21.02.2025 & 05.03.2025 for conducting mock testing of SPS in their control area and continuous follow up is also being done in OCC & PSC meeting since May 2024.

During 2024-25, mock testing of 14 SPS out of total 55 SPS were not conducted. In view of high demand scenario during summer 2025-26, NLRDC vide letter dated 04.04.2025 requested all the concerned utility to conduct the mock testing of pending SPS by the end of April 2025. However, as reported, mock testing of 03 SPS out of pending 14 SPS have been done. In this regard, discussion was also held in 60th & 61st PSC meeting. PSC forum requested all the members to conduct the mock testing of all the SPS in their respective control area at the earliest.

Status of mock testing of all the SPS in NR is attached as **Annexure-B.VIII**.

Other major points of discussion are as follows:

i. During mock testing of SPS of HVDC Rihand-Dadri on 20.03.2025, some issues were identified. SPS of HVDC Rihand-Dadri operated recently on 21.05.2025 during incident of outage of both poles. Desired SPS actions were not observed at some of the stations. NRLDC vide letter dated 02.07.2025, requested POWERGRID to take necessary remedial measure and make complete SPS system healthy. POWERGRID may share the details of action taken and present status.

ii. In one of the SPS cases i.e., N-1-1/ N-2 of 765kV Anta-Phagi 1 & 2, instantaneous generation backdown of ~2100 MW is designed as SPS action. In such scenario, to avoid overloading of WR-NR corridor and over drawl by Rajasthan, it was agreed that RVPNL shall implement the automatic load shedding of ~750 MW by 28.02.2018. However, as per details available, implementation of automatic load shedding as per SPS hasn't been done yet. This matter has already been discussed in PSC as well as OCC meetings on regular basis. The concern of grid security and reliability was also raised during request of shutdown of 765kV Anta-Phagi line. is requested to expedite implementation of the automatic load shedding of ~750 MW as per SPS (N-1-1/ N-2 contingency of 765kV Anta-Phagi-1 & 2). RVPNL may share the updates in this regard.

Further, Clause 16.2 of IEGC 2023 also mandates the mock testing of SPS for reviewing SPS parameters & functions, at least once a year. Mock testing of all the SPS needs to be conducted in 2025-26. In view of this following is requested:

i. Concerned constituents / utility are requested to conduct the mock testing of pending SPS (whose mock testing was not conducted in 2024-25) at the earliest.

ii. Utilities are also requested to conduct the mock testing of SPS schemes in their respective control area w.r.t. year 2025-26.

iii. In compliance with IEGC clause 16.2, users shall ensure that mock testing along with the review of SPS logic of all the SPS is conducted at least once a year.

iv. Further In compliance with IEGC clause 16.3, users shall also share the detailed report of SPS operation in their respective control area within 3 days of its operation. Presently, no such report is being received.

Further, during 60th PSC meeting, forum also decided to not disable the SPS where ICTs are now N-1 compliant after augmentation. It was decided that SPS

may be kept enabled with logic based on loading instead of ICT tripping. Members are requested to share the confirmation in this regard.

Members may like to discuss.

Status of action taken on decision of 232nd OCC meeting of NRPC

S.N.	Agenda	Decision of 232nd OCC meeting of NRPC	Status of action taken
1	Agenda. Rectification of the breaker and charging of the 220kV Sunam (PS)-Patran (IndiGrid) Circuit (Agenda by Punjab SLDC)	IndiGrid representative apprised that a specific power card is to be replaced and order for the same has been placed and OEM is in process to replace it. Expected timeline mentioned by IndiGrid in the meeting for this work is one month as OEM is in process to manufacture this specific power card.	IndiGrid to apprise the status.

Follow up issues from previous OCC meetings

Annexure-A.II

<table>
<tr><td>1</td><td>Down Stream network by State utilities from ISTS Station</td><td>Augmentation of transformation capacity in various existing substations, addition of new substations along with line bays as well as requirement of line bays by STUs for downstream network are under implementation at various locations in Northern Region. Further, 220kV bays have already been commissioned at various substations in NR. For its utilization, downstream 220kV system needs to be commissioned.</td><td colspan="3">List of downstream networks is enclosed in Annexure-A.II.I.</td></tr>
<tr><td>2</td><td>Progress of installing new capacitors and repair of defective capacitors</td><td>Information regarding installation of new capacitors and repair of defective capacitors is to be submitted to NRPC Secretariat.</td><td colspan="3">Data upto following months, received from various states / UTs:</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>CHANDIGARH</td><td>Sep-2019</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>DELHI</td><td>May-2025</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>HARYANA</td><td>Apr-2025</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>HP</td><td>Mar-2025</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>J&K and LADAKH</td><td>Not Available</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>PUNJAB</td><td>Mar-2025</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>RAJASTHAN</td><td>Mar-2025</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>UP</td><td>May-2025</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>UTTARAKHAND</td><td>May-2025</td></tr>
<tr><td></td><td></td><td></td><td colspan="3">All States/UTs are requested to update status on monthly basis.</td></tr>
<tr><td>3</td><td>Healthiness of defence mechanism: Self-certification</td><td>Report of mock exercise for healthiness of UFRs carried out by utilities themselves on quarterly basis is to be submitted to NRPC Secretariat and NRLDC. All utilities were advised to certify specifically, in the report that “All the UFRs are checked and found functional”.</td><td colspan="3">Data upto following months, received from various states / UTs:</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>CHANDIGARH</td><td>Not Available</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>DELHI</td><td>Mar-2025</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>HARYANA</td><td>Mar-2025</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>HP</td><td>Mar-2025</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>J&K and LADAKH</td><td>Not Available</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>PUNJAB</td><td>Mar-2025</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>RAJASTHAN</td><td>Dec-2024</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>UP</td><td>Jun-2025</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>UTTARAKHAND</td><td>Jun-2025</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>BBMB</td><td>Mar-2025</td></tr>
<tr><td></td><td></td><td></td><td colspan="3">All States/UTs are requested to update status for healthiness of UFRs on monthly basis for islanding schemes and on quartely basis for the rest.</td></tr>
<tr><td></td><td></td><td>In compliance of NPC decision, NR states/constituents agreed to raise the AUFR settings by 0.2 Hz in 47th TCC/49th NRPC meetings.</td><td colspan="3">Status:</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>CHANDIGARH</td><td>Not Available</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>DELHI</td><td>Increased</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>HARYANA</td><td>Increased</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>HP</td><td>Increased</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>J&K and LADAKH</td><td>Increased</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>PUNJAB</td><td>Increased</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>RAJASTHAN</td><td>Increased</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>UP</td><td>Increased</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>UTTARAKHAND</td><td>Increased</td></tr>
<tr><td></td><td></td><td></td><td>◎</td><td>BBMB</td><td>Increased</td></tr>
</table>

<table>
<tr><td>4</td><td>Status of Automatic Demand Management System in NR states/UT's</td><td>The status of ADMS implementation in NR, which is mandated in clause 5.4.2 (d) of IEGC by SLDC/SEB/DISCOMs is presented in the following table:</td><td>The status of ADMS implementation in NR is enclosed in Annexure-A.II.II.
<table><tr><td>◎</td><td>DELHI</td><td>Scheme Implemented but operated in manual mode.</td></tr><tr><td>◎</td><td>HARYANA</td><td>Scheme not implemented</td></tr><tr><td>◎</td><td>HP</td><td>Scheme not implemented</td></tr><tr><td>◎</td><td>PUNJAB</td><td>Scheme not implemented</td></tr><tr><td>◎</td><td>RAJASTHAN</td><td>Under implementation.</td></tr><tr><td>◎</td><td>UP</td><td>Scheme implemented by NPCIL only</td></tr><tr><td>◎</td><td>UTTARAKHAND</td><td>Scheme not implemented</td></tr></table></td></tr>
<tr><td>5</td><td>Status of availability of ERS towers in NR</td><td>As per the decesion of 68th NRPC and 211th OCC meeting, ERS availability monitoring is being taken as rolling/follow-up agenda in OCC meetings for regular monitoring of ERS under different utilities in Northern region.</td><td>As per the information received from different utilities in Northern region, updated status of availability of ERS towers in Northern Region attached as Annexure-A.II.III.</td></tr>
<tr><td>6</td><td>Submission of breakup of Energy Consumption by the states</td><td>All states/UTs are requested to submit the requisite data as per the billed data information in the format given as under:
<table><tr><td>Category→</td><td>Consumption by Domestic Loads</td><td>Consumption by Commercial Loads</td><td>Consumption by Agricultural Loads</td><td>Consumption by Industrial Loads</td><td>Traction supply load</td><td>Miscellaneous / Others</td></tr><tr><td><Month></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table></td><td>Status of the information submission (month) from states / utilities is as under:
<table><tr><td></td><td>State / UT</td><td>Upto</td></tr><tr><td>◎</td><td>CHANDIGARH</td><td>Not Submitted</td></tr><tr><td>◎</td><td>DELHI</td><td>May-25</td></tr><tr><td>◎</td><td>HARYANA</td><td>Apr-25</td></tr><tr><td>◎</td><td>HP</td><td>May-25</td></tr><tr><td>◎</td><td>J&K and LADAKH</td><td>JPDCL- Mar'24
KPDCL- Not Submitted</td></tr><tr><td>◎</td><td>PUNJAB</td><td>Apr-25</td></tr><tr><td>◎</td><td>RAJASTHAN</td><td>Mar-25</td></tr><tr><td>◎</td><td>UP</td><td>Feb-25</td></tr><tr><td>◎</td><td>UTTARAKHAND</td><td>Jan-25</td></tr></table>Chandigarh is requested to submit the requisite data w.e.f. April 2018 as per the billed data information in the given format</td></tr>
<tr><td>7</td><td>Status of FGD installation vis-à-vis installation plan at identified TPS</td><td>List of FGDs to be installed in NR was finalized in the 36th TCC (special) meeting dt. 14.09.2017. All SLDCs were regularly requested since 144th OCC meeting to take up with the concerned generators where FGD was required to be installed.
Further, progress of FGD installation work on monthly
basis is monitored in OCC meetings.</td><td>Status of the information submission (month) from states / utilities is as under:
<table><tr><td>◎</td><td>HARYANA</td><td>Jun-2024</td></tr><tr><td>◎</td><td>PUNJAB</td><td>Feb-2025</td></tr><tr><td>◎</td><td>RAJASTHAN</td><td>Feb-2025</td></tr><tr><td>◎</td><td>UP</td><td>Jan-2024</td></tr><tr><td>◎</td><td>NTPC</td><td>Mar-2025</td></tr></table>FGD status details are enclosed as Annexure-A.II.IV.
All States/utilities are requested to update status of FGD installation progress on monthly basis.</td></tr>
<tr><td>8</td><td>Information about variable charges of all generating units in the Region</td><td>The variable charges detail for different generating units are available on the MERIT Order Portal.</td><td>All states/UTs are requested to submit daily data on MERIT Order Portal timely.</td></tr>
</table>

9	Reactive compensation at 220 kV/ 400 kV level at 7 substations			
	State / Utility	Substation	Reactor	Status
i	DTL	Peeragarhi	1x50 MVAr at 220 kV	1x50 MVAr Reactor at Peeragarhi has been commissioned on dated 18.09.2023
ii	DTL	Harsh Vihar	2x50 MVAr at 220 kV	2x50 MVAR Reactor at Harsh Vihar has been commissioned on dated 31th March 2023.
iii	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.
iv	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.
v	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.
vi	DTL	Electric Lane	1x50 MVAr at 220 kV	Under Re-tendering due to Single Bid
vii	PTCUL	Kashipur	1x125 MVAR at 400 kV	The Letter of Award for "Procurement of 125 MVAR Reactor, Online DGA, ODS, NIFPS along with its accessories at 400 KV Sub-station Kashipur" against Tender Specification no. PTCUL/E-Tender/C&P-II/SS-12/2024-25 has been issued to M/s Bharat Heavy Electricals Limited, New Delhi on 26.06.2025.

Annexure-A-II.I

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

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
1	400/220kV, 3x315 MVA Samba	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• Network to be planned for 2 bays.	Jul'25	02 No. of bays shall be utilized for LILO-II of 220kV Jatwal-Bishnah Transmission Line, the work of which is delayed due to persisting RoW issues. expected date of completion is Mar 2025 subject to availability of funds and resolving of RoW issues), Updated in 220th 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-wampoh-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	Contractual completion date on 04.08.2025.	Under construction.Updated in 230rd 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	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.Commisioned date: 09.06.2022. Updated in 198th OCC by HPPTCL
				• Network to be planned for 4 bays	-	HPPTCL to update the status.
8	Sikar 400/220kV, 1x 315 MVA S/s	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• LILO of 220 kV Sikar (220 kV GSS)-Dhod S/c line at Sikar (PG)	Commissioned	LILO of 220 kV S/C Sikar-Dhod line at 400 kV GSS PGCIL, Sikar has been charged on dt. 31.03.2022
				• Network to be planned for 2 bays.	-	Against the 3rd ICT at 400 kV GSS Sikar, only 2 bays were constructed and same has been utilized by RVPN by constructing LILO of 220 kV S/C Sikar – Dhod line as updated by RVPNL in 195th OCC
9	Bhiwani 400/220kV S/s	Commissioned: 6 Total: 6	Utilized: 2 Unutilized: 4	• 220 kV D/C line Bhiwani (PG) – Bhiwani (HVPNL) line	Commissioned	Updated in 202nd OCC by HVPNL
				• 220 kV Bhiwani (PG) - Isherwal (HVPNL) D/c line.	-	Issue related to ROW as intimated in 228th OCC by HVPNL. **Status:** 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 since30.11.2023 due to severe ROW issues. Expected to be completed by 31.03.2025. 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 Pardesh 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	Oct'25	Erection and stringing work completed.The signing of Connection agreement amongst the Utilities is pending. Updated in 230th OCC by HVPNL.
11	400/220kV Tughlakabad GIS	Commissioned: 6 Under Implementation: 4	Utilized: 6 Unutilized: 0	• 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	Commissioned	Energization date: 31.05.2024 updated by HPPTCL in 220th OCC
				• 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 - Pali D/C line Kadarpur - Sec-65	Commissioned	Updated in 232nd OCC by HVPNL **Status:-** A-formats for FTC of line submitted on FTC portal of NRLDC on dated 09.04.25.

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 Sohna-Rangla Rajpur at Roj Ka Meo line at 400kV Sohna Road	Oct'25	Line work completed, but commissioning of 220kV substation Roj ka Meo is pending till now.. However, this arrangement will not lead to usage of additional bays i.e. no of utilitsed bays at Sohna road will remain same.Updated in 230th OCC by HVPNL
				• LILO of both circuits of 220kV D/c Badshahpur-Sec77 line at 400kV Sohna Road	-	The matter is subjudice in Hon'ble Punjab & Haryana High court, Chandigarh Updated in 228th OCC by HVPNL. **Status:-** Earlier 02 nos 220 kV line bays were to be utilized for the 220 kV GIS S/Stn. Sec-77, Gurugram but due to denotification of land of the 220 kV GIS S/Stn. Sec-77 the said substation is now going to be dismantled and a new substation is proposed at Sec-75A, Gurugram. Now, these 02 no. 220 kV line bays may be utilized at 220 kV GIS S/Stn Sec-75A, Gurugram.
15	400/220kV Prithla Sub-station	Commissioned: 8 Aprroved: 2 Total: 10	Utilized: 4 Unutilized: 4 Under Implementation:2	• 220kV D/C line from Prithla to Harfali with LILO of one circuit at 220kV Meerpur Kurali	Dec'25	Contract awarded on 08.08.23 to M/s Skipper with completion in December 25.Updated in 230th OCC by HVPNL
				• LILO of both ckt of 220kV D/c Ranga Rajpur – Palwal line	Commissioned	Energization date: 31.12.2021. Updated in 198th OCC by HVPNL
				• 220kV D/C for Sector78, Faridabad	31.07.2025	Issue related to ROW and Pending crossing approval from Northern Railways and DFCCIL. as intimated in 228th OCC by HVPNL.
				• Prithla - Sector 89 Faridabad 220kV D/c line	Jul'25	The work for construction of 220kV D/C Prithla-Sector-78 Faridabad line on multi circuit towers is delayed mainly due to severe resistance by local villagers & ROW problem at site during construction. Due to delay in construction of 220kV D/C Prithla-Sector-78 Faridabad line, the work for construction of 220kV D/C Prithla-Sector 89 Faridabad line might delay..Updated in 230th OCC by HVPNL
16	400/220kV Sonepat Sub-station	Commissioned: 6 Under Implementation:2 Total: 8	Utilized: 2 Unutilized: 4 Under Implementation:2	• LILO of both circuits of 220kV Samalkha - Mohana line at Sonepat	June'25	Updated in 232nd OCC by HVPNL. **Status:** A-formats for FTC of line submitted on FTC portal of NRLDC on dated 09.04.25.
				• Sonepat - HSIISC Rai 220kV D/c line	Commissioned	Energization date: 31.05.2024 updated by HVPNL in 220th OCC
				• Sonepat - Kharkhoda Pocket A 220kV D/c line	31.07.2025	Updated in 232nd OCC by HVPNL. **Status:** 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.
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 Jallandhar Sub-station	Commissioned: 10 Total: 10	Utilized: 8 Unutilized: 2	• LILO of 220 kV BBMB Jalandhar - Butari line at 400 kV PGCIL Jalandhar	-	LILO of 220 kV BBMB Jalandhar - Butari line at 400 kV PGCIL Jalandhar being planned. Route plan and estimate of work sanctioned, DNIT has been sent to float tender as updated by PSTCL in 227th OCC
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.

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
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	Commissioned	Ckt-1 commissioned at 16:13hrs on dated 06.08.24 & Ckt-2 commissioned at 20:10 hrs on dated 05.08.24. Updated in 223rd OCC by HVPNL
25	400/220kV Pachkula Sub-station	Commissioned: 8 Under tender:2 Total: 10 Out of these 10 nos. 220kV	Utilized: 2 Unutilized: 4 Under Implementation:2	• Panchkula – Pinjore 220kV D/c line	Commissioned	Updated in 218th OCC by HVPNL
				• Panchkula – Sector-32 220kV D/c line	Commissioned	Energization date: 24.05.2024 updated by HVPNL in 220th OCC
				• Panchkula – Raiwali 220kV D/c line	Commissioned	Updated in 194th OCC by HVPNL
				• Panchkula – Sadhaura 220kV D/c line: Sep'23	Jun'25	Revised target date as confirmed by concerned XEN TS, Panchkula.Updated in 230th 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	-	Draft connectivity agreements for 220kV Rashiana-Amritsar has been received from CTU and the same under processing. Draft connectivity agreements for 220kV Patti-Amritsar line is under consideration by CTU. CTU is processing the agreement and PSTCL has provided with the requisite inputs/data to CTU. Updated in 232nd 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)	-	Draft connectivity agreements for 220kV Rashiana-Amritsar & 220kV Patti-Amritsar lines are under consideration by CTU. CTU is processing the agreement and PSTCL has provided with the requisite inputs/data to CTU. Updated in 232nd 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	-	Proposal turned down by CEA.Updated in 230th OCC by HVPNL.
				• Bahadurgarh - METL 220kV D/c line (Deposit work of M/s METL)	15.06.2026	Updated in 230th OCC by HVPNL. **Status:** The work stands awarded to the M/s KRR and the execution work has been started at site. Partial route stands approved by the competant authority of the HVPNL. Further, 06 no. Foundation has been casted.
				• Bahadurgarh - Kharkhoda Pocket B 220kV D/c line	30.06.2025	Updated in 230th OCC by HVPNL. **Status:** RoW issues which are being resolved with the help of Duty Magistrate.
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 - Bahraich 220kV S/c line (Energization date: 15.02.2021) updated by UPPTCL in 196th OCC
31	400/220kV, Kankroli	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• 220 kV D/C Kankroli(PG) - Nathdwara line	-	Standard bid document has been finalized on 13.08.2024 and bid is under preparation as updated by RVPN in 222nd OCC.
32	400/220kV, Manesar	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4	• Network to be planned for 2 bays	-	Status:- A proposal is being prepared for the creation of another 220kV D/C line from the 400kV substation Panchgaon (PG) to the 220kV substation Panchgaon (HVPNL), along with the LILO of one circuit of the 220kV D/C Panchgaon (PG) – Mau line at the 220kV substation Panchgaon to utilize two bays at the 400kV substation Panchgaon. The load flow study for this has already been completed.
33	400/220kV, Saharanpur	Commissioned: 6 Under Implementation:2 Total: 8	Utilized: 6 Unutilized: 0 Under Implementation:2	• Network to be planned for 2 bays	Commissioned	Saharanpur(PG)-Devband D/c line (Energization date: 20.04.2023) updated by UPPTCL in 207th OCC
34	400/220kV, Wagoora	Commissioned: 10 Total: 10	Utilized: 6 Unutilized: 4	• Network to be planned for 4 bays	-	PDD, J&K to update the status.
35	400/220kV, Ludhiana	Commissioned: 9 Total: 9	Utilized: 8 Unutilized: 1	• Network to be planned for 1 bay	Commissioned	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.

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
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	• 400 kV PGCIL Patiala - 220 kV Bhadson (D/C)	-	2 Nos. bays for 400 kV PGCIL Patiala - 220 kV Bhadson (D/C) line being planned. Technical bid for civil work of 66kV to 220kV Bhadson upgradation has been opened and further processed for opening of financial bid. Work likely to be started by 15.05.2025. as updated by PSTCL in 230th OCC meeting

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks

Status of ADMS implementation in NR:

Sl. No.	State / UT	Status	Remarks
1	DELHI	Scheme Implemented but operated in manual mode.	Revised Standard Operating Procedure (SOP) of Automatic Demand Management Scheme (ADMS) in NCT of Delhi has been approved in 51st TCC and 76th NRPC meeting. In OCC meeting, DTL intimated that TPPDL has informed that they have engaged SCADA OEM for the implementation of ADMS. However, OEM has confirmed that incorporation of ADMS logic into the current SCADA system is not feasible and it would require an upgrade or refresh of the system, necessitating additional expenditure for which DERC has been approached. The complete implementation cycle is expected to be within 2 years. However, in the meantime considering the criticality, their in-house team is working to develop a trigger notification/alarm system for manual operation of breaker triggering from the control room and thereafter exploring the possibility of automatically triggering the breaker using the trigger notification. TPPDL has stated that they expect to complete it by August 2025, if materialized. BRPL and BYPL have informed that their existing SCADA system is obsolete and it is in the up-gradation phase by OEM. After the up-gradation of SCADA system, the ADMS is expected to be implemented in BRPL & BYPL by Oct 25.
2	HARYANA	Scheme not implemented	Haryana SLDC intimated that as per Joint Roadmap of implementation of ADMS in Haryana supplied to NRPC vide memo dated 17.10.2023 (Annexure-II), the implementation plan was proposed to be carried out in two parts, as mentioned below: PART-I: Control with Transmission Utility PART-II: Control with Distribution Utility It is pertinent to mention that as part of upcoming SCADA-EMS system i.e. upgradation of SCADA-EMS system, a feature in the name of LSS (Load Shedding Software)/ ADMS is part of the Technical Specification of project to be delivered. Therefore, the functionalities of ADMS application will be covered under 'Part-I: Control with Transmission Utility' will already be covered using the RTUs available at select substations along with the ADMS software being delivered by M/s GE under SCADA upgradation project. Hence, there is no need to acquire a separate ADMS application & associated hardware for data centre for implementation of PART-I. Further for Part -II a committee has been constituted for further finalization of the ADMS module with control with Discoms is under discussions for preparation of DPR.
3	HP	Scheme not implemented	HPSDLC has kept the provision of ADMS in upgradation/replacement of SCADA system under ULDC Phase-III scheme for operating the feeders automatically through ADMS functionality. HP SLDC mentioned that logic regarding implementation of Automatic Demand Management System in HP Control Area has been finalized and finalization of feeders to give this load relief is pending. 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 from HPSEBL is awaited as intimated by HPSLDC.
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. 3. The software at the SLDC end for ADMS shall be available with ULDC phase –III SCADA system which is under implementation. ii. In 222nd OCC, MS NRPC asked Punjab to co-ordiante with Powergrid for integration of their propsoed logic with the ULDC phase-III SCADA system for timely implementation.

5	RAJASTHAN	Under implementation	RVPN has pilot tested the logic of ADMS which is to be implemented for Rajasthan.In 232th OCC meeting, RVPN informed that 270 nos. of circuit breakers have been mapped to ADMS, all 270 circuit breakers tested upto yard individually. Total 650CBs are to be mapped in phased manner.
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.(it is delayed) 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. vi. MS, NRPC apprised forum that a letter has been written to Director, SLDC for co-odinatng with Director (Distribution), UPPCL for expediting the finalization of feeder list at 33kV for ADMS implementation. vii. Response from UPPCL regarding the finalization of feeder list at 33kV for ADMS implementation is awaited. ix. In 230th OCC meeting UP SLDC representative informed that feeder list at 33kV level for ADMS is awaited from UPPCL.
7	UTTARAKHAND	Scheme not implemented	i. UPCL has prepared a system architecture in which all the non-monitored sub-stions 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. iii. Uttarakhand SLDC informed that feeder list at 11kV level has been finalized and logic of ADMS implementation is under finalization. iv. Uttarakhand has intimated that It is bring to your notice that installation MFT(Multi Function Transducers) at various interstate points at PTCUL Substations under ADRS Project of UPCL is in progress. v. First Phase- Data Acquisition of 32 interstate points completed. vi. Second Phase-95 distribution side Substation work is on progress. vii In 230th OCC meeting Uttarakhand SLDC representative informed that Harbour installation and communication establishment has been done on 35 11kV feeders out of total 195 11kV feeders. The work is expected to be completed by December, 2025.

Annexure-A.II.III.

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		Tender has been scraped due to single bidder.
		220kV	1045.135	NIL	1		
2	Powergrid NR-1	220 KV	1842.88	NIL	1		
		400 KV	11074.26	12 Towers	3	All 400kV ERS at Ballabhgarh	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 Hight.
		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 Ajmer
		220 kV	16227.979		3		
		400 kV	6899.386		2		
		765 kV	425.498		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
13	DTL	220kV	915.498	NIL	1	400kV Bamnauli 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		
14	JKPTCL						JKPTCL, Jammu: being procured JKPTCL, Kashmir:10 tower procured (out of which 3 on loan to JKPTCL, Jammu)
15	HVPN						HVPN has apprised that purchase order for procurement of 2 sets of Emergency Restoration System (ERS) in HVPNL has been issued to M/s Jost's Engineering Company Ltd., Mumbai
16	PSTCL	400 kV	1666.43	2	2		
		220 kV	7921.991				
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)

Annexure-A.II.IV

FGD COMMISSIONING STATUS						
S.No.	Utility	Plant Name	Unit	Target Commissioning Date (As updated by utility in OCC)	If commissioned , Actual Date of Commissioning	If not commissioned , Target Date of Commissioning
1	Adani Power Ltd.	KAWAI TPS	1	31-Dec-24		31-Dec-29
2			2	31-Dec-24		31-Dec-29
3	APCPL	INDIRA GANDHI STPP	1		3-May-24	
4			2	30-Sep-23	27-Jan-25	
5			3	30-Jun-23		31-May-25
6	GVK	GOINDWAL SAHIB	1	30-Apr-20	INFO NOT RECEIVED	
7			2	29-Feb-20		
8	NTPC	DADRI NCTPP	1	31-Dec-20	31.12.2019,(DSI - Dry FGD)	
9			2	31-Oct-20	27.12.2019,(DSI - Dry FGD)	
10			3	31-Aug-20	27.07.2020,(DSI - Dry FGD)	
11			4	30-Jun-20	14.07.2020,(DSI - Dry FGD)	
12			5	30-Jun-22	15-Jun-22	
13			6	31-Mar-23	8-Feb-24	
14		RIHAND STPS	1	31-Dec-24		30-Nov-26
			2	30-Jun-26		31-Aug-26
			3	31-Dec-24		31-Dec-26
			4	31-Mar-25		30-Sep-26
			5	30-Jun-25		30-Jun-26
15			6	31-Mar-25		31-Mar-25
16		SINGRAULI STPS	1	31-Dec-24		30-Sep-25
17			2	31-Dec-24		30-Sep-25
18			3	31-Dec-24		30-Sep-25
19			4	31-Dec-24		31-Dec-25
20			5	31-Mar-25		31-Dec-25
21			6	30-Jun-24		31-Aug-25
22			7	31-Mar-24	Hot Gas In completed on 26.03.2025	30-Jun-25
23		UNCHAHAR TPS	1	31-Dec-23	22-Feb-25	
24			2	31-Dec-23	22-Feb-25	
25			3	30-Sep-23		30-May-25
26			4	30-Sep-23		30-May-25
27			5	30-Sep-23		30-May-25
28			6	31-Aug-22	11-Oct-22	
29		MEJA STAGE- 1	1	31-Oct-23	16-Jan-25	
30			2	30-Jun-23	28-Feb-25	
31		TANDA STAGE -1	1	No FGD		
			2	No FGD		
			3	No FGD		
32			4	No FGD		
33		TANDA STAGE -2	5	31-Mar-23	28-Nov-24	
34			6	30-Sep-23		30-May-25
35	L&T POWER DEVELOPMENT	NABHA TPP (RAJPURA TPP)	1	30-Apr-21	NPL has completed construction of FGD units for	
36			2	28-Feb-21	both of its units, which have been ready for	
37	TALWANDI SABO POWER LTD.	TALWANDI SABO TPP	1	28-Feb-21	INFO NOT RECEIVED	
38			2	31-Dec-20		
39			3	31-Oct-20		
40	HGPCL	PANIPAT TPS	6	31-Dec-25		
41			7	31-Dec-25		
42			8	31-Dec-25		
43		RAJIV GANDHI TPS	1	31-Aug-27		
44			2	31-Aug-27		
45		YAMUNA NAGAR TPS	1	31-Aug-27		
46			2	31-Aug-27		
47	Lalitpur Power Gen. Company Ltd.	LALITPUR TPS	1	31-Dec-26		
48			2	30-Sep-26		
49			3	30-Jun-26		
50	Lanco Anpara Power Ltd.	ANPARA C TPS	1	31-Dec-25		
51			2	31-Dec-25		
52	Prayagraj Power Generation Company Ltd.	PRAYAGRAJ TPP	1	31-Dec-26		
53			2	31-Dec-26		
54			3	31-Dec-26		
55	PSPCL	GH TPS (LEH.MOH.)	1	31-Dec-26		
56			2	31-Dec-26		
57			3	31-Dec-26		
58			4	31-Dec-26		
59		GGSSTP, Ropar	3	31-Dec-26		
60			4	31-Dec-26		
61			5	31-Dec-26		
62			6	30-Dec-26		
63	Rosa Power Supply Company	ROSA TPP PH-I	1	31-Dec-26		
64			2	31-Dec-26		
65			3	31-Dec-26		
66			4	31-Dec-26		
67			5	30-Nov-25		

68	RRVUNL	KOTA TPS	6	30-Nov-25		
69			7	30-Nov-25		
70		SURATGARH TPS	1	31-Dec-29		
71			2	31-Dec-29		
72			3	31-Dec-29		
73			4	31-Dec-29		
74			5	31-Dec-29		
75			6	31-Dec-29		
76		SURATGARH SCTPS	7	28-Feb-26		
77			8	28-Feb-26		
78		CHHABRA TPP	1	31-Dec-29		
79			2	31-Dec-29		
80			3	31-Dec-29		
81			4	31-Dec-29		
82		CHHABRA SCPP	5	28-Feb-26		
83			6	28-Feb-26		
84		KALISINDH TPS	1	28-Feb-26		
85			2	28-Feb-26		
86	UPRVUNL	ANPARA TPS	1	31-Dec-25		
87			2	31-Dec-25		
88			3	31-Dec-25		
89			4	31-Dec-25		
90			5	31-Dec-25		
91			6	31-Dec-25		
92			7	31-Dec-25		
93		HARDUAGANJ TPS	8	31-Dec-26		
94			9	31-Dec-26		
95		OBRA TPS	9	31-Dec-26		
96			10	31-Dec-26		
97			11	31-Dec-26		
98			12	31-Dec-26		
99			13	31-Dec-26		
100		PARICHHA TPS	3	31-Dec-26		
101			4	31-Dec-26		
102			5	31-Dec-26		
103			6	31-Dec-26		

MIS Report for Status of Islanding Schemes

Implemented Schemes

Sl. No.	Islanding Scheme	SLDC	Status	Submission of Self Certification of Healitheness	SOP	SCADA Display Page	Remarks
1	NAPS IS	UP	Implemented	Yes (08-10-2021)	Yes	Yes	-
2	RAPS IS	Rajasthan	Implemented	16-Aug-21	Yes	Yes	List of officials in-charge, format for generation, islanding scheme sld and relays in RAPP IS submitted by RVPN on 04.12.2021.
3	Delhi IS	Delhi	Implemented				
4	Lucknow-Unchahar IS	UP	Implemented				The data of 132 kV S/s Hussainganj is not available at UPSLDC due to lack of OPGW. The work of laying OPGW cable is under progress and same shall be completed by end of June 2025.

Under Implementation/ Newly Proposed/Under Discussion

Sl. No.	Islanding Scheme	SLDC	Status	Details of progress	DPR for PSDF funding (Required / Not Required)	Timelines Status - Proposed/Actual									
						Study		Design		Approval		Procurement		Commissioning	
						Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual
1	Pathankot-RSD IS	Punjab	Dismantled	In 231st OCC meeting Punjab SLDC informed that the Pathankot-RSD islanding scheme has been dismantled during works of control room extension.		-		-	-	-	-	-	-	-	-
2	Agra IS	UP	Under Implementation	Scheme has been approved in 71th NRPC meeting held on 29.01.2024. In 228th OCC, UPPTCL representative apprised forum that management is of view that procurement of UFRs for the Lalitpur-Agra islanding scheme should be explored through PSDF funding. During the meeting held on 07.03.2025, PSDF Secretariat raised some queries regarding the scheme and UPPTCL was asked to submit their board approval. UPPTCL is currently preparing responses to the PSDF Secretariat's queries and will resubmit the proposal once it has been approved by the UPPTCL board.		-		-	-	-	-	-	-	-	-
3	Jodhpur-Barmer-Rajwest IS	Rajasthan	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. In 228th OCC, RRVPNL representative mentioned that they have submitted their proposal of Jodhpur-Barmer- Rajwest islanding scheme to PSDF Secretariat on 16.01.2025 for PSDF funding. During the meeting held on 07.03.2025, PSDF Secretariat raised some queries regarding the scheme. In 232nd OCC, RRVPNL representative informed that responses to these queries have been replied on 30.05.2025.	-	-		-	-	-	-	-	-	-	-
4	Suratgarh IS	Rajasthan	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. In 228th OCC, RRVPNL representative mentioned that DPR for implementation of Suratgarh islanding scheme would be submitted after confirmation of status of PSDF funding from PSDF Sectt for Jodhpur-Barmer Rajwest IS.	-	-		-	-	-	-	-	-	-	-
5	Patiala-Nabha Power Rajpura IS	Punjab	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. In 227th OCC, Punjab SLDC apprised forum that they have submitted their proposal to PSDF Secretariat . During the meeting held on 07.03.2025, PSDF Secretariat raised some observations regarding the scheme which has been replied by Punjab.		-		-	-	-	-	-	-	-	-
6	Kullu-Manali-Mandi IS	HP	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. In 231st OCC, HPSLDC representative informed that the Monitoring committee of State PSDF has provided approval for State PSDF funding for implementation of proposed UFR scheme for Kullu-Manali islanding scheme in the meeting held on 22nd April, 2025. He further stated that the procurement of UFRs will be undertaken by HPSEBL. The tentative timeline for the implementation of the schemes will be obtained from HPSEBL and shared with the forum in due course.		-		-	-	-	-	-	-	-	-
7	Shimla-Solan IS	HP	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. In 232nd OCC, HPSLDC representative informed that HPSEBL has done the testing and requisite frequency settings of their generators for Shimla-Solan islanding scheme. HPSLDC representative further informed that the Monitoring committee of State PSDF has provided approval for State PSDF funding for implementation of proposed UFR scheme for Shimla-Solan islanding scheme in the meeting held on 22nd April, 2025. He further stated that the procurement of UFRs will be undertaken by HPSEBL. The tentative timeline for the implementation of the schemes will be obtained from HPSEBL and shared with the forum in due course.											

Thermal Generators

Annexure-A.IV

S. No.	Name of Plant	Unit	Installed Capacity	MVA Rating	Make of Units	COD	GT Details			Mode of Fuel Transport (Pit Head/Non Pit-head)	Name of Utility	Sector	Control Area	Type	Real and Reactive Power Capability assessment.			Assessment of Reactive Power Control Capability as per CEA Technical Standards for connectivity			Model Validation and verification test for the complete Generator and Excitation System model including PSS.			Model Validation and verification of Turbine/Governor and Load Control or Active Power/frequency Control Functions.			Testing of Governor performance and Automatic Generation Control			Revised Simulation Models		
							Voltage Ratio	GT MVA Capacity	Tap Ratio of GT (Present Tap/Total Taps)						Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Whether Revised Models Submitted?	Remarks	
1																																
2																																
3																																
4																																
5																																
6																																
7																																
8																																
9																																
10																																

Hydro Generators

S. No.	Name of Plant	Unit	Installed Capacity	MVA Rating	Make of Units	COD	GT Details			Type (Pondage/RoR etc.)	Name of Utility	Sector	Control Area	Real and Reactive Power Capability assessment.			Assessment of Reactive Power Control Capability as per CEA Technical Standards for connectivity			Model Validation and verification test for the complete Generator and Excitation System model including PSS.			Model Validation and verification of Turbine/Governor and Load Control or Active Power/frequency Control Functions.			Testing of Governor performance and Automatic Generation Control			Revised Simulation Models		
							Voltage Ratio	GT MVA Capacity	Tap Ratio of GT (Present Tap/Total Taps)					Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Whether Revised Models Submitted?	Remarks	
1	Mahi Power House-I	UNIT-I	25 MW	27.778 MVA	BHEL, Bhopal	22/01/1986	11kV/132kV	31.5 MVA	3/5	RoR	RVUN	Power/ Energy																			As per guidelines the OEM representative must remain present at the time of Generator periodic testing hence looking to the age and present status of Units at Mahi PH-I, Letters Dated 12/07/2024 and 19/12/2024 have been sent to the OEM M/s BHEL, Bhopal, and accordingly the plan may be scheduled .
2	Mahi Power House-I	UNIT-II	25 MW	27.778 MVA	BHEL, Bhopal	06/02/1986	11kV/132kV	31.5 MVA	3/5	RoR	RVUN	Power/ Energy																			

Nuclear Generators

S. No.	Name of Plant	Unit	Installed Capacity	MVA Rating	Make of Units	COD	GT Details			Type	Name of Utility	Sector	Control Area	Type	Real and Reactive Power Capability assessment.			Assessment of Reactive Power Control Capability as per CEA Technical Standards for connectivity			Model Validation and verification test for the complete Generator and Excitation System model including PSS.			Model Validation and verification of Turbine/Governor and Load Control or Active Power/frequency Control Functions.			Testing of Governor performance and Automatic Generation Control			Revised Simulation Models		
							Voltage Ratio	GT MVA Capacity	Tap Ratio of GT (Present Tap/Total Taps)						Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Whether Revised Models Submitted?	Remarks	

Gas Based Generators

S. No.	Name of Plant	Unit	Installed Capacity	MVA Rating	Make of Units	COD	GT Details			Name of Utility	Sector	Control Area	Type	Real and Reactive Power Capability assessment.			Assessment of Reactive Power Control Capability as per CEA Technical Standards for connectivity			Model Validation and verification test for the complete Generator and Excitation System model including PSS.			Model Validation and verification of Turbine/Governor and Load Control or Active Power/frequency Control Functions.			Testing of Governor performance and Automatic Generation Control			Revised Simulation Models	
							Voltage Ratio	GT MVA Capacity	Tap Ratio of GT (Present Tap/Total Taps)					Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Whether Revised Models Submitted?	Remarks

Renewable Energy Plants

S. No.	Name of Plant	Pooling Station Name	Installed Capacity	Type (Solar/Wind)	COD	Owner	Sector	Control Area	Inverter/ WTG Make	Inverter/ WTG Model	PPC Make	Real and Reactive Power Capability for Generator			Power Plant Controller Function Test			Frequency Response Test			Active Power Set Point change test			Reactive Power (Voltage / Power Factor / Q) Set Point change test			Revised Simulation Models		
												Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Whether Revised Models Submitted?	Remarks	

HVDC Links

S. No	Name of Link	Type (LCC/VSC/Back-to-Back)	HVDC_Voltage (kV)	Converter-1		Converter-2		Master Converter Station	Pole_number	Length (km)	Capacity (MW)	Owner	Forward Direction			Reverse Direction			Reactive Power Controller (RPC) Capability for HVDC/FACTS			Filter bank adequacy assessment based on present grid condition, in consultation with NLDC.			Revised Simulation Models		
				Station Name	Region	Station Name	Region						Maximum Capacity	Minimum Capacity	Ground_return_capacity	Maximum Capacity	Minimum Capacity	Ground_return_capacity	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Whether Revised Models Submitted?	Remarks	
1			500	APL-Mundra	WR	Mohindargarh	NR		1	989	1,250	ATIL	150	500	1250					Due			Due			
2			500	APL-Mundra		Mohindargarh			2	989	1,250	ATIL	150	500	1250					Due			Due			
3		LCC	800	Champa_HVDC	WR	Kurukshetra	NR	Champa_HVDC	1	1,306	1,500	POWERGRID	150	1,500	DMR path	NA	NA	NA		Due	Apr-2025		Due			
4		LCC	800	Champa_HVDC	WR	Kurukshetra	NR	Champa_HVDC	2	1,306	1,500	POWERGRID	150	1,500	DMR path	NA	NA	NA		Due	Apr-2025		Due			
5		LCC	800	Champa_HVDC	WR	Kurukshetra	NR	Champa_HVDC	3	1,306	1,500	POWERGRID	150	1,500	DMR path	NA	NA	NA		Due	Apr-2025		Due			
6		LCC	800	Champa_HVDC	WR	Kurukshetra	NR	Champa_HVDC	4	1,306	1,500	POWERGRID	150	1,500	DMR path	NA	NA	NA		Due	Apr-2025		Due			

STATCOMs/SVCs

S.No	Station	Statcom	Capacity (MVAR)	Owner	Make	Reactive Power Controller (RPC) Capability for HVDC/FACTS			Filter bank adequacy assessment based on present grid condition, in consultation with NLDC			Validation of response by FACTS devices as per settings.			Revised Simulation Models	
						Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Whether Revised Models Submitted?	Remarks
1	Kurukshetra	TCR	500	POWERGRID	GE Vernova T&D	NA	NA	NA	NA	NA	NA	Nov-2023	No	Sep-2028		
2	Fatehgarh-2	STATCOM	.+/-600	POWERGRID	SIEMENS	Oct-2023	No	Sep-2028	NA	NA	NA	Oct-2023	No	Sep-2028		
3	Bhadla-2	STATCOM	.+/-600	POWERGRID	SIEMENS	Jun-2023	No	May-2028	NA	NA	NA	Jun-2023	No	May-2028		
4	Bikaner-2	STATCOM	.+/-300	POWERGRID	SIEMENS	Jul-2023	No	Jun-2028	NA	NA	NA	Jul-2023	No	Jun-2028		

FSCs/TCSCs

S. No	End 1	End 2	Line No.	Compensator Location	Make	Fixed Compensation	Variable Compensation Positive	Variable Compensation Negative	Agency	Reactive Power Controller (RPC) Capability for HVDC/FACTS			Filter bank adequacy assessment based on present grid condition, in consultation with NLDC			Validation of response by FACTS devices as per settings.			Revised Simulation Models	
										Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Whether Revised Models Submitted?	Remarks

Series Reactor

S.No	End 1	End 2	Line No.	End	Capacity	Make	Reactive Power Controller (RPC) Capability for HVDC/FACTS			Filter bank adequacy assessment based on present grid condition, in consultation with NLDC			Validation of response by FACTS devices as per settings.			Revised Simulation Models	
							Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Last tested on (dd/mm/yyyy)	Whether due?	Tentative Schedule date	Whether Revised Models Submitted?	Remarks
1																	
2																	

Annexure-A.V

OFFICE OF THE CHIEF ENGINEER (TRANSMISSION), JKPTCL,Jammu
220 KV Grid Station Complex, Narwal Bala, Gladni, Jammu
Email: sojpdd@gmail.com Tel /Fax:-0191- 2476172

The Executive Director,
Power Grid Corporation of India Limited (PGCIL),
ULDC, Northern Region-II,
OB-26, "Grid Bhawan",
Rail Head Complex, Jammu.

No: - CE/Trans./J/JKPTCL/T/ 3164-67 **Date:-** 20-**06-2025.**

Subject: Urgent Request for Upgradation of 220 KV Transmission Lines to HTLS Conductors to Address Capacity Constraints for Gladni and Chowadhi Grid Sub-Stations.

Sir,

With reference to the critical operational requirements of the Jammu region's power infrastructure, we wish to highlight an urgent issue concerning the transmission capacity constraints of the 220 KV Gladni-Jatwal transmission line, 220KV Salal-Gladni Transmission line (Ckt. 1 & Ckt. 2), which are adversely impacting the load requirements of the Gladni and Chowadhi Grid Sub-Stations. The Gladni Grid Sub-Station, with an installed capacity of 710 MVA at 220/132 KV, is presently fed through three single-circuit 220 KV transmission lines owned by PGCIL, i.e, 220KV Salal-Gladni Circuit-I (ACSR Zebra), 220KV Salal-Gladni Circuit-II (ACSR Moose) and 220KV Jatwal-Gladni Circuit-I (ACSR Zebra).

These lines were sufficient to meet the load demand of Gladni Grid Sub-Station. However, the 220/33 KV, 160 MVA Chowadhi Grid Sub-Station, commissioned under PMDP-15, has been integrated into the 220 KV Jatwal-Gladni single-circuit line through a loop-in-loop-out (LILO) arrangement. This configuration has significantly reduced the power flow towards Gladni, rendering the sub-station reliant primarily on the two Salal-Gladni single-circuit lines with a meagre power flow through 220KV Gladni-Chowadhi line. These circuits are inadequate to meet the full load demand of Gladni Grid Sub-Station, especially considering future load growth projections.Furthermore, all three aforementioned transmission lines are operating at their maximum thermal capacity, with no margin for additional loading due to the limitations of the existing ACSR conductors. This poses a critical bottleneck in ensuring reliable power supply to the Jammu region, particularly for the strategically vital Gladni Grid Sub-Station and the Chowadhi Grid Sub-Station, which is planned for augmentation to 2x160 MVA in future.

In view of the above, and given the strategic importance of these grid sub-stations to the region's power infrastructure, we urgently request PGCIL to prioritize the upgradation of the conductors on the said 220 KV transmission lines to High-Temperature Low-Sag (HTLS) conductors. This upgradation is imperative to enhance the transmission capacity, ensure operational reliability, and fully utilize the installed capacities of the 710 MVA Gladni Grid Sub-Station and the 160 MVA (with planned 2x160 MVA) Chowadhi Grid Sub-Station. Immediate action is critical to prevent potential load curtailments and ensure uninterrupted power supply to the region.

We kindly request your expeditious intervention to initiate the necessary technical evaluations and implementation processes. JKPTCL assures full cooperation and support to facilitate the timely execution of this upgradation.

Yours Sincerely,

20/06/2025

Chief Engineer (Transmission)
Jammu, JKPTCL

Copy to:

1. The Managing Director, JKPTCL, J&K, Jammu for kind information with a request to take up the matter with the PGCIL authorities on top priority.
2. Superintending Engineer, O&M, Circle-I, JKPTCL, Jammu for information.
3. Executive Engineer, TLMD-II,JKPTCL, Jammu Jammu for information and necessary follow-up action.

Annexure-I

Annexure-A.VI

Rahul Tewari, IAS
ਰਾਹੁਲ ਤਿਵਾੜੀ, ਆਈ.ਏ.ਐਸ.
Secretary
ਸਕੱਤਰ
Telc. No. 0172-2743189

D.O. No. 1/18/2011-EC(PR)/749
ਅੱਧ ਸ.ਪੱ. ਨੰ :

Government of Punjab
ਪੰਜਾਬ ਸਰਕਾਰ
Deptt. of Science Technology & Environment, Housing & Urban Development, Power And Chairman-cum-Managing Director, Punjab State Transmission Corporation Limited.
ਵਿਗਿਆਨ ਤਕਨੀਕ ਅਤੇ ਵਾਤਾਵਰਣ, ਮਕਾਨ ਉਸਾਰੀ ਤੇ ਸ਼ਹਿਰੀ ਵਿਕਾਸ ਅਤੇ ਊਰਜਾ ਵਿਭਾਗ ਅਤੇ ਚੇਅਰਮੈਨ-ਕਮ-ਮੈਨੇਜਿੰਗ ਡਾਇਰੈਕਟਰ, ਪੰਜਾਬ ਰਾਜ ਟਰਾਂਸਮਿਸ਼ਨ ਕਾਰਪੋਰੇਸ਼ਨ ਲਿਮਟਿਡ
Chandigarh
ਚੰਡੀਗੜ੍ਹ

Chandigarh the ...14/08/2024.....

Subject: **Shifting of 220 KV Rashiana-Verpal & 220KV Patti-Verpal single circuit lines to 400 KV Substation PGCIL Amritsar (Balachak) - reg.**

Dear Ravisankar ji;

You may be aware that Clause 9 of the Indian Electricity Grid Code (IEGC) 2023 mandates that a connectivity agreement be signed between the State Transmission Utility (STU), Central Transmission Utility (CTU), and the Transmission Licensee for new Inter-State Transmission System (ISTS) connectivity. Additionally, the transmission asset must be registered on the National Single Window System (NSWS) portal before any physical connection to the ISTS.

Accordingly, on 23rd May 2024, PSTCL submitted applications (Numbers: 2200000835 and 2200000836) on the NSWS portal for the relocation of the 220 KV Rashiana-Verpal and 220 KV Patti-Verpal single circuit lines from the 220 KV Verpal end to the 400 KV Substation PGCIL Amritsar (Balachak). These projects, which are expected to be commissioned soon, are currently pending because the draft connectivity agreements have not yet been generated.

CTUIL has raised concerns about the single bus bar arrangement at the 220 KV Substation Patti, citing non-compliance with CEA guidelines. On 27th June 2024, PSTCL formally informed CTUIL that a 220 KV double bus scheme at the 220 KV Substation Patti is under planning, and the relevant documentation in this regard will be provided once finalized. However, the requisite approval has not been received so far.

I may add that the 220 KV Substation Patti, commissioned in 1989, is an older facility and, therefore, lacks a double bus-bar system. PSTCL plans to upgrade the substation with a second bus bar in the future.

These projects are nearing completion and are urgently needed to balance the loading conditions in the area. In view of this, it is requested that the processing of the NSWS applications and the subsequent draft connectivity agreements for these works be expedited.

Yours sincerely,

Regards;

(Rahul Tewari)

Sh. G. Ravisankar,
Chairman,
Central Transmission Utility of India Ltd,
Gurgaon, Haryana

Annexur-II

Annexure-A.VII

Regarding Approval of NSWS application no- 2200000835 & 2200000836 regarding Shifting of 220kV Rashiana-Verpal S/C & 220kV Patti-verpal S/C to 400kV PGCIL Amritsar (Balachak) from Verpal end

From: SE Planning (se-planning@pstcl.org)

To: kanhaiya.cea@gov.in; cea-pspa1@gov.in

Cc: ce-tl@pstcl.org; se-sldcop@punjabsldc.org; i.sharan@nic.in; ase-sldcop@pstcl.org; srxen-plann1@pstcl.org

Date: Friday, August 30, 2024 at 03:22 PM GMT+5:30

Dear Sir,

As you are aware that the clause 9 of the Indian Electricity Grid Code (IEGC) 2023 requires a connectivity agreement to be signed between the State Transmission Utility (STU), Central Transmission Utility (CTU), and transmission licensee for a new Inter-State Transmission System (ISTS) connectivity. Additionally, the transmission asset must be registered on the National Single Window System (NSWS) portal before the physical connection to ISTS.

Accordingly, on 23rd May 2024, PSTCL submitted applications (numbers: 2200000835 and 2200000836) on NSWS portal for the relocation of the 220kV Rashiana-Verpal and 220kV Patti-Verpal single Circuit lines from the 220 kV Verpal end to the 400kV Substation PGCIL Amritsar (Balachak). These projects, are ready to energize but are currently pending because the draft connectivity agreements have not yet been generated by CTUIL.

Thereafter, CTUIL had raised concerns about the existing single bus bar arrangement at 220kV substation Patti and some communication/OPGW related issues at 220kV S/S Rashiana, citing non-compliance with CEA guidelines. Subsequently on 27.06.2024, PSTCL had formally informed CTUIL that a 220kV double bus scheme at 220kV Substation Patti is under planning, and the relevant documentation in this regard will be provided once finalised. However, the requisite approval has not been received so far. Further, vide DO letter no 1/18/2011-EB(PR)/749 dated 14.08.2024, it was intimated to Chairman of CTUIL that the 220kV Substation Patti, commissioned in 1989, is an older facility and therefore, lacks a double bus-bar system and PSTCL plans to upgrade the substation with a second bus bar in future, and had requested to expedite the processing of NSWS applications and subsequently draft agreements for these works.

Most recently, the matter was also conveyed by PSTCL at the NRPC forum in the recently held 222nd OCC meeting, wherein NRPC was of the opinion that 220kV S/S Patti, being an existing substation, should not be an issue and the said agreement should have been cleared by the concerned agencies. NRPC advised PSTCL to approach CEA in this regard, so that the transmission assets (where all erection related works have been completed) can be commissioned at the earliest.

In the light of above, PSTCL requests the intervention of CEA in the matter regarding processing of the said NSWS applications and issuance of draft agreements by CTUIL for these works as these works stand ready to be energized and are urgently required to balance the loading conditions in the area.

Regards

Dy. CE/Planning,
PSTCL, Patiala.

Annexure-III

Annexure-A.VIII

Rahul Tewari, IAS
ਰਾਹੁਲ ਤਿਵਾੜੀ, ਆਈ.ਏ.ਐਸ.
Secretary
ਸਕੱਤਰ
Tele. No. 0172-2743189

D.O. No.1/18/2011-EB(PR)/1265
ਅੱਧ.ਸ.ਪੱ.ਨੰ :
Government of Punjab
ਪੰਜਾਬ ਸਰਕਾਰ
Deptt. of Housing & Urban Development, Power And Chairman-cum-Managing Director, Punjab State Transmission Corporation Limited, Deptt. of New And Renewable Energy Sources.
ਮਕਾਨ ਉਸਾਰੀ ਤੇ ਸ਼ਹਿਰੀ ਵਿਕਾਸ ਅਤੇ ਊਰਜਾ ਵਿਭਾਗ ਅਤੇ ਚੇਅਰਮੈਨ-ਕਮ-ਮੈਨੇਜਿੰਗ ਡਾਇਰੈਕਟਰ, ਪੰਜਾਬ ਰਾਜ ਟਰਾਂਸਮਿਸ਼ਨ ਕਾਰਪੋਰੇਸ਼ਨ ਲਿਮਟਿਡ ਅਤੇ ਨਵੀਂ ਤੇ ਨਵੀਨਿਆਉਣਯੋਗ ਊਰਜਾ ਸਰੋਤ ਵਿਭਾਗ
Chandigarh
ਚੰਡੀਗੜ੍ਹ
Chandigarh the 28/11/2024

Subject: **Regarding Connectivity agreement of shifting of 220 KV Rashiana-Verpal & 220 KV Patti- Verpal Single Circuit lines to 400 KV Sub-Station PGCIL Amritsar (Balachak) and Opinion of CTUIL regarding requirement of connectivity agreement for 220 KV Sherpur.**

Dear Abhay ji;

Please refer to my demi-official letter No. 1/18/2011-EB(PR)/749 dated August 14, 2024 (copy enclosed), wherein it was requested to expedite the processing of NSWS applications and issuance of draft connectivity agreements for the relocation works of the 220 kV Rashiana–Verpal and Patti–Verpal lines from the 220 kV Verpal end to the 400 kV PGCIL Amritsar (Balachak) Sub-Station.

The aforesaid request remains unresolved by CTUIL due to the non-availability of a double busbar at the 220 kV Patti Sub-Station. This matter was also discussed in the NRPC forum during the 222nd OCC meeting, where NRPC indicated that the existing 220 kV Patti Sub-Station should not pose any issues and that the relevant agreement should have been approved. NRPC further recommended that PSTCL consults with CEA to expedite the commissioning of completed transmission assets.

Accordingly, PSTCL reached out to CEA on August 30, 2024, requesting their intervention to expedite the issuance of draft agreements for the specified projects by CTUIL. Subsequently, on October 22, 2024, PSTCL contacted CEA again to arrange a meeting involving CTUIL, CEA, and PSTCL to address and resolve the matter at the earliest.

The urgency of these projects cannot be overstated as they are critical to balancing the loading conditions in the Amritsar and Ludhiana areas. Additionally, PSTCL approached CTUIL on August 8, 2024, and September 24, 2024, seeking clarifications on the ongoing upgradation of the 220 kV Sherpur Sub-Station, which involves the LILO connectivity of the 220 kV Dhandari Kalan–(BBMB) Jamalpur line.

Contd. P/2

It is pertinent to note that the 220 kV Jamalpur Sub-Station is owned by BBMB, whereas the 220 kV Dhandari Kalan–Jamalpur line is an asset of PSTCL. Moreover, the State of Punjab holds a share of power from the 220 kV Jamalpur (BBMB) Sub-Station, and the commissioning of the 220 kV Sherpur Sub-Station is expected by December 2024.

PSTCL has conveyed to CTUIL that a connectivity agreement for the energization of the 220 kV Sherpur Sub-Station is not necessary based on the above rationale. PSTCL has requested CTUIL to communicate its position promptly if it disagrees, to ensure that the energization of the 220 kV Sherpur Sub-Station proceeds without undue delay. However, this matter also remains pending with CTUIL to date.

In light of the above, you are kindly requested to:

1) Expedite the processing of NSWS applications and the subsequent draft connectivity agreements for the relocation of the 220 kV Rashiana–Verpal and 220 kV Patti–Verpal lines.

2) Provide a conclusive opinion regarding the necessity of a connectivity agreement for the 220 kV Sherpur Sub-Station with the LILO of the 220 kV Dhandari Kalan–Jamalpur (BBMB) line.

With regards, Yours sincerely,

(Rahul Tewari)

Sh. Abhay Choudhary,
Chairman,
Central Transmission Utility of India Limited,
Gurugram, Haryana

Endst. No. 1/18/2011-EB(PR)/1269 Dated: 28/11/2024

Copy of the above is forwarded to the Director/Technical, PSTCL, Patiala for information and further necessary action please.

OSD/Power Reforms

CEA-PS-14-77/1/2020-PSETD Division

1/46171/2025

Annexure-IV

Annexure-A.IX

भारत सरकार/ Government of India

विद्युत मंत्रालय/ Ministry of Power

केन्द्रीय विद्युत प्राधिकरण/ Central Electricity Authority

विद्युत प्रणाली अभियांत्रिकी एवं प्रौद्योगिकी विकास प्रभाग

Power System Engineering & Technology Development Division

सेवा में,

<as per attached list>

विषय: Minutes of the meeting held on 15.01.2025 to discuss the issue regarding connectivity agreements of shifting 220 kV Rashiana-Verpal and 220 kV Patti-Verpal Single circuit lines to 400 kV Substation PGCIL Amritsar (Balachak)

महोदया/ महोदय,

A meeting was held under the chairmanship of Member (PS), CEA on 15.01.2025 at 11:00 hrs through online mode to discuss the issue regarding connectivity agreements of shifting 220 kV Rashiana-Verpal and 220 kV Patti-Verpal Single circuit lines to 400 kV Substation of PGCIL Amritsar (Balachak) Sub-Station.

The minutes of the meeting are attached for your information and necessary action.

भवदीय,

Signed by Pankaj Kumar Verma
Date: 16-01-2025 10:04:51

(पंकाज कुमार वर्मा /Pankaj Kumar Verma)

उप-निदेशक/Dy.Director

To,

CMD, POWERGRID	cmd@powergrid.in
M/s CTUIL	ashok@powergrid.in, kksarkar@powergrid.in
M/s NRPC	ms-nrpc@nic.in, dharmendra.cea@nic.in
M/s Grid-India	cmd@grid-india.in, nrldcso@grid-india.in, nroy@grid-india.in
M/s PSTCL	cmd@pstcl.org, dir-tech@pstcl.org

Copy to,

1. CE (PSPA-I), CEA
2. CE (GM), CEA
3. SA to Member (PS), CEA
4. Chief Engineer, PCD, CEA
5. Chief Engineer, PSPM, CEA
6. Chief Engineer, CEI, CEA

Minutes of the meeting held on 15.01.2025 to discuss the issue regarding connectivity agreements of shifting 220 kV Rashiana-Verpal and 220 kV Patti-Verpal Single circuit lines to 400 kV Substation PGCIL Amritsar (Balachak)

List of participants is at **Annexure-I.**

A meeting was convened on 15.01.2025 under the chairmanship of Member (PS), CEA to discuss regarding issuance of connectivity agreements for the relocation works of the 220-kV Rashiana- Verpal and Patti-Verpal lines from the 220 kV Verpal end to the 400 kV PGCIL Amritsar (Balachak) Sub-Station.

PSTCL briefed that they have submitted applications on the National Single Window System (NSWS) portal for the relocation of the 220 kV Rashiana-Verpal and 220 kV Patti-Verpal Single Circuit lines form the 220 kV Verapal end to the 400 kV substation PGCIL Amrtisar (Balachak). However, CTUIL has raised the concerns about the single bus bar arrangement at the 220 kV Patti Substation, citing non-compliance of Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022.

CTUIL appraised that as per Clause 44(2), Table 7 of the Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022, the switching scheme for voltage levels of 220 kV or 230 kV shall be either a Double Main and Transfer Bus Scheme or Double Bus Scheme or Main and Transfer Bus Scheme. However, the Scheme at Patti Substation at 220 kV is Single Bus Scheme.

Superintended Engineer (NRPC) stated that the matter was discussed in the NRPC forum during the 222nd OCC meeting, where NRPC recommended that PSTCL may consult with CEA for the exemption of the requirement of double bus scheme at Patti Substation.

Deputy Director (PSETD) stated that Double main and transfer bus scheme or Double bus scheme or Main and transfer bus scheme provides the reliability. Therefore, in case of Single Bus scheme, for the maintenance of the Bus, all the feeders associated with the section are to be taken into shutdown, thereby reducing the reliability of the Power supply.

PSTCL stated that there is space constraint at the Pati Substation. The Patti Substation was commissioned in 1989 and therefore is quite old Substation.

Member (PS) suggested PSTCL to upgrade the Substation to Double bus and Transfer Scheme. He further suggested that if there is space constraint then GIS option may be explored. He suggested that a team comprising of CEA, CTUIL, Grid-India, Power Grid and NRPC may visit the site to study the matter in details and to recommend the measures to be taken by PSTCL for ensuring the reliability of power supply.

The meeting was concluded with the following decisions:

1. At present CTUIL may grant the connectivity considering that Patti Substation was commissioned in 1989 much before notification of above-mentioned Regulations and space constraint at the Substation.
2. A team comprising of CEA, CTUIL, Grid-India, Power Grid and NRPC may visit the site to study the matter in details and to recommend the measures to be taken by PSTCL for ensuring the reliability of power supply and upgradation of the Substation. CTUIL may coordinate the team visit.

Meeting ended with thanks to the chair.

***

Annexure-I

List of participants

CEA

1. Sh. A.K. Rajput, Member (PS)
2. Sh.N.R.L.K. Chief Engineer (PSE&TD)
3. Ms.Rishika Saran (Chief Engineer)
4. Sh. Bhanwar Meena, Director (PSE&TD)
5. Sh. Pankaj Kumar Verma, Deputy Director (PSE&TD)

NRPC

Sh. Dharmendra Meena, Superintended Engineer

CTUIL

1. Sh. K K Sarkar, Senior General Manager
2. Sh. Thiagarajan, Senior General Manager
3. Sh. Vishwas Kanwat, DGM
4. Sh. Akshat Agrawal

PSTCL

1. Sh. Sanjeev Kumar Sood, Chief Engineer
2. Sh. Ravi Luthra, Superintending Engineer (Planning)

(ISO 9001 : 2015)

Centre for Construction Development & Research
National Council for Cement and Building Materials
(Under the Administrative Control of Ministry of Commerce & Industry, Govt. of India)
34 Km Stone, Delhi-Mathura Road (NH-2), Ballabgarh - 121004, Haryana, India

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राष्ट्रीय सीमेंट एवं भवन सामग्री परिषद्
(भारत सरकार के वाणिज्य एवं उद्योग मंत्रालय के प्रशासनिक शासनाधीन)
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स्पीडपोस्ट/ ई-मेल

संदर्भ: सी डी आर/ एस पी-6748
10 मार्च 2025

श्री मनोज जैन
महाप्रबंधक,
पावर ग्रिड कॉर्पोरेशन इंडिया लिमिटेड।
400/220 केवी सब स्टेशन
बस्सी सब स्टेशन, दामोदरपुरा, बस्सी,
जयपुर, राजस्थान-303301
ईमेल- mkjain@powergridindia.com

(द्वारा : श्री पी.एन. ओझा, संयुक्त निदेशक एवं एचओसी-सीडीआर)

Sub: Condition Assessment of Residential Quarters of Type-B (17no.), Type-C (5no.), Type-D (1nos), Recreation Center (1nos) & Transit Camp (1nos) at PGCIL 400/220kv Bassi Substation Damodarpura, Bassi, Distt-Jaipur. Reg. Final Report

श्रीमान,

उपरोक्त विषय के संदर्भ मे अंतिम रिपोर्ट की तीन प्रतियां संलग्न कर रहे है। कृपया रिपोर्ट प्राप्ति के बाद सूचित करे।

धन्यवाद!

भवदीय
राष्ट्रीय सीमेंट एवं भवन सामग्री परिषद
नितिन चौधरी 10/03/25
नितिन चौधरी
समूह प्रबंधक और प्रोग्राम लीडर
निर्माण विकास एवं अनुसंधान केंद्र

संलग्न : अंतिम रिपोर्ट की तीन प्रतियां

10/3

अनवर सलीम 10/3/25

Condition Assessment of Residential Quarters

Type-B (17nos.), Type-C (5nos.), Type-D (1no.), Transit Camp (1no.) and Recreation Centre (1no.) of 400/220kv Bassi, Rajasthan

For

Power Grid Corporation of India Limited

FINAL REPORT
CDR/SP-6748
MARCH 2025

Centre for Construction Development and Research
NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
34 Km Stone, Delhi-Mathura Road, NH-2, Ballabgarh – 121 004 (Haryana)

REPORT

Condition Assessment of Residential Quarters Type-B (17nos.), Type-C (5nos.), Type-D (1no.), Transit Camp (1no.) and Recreation Centre (1no.) of 400/220kv Bassi, Rajasthan
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FINAL REPORT

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34 Km Stone, Delhi-Mathura Road, NH-2, Ballabgarh – 121 004 (Haryana)

Prepared By	Anwar Salim	A.Salim 10/3/25
Checked By	Mantu Gupta	Mantu 10/3/25
Approved By	Nitin Chowdhary	10/3/25

Electronic File Ref: CDR-2/F:/Report/SP- 6702-10032025	Report No. NCB/CDR/3693 Version: Final	No. of Pages 63

CONTENTS

1.0 INTRODUCTION

PGCIL had approached National Council for Cement and Building Materials (NCCBM) to undertake the work of "Condition Assessment of Residential Quarters of Type-B (17nos.), Type-C (5nos.), Type-D (1no.), Transit Camp (1no.) and Recreation Centre (1no.) at PGCIL 400/220KV Bassi Substation Damodarpura, Bassi, Distt- Jaipur. Consequently, preliminary site inspection was carried out by NCCBM officials on 8th February 2024 to define the scope of work for the condition assessment of these structures. Based on the preliminary site inspection, NCCBM had submitted the proposal for the condition assessment vide our letter No. Ref. CDR/SP-6280/SAR-349 dated 20th February 2024. Subsequently, PGCIL had issued Letter of Award (LoA) No. N1/C&M/24-25/ST-PAC basis/ LOA/24-108133/01 dated 2nd July 2024.

Accordingly, NCCBM had started the condition assessment work with the following mutually agreed scope of work between PGCIL and NCCBM:

Scope of work:

i) Detailed visual inspection of the subject structures. This will involve recording the visual observations regarding the structural and non-structural components of the buildings along with the details of apparent signs of distress observed in the RCC members/brick wall. The results of the detailed visual inspection will be supported and supplemented with photographs wherever possible.

ii) Conducting investigation using Non-Destructive testing and laboratory testing of in-situ samples collected from site. This will involve the following:

a) Determination of equivalent cube compressive strength (if feasible) of concrete in RCC members of the super structure using concrete core extraction & testing technique as per IS 456:2000 & IS 516 (Part 4) : 2018. For this, concrete cores of 60 mm diameter will be extracted. The locations from which the concrete cores are extracted will be decided by NCCBM team deputed for assessment in coordination with representatives of PGCIL. In case extraction of intact concrete cores suitable for compressive strength testing appears to be difficult due to reasons such as breakage, washing out of cores, etc., during the process of extraction, same will be recorded and reported in the report.

b) Carry out Ultra Sonic Pulse Velocity (UPV) testing of concrete in RCC members as per IS 516 (Part 5/Sec 1): 2018 to assess the quality of concrete. The UPV testing shall be carried out at points which are accessible and on well prepared concrete surfaces. The test will be done by cross probing method where two opposite faces of the member are readily accessible at the same time. Wherever only one face of the RCC member is readily accessible at a time, the test will be done by surface probing method.

c) Measurement of the depth of carbonation front IS 516 (Part 5/Sec 3): 2021 on the extracted concrete cores and/or other in-situ samples of concrete.

d) Half Cell Potential test as per IS 516 (Part 5/Sec 2): 2021 to determine the likely corrosion condition of reinforcement bars in few selected and safely accessible RCC members.

e) Surface electrical resistivity test on concrete using four-point Wenner Probe Technique in few selected and safely accessible members.

f) Laboratory testing on in-situ samples of joining mortar in the brick wall collected from the site to determine sulphate content. These samples will be collected from safely accessible locations.

g) Laboratory testing on in-situ samples of bricks for determination of Compressive Strength, Efflorescence & water absorption. The sample of 10 bricks from each type of structure will be collected.

h) Chemical analysis of hardened concrete samples in the laboratory. This will involve evaluation of chlorides, sulphates and pH of the concrete.

i) Determining the extent of distress in RCC slabs and brick walls based on the above investigation and arriving at conclusions and recommendations regarding further action to be taken.

j) Preparation of Report covering a) to i) above.

2.0 DESCRIPTION OF STRUCTURE & DATA/DOCUMENT PROVIDED BY SPONSOR

PGCIL 400/220KV Bassi Substation Damodarpura, Bassi, Dist-Jaipurhas residential Quarters of Type-B (17 nos.), Type-C (5 nos.), Type-D (1 no.), Transit Camp (1 no.) and Recreation Centre (1 no.). Type B and Type C were (G+1) storied. Type D quarters, Recreation Centre and the Transit Camp were single-story. D-Type Quarter contains one garage and one servant quarter too. All the buildings were load bearing structures having stone masonry walls and RCC slabs.

It was informed by the PGCIL representatives on the day of site inspection, the construction of B-type, C-Type & D-Type Quarters, Transit camp & Recreation Centre around 1992-1993. The data regarding the grade of concrete used, concrete mix design, type & grade of steel, structural & architectural drawings were not provided by PGCIL Bassi representative.

3.0 CONDITION ASSESSMENT METHODOLOGY

The methodology adopted for condition assessment covers following three parts:

Visual Observations covering visual inspection, recording & photography of apparent visible condition of the structure and categorizing the various RCC members based on the visible state of distress.

Site Investigation & Sampling covers identification of sample RCC members by random sampling technique and onsite NDT testing such as UPV testing, Concrete Cover Measurement, Core extraction, Half Cell Potential Measurement, Electrical Resistivity measurement, etc.

Laboratory Investigation covers testing of concrete core strength, grinding of concrete cores for further chemical testing i.e. to determine the chloride content, sulphate content & pH.

Based on the visual observations, site investigation and laboratory testing results, the conclusion is derived to define the root cause of distress in the structure.

3.1 Visual Observations:

During visual observation, any apparently visible signs of deterioration in concrete members have been considered as a sign of distress. Distress in any RCC structures/members occurs due to various reasons like carbonation induced corrosion and chloride induced corrosion, over-loading, settlement etc. and may result into reduction in service life of the structure. Generally, distress in concrete manifests itself in many forms such as cracking, spalling of concrete, corrosion of reinforcement steel, seepage etc. During the visit, these signs/if any were looked out for and the recorded details are given in section 4.1 of this report. The photographs indicating the distress observed and on-site testing conducted are shown in Annexure-I.

3.2 Ultrasonic Pulse Velocity (UPV) Testing as per IS 516 (Part 5/Sec 1):2018

UPV is a non-destructive evaluation method for assessing the concrete quality grading; density, homogeneity and uniformity. Basic principle of UPV method is given below.

In this method, an ultrasonic pulse of longitudinal vibrations is produced by an electro-acoustical transducer which is held in contact with one surface of the concrete member under test. When the pulse is induced into the concrete from a transducer, it undergoes multiple reflections at the boundaries of the different material phases within the concrete. A complex system of stress waves is developed which includes longitudinal (compression) waves. The receiving transducer detects the onset of the longitudinal waves, which is the fastest. After traversing a known path length of the member, the pulse of vibrations is converted into an electric signal by a second electro-acoustical transducer, and an electric timing circuit enables the transit time of the pulse to be measured, from which the pulse velocity is calculated.

The Ultrasonic Pulse Velocity in concrete is mainly related to its density and modulus of elasticity. This in turn depends upon the materials and mix proportions used in making concrete as well as methods of placing, compaction and curing of concrete. If the concrete is not thoroughly compacted, or if there is segregation of concrete during placing or there are internal cracks or flaws, the pulse velocity will be lower, although the same materials and mix proportions are used.

There are three methods of conducting UPV test depending upon availability of faces of RCC members in the structure. One is cross-probing (or direct-probing), in which the transducers are held on two opposite faces of the RCC members. If the opposite face is not available, then transducers are held on adjacent faces of the RCC member, this method is known as ‘semi-direct probing’ technique. If the opposite faces are not available, then transducers are held on same face of the RCC member. This method is known as ‘surface probing’ technique involving transmission of Ultrasonic Pulse through the concrete surface. Surface probing in general gives lower pulse velocity than in case of cross probing and depending on number of parameters, the difference could be of the order of about 0.5 km/s.

The underlying principle of assessing the concrete quality grading from UPV method is that, comparatively higher pulse velocities are obtained when the ‘quality’ of concrete in terms of density, homogeneity and uniformity is good. In case of concrete of poorer quality, lower velocities are obtained.

On this basis, guidelines have been evolved for characterizing the concrete quality grading in structures in terms of ultrasonic pulse velocity. Such guideline is given in Table A, which is reproduced from IS 516 (Part 5/Sec 1): 2018 (Amendment No. 1 dated November 2019).

TABLE A

VELOCITY CRITERIA FOR CONCRETE QUALITY GRADING (reproduced from Table 1 of IS 516 (Part 5/Sec 1):2018) [UPV by cross probing method]

SI. No.	**Average Value of Pulse Velocity by Cross Probing Km/s**	**Concrete Quality Grading**
i) For concrete (≤ M 25):		
a)	Above 4.50	Excellent
b)	3.50 - 4.50	Good
c)	Below 3.50	Doubtful[1)]
ii) For concrete (> M 25):		
a)	Above 4.50	Excellent
b)	3.75 - 4.50	Good
c)	Below 3.75	Doubtful[1)]
[1)] In case of 'Doubtful quality', it may be necessary to carry out additional tests.		

For the present investigation, accessible RCC members were selected to conduct the UPV test. After removing plaster etc., the surface of the RCC members were thoroughly cleaned and smoothened with carborundum/grinding stone. The RCC members were then divided in parts at suitable grid spacing and UPV measurements were taken on the grid points marked by cross probing/surface probing technique depending on accessibility of opposite faces of RCC members using UPV Tester PUNDIT (Portable Ultrasonic Non-Destructive Digital Indicative Tester) Lab of make PROCEQ. Grease was used as coupling medium between the transducer face and the concrete surface.

3.3 Concrete Core Testing as per IS 516 (Part 4): 2018

Concrete cores of 60-mm diameter were obtained from different structural members identified, to estimate equivalent cube compressive strength of the structure. Equivalent cube strength does not indicate 28 days' standard cube strength rather it represents the in-situ cube strength and is compared vis-à-vis strength used in design calculation with safety of the structure under load in mind.

There are a number of parameters, which influence the measured compressive strength. Such parameters include size (diameter) of the specimen, length-to-diameter ratio, direction of drilling, method of capping, drilling operations, moisture conditions of cores at the time of testing etc. Many of these parameters have been standardized.

The second set of variables relates to the intrinsic difference that exists between the concrete in structure and in standard laboratory-controlled specimens, the core specimens representing the former. Such intrinsic differences are due to inherent differences that may occur in mixing constituents, degree of compaction, extent of curing and temperature condition in two cases. The procedure for sampling,

preparing, testing and calculating the equivalent compressive strength with corrections are given in IS 516 (Part 4):2018.

The Clause 17.4.3 of **IS 456:2000** (Code of Practice for Plain and Reinforced Concrete) consider that concrete in the area represented by a core test is acceptable if the average equivalent cube strength of the cores is equal to at least 85 percent of the cube strength of the grade of concrete specified for the corresponding age and no individual core has a strength less than 75 percent.

3.4 Concrete Cover Study

Concrete cover, in reinforced Concrete, is the least distance between the surface of embedded and the outer surface of the Concrete

The concrete cover must have a minimum thickness for three main reasons:

- To protect the steel reinforcement bars (rebars) from environmental effects to prevent their corrosion;
- To protect the reinforcement bars from fire, and;
- To give reinforcing bars sufficient embedding to enable them to be stressed without slipping.

The premature failure of corroded steel reinforcements and the expansion of the iron corrosion products around the rebars are amongst the main causes of the concrete degradation. A sufficient thickness of concrete cover is required in order to slow down the electrochemical process in concrete towards the rebar. The minimum concrete cover will depend on the environmental conditions encountered and must be thicker when the concrete is also exposed to moisture and chloride.

For a longitudinal reinforcing bar in a Column nominal cover shall in any case not be less than 40 mm or less than the diameter of such bar as per clause 26.4.2.1 of IS 456:2000. For footing, minimum cover shall be 50mm as per clause 26.4.2.2 of IS 456:2000.

Minimum values for the nominal cover of normal weight aggregate concrete which should be provided to all reinforcement including links depending on exposure condition are specified in Table 16 of IS 456:2000 which is reproduced as Table-B below:

Table B: Nominal Cover to Meet Durability Requirements

(IS 456:2000; Table 16; Clause 26.4.2)

Exposure	Nominal concrete cover not less than (mm)
Mild	20
Moderate	30
Severe	45
Very severe	50
Extreme	75

Note:

a. For main reinforcement up to 12 mm diameter bars for mild exposure the nominal cover may be reduced by 5mm.

b. Unless specified otherwise, actual concrete cover should not deviate from the required nominal cover by +10mm & 0 mm.

c. For exposure condition severe and very severe reduction of 5 mm may be made where concrete grade is M35 and above.

Measurement of thickness of concrete cover provided to reinforcing bars was carried out at site by using an electromagnetic cover meter (Profoscope of Make-Proceq) at site on safe & accessible locations. Profoscope detects the reinforcing bars and mesh, to measure their cover depth. The instrument is based on the magnetic technique and is calibrated for different purposes.

3.5 Carbonation Test as per IS 516 (Part 5 / Sec 3):2021

Carbonation is the formation of calcium carbonate ($CaCO_3$) by chemical reactions in concrete. When CO_2 penetrates into the hardened concrete, it reacts with Portlandite [Portlandite is a mineral formed during the curing of concrete, calcium hydroxide $Ca(OH)_2$ in the presence of moisture forming $CaCO_3$]. The rate of carbonation depends mainly on the relative humidity, the concentration of CO_2, the penetration pressure and the temperature of the environment where concrete is placed.

As carbon dioxide enters the concrete from the environment, it reacts with calcium hydroxide present in the concrete and depending upon the concrete quality grading it reduces the alkalinity of the pore fluids, thereby de-passivating ferric oxide layer on reinforcing bar which in turn initiates the process of corrosion in reinforcement.

To determine the depth of carbonation, concrete is exposed and sprayed with a pH indicator (solutions of 1% phenolphthalein in 70% ethyl alcohol). The demarcation between the region, which turns into magenta (dark pink colour) and the region showing no change in colour indicate the carbonation front.

The procedure for measurements is given in IS 516 (Part 5/Sec 3): 2021.

3.6 Half-Cell Potential (HCP) measurements as per IS 516 (Part 5/Sec 2): 2021

This test method is based on IS 516 (Part 5 /Sec 2): 2021, which covers the estimation of electrical Half Cell Potential of uncoated reinforcing steel, to determine corrosion activity using reference electrode copper; copper sulphate half-cell. It is not possible to expose all the reinforcements in the structural element and observe the extent of corrosion. So, this method has been very convenient to assess the condition of the entire length of a member by exposing a portion of the reinforcement at a suitable location, which measures the half-cell potential on the entire length, by placing the reference electrode on the wet concrete surface.

The Half-Cell Potential measurement is based on the principle that corrosion, being an electro-chemical process, induces certain voltage in the reinforcement steel that is corroding. The wetting of the concrete is required to make the portion between the concrete surface and the reinforcing bar as electrolytes.

The obtained values of test results are compared with criteria given in IS 516: (Part 5/Sec 2): 2021 to find the condition of corrosion in reinforcement steel. The criteria for corrosion status are reproduced in Table C.

TABLE C

Criteria for Corrosion Condition of Rebar in Concrete for Copper – Copper Sulphate Half-Cells

$Cu/CuSO_4$ Electrode

[ACCORDING TO IS 516 (Part 5/Sec 2): 2021]

Potentials over an Area	Likely Corrosion Condition
> –200mV or less negative than –200mV	Low (there is a greater than 90 percent probability that no reinforcing steel corrosion is occurring in that area at the time of measurement)
– 200mV to – 350mV	Corrosion activity of the reinforcing steel in that area is uncertain
<–350mV or more negative than –350mV	High (there is a greater than 90 percent probability that reinforcing steel corrosion is occurring in that area at the time of measurement)
< – 500mV	Severe corrosion

3.7 Electrical Resistivity measurement

Concrete resistivity is geometrical independent material property that indicates the ratio between the applied voltage and resulting current in a unit Cell. The resistivity of concrete impacts the current flow between the cathodic and anodic regions of the concrete. The higher the concrete resistivity, the lower the current flowing between anodic and cathodic areas will be, and therefore lower the corrosion risk. The Proceq® RESI™ Resistivity Meter permits a rapid and non-destructive measurement of the concrete quality grading with respect to its resistivity.

The Proceq® RESI™ Resistivity Meter i.e. a four-point Wenner probe resistivity meter is used for in-situ measurement of electrical resistivity in concrete. It uses a probe with four terminals set up in a linear array with a fixed distance between the probes. The two outer probes are for the introduction of the current, whereas the two center electrodes are the voltage measurement points. When the probe touches the concrete surface, the electronic control unit circulates the test current and measures the potential between the inner points. The electronic contact is made of foam pads, which are to be saturated with water preliminarily for electrical conductivity.

During the field investigation, electrical Resistivity testing was conducted using Proceq® RESI™ type Resistivity meter at identified safely accessible locations as selected by the NCB team deputed for Condition assessment.

Interpretation of Resistivity measurements from the Wenner four-probe system has been cited when referring to de-passivated steel (Langford and Broomfield, 1987)

Interpretation of Resistivity measurements with regard to corrosion risk for OPC concrete from the Table-2 of RILEM TC 154-EMC: Test Methods for on-site measurement of resistivity of concrete.

TABLE D

Risk of corrosion of reinforcement associated with concrete resistivity for 20°C and OPC Concrete	
Concrete Resistivity (kΩ -cm)	**Risk of corrosion**
<10	High
10-50	Moderate
50-100	Low
>100	Negligible

3.8 Chemical Analysis of Concrete Samples

Corrosion of reinforcing steel due to chlorides in concrete is one of the most common environmental attacks that lead to deterioration of concrete structures. Whenever there is chloride in concrete there is an increased risk of corrosion of embedded metal. Chloride content is then expressed in kg per cubic meter of concrete and compared with the values of limits of chloride contents of concrete (**Table 7 of IS 456:2000**).

Sulphates (SO_3) are present in most cements and in some aggregates; excessive amounts of water-soluble sulphate from these or other mix constituents can cause expansion and disruption of concrete. To prevent it, **IS 456:2000 clause-8.2.5.3** states that the total water-soluble sulphate content of the concrete mix, expressed as SO_3, **should not exceed 4 percent by mass of the cement** in the mix. The sulphate content should be calculated as the total from the various constituents of the mix.

The pH value of the concrete should be above 12.5 as desirable for alkaline environment around reinforcing steel to render it un-corroded. A reduction in the pH value of concrete indicates loss of passive layer around the reinforcement which protects the steel from distress.

For analyzing Chloride content, Sulphate (SO_3) content and pH of concrete, concrete cores were sliced into different layers and grinded into fine powder (passing 150µ IS: Sieve) and then tested as per IS:14959 Part (2) & IS:4032.

Note: Taking a conservative estimate of cement content in the mix as 300 kg/m^3 (for M25 grade of concrete which is the minimum grade for RCC under "Moderate" exposure as specified in IS 456:2000) and density of concrete as 2400 kg/m^3 is taken for the calculation of Chloride and Sulphate content.

3.9 Chemical Analysis of Mortar Samples

The cement mortar sample was collected from stone masonry wall at site. The sulphate content was determined through chemical analysis of mortar sample. Excessive amounts of water-soluble sulphate can cause expansion and disruption of joining mortar in brick walls.

Based on the seismic zone III [as per IS 1893 (Part 1): 2016] and Importance Factor 1 (as per Table 8 of IS 1893 (part 1): 2016), the building category will be determined as per Table 2 of IS 4326: 2013. On the basis of the category of the building, recommended mortar mix proportion of cement to sand

in mortar is given in Table 3 of IS 4326: 2013 is considered for further calculation. The results of mortar sample are compared with the requirement given in Table 3 of IS 4326: 2013. The same table is reproduced below as Table E. As per zone III & importance factor 1.0, building category C is considered and further as per Table 3 of IS 4326: 2013, the mortar mix 1:6 is considered.

Table E Recommended Mortar Mixes (Clauses 8.1.2.1 and 8.2.6)

S. No	Building Category	Proportion of Cement-Sand Mortar Mix
1	B	M3 (Cement: Sand -1: 7) or richer
2	C	M2 (Cement: Sand -1: 6) or richer
3	D	M1 (Cement-sand 1: 5) or richer
4	E	H2 (Cement: Sand -1: 4) or richer

4.0 RESULTS AND DISCUSSION

4.1 Visual Observations

Visual observations along with photographs showing the distress during the field investigation are attached as Annexure-I. Walls of all the tested buildings are of stone masonry. Detailed visual observations are given below:

Transit Camp:

1. Crack along the wall was observed. (Ref. Photo 1& 2)
2. Seepage spots were observed on walls and ceiling of room no. 01,02 & 04. (Ref. Photo 3 & 4)
3. Cracks were observed on walls in waiting hall. (Ref. Photo 5&6)
4. Crack was observed on wall of room no.03. (Ref. Photo 7)
5. Seepage spots were observed on wall of dining hall. (Ref. Photo 8)
6. Crack was observed on wall of dining hall. (Ref. Photo 9)
7. Spalling of concrete on soffit were observed. (Ref. Photo 10)

Recreation Centre:

1. Seepage spots were observed on walls. (Ref. Photo 11)
2. Cracks on the wall was observed. (Ref. Photo 12)

D Type Quarter:

1. Heavy spalling of concrete in ceiling with exposed reinforcement steel was observed. The exposed reinforcement steel seems to be in corroded condition. (Ref. Photo 13)
2. Spalling of concrete in patches with exposed reinforcement steel was observed on ceiling. The exposed reinforcement steel seems to be in corroded condition. (Ref. Photo 14)
3. Seepage spots were observed on the walls & ceiling. (Ref. Photo 15)
4. Cracks was observed on the walls. (Ref. Photo 16 & 17)
5. Termite growth was observed on the walls. (Ref. Photo 18)
6. Crack on external wall was observed. (Ref. Photo 19)

B Type Quarters

1. Seepage spots were observed on the ceiling and walls at many locations. (Ref. Photo 20 & 21)
2. Crack on the wall was observed at many locations. (Ref. Photo 22)
3. Spalling of concrete with exposed reinforcement steel was observed on slab above staircase of some quarters. The exposed reinforcement steel seems to be in corroded condition. (Ref. Photo 23)
4. Past repair work was observed on walls at many quarters. (Ref. Photo 24)
5. Spalling of concrete was observed on ceiling of quarter no B-5. (Ref. Photo 25)
6. Crack on the staircase of quarter no B-17 & B-18 was observed. Vegetation growth was observed on staircase. (Ref. Photo 26 & 27)
7. Spalling of concrete in patches with exposed reinforcement steel was observed on ceiling of quarter B-17. (Ref. Photo 28)
8. Seepage spots was observed on ceiling and walls of quarter B-18. (Ref. Photo 29)
9. Vegetation growth was observed on terrace. (Ref. Photo 30)

C Type Quarters

1. Heavy spalling of concrete with exposed reinforcement steel was observed in quarter no. C-7 & C-8. (Ref. Photo 31& 32)
2. Seepage spots was observed on ceiling and walls of some of quarters. (Ref. Photo 33 & 34)
3. Cracks on the wall was observed at some quarters. (Ref. Photo 35)

4.2 Ultrasonic Pulse Velocity Testing (UPV)

The UPV testing was conducted on accessible & randomly identified 15 nos. RCC slabs of Transit Camp, Recreation Center & Quarters of PGCIL Bassi. The results of the UPV test values obtained on these RCC members are given in **Annexure-II.** The obtained UPV test results were used to determine the concrete quality grading considering M25 grade of concrete as per Table-A of this report (M25 is the minimum grade for RCC under "Moderate" exposure as specified in IS 456:2000).

The obtained Mean Pulse Velocity (UPV test) value by surface probing is varying from **2.88 km/s** to **4.53 km/s** i.e. concrete quality grading is mentioned in the tables

TABLE - 1

TEST RESULT OF ULTRASONIC PULSE VELOCITY

(Surface probing done is made equivalent to cross probing by increasing 0.5 km/sec in obtained results which are ≥ 3.0 km/sec) as per IS 516 (Part 5/Sec 1): 2018).

Method of Test	Locations (refer Annexure-II)	Mean Pulse Velocity obtained (km/s)	Mean Pulse Velocity made equivalent to cross probing by adding 0.5 km/sec for values ≥ 3.0 km/s in obtained results	Concrete Quality Grading as per IS 516 (Part 5/Sec 1): 2018
Surface Probing Technique	(refer S.No.1) Terrace Slab (S1) of Transit Camp	4.01	4.51	Excellent
		3.96	4.46	Good
		4.03	4.53	Excellent
		3.69	4.19	Good
	(refer S.No.2) Terrace Slab (S2) of Transit Camp	3.56	4.06	Good
		3.52	4.02	Good
		3.46	3.96	Good
		3.61	4.11	Good
	(refer S.No.3) Terrace Slab (S3) of Recreation Centre	3.97	4.47	Good
		3.88	4.38	Good
		3.92	4.42	Good
		3.77	4.27	Good
	(refer S.No.4) Terrace Slab (S4) of Recreation Centre	3.46	3.96	Good
		3.45	3.95	Good
		3.42	3.92	Good
		3.29	3.79	Good
	(refer S.No.5) Terrace Slab (S5) of Type D, Quarter no. D1	3.58	4.08	Good
		3.49	3.99	Good
		3.41	3.91	Good
		3.26	3.76	Good
	(refer S.No.6) Terrace Slab (S6) of Type D, Quarter no. D1	3.19	3.69	Good
		3.03	3.53	Good
		3.21	3.71	Good
		3.11	3.61	Good
	(refer S.No.7)	3.52	4.02	Good
		3.70	4.20	Good

Surface Probing Method	Terrace Slab (S7) of Type B Quarter no. B6	3.76	4.26	Good
		3.43	3.93	Good
	(refer S.No.8) Terrace Slab (S8) of Type B Quarter no. B5	3.63	4.13	Good
		3.37	3.87	Good
		3.59	4.09	Good
		3.20	3.70	Good
	(refer S.No.9) Terrace Slab (S9) of Type B Quarter no. B28	3.40	3.90	Good
		3.58	4.08	Good
		3.91	4.41	Good
	(refer S.No.10) Terrace Slab (S10) of Type B, Quarter no. B18	3.81	4.31	Good
		3.74	4.24	Good
		3.85	4.35	Good
		3.76	4.26	Good
	(refer S.No.11) Terrace Slab (S11) of Type B, Quarter no. B17	3.71	4.21	Good
		3.75	4.25	Good
		3.76	4.26	Good
		3.70	4.20	Good
	(refer S.No.15) Terrace Slab (S15) of Type B, Quarter no. B23	**2.92**	-	**Doubtful**
		2.89	-	**Doubtful**
		2.97	-	**Doubtful**
		3.65	4.15	Good
	(refer S.No.12) Terrace Slab (S12) of Type C, Quarter no. C7	3.22	3.72	Good
		3.34	3.84	Good
		3.13	3.63	Good
		2.99	-	**Doubtful**
	(refer S.No.13) Terrace Slab (S13) of Type C, Quarter no. C8	3.24	3.74	Good
		3.01	3.51	Good
		2.88	-	**Doubtful**
		2.96	-	**Doubtful**
	(refer S.No.14) Terrace Slab (S14) of Type C, Quarter no. C9	3.32	3.82	Good
		3.68	4.18	Good
		3.80	4.3	Good
		3.67	4.17	Good

Based on the UPV testing, the overall concrete quality grading is determined in the identified 15 nos. RCC slabs of Transit Camp, Recreation Center & Quarters of PGCIL Bassi. On perusal of UPV test results, it is observed that out of 15 locations, the quality grading of concrete is **'Good'** in 12 nos. of members and in rest 3 nos. of RCC members is in **Doubtful** category**.** The doubtful readings obtained may be due development of surface cracks in the slab.

4.3 Concrete Core Testing

Concrete cores samples were extracted from 8 nos. RCC slabs of Transit Camp, Recreation Center & Quarters of PGCIL Bassi to determine the equivalent cube compressive strength. The testing was done as per IS 516 (Part 4): 2018 at NCCBM Ballabgarh laboratory. Test results received are given in Table-2.

In absence of data regarding grade of concrete, the equivalent cube strength of concrete cores has been compared with the requirement for M25 grade of concrete which is the minimum grade for RCC under "Moderate" exposure condition as specified in IS 456:2000.

On perusal of test results, it is seen that the average equivalent cube strength of core samples is varying from **17.04 N/mm^2 to 31.26 N/mm^2** (refer Table-2). The equivalent cube compressive strength of RCC Slab is **not satisfactory** in 5 nos. of locations for M25 grade of concrete. The concrete strength of slab is **satisfactory** in two locations for M25 grade of concrete. One core specimen could not be tested due core sample got crack during preparation. (Ref. SI. No. 5, Table 2).

4.4 Concrete Cover Study

The concrete cover depth to steel rebars (from outer most reinforcement) in randomly identified RCC slabs of Transit Camp, Recreation Center & Quarters of PGCIL Bassi on 14 nos. RCC slabs is measured with an Electromagnetic Cover meter/Ferro-scanner and a measuring tape/scale in the places where reinforcement steel is exposed and accessible for direct measurement. The measured concrete covers are compared with the minimum criteria for "moderate" exposure given in Table-B of this report. The concrete cover measured on the RCC members at 14 locations is given in Table 3. On perusal of test results, it is seen that the average concrete cover measured using Profoscope is varying from **14 mm to 21 mm** (from outer most reinforcement). The concrete cover measured in slabs is **not satisfactory** at all locations for moderate exposure as per IS 456:2000.

4.5 Carbonation Test

The carbonation depth was measured on the extracted concrete cores from randomly identified 8 nos. RCC slabs of Transit Camp, Recreation Center & Quarters of PGCIL Bassi. The depth of carbonation, measured from outer surface are given in Table-3.

The depth of carbonation determined on the extracted concrete cores from RCC slabs is varying from **25 mm to 49 mm.** The depth of carbonation is much more than provided concrete cover in all the tested slabs.

4.6 Half Cell Potential Measurements

Half-cell potential measurements, using copper electrode-copper sulfate Half-Cell technique, were taken at site to ascertain the corrosion of reinforcement steel in RCC members. The measurements were done on 14 randomly identified RCC slabs of Transit Camp, Recreation Center & Quarters of PGCIL Bassi. Test results are given in Table 4 and the same is compared with corrosion criteria as per IS 516 (Part 5/Sec 2): 2021 (also reproduced in Table C of this report)**.**

On perusal of the test results, the average of Half-cell potential value obtained are varying from **-218 mV to -363 mV.** The results indicated that there is **greater than 90% probability that corrosion probability of corrosion** is occurring in that area at 1 location (ref. Sr. no. 6 of Table 4) and **probability of corrosion is uncertain** in rest 13 nos. of locations at the time of measurement**.** However, out of which at 7 nos. of locations the obtained values are nearer to -350 mV which means steel bars has greater than 90% probability that corrosion is occurring.

4.7 Electrical Resistivity

Electrical resistivity measurements using four-point Wenner probe technique were taken on 14 nos. randomly identified RCC Slabs of Transit Camp, Recreation Center & Quarters of PGCIL Bassi. The results are discussed below and details of test results is given in Table-5. Test result is compared with corrosion risk criteria as per Table-2 of RILEM TC 154-EMC (also reproduced in Table D of this report).

The measured resistivity values are varying from **12.12 kΩ-cm to 41.96 kΩ-cm** and when these measured values are compared with corrosion risk criteria as per Table-2 of RILEM TC 154-EMC, shows the risk of corrosion is **Moderate** at all tested locations**.** However, out of 14 locations, 7 locations reading varying from 12.12 kΩ-cm to 14.80 kΩ-cm, which are nearer to the high-risk of corrosion.

4.8 Chemical Analysis of Concrete Powder

Chloride content, Sulphate content and pH of concrete was determined in 6 nos. randomly identified RCC Slabs of Transit Camp, Recreation Center & Quarters of PGCIL Bassi from extracted concrete core samples. The test results received are given in Table-6**.**

The pH value in the RCC slabs is varying from **10.30 to 11.60**. The acid soluble chloride content varying from **0.74 kg/m^3 to 0.94 kg/m^3,** which **is more than the permissible limit of 0.6kg/m^3** at all locations as per of IS 456:2000**.** The value of water-soluble chloride content is varying from 0.01 kg/m^3 to 0.02 kg/m^3. The value of total water-soluble sulphate (SO_3) content is varying from 1.0% to 1.3% by weight of cement in the mix, which is within the permissible limit of 4% as per the provision of IS 456:2000.

4.9 Chemical Analysis of Mortar

Sulphate content in the mortar (collected from Transit Camp, Recreation Center & Quarters of PGCIL Bassi) from the randomly identified stone masonry walls were determined from mortar powder samples. The values of test results are tabulated in Table 7.

The total water-soluble sulphates (SO_3) content varies from **0.03% to 0.11%** with an average value of **0.07%** by weight of cement in the mix, which is within the permissible limit of 4% as per codal provision of **IS: 456-2000 (As per clause-8.2.5.3)** in all the tested samples.

5.0 Findings:

i) Visual observations

During visual observation, distress in the form of spalling of concrete with exposed reinforcement steel bars were observed on the RCC slabs. Seepage spots were observed on the walls & ceiling at many locations. Cracks on the walls were observed at many locations. Vegetation growth were observed at some locations on the terrace.

ii) Ultrasonic Pulse Velocity Testing

The quality grading of concrete based on the UPV values obtained on the RCC members shows the grading of concrete at 12 nos. of locations is **Good** and the quality grading of concrete is **Doubtful** in 3 nos. of locations.

iii) Core Testing:

The compressive strength of concrete is **not satisfactory** in 5 nos. of locations and **satisfactory** at 2 nos. of locations for **M25** grade of concrete.

iv) Concrete cover measurement

Concrete cover measured is **not satisfactory** for Moderate exposure condition in all tested locations.

v) Carbonation depth measurement

The depth of carbonation measured is found **more than** provided cover in all tested locations.

vi) Half-Cell Potential Test

The average Half-cell Potential test conducted in 14 RCC members had indicated that:

a. At 13 nos. RCC members the probability of **corrosion is uncertain** at the time of measurement. However, out of which at 7 nos. of locations the obtained values are nearer to -350 mV which means steel bars has **greater than 90% probability that corrosion is occurring.**

b. At 1 no. of location of RCC member, there is **greater than 90% probability that corrosion is occurring**

vii) Resistivity Measurement

The electrical resistivity measurements taken using Wenner four probe technique on the concrete surface has indicated that in all tested RCC member risk of corrosion is Moderate. However, out of

14 locations, 7 locations reading varying from 12.12 kΩ-cm to 14.80 kΩ-cm, which is nearer to the high risk of corrosion.

viii) Chemical analysis of Concrete

The value of acid soluble chloride content is **more than** the permissible limit in all tested locations.

ix) Chemical analysis of Mortar

The average value of total water-soluble sulphate (SO_3) content is within the permissible limit of 4% in all the tested samples.

6.0 CONCLUSION

Based on the above findings, visually distress in the form of spalling of concrete from slabs with exposed reinforcement steel bars at many locations were observed. Seepage spots were observed on the walls & ceiling at many locations. Cracks on the walls and seepage on the walls & ceiling were observed at many locations. The depth of carbonation measured is found more than provided cover in all locations. The ascertain in-situ strength of concrete is found less than the M25 grade at 5 out of 8 tested locations of RCC members. Based on half-cell potential test, it indicates that the status of embedded steel bars has greater than 90% probability that corrosion is occurring at more than 50% locations. Out of 14 locations, 7 locations reading varying from 12.12 kΩ-cm to 14.80 kΩ-cm, which is nearer to the high-risk of corrosion. Based on chemical test, it is found that the chloride content in concrete is much higher than the permissible limit in all the RCC members. Also concrete is highly carbonated based on carbonation depth measurement. In this regard, literature states that in case of both chloride & carbonation induced corrosion occurring simultaneously then rate of corrosion increases and distress in RCC structure occurs at faster rate.

7.0 RECOMMENDATIONS

The building was constructed around 1992-1993; since then, the Indian standards for reinforcement concrete design and construction, seismic compliance of buildings, etc., have been revised & upgraded and also considering the buildings are load bearing structures, the building is not safe for living in its present condition. Also, if repair of this building is done, it will not increase the service life of the structure.

…End of Report…

TABLE-2
TESTS RESULTS OF CONCRETE CORE

SI. No	RCC member	Identification of core	Individual Core Strength in N/mm^2	Average Equivalent Cube Strength In N/mm^2	Whether strength of Concrete is satisfactory for M-25 grade (Yes/No)
1	Terrace slab (S1) Transit Camp	C1/S1	31.06	31.26	Yes
		C2/S1	25.58		
		C3/S1	37.13		
2	Terrace slab (S3) of Recreation Centre	C5/S3	20.41	**21.13**	No
		C6/S3	20.97		
		C7/S3	22.01		
3	Terrace Slab (S5) of Type D Quarters	C9/S5	23.80	**20.45**	No
		C10/S5	**16.05**		
		C11/S5	21.50		
4	Terrace Slab (S7) Type B, Quarter No. B-6	C13/S7	26.25	**21.80**	No
		C14/S7	23.17		
		C15/S7	**15.97**		
5	Terrace Slab (S8) Type B, Quarter no.B-5	C17/S8	27.39	-	-
		C18/S8	*		
		C19/S8	29.09		
6	Terrace Slab (S9) Type B, Quarter no.B-28	C21/S9	**18.42**	**22.61**	No
		C22/S9	22.28		
		C23/S9	27.14		
7	Terrace Slab (S13) Type C, Quarter no.C-8	C25	21.28	**17.04**	No
		C26	**14.47**		
		C27	**15.36**		
8	Terrace Slab (S12) Type C, Quarter no.C-7	C29	20.87	22.67	Yes
		C30	24.91		
		C31	22.24		

* Core sample got cracked during preparation

TABLE-3
TEST RESULTS OF CONCRETE COVER AND CARBONATION DEPTH ON RCC STRUCTURES OF PGCIL BASSI

Sl. No.	Location	Average Cover (mm)	Average Carbonation depth (mm)	Remarks
1	Terrace slab (S1) Transit Camp	16	**40**	Carbonation is more than cover
2	Terrace Slab (S2) of Transit Camp	19	-	-
3	Terrace Slab (S3) of Recreation Center	19	**45**	Carbonation is more than cover
4	Terrace Slab (S4) of Recreation Center	14	-	-
5	Terrace Slab (S5) of Type D, Quarter no. D1	20	**41**	Carbonation is more than cover
6	Terrace Slab (S6) of Type D, Quarter no. D1	16	-	-
7	Terrace Slab (S7) of Type B, Quarter no. B6	17	**47**	Carbonation is more than cover
8	Terrace Slab (S8) of Type B, Quarter no. B5	18	**39**	Carbonation is more than cover
9	Terrace Slab (S9) of Type B, Quarter no. B28	18	**25**	Carbonation is more than cover
10	Terrace Slab (S10) of Type B, Quarter no. B18	16	-	-
11	Terrace Slab (S11) of Type B, Quarter no. B17	19	-	-
12	Terrace Slab (S12) of Type C, Quarter no. C7	18	**49**	Carbonation is more than cover
13	Terrace Slab (S13) of Type C, Quarter no. C8	21	**49**	Carbonation is more than cover
14	Terrace Slab (S14) of Type C, Quarter no. C9	21	-	-

TABLE -4
Test Result of Half Cell Potential Measurements of PGCIL Bassi

SI. No.	Location	HCP Readings (-mv)					Average Value (-mV)	Corrosion Status as per IS 516 (Part-5/Sec 2):2021
1	Terrace Slab (S1) of Transit Camp	216	218	218	222	224	220	Probability of corrosion is **Uncertain** at the time of measurement
		217	219	221	223	224		
2	Terrace Slab (S2) of Transit Camp	214	219	215	226	216	218	Probability of corrosion is **Uncertain** at the time of measurement
		220	224	218	215	217		
3	Terrace Slab (S3) of Recreation Centre	256	246	248	244	234	237	Probability of corrosion is **Uncertain** at the time of measurement
		241	232	221	224	227		
4	Terrace Slab (S4) of Recreation Centre	240	253	236	254	231	242	Probability of corrosion is **Uncertain** at the time of measurement
		241	244	222	248	254		
5	Terrace Slab (S5) of Type D, Quarter no. D1	320	301	321	359	340	341	Probability of corrosion is **Uncertain** at the time of measurement
		368	350	347	348	360		
6	Terrace Slab (S6) of Type D, Quarter no. D1	365	365	360	361	363	**363**	**Greater than 90% probability** that reinforcing steel corrosion is occurring in that area at the time of measurement.
		362	364	363	362	364		
7	Terrace Slab (S7) of Type B, Quarter no. B6	345	354	348	360	341	347	Probability of corrosion is **Uncertain** at the time of measurement
		350	352	341	330	344		
8	Terrace Slab (S8) of Type B, Quarter no. B5	320	335	280	340	330	320	Probability of corrosion is **Uncertain** at the time of measurement
		321	318	330	340	289		
9	Terrace Slab (S9) of Type B, Quarter no. B28	290	299	302	310	275	297	Probability of corrosion is **Uncertain** at the time of measurement
		289	291	299	301	309		
10	Terrace Slab (S10) of Type B, Quarter no. B18	307	325	314	311	306	317	Probability of corrosion is **Uncertain** at the time of measurement
		309	314	312	338	330		
11	Terrace Slab (S11) of Type B, Quarter no. B17	311	307	322	318	340	316	Probability of corrosion is **Uncertain** at the time of measurement
		314	319	312	303	316		
12	Terrace Slab (S12) of Type C, Quarter no. C8	345	342	385	325	363	344	Probability of corrosion is **Uncertain** at the time of measurement
		343	368	331	321	321		
13	Terrace Slab (S13) of Type C, Quarter no. C7	314	343	348	332	346	334	Probability of corrosion is **Uncertain** at the time of measurement
		349	331	341	310	321		
14	Terrace Slab (S14) of Type C, Quarter no. C9	284	270	288	290	294	287	Probability of corrosion is **Uncertain** at the time of measurement
		298	295	284	290	278		

TABLE- 5
TEST RESULT OF ELECTRICAL RESISTIVITY MEASURED ON STRUCTURES AT PGCIL BASSI

SI. No.	Location	Resistivity Value (kΩ-cm)					Average Resistivity Value (kΩ-cm)	Risk of Corrosion
1	Terrace Slab (S1) of Transit Camp	24.4	28.6	28.2	25.3	26.7	26.12	Moderate
		27.3	24.8	24.4	25.6	25.9		
2	Terrace Slab (S2) of Transit Camp	21.6	18.9	19.2	19.8	20.0	19.59	Moderate
		18.1	18.9	20.1	20.0	19.3		
3	Terrace Slab (S3) of Recreation Centre	26.7	23.0	21.9	24.4	23.0	25.37	Moderate
		24.0	27.8	24.9	28.0	30.0		
4	Terrace Slab (S4) of Recreation Centre	15.3	13.8	16.4	14.1	14.4	15.72	Moderate
		15.6	16.3	16.8	19.1	15.4		
5	Terrace Slab (S5) of Type D, Quarter no. D1	14.3	14.0	22.0	16.8	17.3	18.16	Moderate
		18.4	17.3	20.2	21.5	19.8		
6	Terrace Slab (S6) of Type D, Quarter no. D1	15.7	14.0	15.8	14.5	14.7	14.80	Moderate
		15.0	14.3	14.8	14.6	14.6		
7	Terrace Slab (S7) of Type B, Quarter no. B6	15.3	14.7	15.1	14.1	14.2	14.47	Moderate
		14.8	14.3	13.9	14.3	14.0		
8	Terrace Slab (S8) of Type B, Quarter no. B5	11.0	12.3	12.8	13.0	13.8	12.12	Moderate
		11.8	12.0	11.6	11.9	11.0		
9	Terrace Slab (S9) of Type B, Quarter no. B28	51.3	48.6	44.9	38.6	41.4	41.96	Moderate
		44.3	38.7	34.9	36.7	40.2		
10	Terrace Slab (S10) of Type B, Quarter no. B18	13.2	12.7	12.9	12.2	11.9	13.66	Moderate
		14.2	14.8	14.6	16.2	13.9		
11	Terrace Slab (S11) of Type B, Quarter no. B17	13.4	13.8	12.4	13.9	14.1	14.21	Moderate
		15.6	15.9	16.4	12.9	13.7		
12	Terrace Slab (S12) of Type C, Quarter no. C8	12.5	13.1	13.5	14.9	12.7	14.26	Moderate
		15.6	16.1	14.2	13.2	16.8		
13	Terrace Slab (S13) of Type C, Quarter no. C7	16.9	13.8	18.4	16.6	15.9	16.74	Moderate
		18.4	17.6	19.2	14.9	15.7		
14	Terrace Slab (S14) of Type C, Quarter no. C9	12.8	14.9	14.6	16.2	15.3	14.45	Moderate
		12.6	13.4	14.2	15.9	14.6		

TABLE-6
CHEMICAL ANALYSIS (CHLORIDE CONTENT, PH VALUE & SULPHATE CONTENT) OF CONCRETE

SI. No.	Identification	Results			
		pH value	Acid Soluble Chloride Content (kg/m3)	Water Soluble Chloride Content (kg/m3)	Water Soluble Sulphate Content (%)
1	Terrace Slab (S1) of Transit Camp	11.22	0.84	0.02	1.2
2	Terrace Slab (S3) of Recreation Centre	11.60	0.77	0.02	1.3
3	Terrace Slab (S5) of Type D, Quarter no. D1	11.09	0.79	0.01	1.1
4	Terrace Slab (S7) of Type B, Quarter no. B6	11.22	0.86	0.01	1.0
5	Terrace Slab (S8) of Type B, Quarter no. B5	10.30	0.74	0.01	1.0
6	Terrace Slab (S12) of Type C, Quarter no. C8	10.50	0.94	0.02	1.0

Note: Taking a conservative estimate of cement content in the mix as 300 kg/m^3 and density as 2400 kg/m^3 for the calculation of chloride and sulphate content.

TABLE-7
CHEMICAL ANALYSIS (SULPHATE CONTENT) OF STONE JOINING MORTAR POWDER EXTRACTED FROM RANDOMLY IDENTIFIED LOCATIONS OF QUARTERS OF PGCIL
BASSI

S. No.	Mortar	Location	Percentage of Sulphates on the basis of Ratio of mortar (1part cement: 4-part sand) as specified in IS:4326-2013	Whether Sulphate Content is more than maximum permissible limit of 4% as per IS 456-2000
1	Stone Mortar	B-Type Quarters	0.11	No
2		C- Type Quarters	0.04	No
3		D- Type Quarter	0.03	No
4		Transit Camp	0.09	No
5		Recreation Centre	0.06	No
Average			**0.07**	**No**

Annexure- I

Visual Observations at PGCIL Bassi

Photo 1 & 2: Crack along the wall

Photo 3 & 4: Seepage spots on walls and ceiling

Photo 5 & 6: Cracks was observed on walls in waiting hall

Annexure- I

Photo 7: Cracks on the wall

Photo 8: Seepage spots on the wall of dining hall

Photo 9: Crack on the wall

Photo 10: Spalling of concrete on soffit

Photo 11: Seepage spots on the walls

Photo 12: Cracks on the wall

Annexure- I

Photo 13: Heavy spalling of concrete with exposed reinforcement steel

Photo 14: Spalling of concrete in patches with exposed reinforcement steel

Photo 15: Seepage spots on the walls & ceiling

Photo 16: Cracks on the wall

Photo 17: Cracks on the wall of washroom

Photo 18: Termite growth was observed on the walls

Annexure- I

Photo 19: Crack on the external wall

Photo 20: Seepage spots on the walls & ceiling

Photo 21: Seepage spots on the walls & ceiling

Photo 22: Crack on the wall

Photo 23: Spalling of concrete with exposed reinforcement on slab above staircase at First floor level

Photo 24: Past repair work

Annexure- I

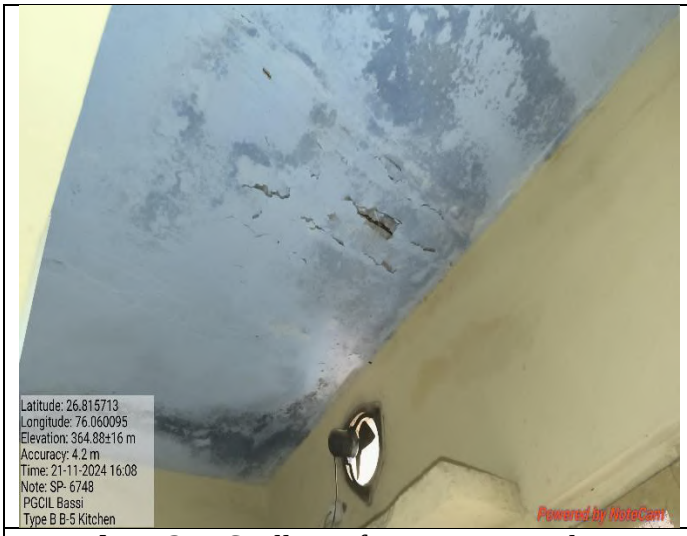

Photo 25: Spalling of concrete on ceiling

Photo 26: Crack on the staircase

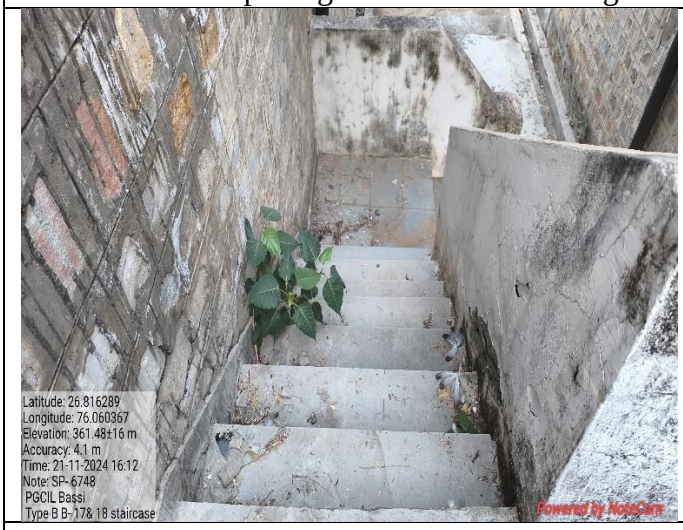

Photo 27: Vegetation growth on staircase

Photo 28: Spalling of concrete in patches with exposed reinforcement on ceiling

Photo 29: Seepage spots on ceiling and walls

Photo 30: Vegetation growth on terrace

Annexure- I

Photo 31 & 32: Heavy spalling of concrete with exposed reinforcement

Photo 33 & 34: Seepage spots on ceiling and walls

Annexure- I

Photo 35: Cracks on the wall

Photo 36: A view of Concrete Core Extraction

Photo 37: A view of Half Cell Potential test conducted at Site

Photo 38: A view of Electrical Resistivity test conducted at site

Photo 39: A view of UPV test conducted at site

NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
(TESTING LABORATORIES)
NON-DESTRUCTIVE TESTING (NDT) LABORATORY
TEST REPORT

Ultrasonic Pulse Velocity Test as per IS 516 (Part 5/Sec 1): 2018							
Project No. & Customer Details: SP-6748 & NCB-CDR						**Request Reference No:** 766	
Date of Testing: 21/11/2024	**Test Report No:** 766/6532/UPV/26122024					**Test Report Date:** 26/12/2024	
Structure & Location of Test: PGCIL Transit Camp, Bassi Jaipur						**Transducer Frequency:** 54kHz	
Method of Transmission: Surface Probing				**Member/Specimen Identification:** As mentioned below			
Member/Specimen Size: (1.2x1.0) m Surface Area						**Grid Spacing:** 200mm	
Orientation of Reinforcement w.r.t Pulse path: Parallel							
Concrete Temperature: Surface Temperature 20° C							
Condition of Concrete: Dry Surface							

Sl. No.	Location of Test Point/Grid Point Identification		Path Length (mm)	Time (µs)	Pulse Velocity (km/s)	Temperature Correction Factor %	Corrected Velocity (km/s)	Average value of Pulse Velocity by Surface Probing along the chosen line (km/s)
1	Terrace slab (S-1) of Transit Camp	1A-1B	200	50.0	4.00	N.A.	N.A.	**4.01**
		1A-1C	400	98.0	4.08		N.A.	
		1A-1D	600	149.0	4.03		N.A.	
		1A-1E	800	201.0	3.98		N.A.	
		2A-2B	200	51.0	3.92	N.A.	N.A.	**3.96**
		2A-2C	400	100.0	4.00		N.A.	
		2A-2D	600	149.0	4.03		N.A.	
		2A-2E	800	198.0	4.04		N.A.	
		3A-3B	200	49.0	4.08	N.A.	N.A.	**4.03**
		3A-3C	400	101.0	3.96		N.A.	
		3A-3D	600	151.0	3.97		N.A.	
		3A-3E	800	203.0	3.94		N.A.	
		4A-4B	200	50.0	4.00	N.A.	N.A.	**3.69**
		4A-4C	400	100.0	4.00		N.A.	
		4A-4D	600	187.0	3.21		N.A.	
		4A-4E	800	204.0	3.92		N.A.	

Remarks: Nil

Checked by

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NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
(TESTING LABORATORIES)
NON-DESTRUCTIVE TESTING (NDT) LABORATORY
TEST REPORT

Ultrasonic Pulse Velocity Test as per IS 516 (Part 5/Sec 1): 2018

Project No. & Customer Details: SP-6748 & NCB-CDR | **Request Reference No:** 766

Date of Testing: 21/11/2024 | **Test Report No:** 766/6532/UPV/26122024 | **Test Report Date:** 26/12/2024

Structure & Location of Test: PGCIL Transit Camp, Bassi Jaipur | **Transducer Frequency:** 54kHz

Method of Transmission: Surface Probing | **Member/Specimen Identification:** As mentioned below

Member/Specimen Size: (1.2x1.0) m Surface Area | **Grid Spacing:** 200 mm

Orientation of Reinforcement w.r.t Pulse path: Parallel

Concrete Temperature: Surface Temperature 20° C

Condition of Concrete: Dry Surface

Sl. No.	Location of Test Point/Grid Point Identification		Path Length (mm)	Time (µs)	Pulse Velocity (km/s)	Temperature Correction Factor %	Corrected Velocity (km/s)	Average value of Pulse Velocity by Surface Probing along the chosen line (km/s)
2	Terrace slab (S-2) of Transit Camp	1A-1B	200	51.0	3.92	N.A.	N.A.	**3.56**
		1A-1C	400	104.0	3.85		N.A.	
		1A-1D	600	153.0	3.92		N.A.	
		1A-1E	800	211.0	3.79		N.A.	
		1A-1F	1000	306.0	3.27		N.A.	
		2A-2B	200	53.0	3.77	N.A.	N.A.	**3.52**
		2A-2C	400	100.0	4.00		N.A.	
		2A-2D	600	159.0	3.77		N.A.	
		2A-2E	800	212.0	3.77		N.A.	
		2A-2F	1000	310.0	3.23		N.A.	
		3A-3B	200	58.0	3.45	N.A.	N.A.	**3.46**
		3A-3C	400	109.0	3.67		N.A.	
		3A-3D	600	161.0	3.73		N.A.	
		3A-3E	800	222.0	3.60		N.A.	
		3A-3F	1000	307.0	3.26		N.A.	
		4A-4B	200	49	4.08	N.A.	N. A	**3.61**
		4A-4C	400	103	3.88		N. A	
		4A-4D	600	153	3.92		N. A	
		4A-4E	800	201	3.98		N. A	
		4A-4F	1000	306	3.27		N. A	

Remarks: Nil

Checked by

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NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
(TESTING LABORATORIES)
NON-DESTRUCTIVE TESTING (NDT) LABORATORY
TEST REPORT

Ultrasonic Pulse Velocity Test as per IS 516 (Part 5/Sec 1): 2018							
Project No. & Customer Details: SP-6748 & NCB-CDR						**Request Reference No:** 766	
Date of Testing: 21/11/2024	**Test Report No:** 766/6532/UPV/26122024					**Test Report Date:** 26/12/2024	
Structure & Location of Test: PGCIL Recreation Center, Bassi Jaipur						**Transducer Frequency:** 54kHz	
Method of Transmission: Surface Probing				**Member/Specimen Identification:** As mentioned below			
Member/Specimen Size: (1.2x1.0) m Surface Area						**Grid Spacing:** 200 mm	
Orientation of Reinforcement w.r.t Pulse path: Parallel							
Concrete Temperature: Surface Temperature 20° C							
Condition of Concrete: Dry Surface							

Sl. No.	Location of Test Point/Grid Point Identification		Path Length (mm)	Time (µs)	Pulse Velocity (km/s)	Temperature Correction Factor %	Corrected Velocity (km/s)	Average value of Pulse Velocity by Surface Probing along the chosen line (km/s)
3	Recreation Center S-3	1A-1B	200	49.0	4.08	N.A.	N.A.	**3.97**
		1A-1C	400	102.0	3.92		N.A.	
		1A-1D	600	148.0	4.05		N.A.	
		1A-1E	800	204.0	3.92		N.A.	
		2A-2B	200	59.0	3.39	N.A.	N.A.	**3.88**
		2A-2C	400	112.0	3.57		N.A.	
		2A-2D	600	151.0	3.97		N.A.	
		2A-2E	800	203.0	3.94		N.A.	
		3A-3B	200	48.0	4.17	N.A.	N.A.	**3.92**
		3A-3C	400	101.0	3.96		N.A.	
		3A-3D	600	153.0	3.92		N.A.	
		3A-3E	800	205.0	3.90		N.A.	
		4A-4B	200	51.0	3.92	N.A.	N.A.	**3.77**
		4A-4C	400	106.0	3.77		N.A.	
		4A-4D	600	158.0	3.80		N.A.	
		4A-4E	800	214.0	3.74		N.A.	

Remarks: Nil

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NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
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NON-DESTRUCTIVE TESTING (NDT) LABORATORY
TEST REPORT

Ultrasonic Pulse Velocity Test as per IS 516 (Part 5/Sec 1): 2018

Project No. & Customer Details: SP-6748 & NCB-CDR | **Request Reference No:** 766

Date of Testing: 21/11/2024 | **Test Report No:** 766/6532/UPV/26122024 | **Test Report Date:** 26/12/2024

Structure & Location of Test: PGCIL Recreation Center, Bassi Jaipur | **Transducer Frequency:** 54kHz

Method of Transmission: Surface Probing | **Member/Specimen Identification:** As mentioned below

Member/Specimen Size: (1.2x1.0) m Surface Area | **Grid Spacing:** 200 mm

Orientation of Reinforcement w.r.t Pulse path: Parallel

Concrete Temperature: Surface Temperature 20° C

Condition of Concrete: Dry Surface

Sl. No.	Location of Test Point/Grid Point Identification		Path Length (mm)	Time (µs)	Pulse Velocity (km/s)	Temperature Correction Factor %	Corrected Velocity (km/s)	Average value of Pulse Velocity by Surface Probing along the chosen line (km/s)
4	Recreation Center S-4	1A-1B	200	53.0	3.77	N.A.	N.A.	3.46
		1A-1C	400	118.0	3.39		N.A.	
		1A-1D	600	177.0	3.39		N.A.	
		1A-1E	800	229.0	3.49		N.A.	
		2A-2B	200	52.0	3.85	N.A.	N.A.	3.45
		2A-2C	400	122.0	3.28		N.A.	
		2A-2D	600	175.0	3.43		N.A.	
		2A-2E	800	230.0	3.48		N.A.	
		3A-3B	200	56.0	3.57	N.A.	N.A.	3.42
		3A-3C	400	114.0	3.51		N.A.	
		3A-3D	600	178.0	3.37		N.A.	
		3A-3E	800	234.0	3.42		N.A.	
		4A-4B	200	53.0	3.77	N.A.	N.A.	3.29
		4A-4C	400	156.0	2.56		N.A.	
		4A-4D	600	179.0	3.35		N.A.	
		4A-4E	800	231.0	3.46		N.A.	

Remarks: Nil

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NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
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NON-DESTRUCTIVE TESTING (NDT) LABORATORY
TEST REPORT

Ultrasonic Pulse Velocity Test as per IS 516 (Part 5/Sec 1): 2018								
Project No. & Customer Details: SP-6748 & NCB-CDR							**Request Reference No:** 766	
Date of Testing: 21/11/2024	**Test Report No:** 766/6532/UPV/26122024						**Test Report Date:** 26/12/2024	
Structure & Location of Test Type-D Residential Quarters, Bassi Jaipur							**Transducer Frequency:** 54kHz	
Method of Transmission: Surface Probing					**Member/Specimen Identification:** As mentioned below			
Member/Specimen Size: (1.2x1.0) m Surface Area							**Grid Spacing:** 200 mm	
Orientation of Reinforcement w.r.t Pulse path: Parallel								
Concrete Temperature: Surface Temperature 20° C								
Condition of Concrete: Dry Surface								

Sl. No.	Location of Test Point/Grid Point Identification		Path Length (mm)	Time (µs)	Pulse Velocity (km/s)	Temperature Correction Factor %	Corrected Velocity (km/s)	Average value of Pulse Velocity by Surface Probing along the chosen line (km/s)
5.	Type-D Residential Quarters Slab S-5	1A-1B	200	52.0	3.85	N.A.	N.A.	**3.58**
		1A-1C	400	110.0	3.64		N.A.	
		1A-1D	600	166.0	3.61		N.A.	
		1A-1E	800	227.0	3.52		N.A.	
		2A-2B	200	51.0	3.92	N.A.	N.A.	**3.49**
		2A-2C	400	100.0	4.00		N.A.	
		2A-2D	600	159.0	3.77		N.A.	
		2A-2E	800	248.0	3.23		N.A.	
		3A-3B	200	54.0	3.70	N.A.	N.A.	**3.41**
		3A-3C	400	101.0	3.96		N.A.	
		3A-3D	600	167.0	3.59		N.A.	
		3A-3E	800	251.0	3.19		N.A.	
		4A-4B	200	55.0	3.64	N.A.	N.A.	**3.26**
		4A-4C	400	119.0	3.36		N.A.	
		4A-4D	600	189.0	3.17		N.A.	
		4A-4E	800	245.0	3.27		N.A.	

Remarks: Nil

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NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
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NON-DESTRUCTIVE TESTING (NDT) LABORATORY
TEST REPORT

Ultrasonic Pulse Velocity Test as per IS 516 (Part 5/Sec 1): 2018

Project No. & Customer Details: SP-6748 & NCB-CDR | **Request Reference No:** 766

Date of Testing: 21/11/2024 | **Test Report No:** 766/6532/UPV/26122024 | **Test Report Date:** 26/12/2024

Structure & Location of Test: Type-D Residential Quarters, Bassi Jaipur | **Transducer Frequency:** 54kHz

Method of Transmission: Surface Probing | **Member/Specimen Identification:** As mentioned below

Member/Specimen Size: (1.2x1.0) m Surface Area | **Grid Spacing:** 200 mm

Orientation of Reinforcement w.r.t Pulse path: Parallel

Concrete Temperature: Surface Temperature 20° C

Condition of Concrete: Dry Surface

Sl. No.	Location of Test Point/Grid Point Identification		Path Length (mm)	Time (µs)	Pulse Velocity (km/s)	Temperature Correction Factor %	Corrected Velocity (km/s)	Average value of Pulse Velocity by Surface Probing along the chosen line (km/s)
6	Type-D Residential Quarters Slab S-6	1A-1B	200	75.0	2.67	N.A.	N.A.	**3.19**
		1A-1C	400	137.0	2.92		N.A.	
		1A-1D	600	178.0	3.37		N.A.	
		1A-1E	800	249.0	3.21		N.A.	
		2A-2B	200	98.0	2.04	N.A.	N.A.	**3.03**
		2A-2C	400	143.0	2.80		N.A.	
		2A-2D	600	198.0	3.03		N.A.	
		2A-2E	800	250.0	3.20		N.A.	
		3A-3B	200	79.0	2.53	N.A.	N.A.	**3.21**
		3A-3C	400	130.0	3.08		N.A.	
		3A-3D	600	178.0	3.37		N.A.	
		3A-3E	800	249.0	3.21		N.A.	
		4A-4B	200	82.0	2.44	N.A.	N.A.	**3.11**
		4A-4C	400	139.0	2.88		N.A.	
		4A-4D	600	184.0	3.26		N.A.	
		4A-4E	800	255.0	3.14		N.A.	

Remarks: Nil

Checked by

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TEST REPORT

Ultrasonic Pulse Velocity Test as per IS 516 (Part 5/Sec 1): 2018							
Project No. & Customer Details: SP-6748 & NCB-CDR						**Request Reference No:** 766	
Date of Testing: 21/11/2024	**Test Report No:** 766/6532/UPV/26122024					**Test Report Date:** 26/12/2024	
Structure & Location of Test: Type-B Residential Quarters, Bassi Jaipur						**Transducer Frequency:** 54kHz	
Method of Transmission: Surface Probing				**Member/Specimen Identification:** As mentioned below			
Member/Specimen Size: (1.2x1.0) m Surface Area						**Grid Spacing:** 200 mm	
Orientation of Reinforcement w.r.t Pulse path: Parallel							
Concrete Temperature: Surface Temperature 20° C							
Condition of Concrete: Dry Surface							

Sl. No.	Location of Test Point/Grid Point Identification		Path Length (mm)	Time (µs)	Pulse Velocity (km/s)	Temperature Correction Factor %	Corrected Velocity (km/s)	Average value of Pulse Velocity by Surface Probing along the chosen line (km/s)
7	Type-B Residential Quarters B-6 Terrace Slab S-7	1A-1B	200	54.0	3.70	N.A.	N.A.	**3.52**
		1A-1C	400	109.0	3.67		N.A.	
		1A-1D	600	172.0	3.49		N.A.	
		1A-1E	800	229.0	3.49		N.A.	
		2A-2B	200	51.0	3.92	N.A.	N.A.	**3.70**
		2A-2C	400	102.0	3.92		N.A.	
		2A-2D	600	159.0	3.77		N.A.	
		2A-2E	800	222.0	3.60		N.A.	
		3A-3B	200	54.0	3.70	N.A.	N.A.	**3.76**
		3A-3C	400	103.0	3.88		N.A.	
		3A-3D	600	157.0	3.82		N.A.	
		3A-3E	800	216.0	3.70		N.A.	
		4A-4B	200	62.0	3.23	N.A.	N.A.	**3.43**
		4A-4C	400	116.0	3.45		N.A.	
		4A-4D	600	175.0	3.43		N.A.	
		4A-4E	800	233.0	3.43		N.A.	

Remarks: Nil

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NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
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NON-DESTRUCTIVE TESTING (NDT) LABORATORY
TEST REPORT

Ultrasonic Pulse Velocity Test as per IS 516 (Part 5/Sec 1): 2018

Project No. & Customer Details: SP-6748 & NCB-CDR | **Request Reference No:** 766

Date of Testing: 21/11/2024 | **Test Report No:** 766/6532/UPV/26122024 | **Test Report Date:** 26/12/2024

Structure & Location of Test: Type-B Residential Quarters, Bassi Jaipur | **Transducer Frequency:** 54kHz

Method of Transmission: Surface Probing | **Member/Specimen Identification:** As mentioned below

Member/Specimen Size: (1.2x1.0) m Surface Area | **Grid Spacing:** 200 mm

Orientation of Reinforcement w.r.t Pulse path: Parallel

Concrete Temperature: Surface Temperature 20° C

Condition of Concrete: Dry Surface

Sl. No.	Location of Test Point/Grid Point Identification		Path Length (mm)	Time (µs)	Pulse Velocity (km/s)	Temperature Correction Factor %	Corrected Velocity (km/s)	Average value of Pulse Velocity by Surface Probing along the chosen line (km/s)
8	Type-B Residential Quarters B-5 Terrace Slab S-8	1A-1B	200	49.0	4.08	N.A.	N.A.	**3.63**
		1A-1C	400	106.0	3.77		N.A.	
		1A-1D	600	163.0	3.68		N.A.	
		1A-1E	800	226.0	3.54		N.A.	
		2A-2B	200	51.0	3.92	N.A.	N.A.	**3.37**
		2A-2C	400	118.0	3.39		N.A.	
		2A-2D	600	178.0	3.37		N.A.	
		2A-2E	800	240.0	3.33		N.A.	
		3A-3B	200	53.0	3.77	N.A.	N.A.	**3.59**
		3A-3C	400	121.0	3.31		N.A.	
		3A-3D	600	169.0	3.55		N.A.	
		3A-3E	800	217.0	3.69		N.A.	
		4A-4B	200	71.0	2.82	N.A.	N.A.	**3.20**
		4A-4C	400	135.0	2.96		N.A.	
		4A-4D	600	180.0	3.33		N.A.	
		4A-4E	800	248.0	3.23		N.A.	

Remarks: Nil

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NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
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NON-DESTRUCTIVE TESTING (NDT) LABORATORY
TEST REPORT

Ultrasonic Pulse Velocity Test as per IS 516 (Part 5/Sec 1): 2018							
Project No. & Customer Details: SP-6748 & NCB-CDR						**Request Reference No:** 766	
Date of Testing: 21/11/2024	**Test Report No:** 766/6532/UPV/26122024					**Test Report Date:** 26/12/2024	
Structure & Location of Test: Type-B Residential Quarters, Bassi Jaipur						**Transducer Frequency:** 54kHz	
Method of Transmission: Surface Probing					**Member/Specimen Identification:** As mentioned below		
Member/Specimen Size: (1.2x1.0) m Surface Area						**Grid Spacing:** 200 mm	
Orientation of Reinforcement w.r.t Pulse path: Parallel							
Concrete Temperature: Surface Temperature 20° C							
Condition of Concrete: Dry Surface							

Sl. No.	Location of Test Point/Grid Point Identification		Path Length (mm)	Time (µs)	Pulse Velocity (km/s)	Temperature Correction Factor %	Corrected Velocity (km/s)	Average value of Pulse Velocity by Surface Probing along the chosen line (km/s)
9	Type-B Residential Quarters B-28 Terrace Slab S-9	1A-1B	200	51.0	3.92	N.A.	N.A.	**3.40**
		1A-1C	400	107.0	3.74		N.A.	
		1A-1D	600	161.0	3.73		N.A.	
		1A-1E	800	254.0	3.15		N.A.	
		2A-2B	200	54.0	3.70	N.A.	N.A.	**3.58**
		2A-2C	400	112.0	3.57		N.A.	
		2A-2D	600	160.0	3.75		N.A.	
		2A-2E	800	230.0	3.48		N.A.	
		3A-3B	200	49.0	4.08	N.A.	N.A.	**3.91**
		3A-3C	400	102.0	3.92		N.A.	
		3A-3D	600	158.0	3.80		N.A.	
		3A-3E	800	202.0	3.96		N.A.	

Remarks: Nil

Checked by

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NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
(TESTING LABORATORIES)
NON-DESTRUCTIVE TESTING (NDT) LABORATORY
TEST REPORT

Ultrasonic Pulse Velocity Test as per IS 516 (Part 5/Sec 1): 2018

Project No. & Customer Details: SP-6748 & NCB-CDR | **Request Reference No:** 766

Date of Testing: 21/11/2024 | **Test Report No:** 766/6532/UPV/26122024 | **Test Report Date:** 26/12/2024

Structure & Location of Test Type-B Residential Quarters, Bassi Jaipur | **Transducer Frequency:** 54kHz

Method of Transmission: Surface Probing | **Member/Specimen Identification:** As mentioned below

Member/Specimen Size: (1.2x1.0) m Surface Area | **Grid Spacing:** 200 mm

Orientation of Reinforcement w.r.t Pulse path: Parallel

Concrete Temperature: Surface Temperature 20° C

Condition of Concrete: Dry Surface

Sl. No.	Location of Test Point/Grid Point Identification		Path Length (mm)	Time (µs)	Pulse Velocity (km/s)	Temperature Correction Factor %	Corrected Velocity (km/s)	Average value of Pulse Velocity by Surface Probing along the chosen line (km/s)
10	Type-B Residential Quarters B-18 Terrace Slab S-10	1A-1B	200	53.0	3.77	N.A.	N.A.	3.81
		1A-1C	400	103.0	3.88		N.A.	
		1A-1D	600	157.4	3.81		N.A.	
		1A-1E	800	211.0	3.79		N.A.	
		2A-2B	200	53.5	3.74	N.A.	N.A.	3.74
		2A-2C	400	106.6	3.75		N.A.	
		2A-2D	600	159.1	3.77		N.A.	
		2A-2E	800	215.0	3.72		N.A.	
		3A-3B	200	53.7	3.72	N.A.	N.A.	3.85
		3A-3C	400	105.3	3.80		N.A.	
		3A-3D	600	157.4	3.81		N.A.	
		3A-3E	800	205.5	3.89		N.A.	
		4A-4B	200	52.3	3.82	N.A.	N.A.	3.76
		4A-4C	400	106.2	3.77		N.A.	
		4A-4D	600	161.2	3.72		N.A.	
		4A-4E	800	211.8	3.78		N.A.	

Remarks: Nil

Checked by

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NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
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NON-DESTRUCTIVE TESTING (NDT) LABORATORY
TEST REPORT

Ultrasonic Pulse Velocity Test as per IS 516 (Part 5/Sec 1): 2018

Project No. & Customer Details: SP-6748 & NCB-CDR | **Request Reference No:** 766

Date of Testing: 21/11/2024 | **Test Report No:** 766/6532/UPV/26122024 | **Test Report Date:** 26/12/2024

Structure & Location of Test: Type-B Residential Quarters, Bassi Jaipur | **Transducer Frequency:** 54kHz

Method of Transmission: Surface Probing | **Member/Specimen Identification:** As mentioned below

Member/Specimen Size: (1.2x1.0) m Surface Area | **Grid Spacing:**200 mm

Orientation of Reinforcement w.r.t Pulse path: Parallel

Concrete Temperature: Surface Temperature 20° C

Condition of Concrete: Dry Surface

Sl. No.	Location of Test Point/Grid Point Identification		Path Length (mm)	Time (µs)	Pulse Velocity (km/s)	Temperature Correction Factor %	Corrected Velocity (km/s)	Average value of Pulse Velocity by Surface Probing along the chosen line (km/s)
11	Type-B Residential Quarters B-17 Terrace Slab S-11	1A-1B	200	51.4	3.89	N.A.	N.A.	3.71
		1A-1C	400	107.8	3.71		N.A.	
		1A-1D	600	161.4	3.72		N.A.	
		1A-1E	800	216.0	3.70		N.A.	
		2A-2B	200	52.0	3.85	N.A.	N.A.	3.75
		2A-2C	400	108.0	3.70		N.A.	
		2A-2D	600	158.8	3.78		N.A.	
		2A-2E	800	213.6	3.75		N.A.	
		3A-3B	200	53.4	3.75	N.A.	N.A.	3.76
		3A-3C	400	106.2	3.77		N.A.	
		3A-3D	600	162.2	3.70		N.A.	
		3A-3E	800	210.5	3.80		N.A.	
		4A-4B	200	54.0	3.70	N.A.	N.A.	3.70
		4A-4C	400	105.0	3.81		N.A.	
		4A-4D	600	159.8	3.75		N.A.	
		4A-4E	800	219.5	3.64		N.A.	

Remarks: Nil

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NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
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NON-DESTRUCTIVE TESTING (NDT) LABORATORY
TEST REPORT

Ultrasonic Pulse Velocity Test as per IS 516 (Part 5/Sec 1): 2018

Project No. & Customer Details: SP-6748 & NCB-CDR | **Request Reference No:** 766

Date of Testing: 21/11/2024 | **Test Report No:** 766/6532/UPV/26122024 | **Test Report Date:** 26/12/2024

Structure & Location of Test: Type-C Residential Quarters, Bassi Jaipur | **Transducer Frequency:** 54kHz

Method of Transmission: Surface Probing | **Member/Specimen Identification:** As mentioned below

Member/Specimen Size: (1.2x1.0) m Surface Area | **Grid Spacing:** 200 mm

Orientation of Reinforcement w.r.t Pulse path: Parallel

Concrete Temperature: Surface Temperature 20° C

Condition of Concrete: Dry Surface

Sl. No.	Location of Test Point/Grid Point Identification		Path Length (mm)	Time (µs)	Pulse Velocity (km/s)	Temperature Correction Factor %	Corrected Velocity (km/s)	Average value of Pulse Velocity by Surface Probing along the chosen line (km/s)
12	Type-C Residential Quarters C-7 Terrace Slab S-12	1A-1B	200	51.0	3.92	N.A.	N.A.	3.22
		1A-1C	400	101.0	3.96		N.A.	
		1A-1D	600	165.0	3.64		N.A.	
		1A-1E	800	279.0	2.87		N.A.	
		2A-2B	200	50.0	4.00	N.A.	N.A.	3.34
		2A-2C	400	114.0	3.51		N.A.	
		2A-2D	600	182.0	3.30		N.A.	
		2A-2E	800	243.0	3.29		N.A.	
		3A-3B	200	63.0	3.17	N.A.	N.A.	3.13
		3A-3C	400	113.0	3.54		N.A.	
		3A-3D	600	179.0	3.35		N.A.	
		3A-3E	800	273.0	2.93		N.A.	
		4A-4B	200	59.0	3.39	N.A.	N.A.	2.99
		4A-4C	400	113.0	3.54		N.A.	
		4A-4D	600	184.0	3.26		N.A.	
		4A-4E	800	293.0	2.73		N.A.	

Remarks: Nil

Checked by

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NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
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NON-DESTRUCTIVE TESTING (NDT) LABORATORY
TEST REPORT

Ultrasonic Pulse Velocity Test as per IS 516 (Part 5/Sec 1): 2018

Project No. & Customer Details: SP-6748 & NCB-CDR | **Request Reference No:** 766

Date of Testing: 21/11/2024 | **Test Report No:** 766/6532/UPV/26122024 | **Test Report Date:** 26/12/2024

Structure & Location of Test: Type-C Residential Quarters, Bassi Jaipur | **Transducer Frequency:** 54kHz

Method of Transmission: Surface Probing | **Member/Specimen Identification:** As mentioned below

Member/Specimen Size: (1.2x1.0) m Surface Area | **Grid Spacing:** 200 mm

Orientation of Reinforcement w.r.t Pulse path: Parallel

Concrete Temperature: Surface Temperature 20° C

Condition of Concrete: Dry Surface

Sl. No.	Location of Test Point/Grid Point Identification		Path Length (mm)	Time (µs)	Pulse Velocity (km/s)	Temperature Correction Factor %	Corrected Velocity (km/s)	Average value of Pulse Velocity by Surface Probing along the chosen line (km/s)
13	Type-C Residential Quarters C-8 Terrace Slab S-13	1A-1B	200	63.0	3.17	N.A.	N.A.	3.24
		1A-1C	400	126.0	3.17		N.A.	
		1A-1D	600	181.0	3.31		N.A.	
		1A-1E	800	249.0	3.21		N.A.	
		2A-2B	200	52.0	3.85	N.A.	N.A.	3.01
		2A-2C	400	149.0	2.68		N.A.	
		2A-2D	600	198.0	3.03		N.A.	
		2A-2E	800	262.0	3.05		N.A.	
		3A-3B	200	98.0	2.04	N.A.	N.A.	2.88
		3A-3C	400	151.0	2.65		N.A.	
		3A-3D	600	199.0	3.02		N.A.	
		3A-3E	800	272.0	2.94		N.A.	
		4A-4B	200	67.0	2.99	N.A.	N.A.	2.96
		4A-4C	400	143.0	2.80		N.A.	
		4A-4D	600	200.0	3.00		N.A.	
		4A-4E	800	268.0	2.99		N.A.	

Remarks: Nil

Checked by

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NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
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TEST REPORT

Ultrasonic Pulse Velocity Test as per IS 516 (Part 5/Sec 1): 2018

Project No. & Customer Details: SP-6748 & NCB-CDR | **Request Reference No:** 766

Date of Testing: 21/11/2024 | **Test Report No:** 766/6532/UPV/26122024 | **Test Report Date:** 26/12/2024

Structure & Location of Test: Type-C Residential Quarters, Bassi Jaipur | **Transducer Frequency:** 54kHz

Method of Transmission: Surface Probing | **Member/Specimen Identification:** As mentioned below

Member/Specimen Size: (1.2x1.0) m Surface Area | **Grid Spacing:** 200 mm

Orientation of Reinforcement w.r.t Pulse path: Parallel

Concrete Temperature: Surface Temperature 20° C

Condition of Concrete: Dry Surface

Sl. No.	Location of Test Point/Grid Point Identification		Path Length (mm)	Time (µs)	Pulse Velocity (km/s)	Temperature Correction Factor %	Corrected Velocity (km/s)	Average value of Pulse Velocity by Surface Probing along the chosen line (km/s)
14	Type-C Residential Quarters C-9 terrace Slab S-14	1A-1B	200	65.0	3.08	N.A.	N.A.	**3.32**
		1A-1C	400	121.0	3.31		N.A.	
		1A-1D	600	181.0	3.31		N.A.	
		1A-1E	800	239.0	3.35		N.A.	
		2A-2B	200	49.0	4.08	N.A.	N.A.	**3.68**
		2A-2C	400	103.0	3.88		N.A.	
		2A-2D	600	165.0	3.64		N.A.	
		2A-2E	800	220.0	3.64		N.A.	
		3A-3B	200	54.0	3.70	N.A.	N.A.	**3.80**
		3A-3C	400	102.0	3.92		N.A.	
		3A-3D	600	160.0	3.75		N.A.	
		3A-3E	800	210.0	3.81		N.A.	
		4A-4B	200	50.0	4.00	N.A.	N.A.	**3.67**
		4A-4C	400	106.0	3.77		N.A.	
		4A-4D	600	175.0	3.43		N.A.	
		4A-4E	800	212.0	3.77		N.A.	

Remarks: Nil

Checked by

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NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
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NON-DESTRUCTIVE TESTING (NDT) LABORATORY
TEST REPORT

Ultrasonic Pulse Velocity Test as per IS 516 (Part 5/Sec 1): 2018

Project No. & Customer Details: SP-6748 & NCB-CDR | **Request Reference No:** 766

Date of Testing: 21/11/2024 | **Test Report No:** 766/6532/UPV/26122024 | **Test Report Date:** 26/12/2024

Structure & Location of Test: Type-B Residential Quarters, Bassi Jaipur | **Transducer Frequency:** 54kHz

Method of Transmission: Surface Probing | **Member/Specimen Identification:** As mentioned below

Member/Specimen Size: (1.2x1.0) m Surface Area | **Grid Spacing:** 200 mm

Orientation of Reinforcement w.r.t Pulse path: Parallel

Concrete Temperature: Surface Temperature 20° C

Condition of Concrete: Dry Surface

Sl. No.	Location of Test Point/Grid Point Identification		Path Length (mm)	Time (µs)	Pulse Velocity (km/s)	Temperature Correction Factor %	Corrected Velocity (km/s)	Average value of Pulse Velocity by Surface Probing along the chosen line (km/s)
15	Type-B Residential Quarters B-23 Terrace Slab S-15	1A-1B	200	82.0	2.44	N.A.	N.A.	2.92
		1A-1C	400	149.0	2.68		N.A.	
		1A-1D	600	199.0	3.02		N.A.	
		1A-1E	800	270.0	2.96		N.A.	
		2A-2B	200	89.0	2.25	N.A.	N.A.	2.89
		2A-2C	400	148.0	2.70		N.A.	
		2A-2D	600	204.0	2.94		N.A.	
		2A-2E	800	269.0	2.97		N.A.	
		3A-3B	200	79.0	2.53	N.A.	N.A.	2.97
		3A-3C	400	138.0	2.90		N.A.	
		3A-3D	600	198.0	3.03		N.A.	
		3A-3E	800	268.0	2.99		N.A.	
		4A-4B	200	60.0	3.33	N.A.	N.A.	3.65
		4A-4C	400	117.0	3.42		N.A.	
		4A-4D	600	168.0	3.57		N.A.	
		4A-4E	800	212.0	3.77		N.A.	

Remarks: Nil

Checked by

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NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
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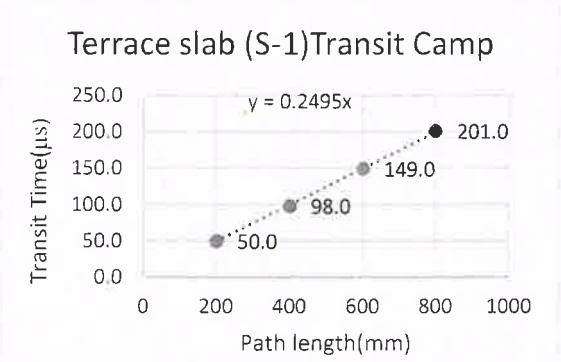
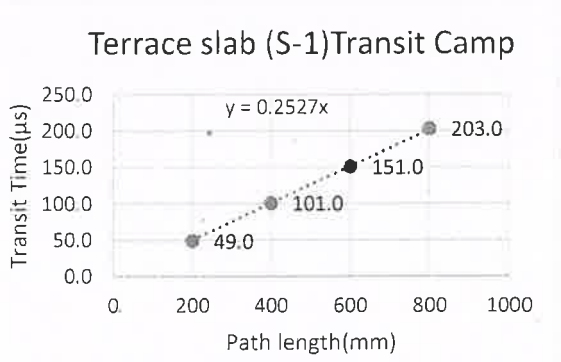
NON-DESTRUCTIVE TESTING (NDT) LABORATORY
TEST REPORT

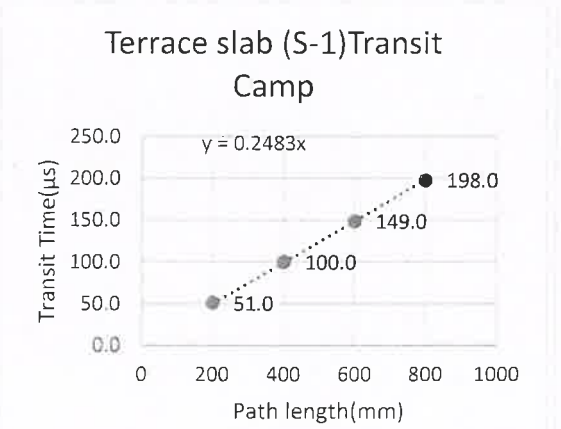
Annexure-A

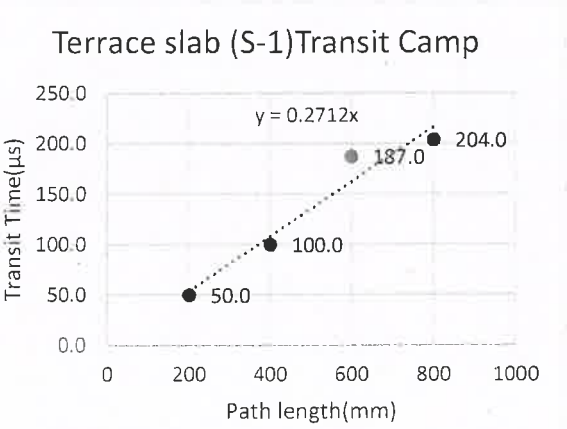
Graphs Showing Pulse Velocity Determination by Indirect (Surface) Transmission

Sr.No.1









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NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
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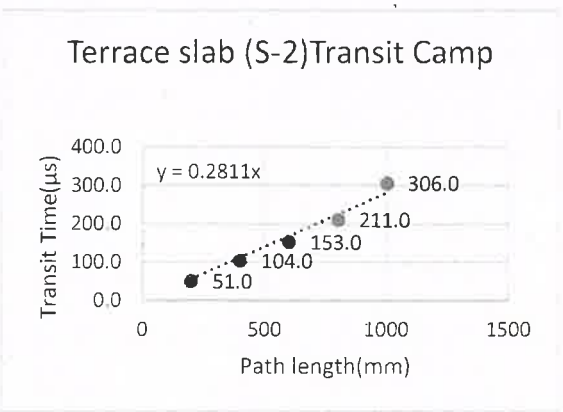
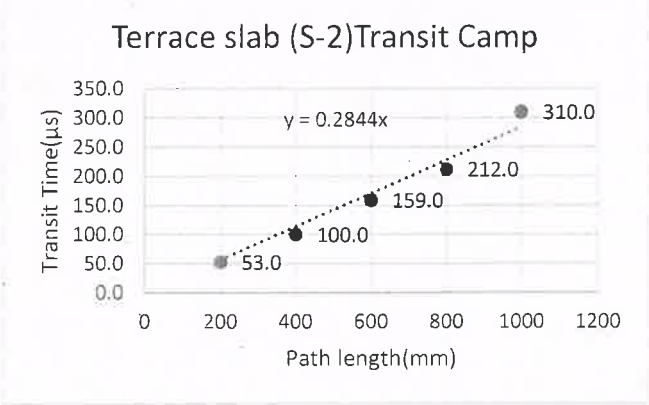
TEST REPORT

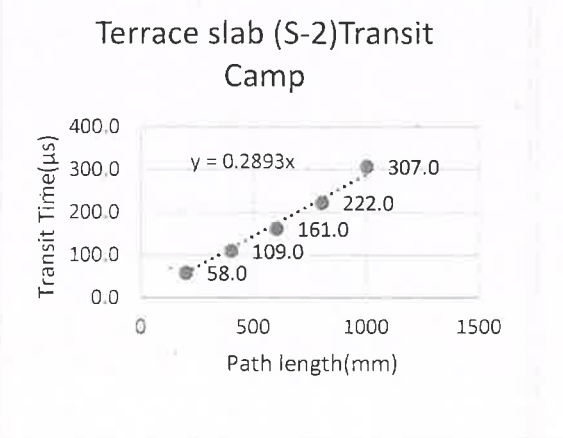
Annexure-A

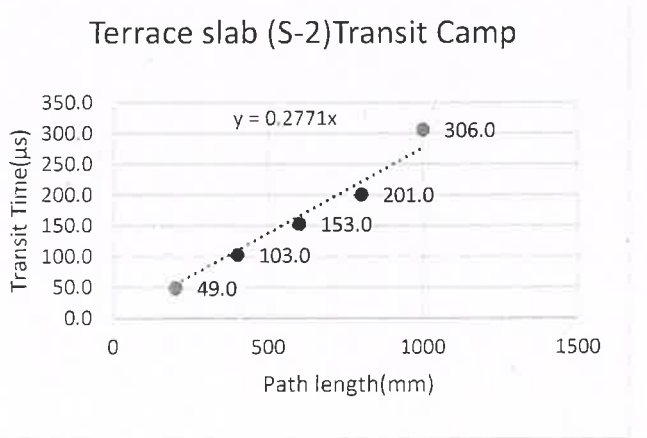
Graphs Showing Pulse Velocity Determination by Indirect (Surface) Transmission

Sr. No-02









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NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
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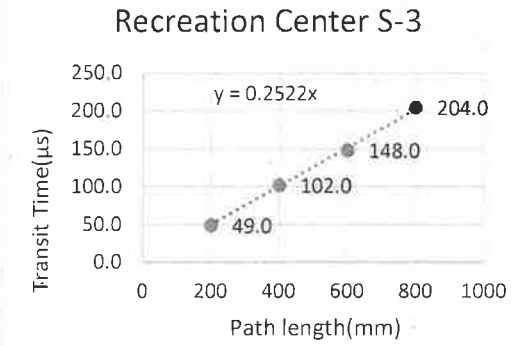
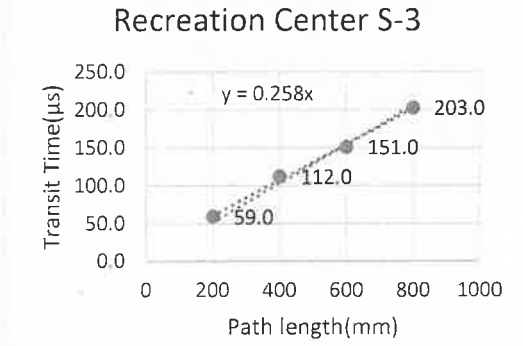
NON-DESTRUCTIVE TESTING (NDT) LABORATORY
TEST REPORT

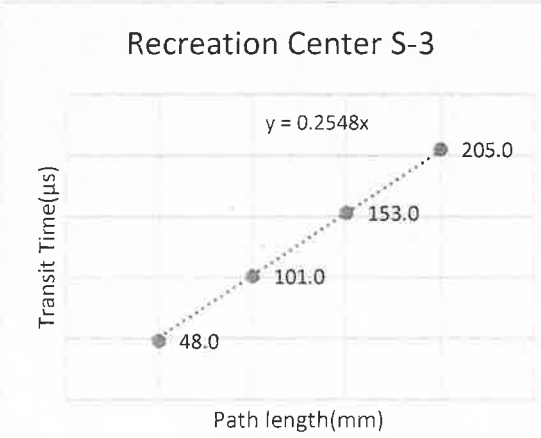
Annexure-A

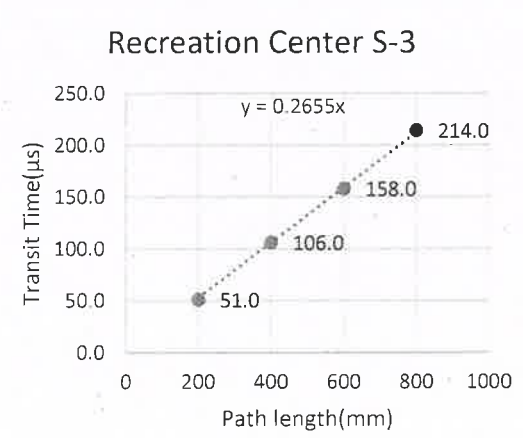
Graphs Showing Pulse Velocity Determination by Indirect (Surface) Transmission

Sr.No.-3









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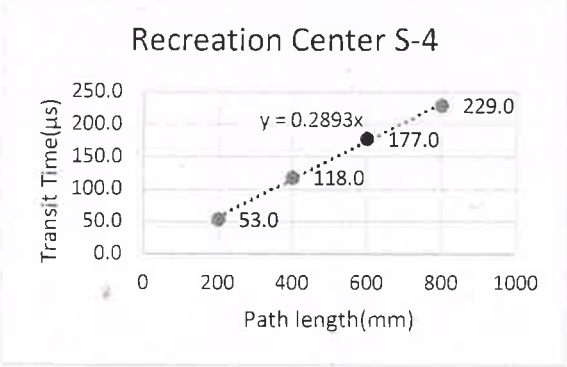
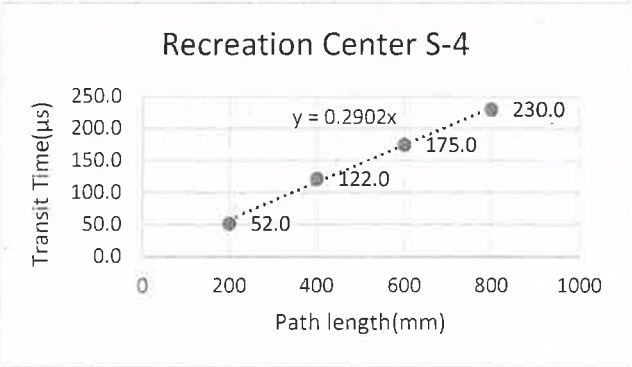
NON-DESTRUCTIVE TESTING (NDT) LABORATORY
TEST REPORT

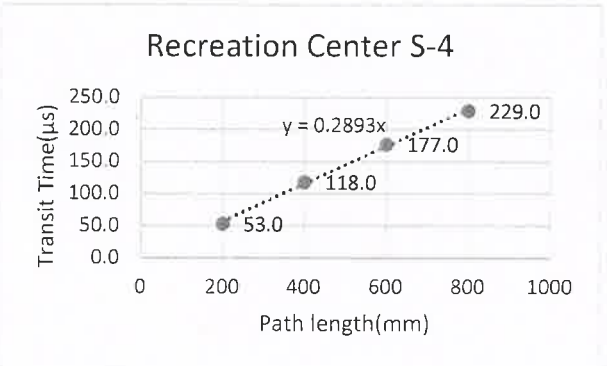
Annexure-A

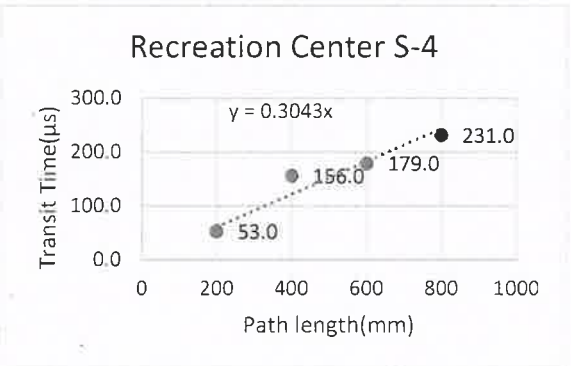
Graphs Showing Pulse Velocity Determination by Indirect (Surface) Transmission

Sr. No-04









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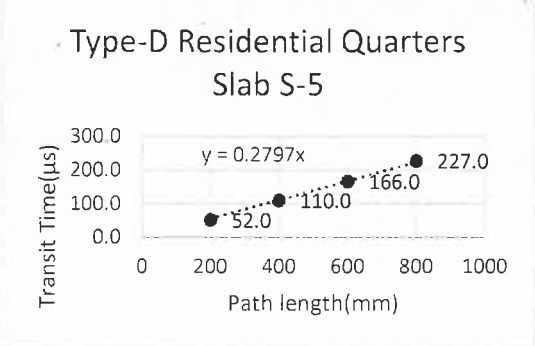
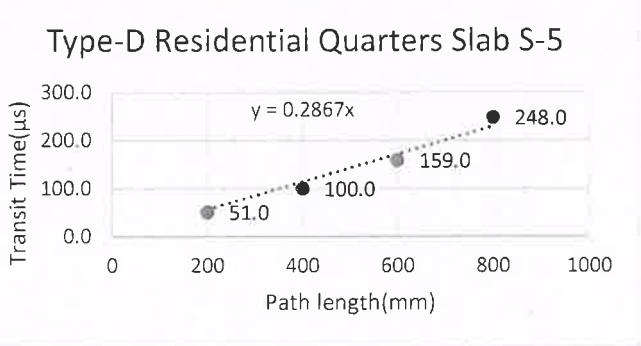
TEST REPORT

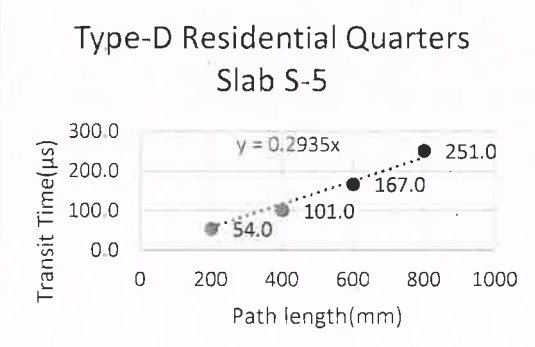
Annexure-A

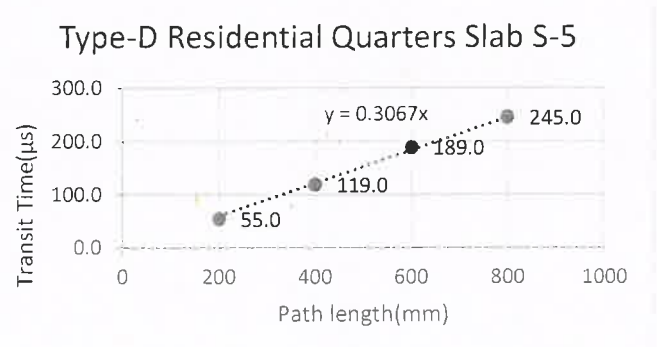
Graphs Showing Pulse Velocity Determination by Indirect (Surface) Transmission

Sr. No-05









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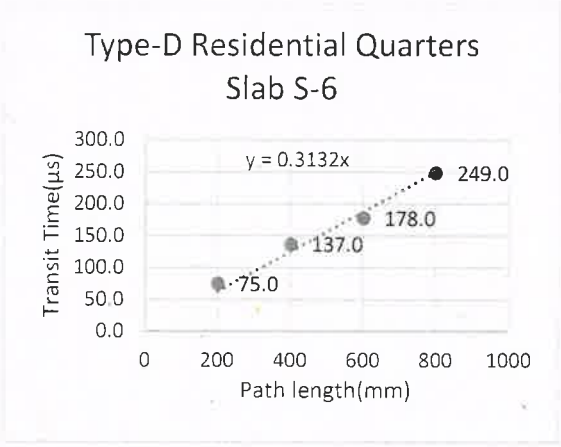
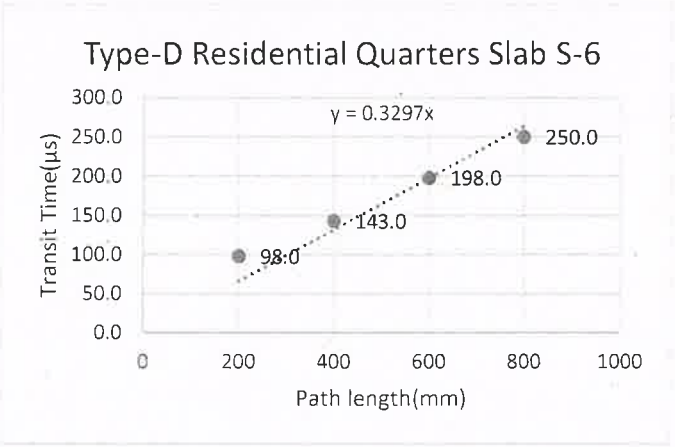
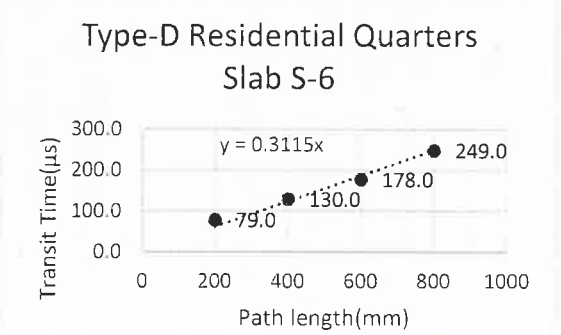
Annexure-A

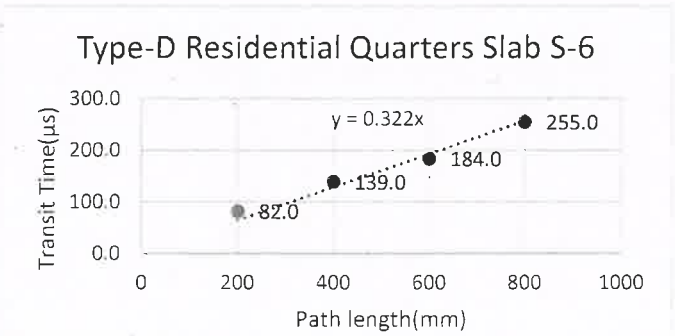
Graphs Showing Pulse Velocity Determination by Indirect (Surface) Transmission

Sr. No-06









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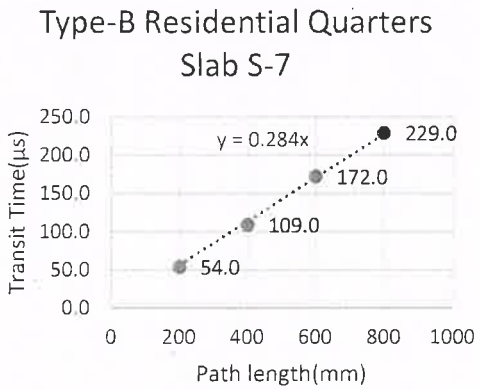
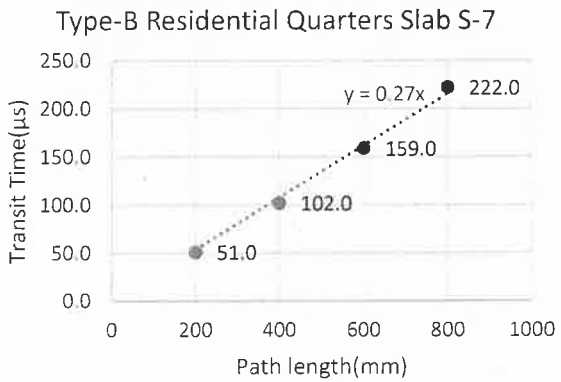
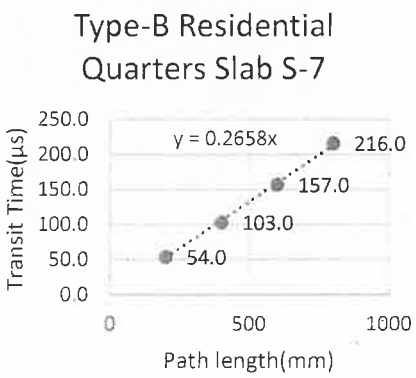
Annexure-A

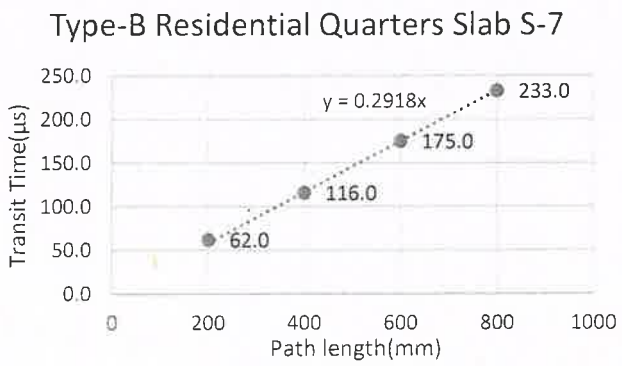
Graphs Showing Pulse Velocity Determination by Indirect (Surface) Transmission

Sr. No-07









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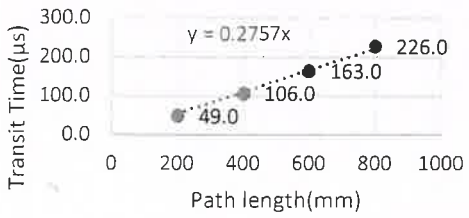
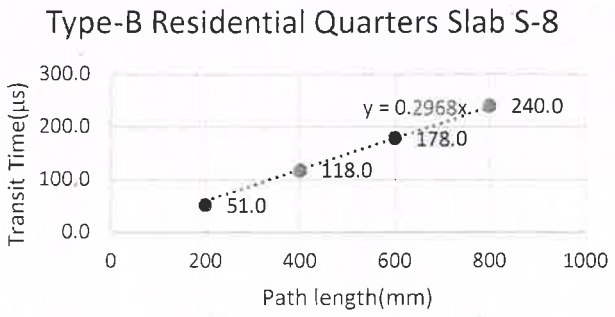
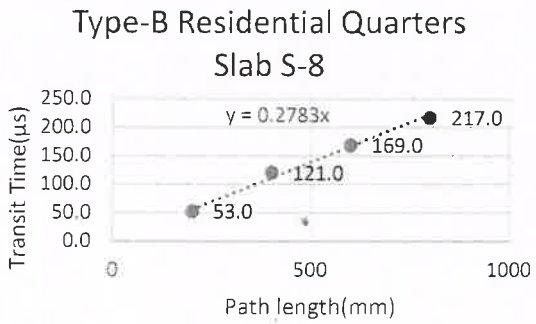
Annexure-A

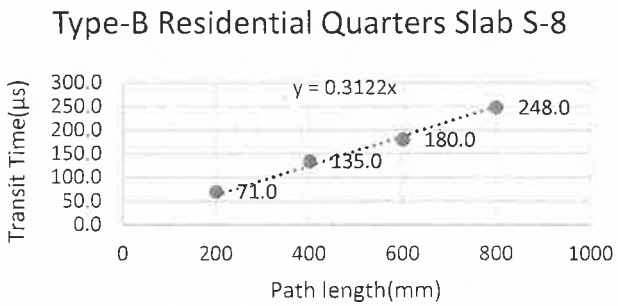
Graphs Showing Pulse Velocity Determination by Indirect (Surface) Transmission

Sr. No-08









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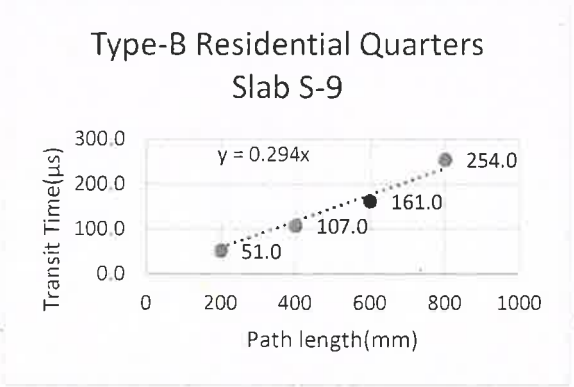
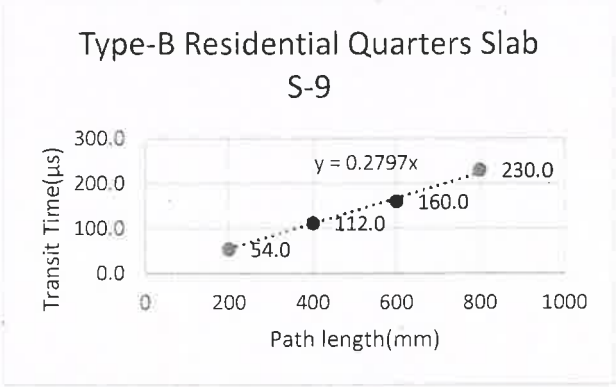
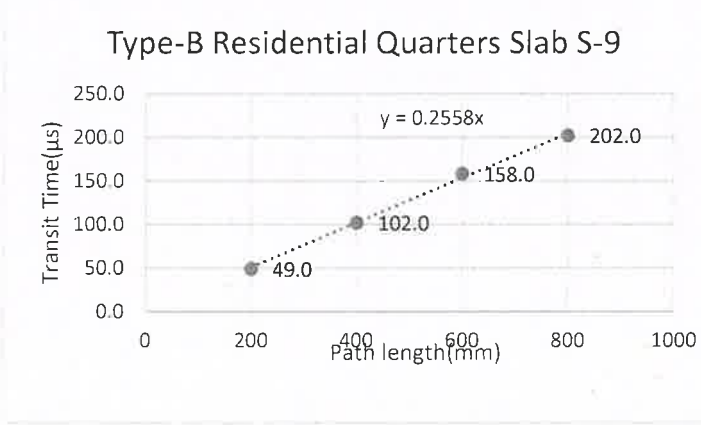
Annexure-A

Graphs Showing Pulse Velocity Determination by Indirect (Surface) Transmission

Sr. No-09







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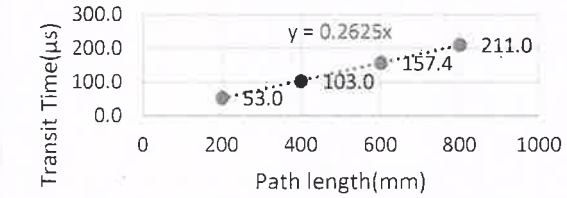
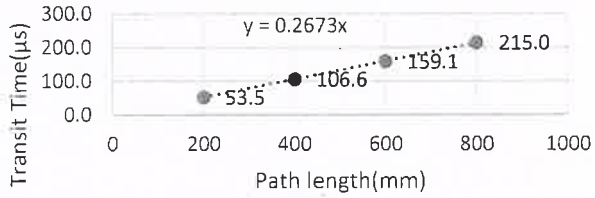
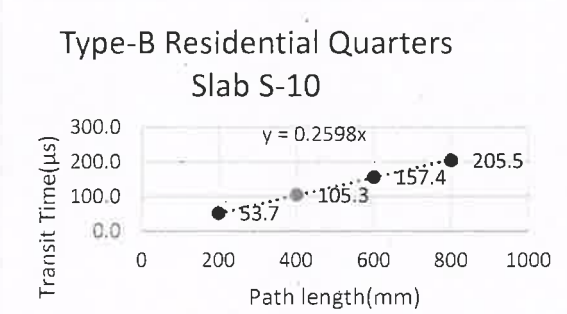
Annexure-A

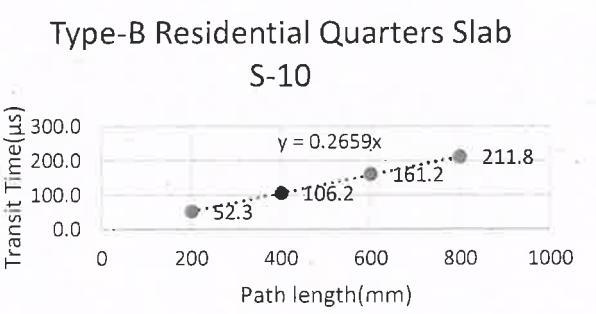
Graphs Showing Pulse Velocity Determination by Indirect (Surface) Transmission

Sr. No-10









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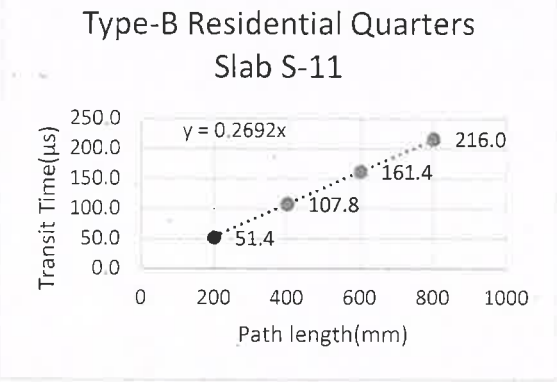
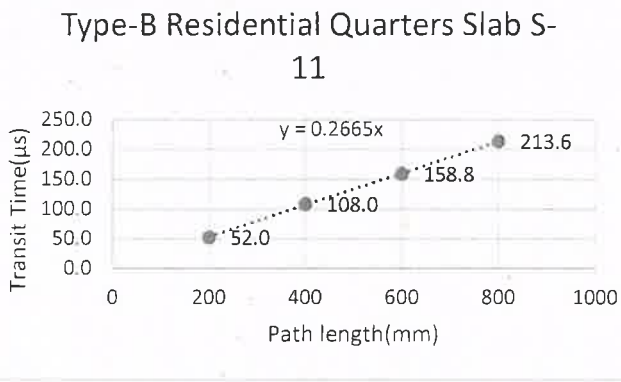
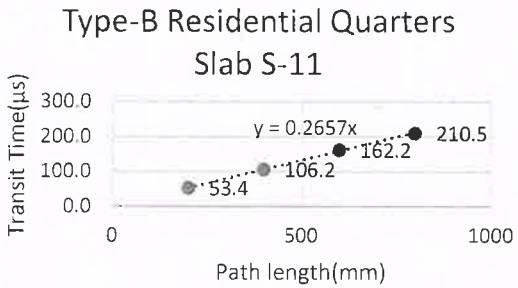
Annexure-A

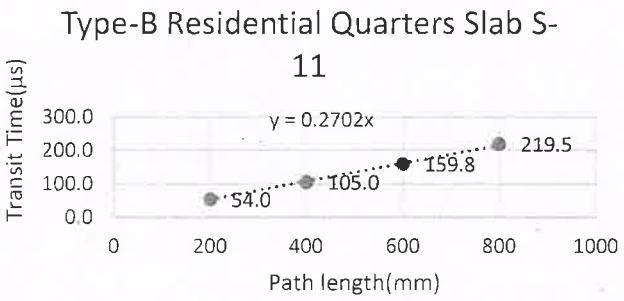
Graphs Showing Pulse Velocity Determination by Indirect (Surface) Transmission

Sr. No-11









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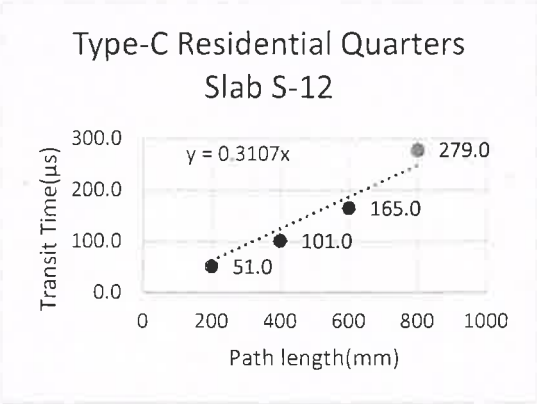
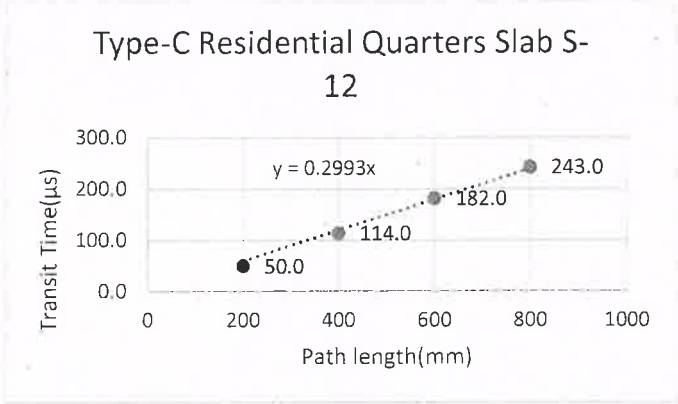
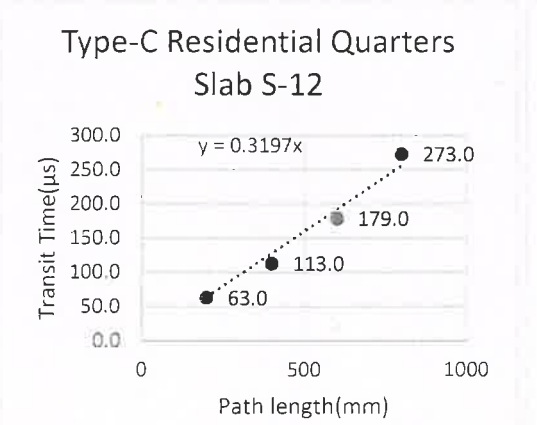
Annexure-A

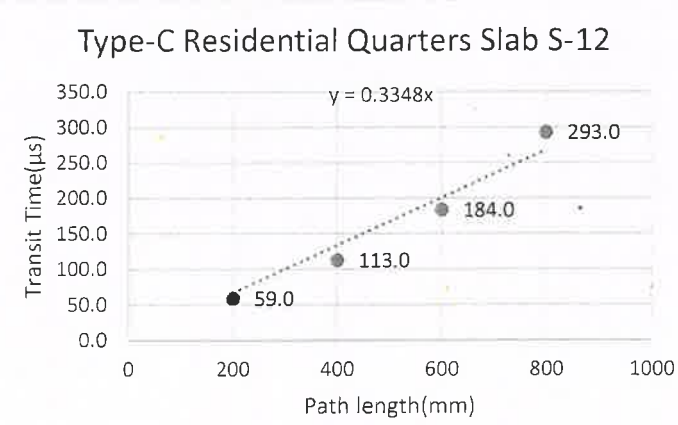
Graphs Showing Pulse Velocity Determination by Indirect (Surface) Transmission

Sr. No-12









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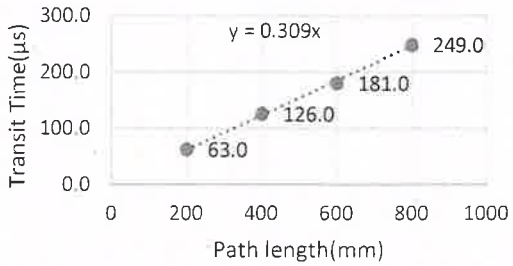
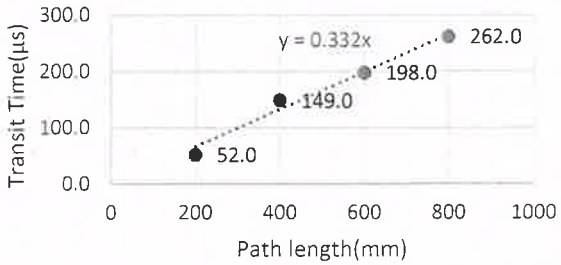
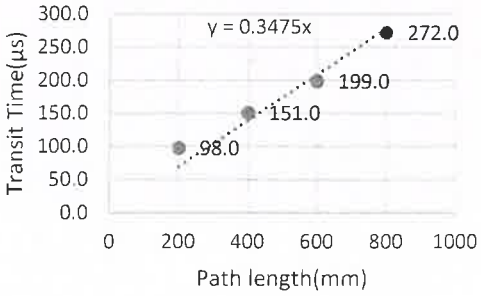
Annexure-A

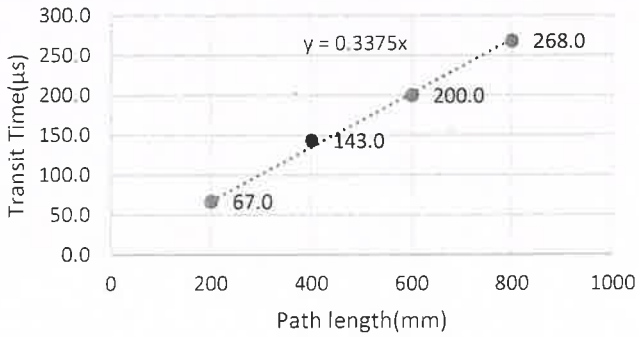
Graphs Showing Pulse Velocity Determination by Indirect (Surface) Transmission

Sr. No-13









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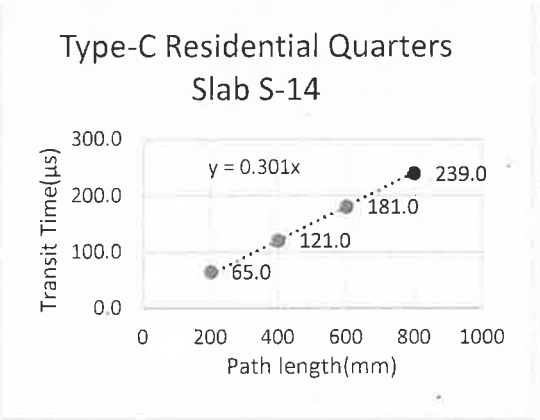
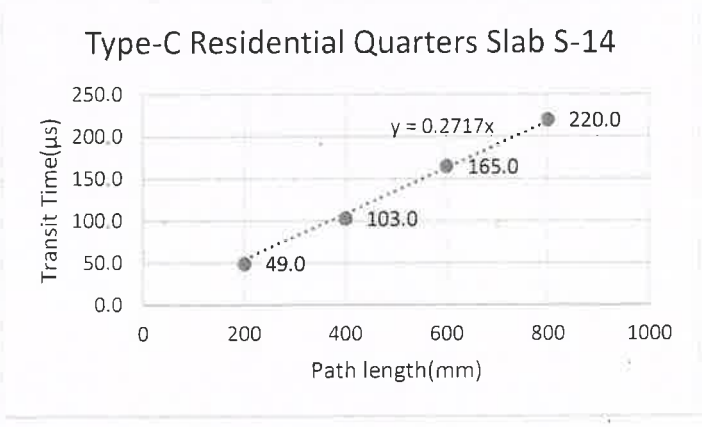
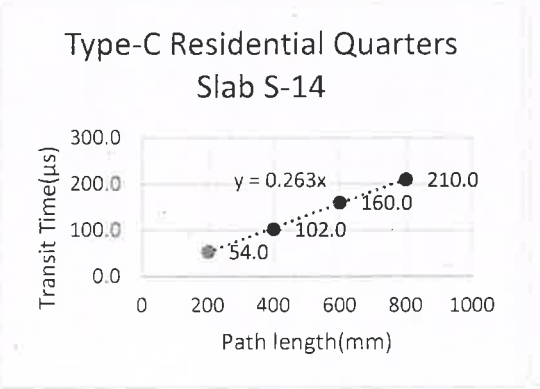
Annexure-A

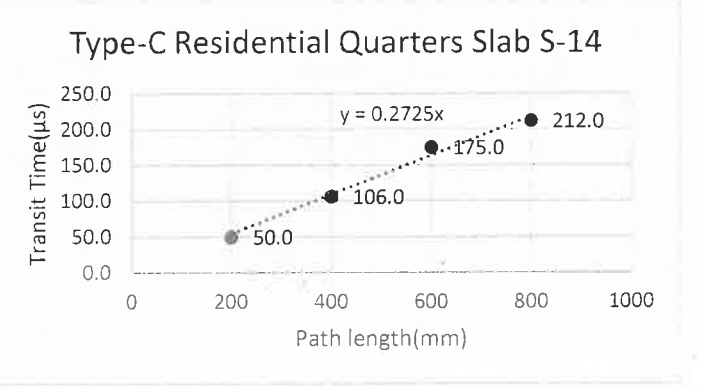
Graphs Showing Pulse Velocity Determination by Indirect (Surface) Transmission

Sr. No-14









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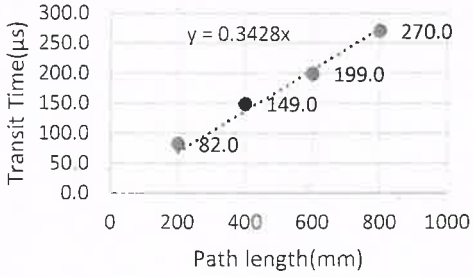
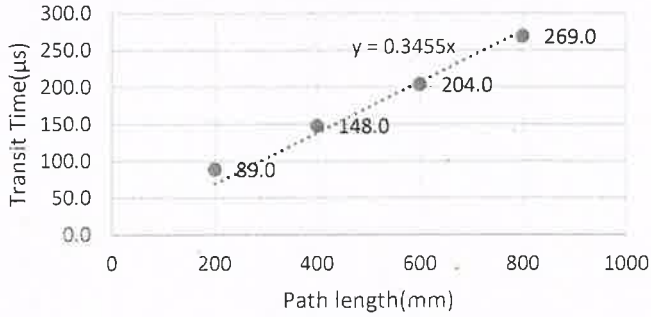
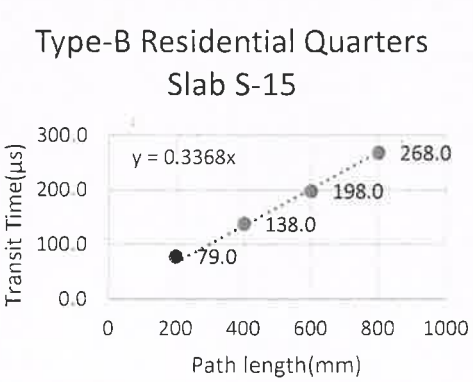
Annexure-A

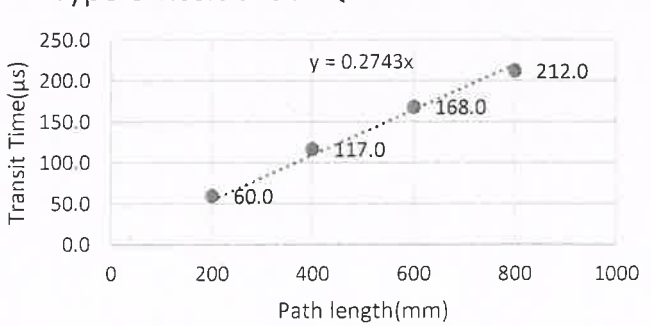
Graphs Showing Pulse Velocity Determination by Indirect (Surface) Transmission

Sr. No-15









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Project No. & Customer Details: SP-6748 & NCB-CDR
Date of Testing: 21,22/11/2024

Notes:

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3. This test report shall not be used for any publicity/legal purpose.
4. Conformance of test results to specifications and standards does not imply that the specimen/structural member/structure/product is endorsed by either NCB or NABL.
5. As per Table 1, velocity criteria for concrete quality grading (Clause 2.5.2) of IS 516 (Part 5/Sec 1):2018 (Amendment No.1 Dated November 2019), the concrete quality grading may be decided as per the following guideline.

SI. No. (1)	Average Value of Pulse Velocity by Cross Probing Km/s (2)	Concrete Quality Grading (3)
i) For concrete (≤ M 25):		
a)	Above 4.50	Excellent
b)	3.50 - 4.50	Good
c)	Below 3.50	Doubtful[1)]
ii) For concrete (> M 25):		
a)	Above 4.50	Excellent
b)	3.75 - 4.50	Good
c)	Below 3.75	Doubtful[1)]
[1)] In case of 'Doubtful quality', it may be necessary to carry out additional tests.		

6. As per 2.4.3.2.1 clause of IS 516 (Part 5/Sec1):2018. The indirect velocity is invariably lower than the direct velocity on the same concrete element. This difference may vary from 5 to 20 percent depending largely on the quality of the concrete under test. For good quality concrete, a difference of about 0.5km/s may generally be encountered.
7. As per 2.4.3.2.5 clause of IS 516 (Part 5/Sec1):2018. Surface probing in general gives lower pulse velocity than in case of Direct Probing and depending on number of parameters, the difference could be of the order of about 0.5 km/s. In view of this, it is recommended that, in surface probing method the pulse velocity may be increased by 0.5km/s, for values ≥ 3.0 km/s.
8. As per ANNEX-A (*Clauses* 2.4.2 *and* 2.4.3.2.1) Determination of Pulse Velocity-Indirect Transmission Subclause A-3: "The slope of the best straight line drawn through the points [tan (ø)] shall be measured and its inverse be recorded as the mean pulse velocity along the chosen line on the concrete surface". Graph showing pulse velocity determination by indirect (Surface) transmission as attached as Annexure-A. Where the points measured and recorded in this way indicate a discontinuity, it is likely that a surface crack or surface layer of inferior quality is present and a velocity measured in such an instance is unreliable.
9. As per clause B-1.3 of ANNEX-B (Clause 2.4.3.1) of IS 516 (Part 5/Sec1):2018. Variations of the concrete temperature between 5°C and 30°C do not significantly affect the pulse velocity measurements in concrete. At temperatures between 30° to 60°C there can be reduction in pulse velocity up to 5 percent. Below freezing temperature, the free water freezes within concrete, resulting in an increase in pulse velocity up to 7.5 percent.

Checked by

Authorised Signatory
(Arup Ghatak)

****End of Report*****

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NATIONAL COUNCIL FOR CEMENT BUILDING MATERIALS (Testing Laboratories)

Mechanical and Physical Properties Investigation (MPI LAB-III)

NCB/TL/QM/TRF-3.2

TEST REPORT

Project No	SP-6748	**Date of Receipt**	02-Dec-24	**ULR No:** TC529624300000959F	**Report No.** MPIL/ 2485 **TC-5296**
Lab Reference No	34777 Core	**Period of Testing**	03-Dec-24 / 19-Dec-24		**Tested as per** IS 516:(Part-4):2018
Sample said to be	Concrete Core	**Date of Reporting**	20-Dec-24		**Disclipine** Mechanical Testing
Sample Condition	Unsealed with ID Tag	**Test Age**	Not Known	**Preparation Method** Capping	**Group** Building Materials

Sample Identification	Laboratory Mark	Length of Core (mm)	Dia of Core (mm)	Core dia Correction Factor	L/D Ratio	Correction Factor	Load (kN)	Area of Core (mm2)	Measured Compressive Strength (N/mm2)	Corrected Compressive Strength (N/mm2)	Corrected Cylinder Strength (N/mm2)	Equivalent Cube Compressive Strength (N/mm2)	Appearance of Fractured faces of concrete
C1/S1	B-9769	84.57	59.32	1.06	1.43	0.937	69.16	2762.31	25.02	26.53	24.85	31.06	Satisfactory
C2/S1	B-3586	71.79	58.85	1.06	1.22	0.914	57.44	2718.71	21.12	22.38	20.46	25.58	Satisfactory
C3/S1	B-5780	73.58	58.60	1.06	1.26	0.918	82.32	2695.66	30.52	32.35	29.70	37.13	Satisfactory
C5/S3	B-9248	66.49	58.80	1.06	1.13	0.904	46.25	2714.09	17.03	18.05	16.33	20.41	Satisfactory
C6/S3	B-9552	77.20	58.92	1.06	1.31	0.924	46.70	2725.18	17.13	18.16	16.78	20.97	Satisfactory
C7/S3	B-2345	90.36	59.0	1.06	1.53	0.948	47.88	2732.59	17.51	18.56	17.61	22.01	Satisfactory
C9/S5	B-1686	75.69	58.74	1.06	1.29	0.922	52.80	2708.55	19.48	20.65	19.04	23.80	Satisfactory
C10/S5	B-5748	80.36	58.70	1.06	1.37	0.931	35.22	2704.87	13.01	13.80	12.84	16.05	Satisfactory
C11/S5	B-5655	77.38	58.66	1.06	1.32	0.925	47.41	2701.18	17.54	18.60	17.20	21.50	Satisfactory

Conditions*

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5. Tested sample shall be retained for 90 days after reporting the results.

Reviewed by

************END OF THE TEST REPORT************

26/12/24

Dr. Sanjay Mundra
Authorized Signatory

NATIONAL COUNCIL FOR CEMENT BUILDING MATERIALS (Testing Laboratories)

Mechanical and Physical Properties Investigation (MPI LAB-III)

TEST REPORT

NCB/TL/QM/TRF-3.2

Project No	SP-6748	**Date of Receipt**	02-Dec-24	**ULR No:** TC529624300000960F	**Report No.** MPIL/ 2486 **TC-5296**
Lab Reference No	34778 Core	**Period of Testing**	03-Dec-24 / 18-Dec-24		**Tested as per** IS 516:(Part-4):2018
Sample said to be	Concrete Core	**Date of Reporting**	20-Dec-24		**Discipline** Mechanical Testing
Sample Condition	Unsealed with ID Tag	**Test Age**	Not Known	**Preparation Method** Capping	**Group** Building Materials

Sample Identification	Laboratory Mark	Length of Core (mm)	Dia of Core (mm)	Core dia Correction Factor	L/D Ratio	Correction Factor	Load (kN)	Area of Core (mm2)	Measured Compressive Strength (N/mm2)	Corrected Compressive Strength (N/mm2)	Corrected Cylinder Strength (N/mm2)	Equivalent Cube Compressive Strength (N/mm2)	Appearance of Fractured faces of concrete
C13/S7	B-5398	84.40	58.53	1.06	1.44	0.939	56.78	2689.22	21.10	22.37	21.00	26.25	Satisfactory
C14/S7	B-9748	94.20	58.80	1.06	1.60	0.956	49.65	2714.09	18.28	19.38	18.53	23.17	Satisfactory
C15/S7	B-5832	72.45	59.03	1.06	1.23	0.915	36.04	2735.36	13.17	13.96	12.77	15.97	Satisfactory
C17/S8	B-4271	82.80	59.44	1.06	1.39	0.933	61.47	2773.49	22.15	23.48	21.91	27.39	Satisfactory
C18/S8 #	B-4486	—	—	—	—	—	—	—	—	—	—	—	—
C19/S8	B-6721	80.51	59.42	1.06	1.35	0.929	65.52	2771.63	23.63	25.05	23.27	29.09	Satisfactory
C21/S9	B-6279	65.66	59.44	1.06	1.10	0.902	42.80	2773.49	15.42	16.35	14.74	18.42	Satisfactory
C22/S9	B-2088	64.32	59.41	1.06	1.08	0.899	51.85	2770.70	18.70	19.83	17.83	22.28	Satisfactory
C23/S9	B-5379	70.50	59.44	1.06	1.19	0.910	62.43	2773.49	22.50	23.85	21.71	27.14	Satisfactory

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5. Tested sample shall be retained for 90 days after reporting the results.

NOTE - C18/S8 - Core got cracked during prepration.
#

Reviewed by

*************END OF THE TEST REPORT************

26/12/24

Dr. Sanjay Mundra
Authorized Signatory

NATIONAL COUNCIL FOR CEMENT BUILDING MATERIALS (Testing Laboratories)

Mechanical and Physical Properties Investigation (MPI LAB-III)

NCB/TL/QM/TRF-3.2

TEST REPORT

Project No	SP-6748	**Date of Receipt**	02-Dec-24	**ULR No:**	TC529624300000961F
Lab Reference No	34779 Core	**Period of Testing**	03-Dec-24 / 18-Dec-24		
Sample said to be	Concrete Core	**Date of Reporting**	20-Dec-24		
Sample Condition	Unsealed with ID Tag	**Test Age**	Not Known	**Preparation Method**	Capping

Report No. MPIL/ 2487 TC-5296
Tested as per IS 516:(Part-4):2018
Disciplne Mechanical Testing
Group Building Materials

Sample Identification	Laboratory Mark	Length of Core (mm)	Dia of Core (mm)	Core dia Correction Factor	L/D Ratio	Correction Factor	Load (kN)	Area of Core (mm2)	Measured Compressive Strength (N/mm2)	Corrected Compressive Strength (N/mm2)	Corrected Cylinder Strength (N/mm2)	Equivalent Cube Compressive Strength (N/mm2)	Appearance of Fractured faces of concrete
C25	B-3205	83.44	59.21	1.06	1.41	0.935	47.29	2752.07	17.17	18.21	17.02	21.28	Satisfactory
C26	B-5575	87.34	59.35	1.06	1.47	0.942	32.07	2765.10	11.59	12.29	11.57	14.47	Satisfactory
C27	B-6998	87.36	59.34	1.06	1.47	0.942	34.03	2764.17	12.30	13.04	12.29	15.36	Satisfactory
C29	B-3699	70.57	59.11	1.06	1.19	0.911	47.43	2742.78	17.28	18.32	16.70	20.87	Satisfactory
C30	B-7210	73.48	59.17	1.06	1.24	0.917	56.41	2748.35	20.51	21.75	19.93	24.91	Satisfactory
C31	B-5446	77.62	59.64	1.06	1.30	0.923	50.79	2792.19	18.18	19.27	17.79	22.24	Satisfactory

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24/12/24
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************END OF THE TEST REPORT************

28/12/24
Dr. Sanjay Mundra
Authorized Signatory

National Load Despatch Centre
Import Capability of Punjab for August 2025

\

Issue Date: - Issue Time: 1600 Revision No. 0

Date	Time Period in IST (hrs)	Total Transfer Capability (TTC) (MW)	Reliability Margin (MW)	Available Transfer Capability (ATC) (MW)	Approved General Network Access (MW)	Margin Available for Temporary General Network Access(MW)	Changes in TTC w.r.t. Last Revision	Comments
1 August 2025 to 31 August 2025	00-24	10900	500	10400	5497	4903		https://www.punjabsldc.org/ATC_TTC.aspx
Limiting Constraints		N-1 contigency of 400/220KV ICT at Rajpura, Ludhiana, Jalandhar, Muktsar Loading close to N-1 contingency limits of 400/220kV Malerkotla and Patiala ICTs 220 kV underlying network at Jalandhar, Ludhiana and Amritsar						

National Load Despatch Centre
Import Capability of Uttar Pradesh for August 2025

Issue Date: - Issue Time: 1600 Revision No. 0

Date	Time Period in IST (hrs)	Total Transfer Capability (TTC) (MW)	Reliability Margin (MW)	Available Transfer Capability (ATC) (MW)	Approved General Network Access (MW)	Margin Available for Temporary General Network Access(MW)	Changes in TTC w.r.t. Last Revision	Comments
1 August 2025 to 31 August 2025	00-24	17700	600	17100	10165	6935		https://www.upsldc.org/documents/20182/0/ttc_atc_24-11-16/4c79978e-35f2-4aef-8c0f-7f30d878dbde
Limiting Constraints	N-1 contingency of 400/220kV Panki, Allahabad(PG), Agra(PG), Lucknow (PG) ICTs							

National Load Despatch Centre
Import Capability of Haryana for August 2025

Issue Date: - Issue Time: 1600 Revision No. 0

Date	Time Period in IST (hrs)	Total Transfer Capability (TTC) (MW)	Reliability Margin (MW)	Available Transfer Capability (ATC) (MW)	Approved General Network Access (MW)	Margin Available for Temporary General Network Access(MW)	Changes in TTC w.r.t. Last Revision	Comments
1 August 2025 to 31 August 2025	00-24	10500	300	10200	5418	4782		https://hvpn.org.in/#/atcttc
Limiting Constraints	N-1 contingency of 400/220kV ICT at Deepalpur, Hisar, Kabulpur and Panipat(BBMB)							

National Load Despatch Centre
Import Capability of Rajasthan for August 2025

Issue Date: - Issue Time: 1600 Revision No. 0

Date	Time Period in IST (hrs)	Total Transfer Capability (TTC) (MW)	Reliability Margin (MW)	Available Transfer Capability (ATC) (MW)	Approved General Network Access (MW)	Margin Available for Temporary General Network Access(MW)	Changes in TTC w.r.t. Last Revision	Comments
1 August 2025 to 31 August 2025	00-24	7600	600	7000	5755	1245		https://sldc.rajasthan.gov.in/rrvpnl/scheduling/downloads
Limiting Constraints	N-1 contingency of 400/220kV Heerapura, Jodhpur, Bikaner, Ajmer, Merta, Hindaun and Ratangarh ICTs							

National Load Despatch Centre
Import Capability of Delhi for August 2025

Issue Date: - Issue Time: 1600 Revision No. 0

Date	Time Period in IST (hrs)	Total Transfer Capability (TTC) (MW)	Reliability Margin (MW)	Available Transfer Capability (ATC) (MW)	Approved General Network Access (MW)	Margin Available for Temporary General Network Access(MW)	Changes in TTC w.r.t. Last Revision	Comments
1 August 2025 to 31 August 2025	00-24	7600	300	7300	4810	2490		https://www.delhisldc.org/resources/atcttcreport.pdf
Limiting Constraints	N-1 contingency of 400/220kV HarshVihar and Bawana (bus-split) ICTs.							

National Load Despatch Centre
Import Capability of Uttarakhand for August 2025

Issue Date: - Issue Time: 1600 Revision No. 0

Date	Time Period in IST (hrs)	Total Transfer Capability (TTC) (MW)	Reliability Margin (MW)	Available Transfer Capability (ATC) (MW)	Approved General Network Access (MW)	Margin Available for Temporary General Network Access(MW)	Changes in TTC w.r.t. Last Revision	Comments
1 August 2025 to 31 August 2025	00-24	1710	100	1610	1402	208		https://uksldc.in/ttc-atc
Limiting Constraints		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 HP for August 2025

Issue Date: - Issue Time: 1600 Revision No. 0

Date	Time Period in IST (hrs)	Total Transfer Capability (TTC) (MW)	Reliability Margin (MW)	Available Transfer Capability (ATC) (MW)	Approved General Network Access (MW)	Margin Available for Temporary General Network Access(MW)	Changes in TTC w.r.t. Last Revision	Comments
1 August 2025 to 31 August 2025	00-24	2386	100	2286	1181	1105		https://hpsldc.com/mrm_category/ttc-atc-report/
Limiting Constraints		Overloading of 2*100MVA Giri transformers High loading of 220kV Nallagarh-Upernangal D/C						

National Load Despatch Centre
Import Capability of J&K for August 2025

Issue Date: - Issue Time: 1600 Revision No. 0

Date	Time Period in IST (hrs)	Total Transfer Capability (TTC) (MW)	Reliability Margin (MW)	Available Transfer Capability (ATC) (MW)	Approved General Network Access (MW)	Margin Available for Temporary General Network Access(MW)	Changes in TTC w.r.t. Last Revision	Comments
1 August 2025 to 31 August 2025	00-24	2800	100	2700	1977	723		
Limiting Constraints		N-1 contigency of 400/220KV ICTs at Amargarh, Kishenpur 220 kV underlying network at Amargarh, Wagoora Low voltages in J&K control area due to high MVAR drawl						

National Load Despatch Centre
Import Capability of Chandigarh for August 2025

Issue Date: - Issue Time: 1600 Revision No. 0

Date	Time Period in IST (hrs)	Total Transfer Capability (TTC) (MW)	Reliability Margin (MW)	Available Transfer Capability (ATC) (MW)	Approved General Network Access (MW)	Margin Available for Temporary General Network Access(MW)	Changes in TTC w.r.t. Last Revision	Comments
1 August 2025 to 31 August 2025	00-24	480	20	460	342	118		
Limiting Constraints		N-1 contigency of 220kV Nallagarh-Kishengarh						

Northern Region SPS Details

S. No.	Group	Delhi		UP		Rajasthan		Haryana		Punjab		
		Load	Planned Load (MW)	Load	Planned Load (MW)	Load	Planned Load (MW)	Load	Planned Load (MW)	Load	Planned Load (MW)	Group Total
1	Group-A	Mandola (PG)- 220 kV Narela D/C NSD-70D	150	Feeders from 220/132 kV Muradnagar old S/S 132 kV Niwai Road 132 kV Modi Steel 132 kV Morta 2*63 MVA X-Mer	100	220/132 kV Alwar- 132 kV GSS Pinan 400/220 kV Merta - 132 kV GSS Roon	25			220/66 kV Malerkotla 66 kV Malerkotla ckt 66 kV Naudhrani ckt	35	310
2	Group-B	Mandola (PG) - 220 kV Gopalpur D/C	200			220/132 kV Ratangarh - 132 kV Sardar Sahar	25	Panipat (BBMB) 100 MVA, 220/33 kV ICT	50			275
3	Group-C			Feeders from 220/132 kV Modipuram Sub-station. 132 KV Sardhana, Kankankhera, Kapsad, Kankankhera-2, 132/33kV 40MVA+ 63MVA ICT-2&3 33 kV Ladies Park, 33 kV Pallavpuram, 33 kV Siwaya	100	400/220 kV Merta - 132 kV GSS Merta City 132 kV GSS Lamba+ Gotan 132 kV GSS Kuchera	60	220kV Dhanoda- 220kV Lula Ahir Ckt-1 220kV Lula Ahir Ckt-2 (Load Relief: 220/132kV, 100MVA T/F + 220/33kV, 100MVA T/F) 220kV Charkhi Dadri- 220kV Lula Ahir (Load Relief: 3*100MVA 220/132kV Rewari)	91	220/66 kV Gobindgarh-1 66 kV Chourwala ckt-1, 66 kV Chourwala ckt-2, 66 kV Talwara ckt-1, 66 kV Talwara ckt-2 66 kV Focal Point	71	322
4	Group-D					220/132 kV Alwar- 132 kV GSS Bansoor 132 kV GSS Malakheda 132 kV Ramgarh	60	220kV Charkhi Dadri- 220kV Mohindergarh Ckt-1 (Radial load- 49MW) 220kV Mohindergarh Ckt-2 (Radial load of Narnaul- 38MW)	87	220/66 kV Lalitokalan- 66kV Gill Road ckt-1 66kV Gill Road ckt-2 66kV Ferozpur 66 kV Sarinh	114.25	261.25
5	Group-E			220 kV Mainpuri - 2 x 132/33 kV , 63 MVA T/F (20 MW -60 MW)	50	220/132kV Bhilwara- 132 kV GSS Gangapur, 132 kV GSS Devgarh+Kareda, 132 kV GSS Danta 220/132 kV Merta- (Spare DTPC)	105	132kV PTPS- 132kV Chandauli 132kV Munak 220kV Dhanoda- *220/132 kV 100 MVA X-Mer*	88	220 kV Jamsher- 66 kV Nakodar Road-1 66 kV Nakodar Road-2	100	343
6	Group-F			220 kV Nara- 132/33 kV , 40 MVA T/F 132/33 kV, 2*63 MVA T/F (32 MW -52 MW)	50	220/132 kV Alwar 132 kV GSS Alwar (Local Load) 220/132kV Kota- Kota local load (40/50MVA TF) 132 kV Nanta(Talera) 220/132 kV Beawar- 132 kV GSS Ber Jaitaran	100	Samaypur (BBMB) - 220 kV Palwal D/C (MW) (35MW) 220kV Narwana- 2*100MVA 220/132kV T/F at 220 kV Narwana	55	220 Mohali-1- 66 kV Mohali Phase-7 66 kV Mohali Phase-8B 66 kV Mohali Sector-71 66 kV Mohali Phase-1	100	305
7	Group-G					220/132 kV Ratangarh - 132 KV Ratangarh Inter-Connector 132 kV Fatehpur 220/132 kV Beawar- 132 kV GSS Masuda, 132 KV GSS Asind, Beawar Local Load	100	132kV Charkhi Dadri 132kV Dadri city, 132kV Matenhail, 132kV Kalanaur, 132kV Bahu 132/33kV T/F 20/25MVA 132/133V T/F 16/20 MVA	75	220 kV Ablowal- 66 kV Rakhra-I & II, 66 kV Rakhra-III & IV	100	275
8	Group-H					220/132kV Bhilwara- 132 KV Bhilwara Local Load	12	220kV Fatehabad(PGCIL)- 220kV Fatehabad Ckt-1 220kV Fatehabad Ckt-2 220kV Sirsa	45	220kV Ajitwal- 66 kV Galib ckt 66 kV Doudhar 66 kV Chogawan ckt-1 66 kV Chogawan ckt-2	15	72
9	Group-I			220kV Saharanpur- 220/132kV, 40MVA T/F-1 220/132kV, 40MVA T/F- 132kV Ambala Road 132 kV Gagalheri ckt	100	220/132 kV Ratangarh - 132kV GSS Momasar+ Patlisar	35	132kV Safidon- 220/132kV, 100MVA T/F-1 220/132kV, 100MVA T/F-2	50	220kV Dhandari-2- 66/11kV T-2 66/11kV T-4 66kV Sherpur Ckt-1 66kV Sherpur Ckt-2	109	294
10	Group-J			220kV Nanuta- 132/33kV, 63MVA T/F-1 132/33kV, 63MVA T/F-2 132kV Deoband ckt 132 kV Gangoh ckt 132 kV Rampur-Maniharan 132 kV Shamli-Shyamla	155	220/132 kV Debari- 132kV GSS Mavli 132kV GSS Bhatewar 132 kV Debari local load	90	220kV Hissar(PGCIL)- 220kV Sangwan Ckt-1 220kV Sangwan Ckt-2	45	Ablowal - 66kV Barn 66kV passiana-1 Bahadurgarh- 66kV Bahadurgarh-1 66kV Ghanour 66kV Patiala 66kV Barn-1 66kV Barn-2	153.1	443.1
11	Group-K	400/220kV Bamnauli- 220kV Pappankala Ckt-1 220kV Pappankala Ckt-2	200			220/132 kV Chittorgarh- 132 kV GSS Ajolia ka khera+Bassi 132 kV Senthi Chittorgarh local load	65	220kV Nunamajra- 220/132kV, 100MVA T/F-1 220/132kV, 100MVA T/F-2 220kV Prem Nagar Bhiwani (BBMB)- Bapora Ckt-1 Bapora Ckt-2	57	220 kV Mohali-1 (Sector-80) 66kV CHD-1 66kV CHD-2 66kV CHD-3 66kV CHD-4 66kV Incoming-1 66kV Incoming-2 66kV Incoming-3 220kV Gobindgarh-2 MGG 66kV Khanna Ckt-1 66kV Khanna Ckt-2 66kV Badinpur 66kV Central 66kV Grain Market 66kV Bhari 66/11kV T-2 66/11kV T-4 66/11kV T-6	90	412
		TOTAL	550		555		677		643		887.35	3312.4

Fig-1: Load Details

ग्रिड-इंडिया GRID-INDIA

ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
(A Government of India Enterprise)
[formerly Power System Operation Corporation Limited (POSOCO)]
राष्ट्रीय भार प्रेषण केन्द्र / National Load Despatch Centre

आज़ादी का अमृत महोत्सव

कार्यालय : बी-9, प्रथम एवं द्वितीय तल, कुतुब इंस्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली - 110016
Office : 1st and 2nd Floor, B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi -110016
CIN : U40105DL2009GOI188682, Website : www.grid-india.in, E-mail : gridindiacc@grid-india.in, Tel.: 011- 42785855

संदर्भ: NLDC/SO/CEA/CTU/HVDC CK/

दिनांक: 11th Jun 2025

To,

Member (PS) Central Electricity Authority Sewa Bhawan, R K Puram New Delhi – 110066	**Chief Operating Officer (CTUIL)** 16, Institutional Area, Sector 32, Gurugram Haryana 122001

विषय:– Severe low voltage observed near load centers in northern region post tripping of HVDC Champa-Kurukshetra Pole-1,3 & 4 on 9th Jun 2025

Ref: - Report of Committee constituted by Ministry of Power(MoP) vide Order No. 6/3/2024-Trans under Chairmanship of Member (GO&D), CEA to analyse the issues of multiple tripping incidents occurred in the National grid on 17th June 2024 during which about 16.5 GW of consumer load in Northern Region got interrupted

Dear Sir,

Your kind attention is requested to the tripping incident involving the simultaneous outage of HVDC Champa–Kurukshetra Pole-1, 3, and 4 at 12:21 hours on 9th June 2025. The flash report of the incident is enclosed as Annexe-1. The simultaneous outage of three HVDC poles (Pole -2 is under forced outage since 27th May 2025 on VESDA protection) resulted in alarming conditions in the Indian Grid. The following were major concerns post tripping incident:

i. **Severe Low Voltage**: Voltage levels in the range of 370–380 kV were recorded at several major 400 kV nodes across the Northern Region. The voltage profile captured through PMU data at key stations is enclosed as Annexe-2.
ii. **Load and Generation Loss**: The Northern Region experienced a load loss of approximately 900 MW, impacting the states of Uttar Pradesh, Delhi, Rajasthan, Haryana, and Punjab. Additionally, there was a reduction of around 150 MW in renewable generation from the Rajasthan RE complex.
iii. **N-1 Violation**: 765 kV Aligarh–Greater Noida line experienced loading of nearly 3100 MW, resulting in non-compliance of N-1 security criterion.
iv. **Overloading of ICTs**: 1000 MVA, 765/400 kV ICT at Bhiwani recorded a loading of 1071 MW, indicating severe stress in the Delhi sub-system..

A similar incident occurred on 17th June 2024, involving the simultaneous outage of four HVDC Champa–Kurukshetra poles. That event led to a much larger impact, including a 16.5 GW load loss, tripping of conventional generation (~3900 MW), and a reduction in RE generation (~1900 MW). A committee was constituted by MoP to analyse the event and Committee submitted its report with several

recommendations. The recommendations mentioned in the report which need immediate attention to ensure reliable operation are following:

i. **Commissioning of the dynamic reactive power sources** near major load centres in the Northern Region to improve voltage stability.

ii. **Design and implementation of a suitable SPS scheme** which shall operate after outage of HVDC Champa – Kurukshetra Bipole to obtain relief in the voltage.

While the present incident had a comparatively less severe voltage collapse, possibly due to ~9 GW lower antecedent NR demand, it should nevertheless be treated as a near-miss. With the anticipated rise in demand during the upcoming summer period, voltage profiles in the Northern Region are likely to deteriorate further under similar contingency conditions.

Therefore, it is kindly requested to advise the concerned to analyze the aforementioned incident and implement the recommendations mentioned in the Committee report for safe and reliable system operation.

सधन्यवाद,

भवदीय

(एस. उषा)

कार्यपालक निदेशक, रा॰भा॰प्रे॰कें॰

Encl: As above

प्रतिलिपि सूचनार्थ:

1. Member Secretary, NRPC: *With a kind request to explore the design of suitable SPS scheme at NRPC*
2. Executive Director, HVDC-Engineering, CC-POWERGRID, Gurugram
3. Executive Director- AM, CC-POWERGRID, Gurugram
4. Executive Director, NRLDC

ग्रिड-इंडिया GRID-INDIA
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
भारत सरकार का उद्यम
GRID CONTROLLER OF INDIA LIMITED
(A Government of India Enterprise)
[formerly Power System Operation Corporation Limited (POSOCO)]
उत्तर क्षेत्रीय भार प्रेषण केन्द्र / Northern Regional Load Despatch Centre
कार्यालय : 18-ए, शहीद जीत सिंह सनसनवाल मार्ग, कटवारिया सराय, नई दिल्ली-110016
Office : 18-A, Shaheed Jeet Singh Sansanwal Marg, Katwaria Sarai, New Delhi-110016
CIN : U40105DL2009GOI188682, Website : www.nrldc.in, E-mail : nrldc@grid-india.in, Tel.: 011 26519406, 26523869, Fax: 011 26852747

Flash report of Tripping at 800KV Kurukshetra

1. **Date and Time of the Grid Event (ग्रिड घटना की तिथि और समय) :** 12:22 Hrs/09-06-2025.
2. **Location (स्थान):** Haryana
3. **Name of the Substation/Generating Station/Pooling Station Affected (सब-स्टेशन का नाम):** 800KV HVDC Kurukshetra
4. **Antecedent Conditions (पूर्ववर्ती स्थिति):**

	Frequency (Hz)	NR Demand (MW)	Regional Generation (MW)	Rajasthan Demand (MW)	Haryana Demand (MW)
Pre-Event (घटना पूर्व)	49.966	82612	72516	16431	11442
Post Event (घटना के बाद)	50.046	81724	72446	15822	11222

Pre and post data of 1 minute before and after the event

Important Transmission Line/Unit if under outage महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है	800 KV HVDC KURUKSHETRA(PG) POLE-2
Weather Condition (मौसम स्थिति)	Heatwave conditions at many places in the Northern Region. Heatwave to severe Heatwave at isolated places in Rajasthan.

5. **Generation Loss/Load loss (MW) (उत्पादन/भार क्षति):** As per SCADA, approx. 900 MW change in demand in NR region was observed. Rajasthan Demand changed by 609 MW, Haryana demand dropped by 220MW, Punjab demand dropped by 100MW, UP demand dropped by 602 MW and NR solar generation dropped by 150MW.
6. **Brief Details of the Grid Event (ग्रिड घटना का संक्षिप्त विवरण):**

At 12:21hrs, 800 KV HVDC KURUKSHETRA(PG) POLE-4 tripped on Differential protection operation at Kurukshetra. Following this, at 12:22 hrs Pole-1 and Pole-3 tripped due to Instability Detection protection operation. This led to demand drop in Rajasthan, Haryana, Punjab and Uttar Pradesh.

After the tripping of all the poles in HVDC Kurukshetra, low voltages were observed in NR region. 765KV Aligarh – Gr. Noida Ckt increased upto 3100MW while 1000 MVA,765/400KV ICT-2 at Bhiwani got overloaded to 1071MW.

7. Transmission/Generation element Tripped during the event (संचरण लाइन / विधुत उत्पादन इकाईं जो घटना के दौरान बंद हो गयी):

S.No. (क्र० सं०)	Transmission/Generation element name (संचरण लाइन / विधुत उत्पादन इकाईं का नाम)	Trip Time (बंद होने का समय)	Restoration time (वापस आने का समय)	Reason/ Relay Indication (कारण/रिले संकेत)
1.	800 KV HVDC KURUKSHETRA(PG) POLE-4	12:21 hrs	17:50 hrs	Convertor Transformer differential protection operation
2.	800 KV HVDC KURUKSHETRA(PG) POLE-3	12:22 hrs	13:32 hrs	Instability Detection protection operated in HVDC Pole-1 and Pole-3 at Champa.
3.	800 KV HVDC KURUKSHETRA(PG) POLE-1	12:22 hrs	12:53 hrs	

8. Action Taken by NRLDC (उ०क्षे०भा०प्रे०के० के द्वारा की गयी कार्रवाई): Immediately contacted to HVDC Kurukshetra for tripping details and early restoration of line and generation. The following steps were taken:

a) **UP: 200MW of load curtailment was done and 1600MW of internal generation was increased.**
b) **Punjab: 100 MW of load curtailment was done and 170MW of internal generation was increased (Ropar: 70MW and Talwandi: 100MW in each unit and further maximization)**
c) **BBMB: 50MW of generation was increased in Dehar and 50MW in Pong.**
d) **Tehri: Pumping Mode operation was stopped and Generation mode of operation started in Tehri HEP. 2 units, Unit-3 and Unit-2 were bought on bar at Tehri HEP. Generation was bought up to 234MW.**
e) **SCED down in NR plants was removed. Code for maximization of ISGS thermal plants was issued and was conveyed telephonically also. Appx 2.6 GW increase in Central sector thermal generation and 1.2GW increase in Hydro generation was observed after the above instructions.**

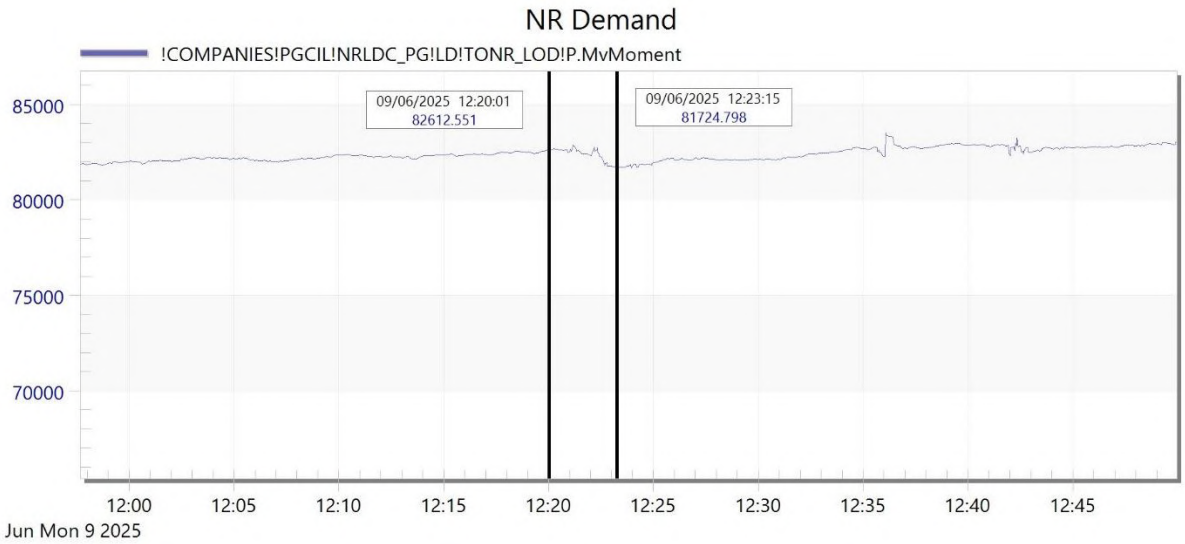
Shift-In Charge, NRLDC
पाली प्रभारी, उ०क्षे०भा०प्रे०के०

प्रतिलिपि :

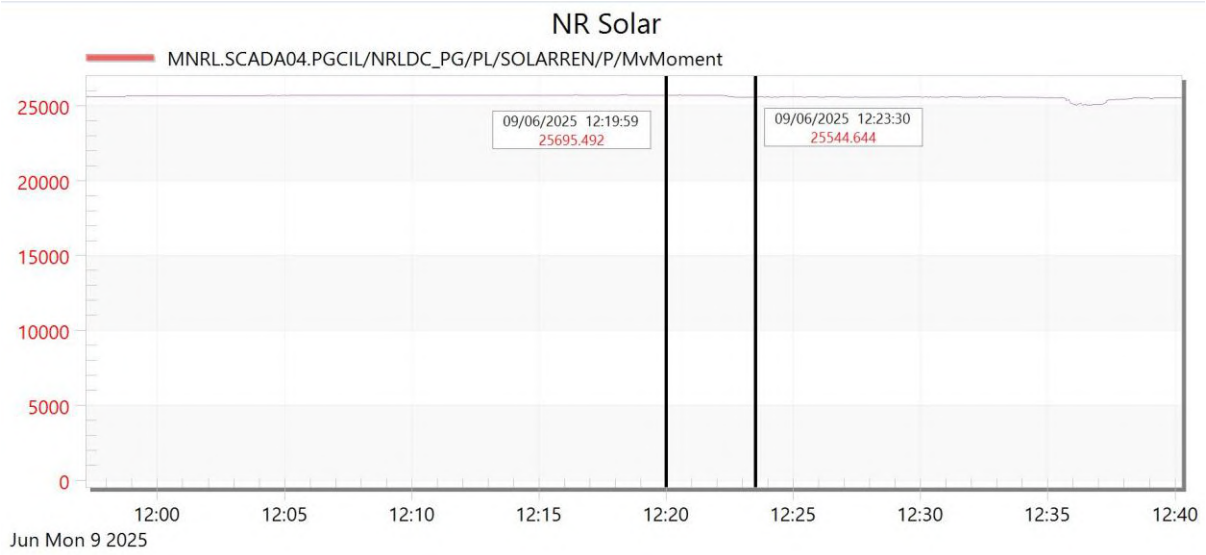
1. **Shift-in charge, NLDC (पाली प्रभारी, रा०भा०प्रे०के०)**
2. **Affected utilities / user (घटना से प्रभावित सभी यूसर/यूटिलिटि)**
3. **MS, RPC (सदस्य सचिव, क्षेत्रीय विधुत समिति)**
4. **'cenpccea@gmail.com', 'cenpc-cea@gov.in**

Annexure (अनुलग्नक)

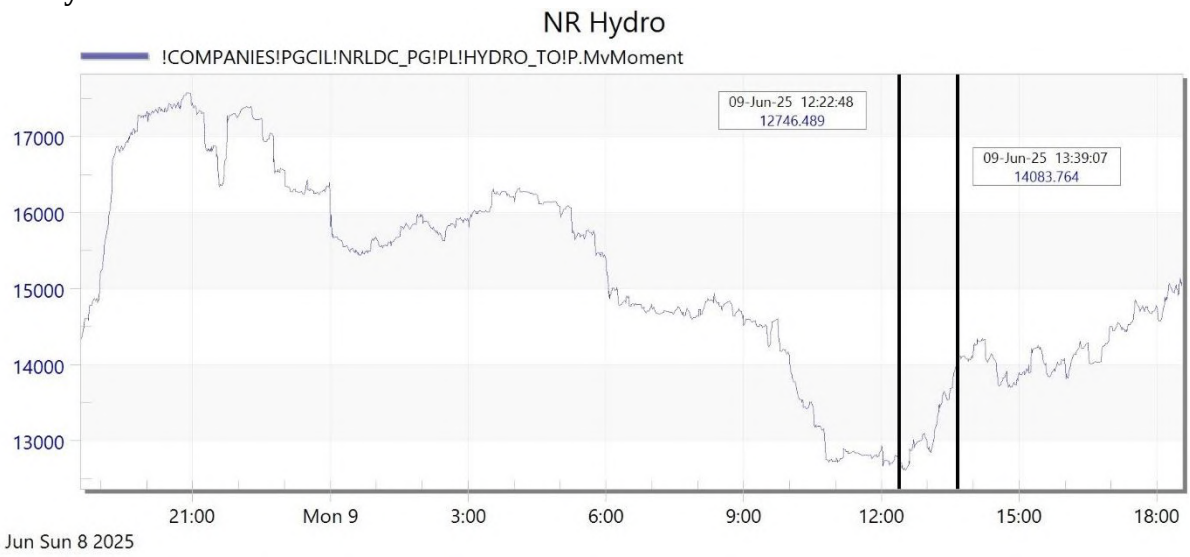
1. **NR Demand**



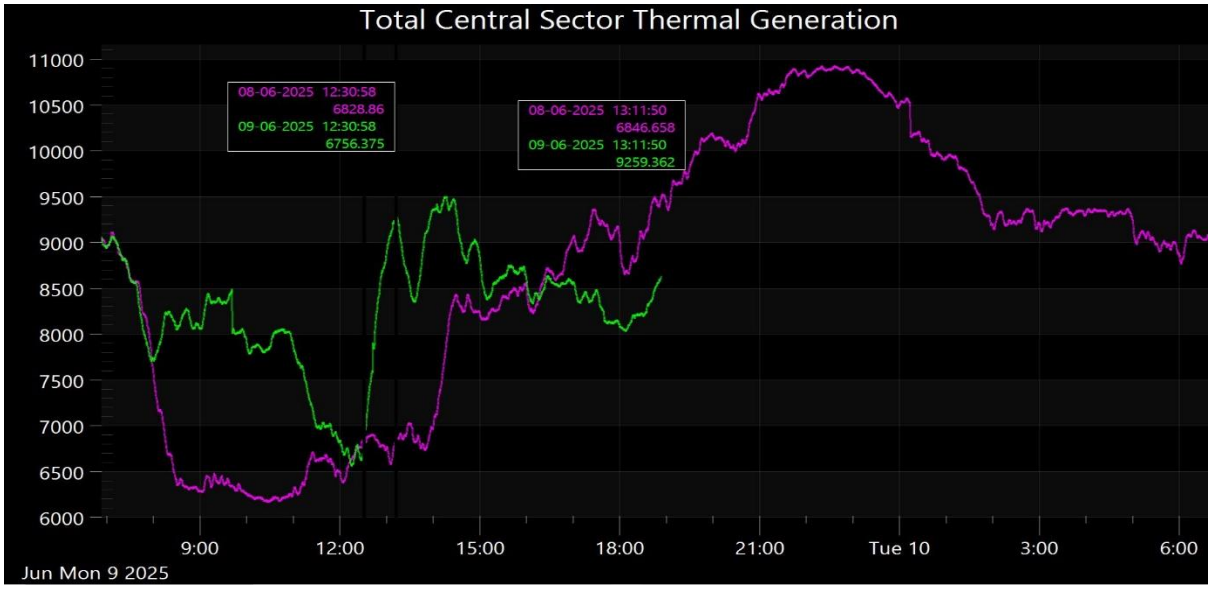
2. **NR Solar**



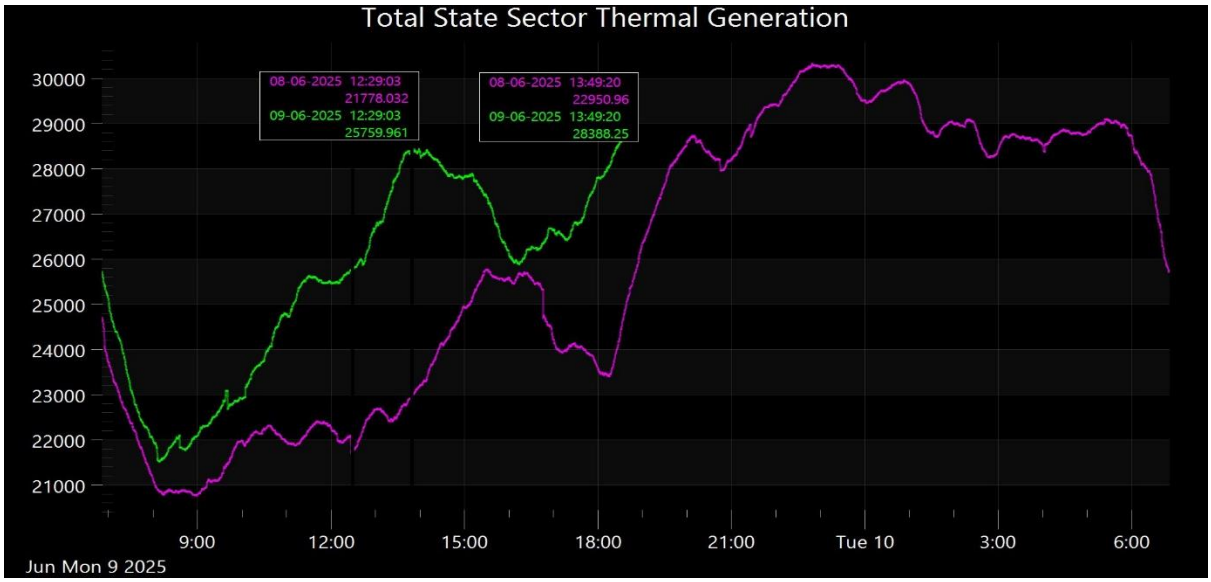
3. **NR Hydro**



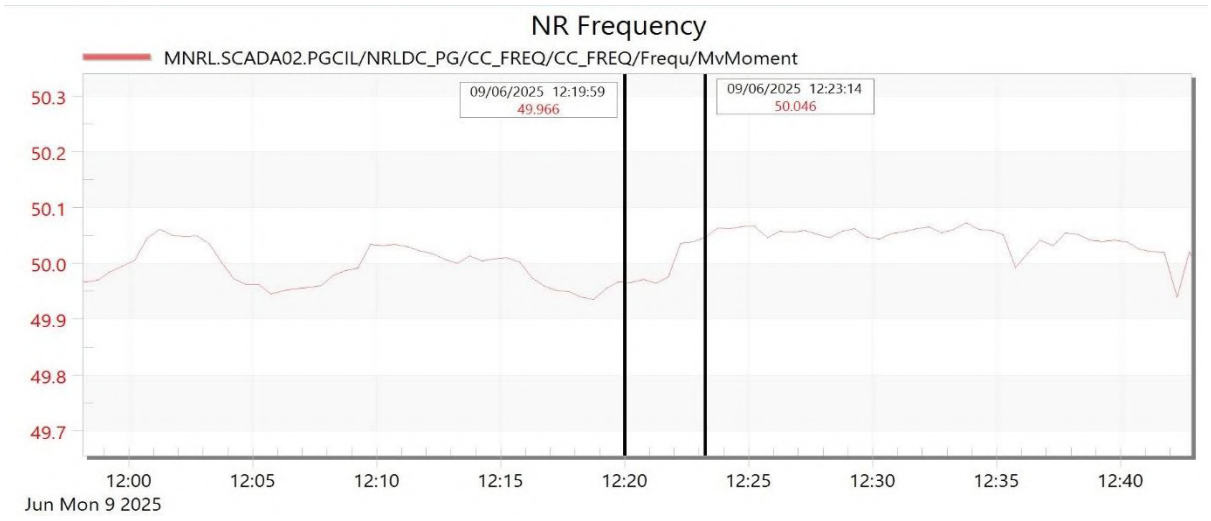
4. Central Thermal Generation



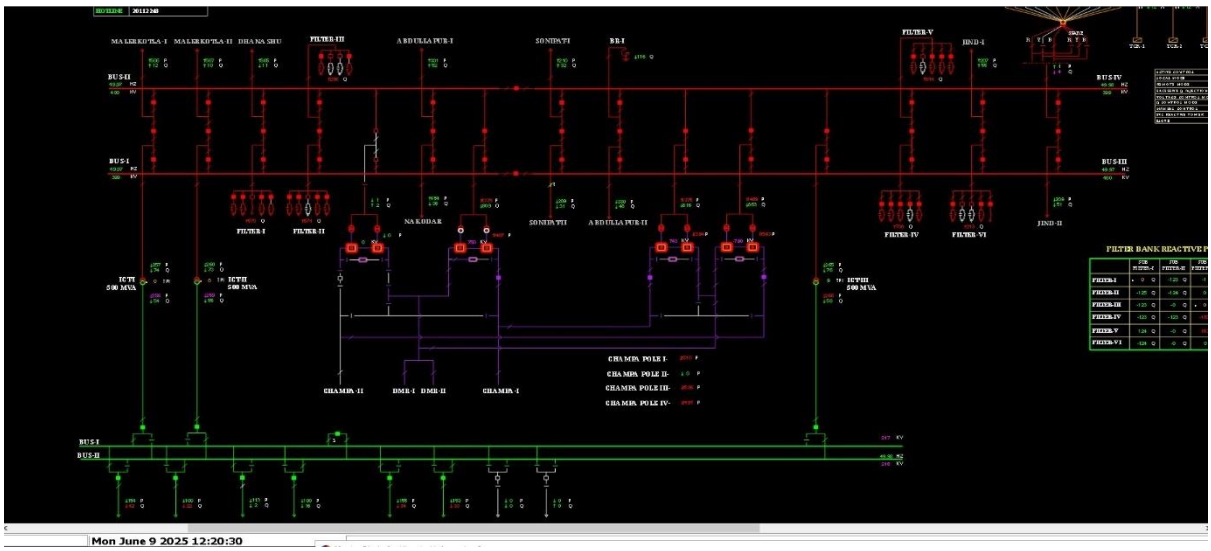
5. State Sector Thermal Generation



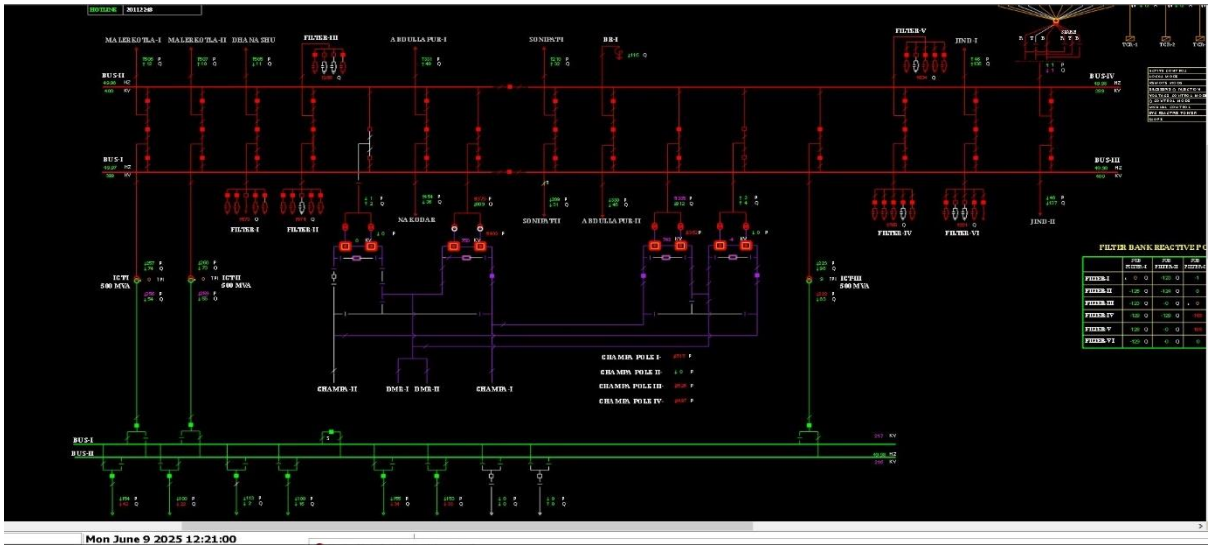
6. Frequency Plot



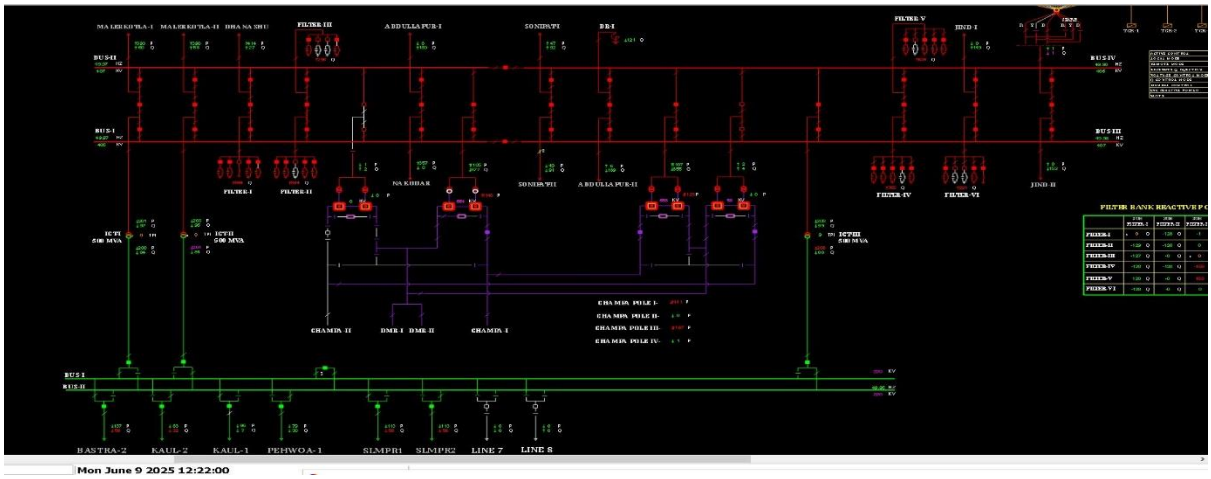
7. SLD of Kurukshetra BT Pole-4



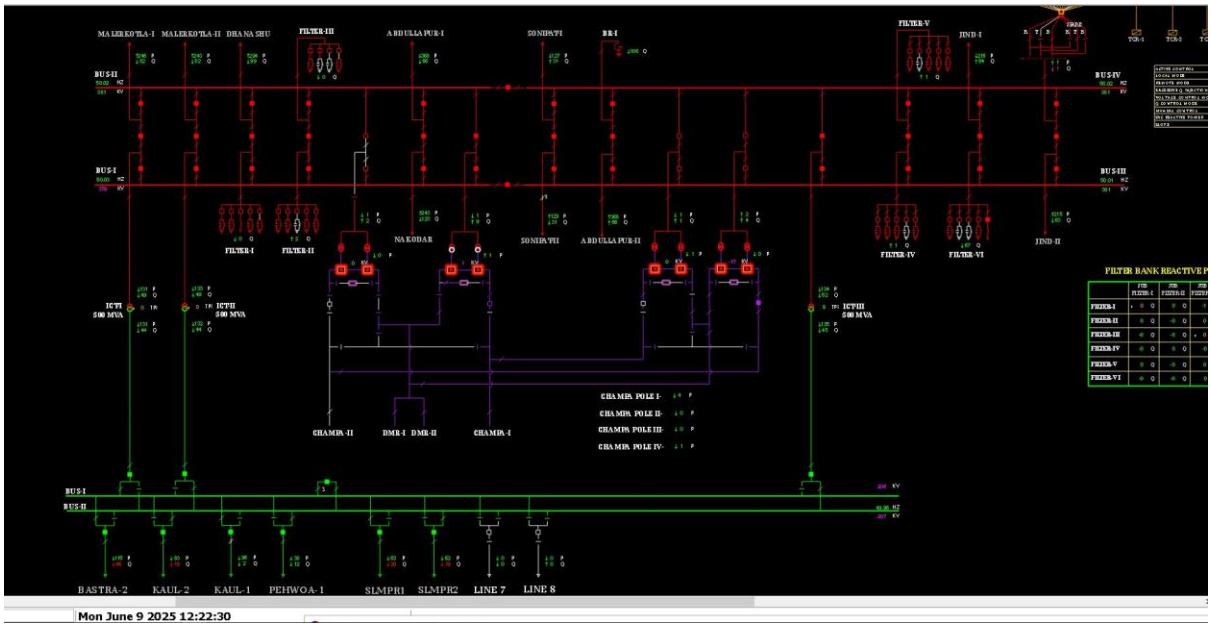
8. SLDC of Kurukshetra AT Pole-4



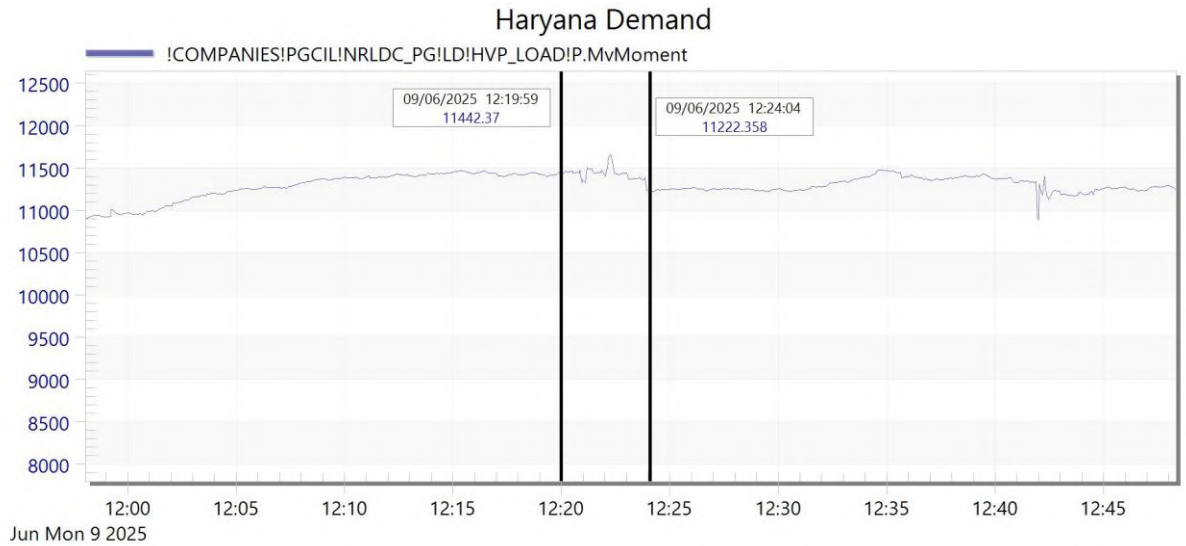
9. SLDC of Kurukshetra BT Pole-1 and Pole-3



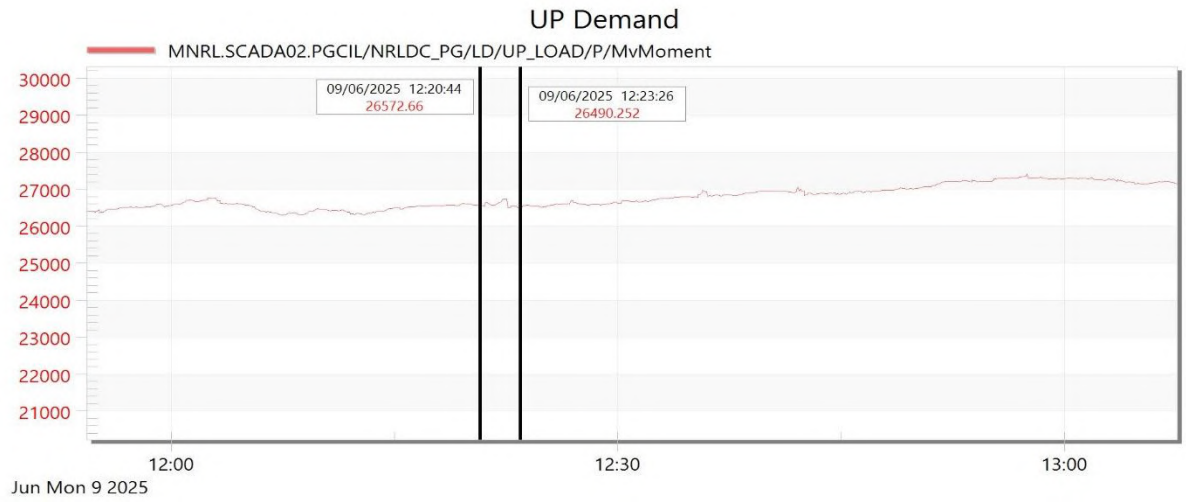
10. SLDC of Kurukshetra AT Pole-1 and Pole-3



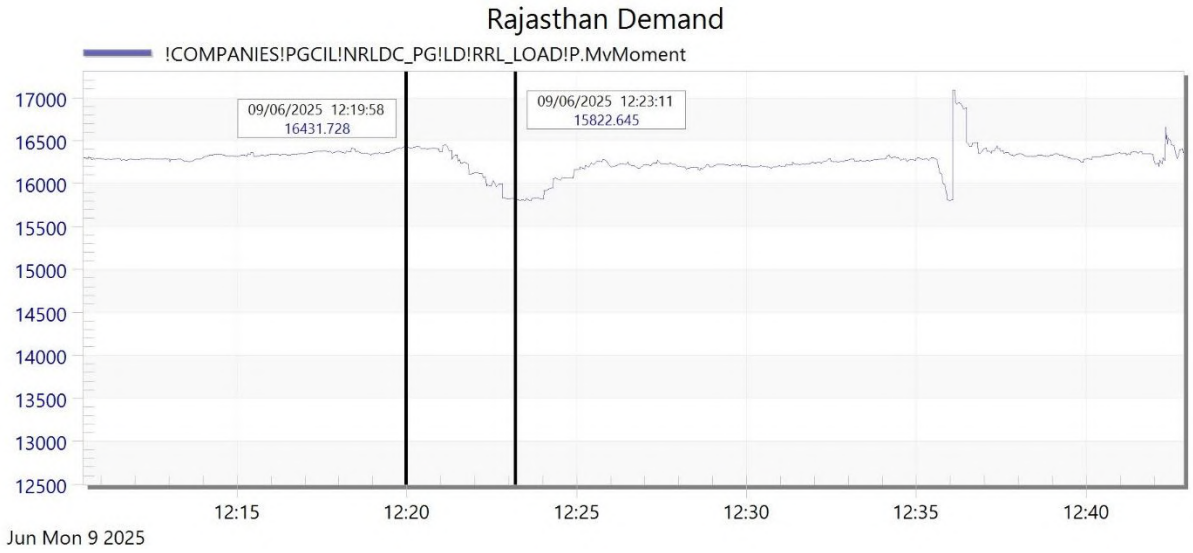
11. Haryana Demand



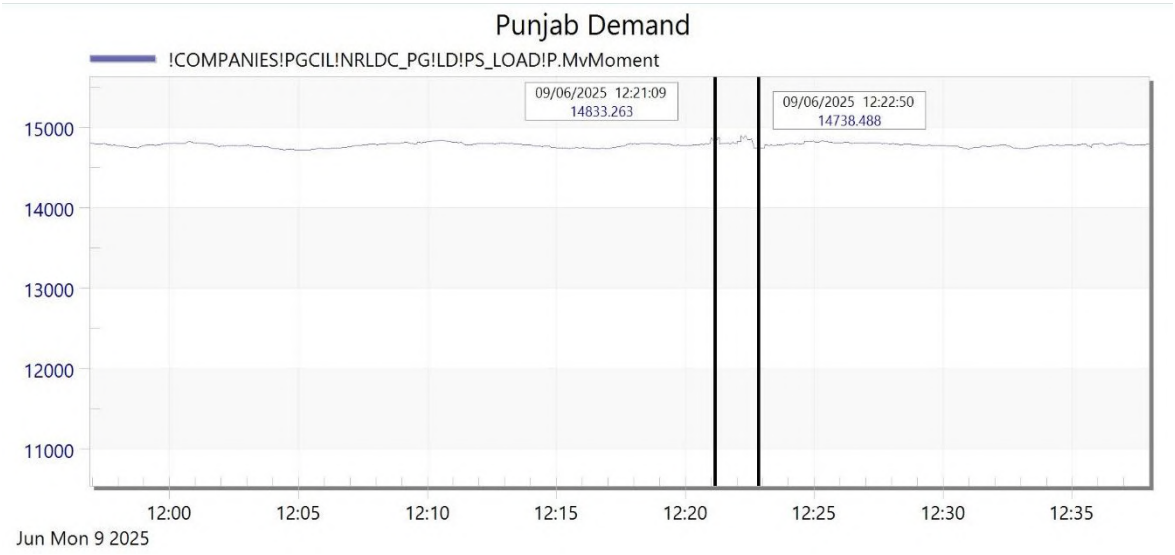
12. UP Demand



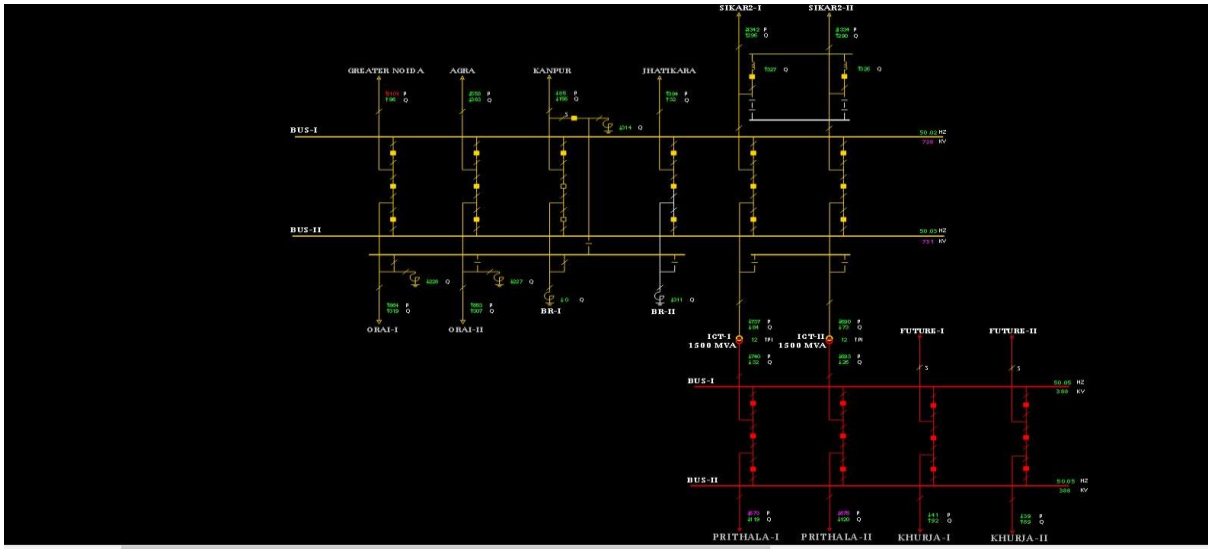
13. Rajasthan Demand



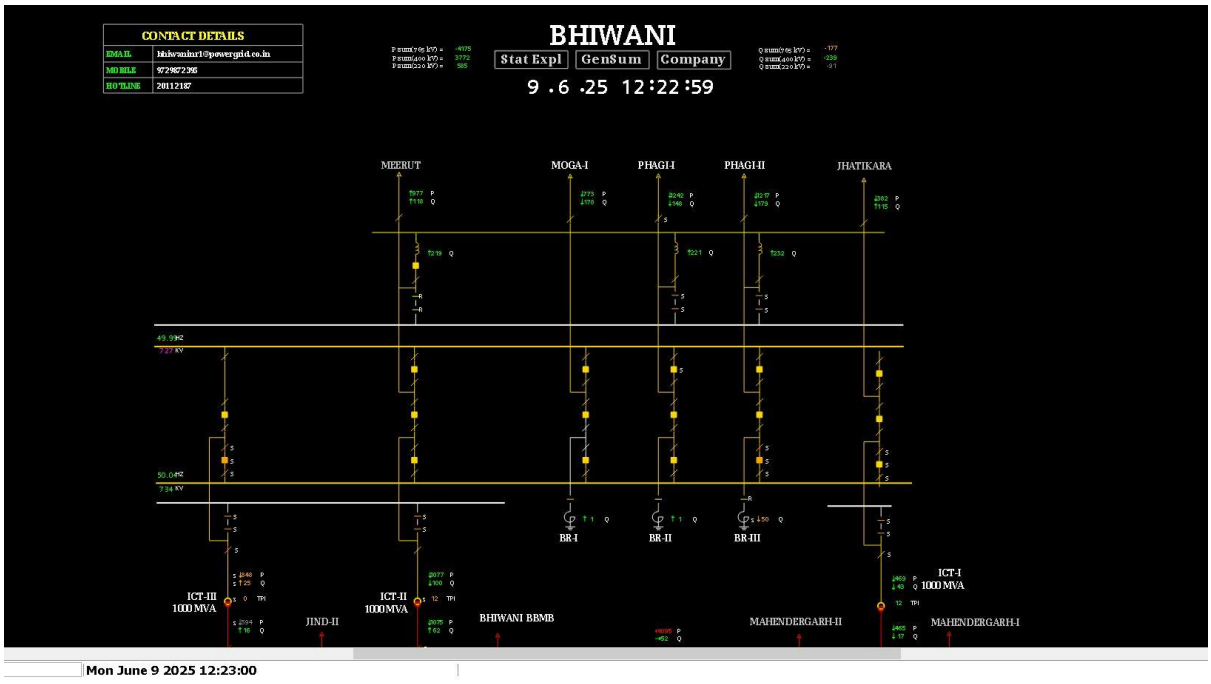
14. Punjab Demand



15. 765KV Aligarh – Gr. Noida Ckt was overloaded 3100MW



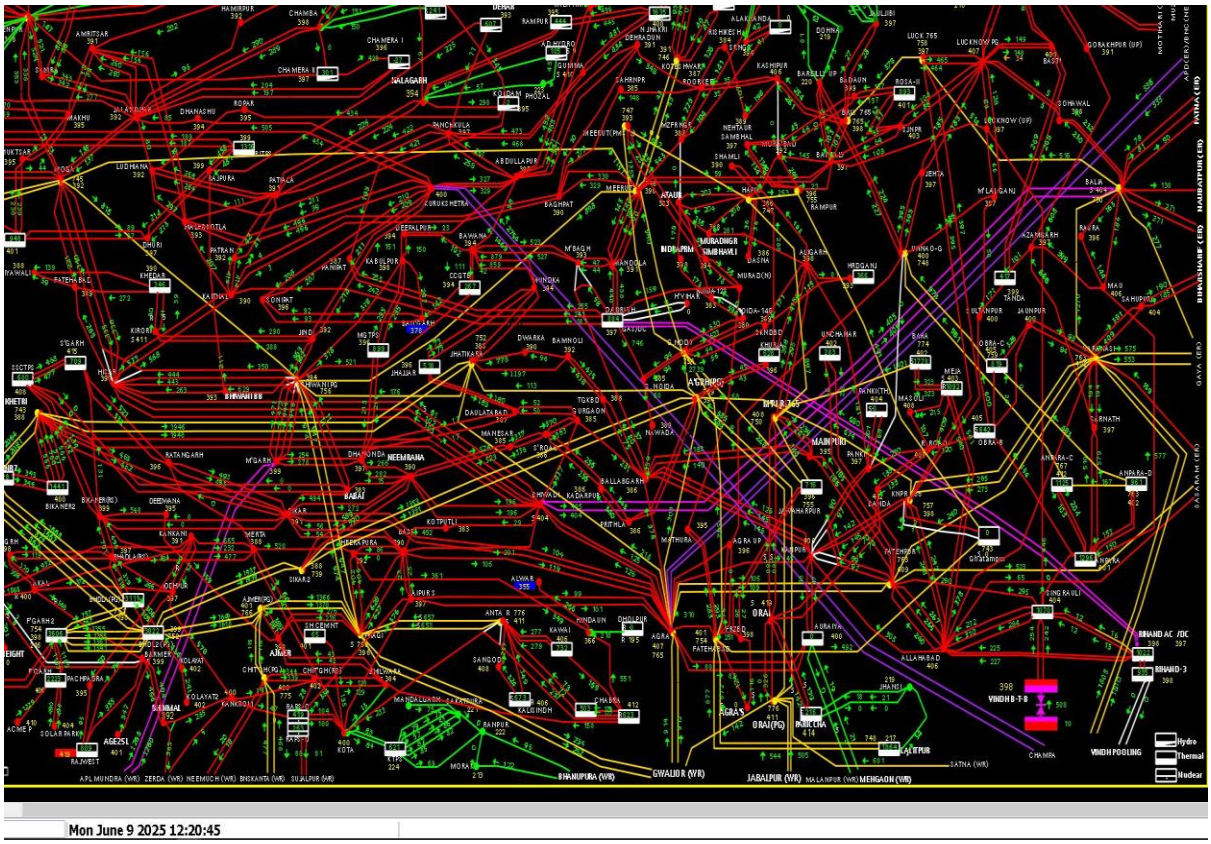
16. 1000MVA, 765/400KV, ICT-2 at Bhiwani was overloaded upto 1070MW



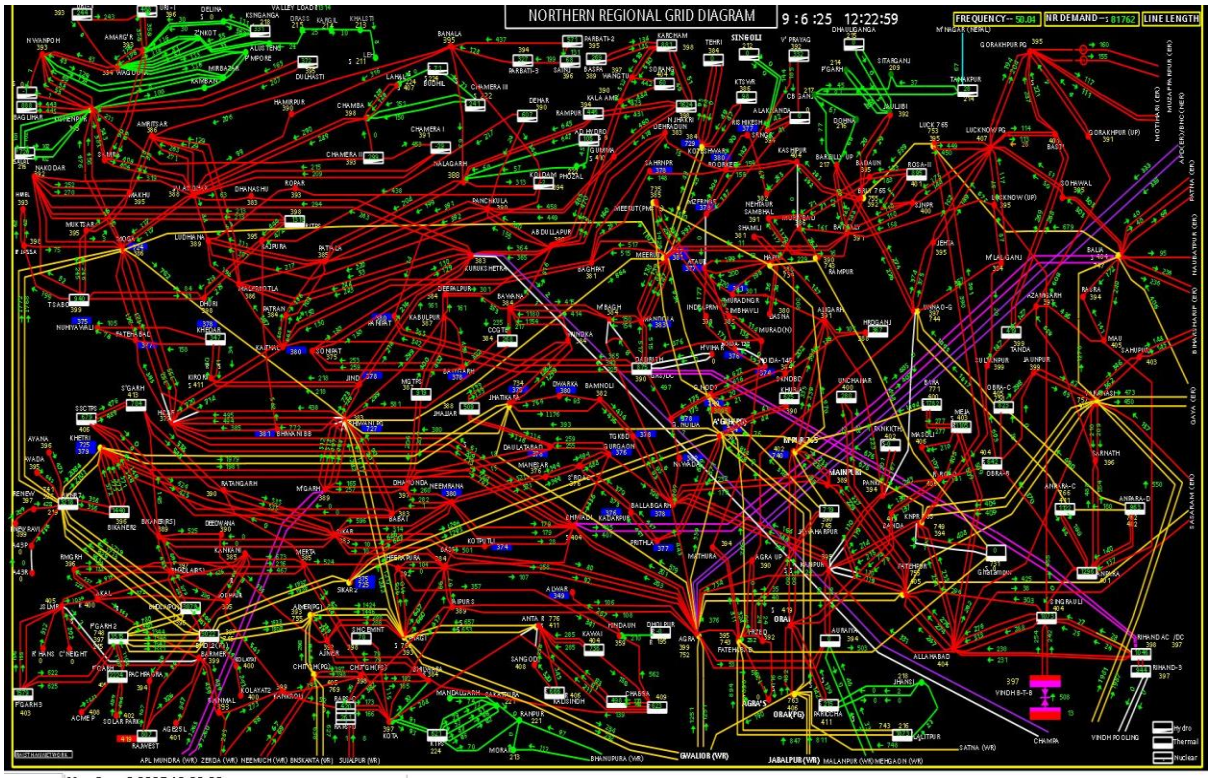
17. SOE

06/09/2025 12:22:03	883	09.06.25 12:22:03,883 KURHV_P	400	BKC6_1	Circuit Breaker	disturbe	Main	MeC1 02	KURHV_PG 400	BKC6_1	CB	Status	0.00
06/09/2025 12:22:03	885	09.06.25 12:22:03,885 KURHV_P	400	BKC6_4	Circuit Breaker	Open	Main	MeC1 02	KURHV_PG 400	BKC6_4	CB	Status	0.00
06/09/2025 12:22:03	885	09.06.25 12:22:03,885 KURHV_P	400	BKC5_5	Circuit Breaker	Open	Main	MeC1 02	KURHV_PG 400	BKC5_5	CB	Status	0.00
06/09/2025 12:22:03	885	09.06.25 12:22:03,885 KURHV_P	400	BKC5_4	Circuit Breaker	Open	Main	MeC1 02	KURHV_PG 400	BKC5_4	CB	Status	0.00
06/09/2025 12:22:03	885	09.06.25 12:22:03,885 KURHV_P	400	BKC5_1	Circuit Breaker	Open	Main	MeC1 02	KURHV_PG 400	BKC5_1	CB	Status	0.00
06/09/2025 12:22:03	885	09.06.25 12:22:03,885 KURHV_P	400	BKC4_4	Circuit Breaker	Open	Main	MeC1 02	KURHV_PG 400	BKC4_4	CB	Status	0.00
06/09/2025 12:22:03	885	09.06.25 12:22:03,885 KURHV_P	400	BKC4_3	Circuit Breaker	Open	Main	MeC1 02	KURHV_PG 400	BKC4_3	CB	Status	0.00
06/09/2025 12:22:03	885	09.06.25 12:22:03,885 KURHV_P	400	BKC4_1	Circuit Breaker	Open	Main	MeC1 02	KURHV_PG 400	BKC4_1	CB	Status	0.00
06/09/2025 12:22:03	886	09.06.25 12:22:03,886 KURHV_P	400	BKC5_3	Circuit Breaker	Open	Main	MeC1 02	KURHV_PG 400	BKC5_3	CB	Status	0.00
06/09/2025 12:22:03	886	09.06.25 12:22:03,886 KURHV_P	400	BKC4_5	Circuit Breaker	Open	Main	MeC1 02	KURHV_PG 400	BKC4_5	CB	Status	0.00
06/09/2025 12:22:03	887	09.06.25 12:22:03,887 KURHV_P	400	BKC4_2	Circuit Breaker	Open	Main	MeC1 02	KURHV_PG 400	BKC4_2	CB	Status	0.00
06/09/2025 12:22:03	993	09.06.25 12:22:03,993 KURHV_P	400	BKC6_1	Circuit Breaker	Open	Main	MeC1 02	KURHV_PG 400	BKC6_1	CB	Status	0.00
06/09/2025 12:22:05	452	09.06.25 12:22:05,452 KURHV_P	400	30KURHV3	Circuit Breaker	Open	Main	MeC1 02	KURHV_PG 400	30KURHV3	CB	Status	0.00
06/09/2025 12:22:05	453	09.06.25 12:22:05,453 KURHV_P	400	31HV3TIE	Circuit Breaker	Open	Main	MeC1 02	KURHV_PG 400	31HV3TIE	CB	Status	0.00
06/09/2025 12:22:05	539	09.06.25 12:22:05,539 KURHV_P	800	808_A	Circuit Breaker	disturbe	Main	MeC1 02	KURHV_PG 800	808_A	CB	Status	0.00

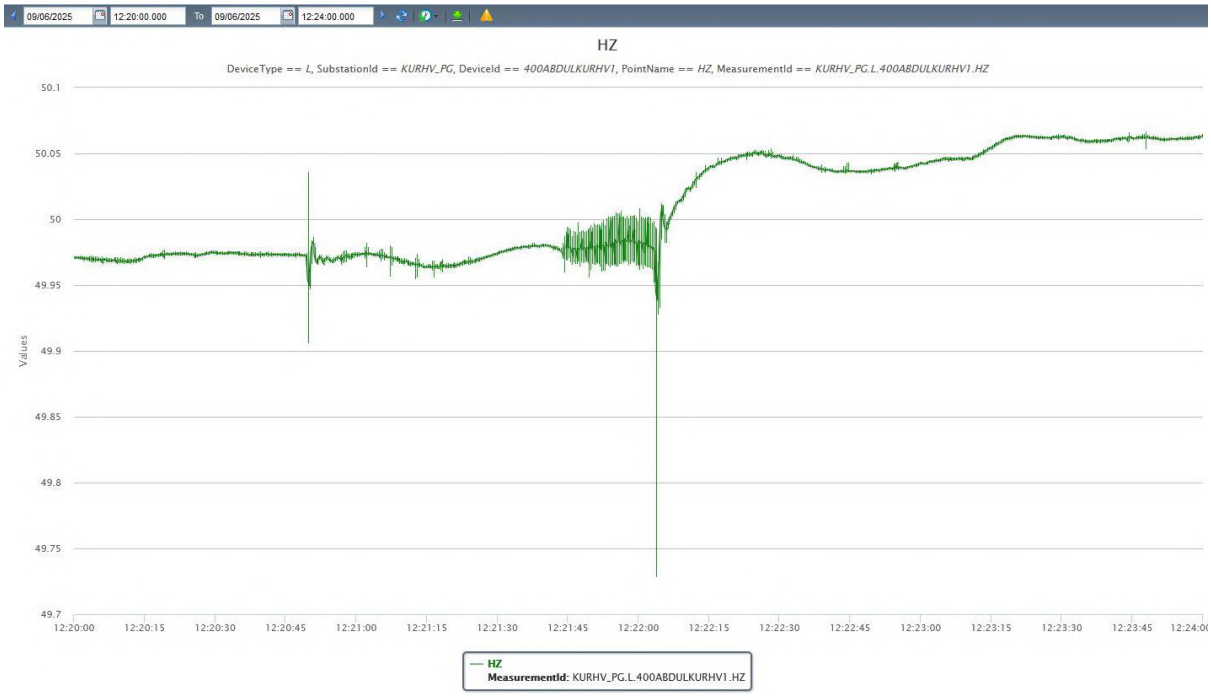
18. NR Network before tripping of Pole 1, 3 and 4 in HVDC Kurukshetra



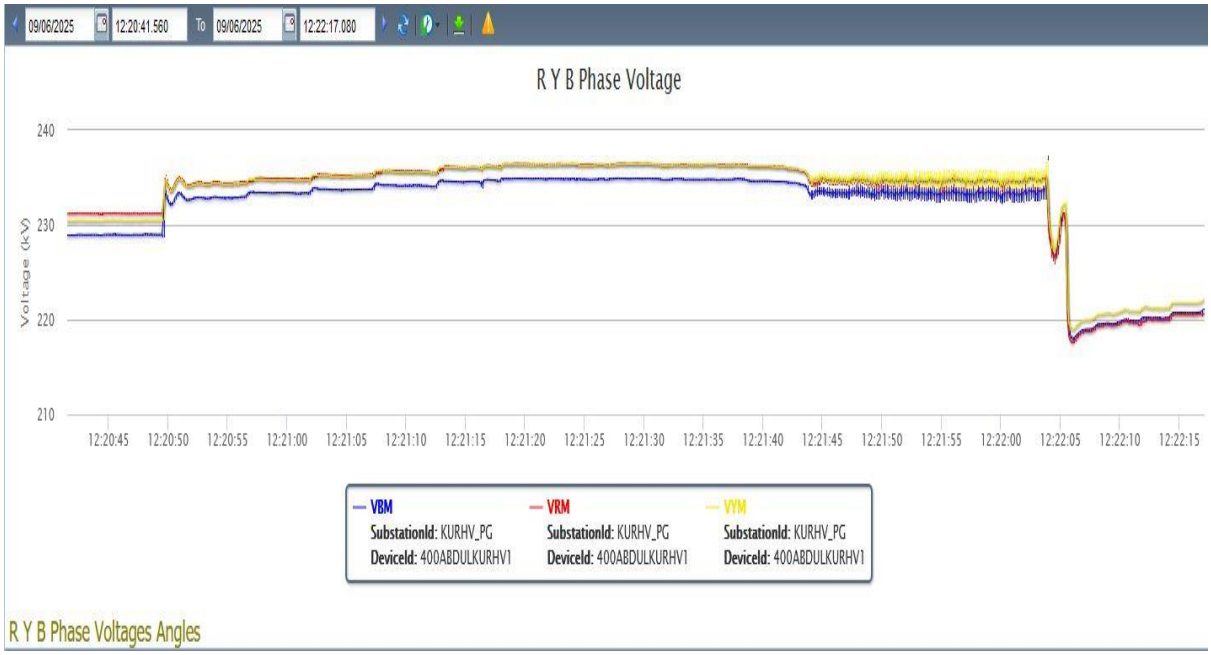
19. Low Voltage in NR Network after tripping of Pole 1, 3 and 4 in HVDC Kurukshetra



20. PMU Frequency

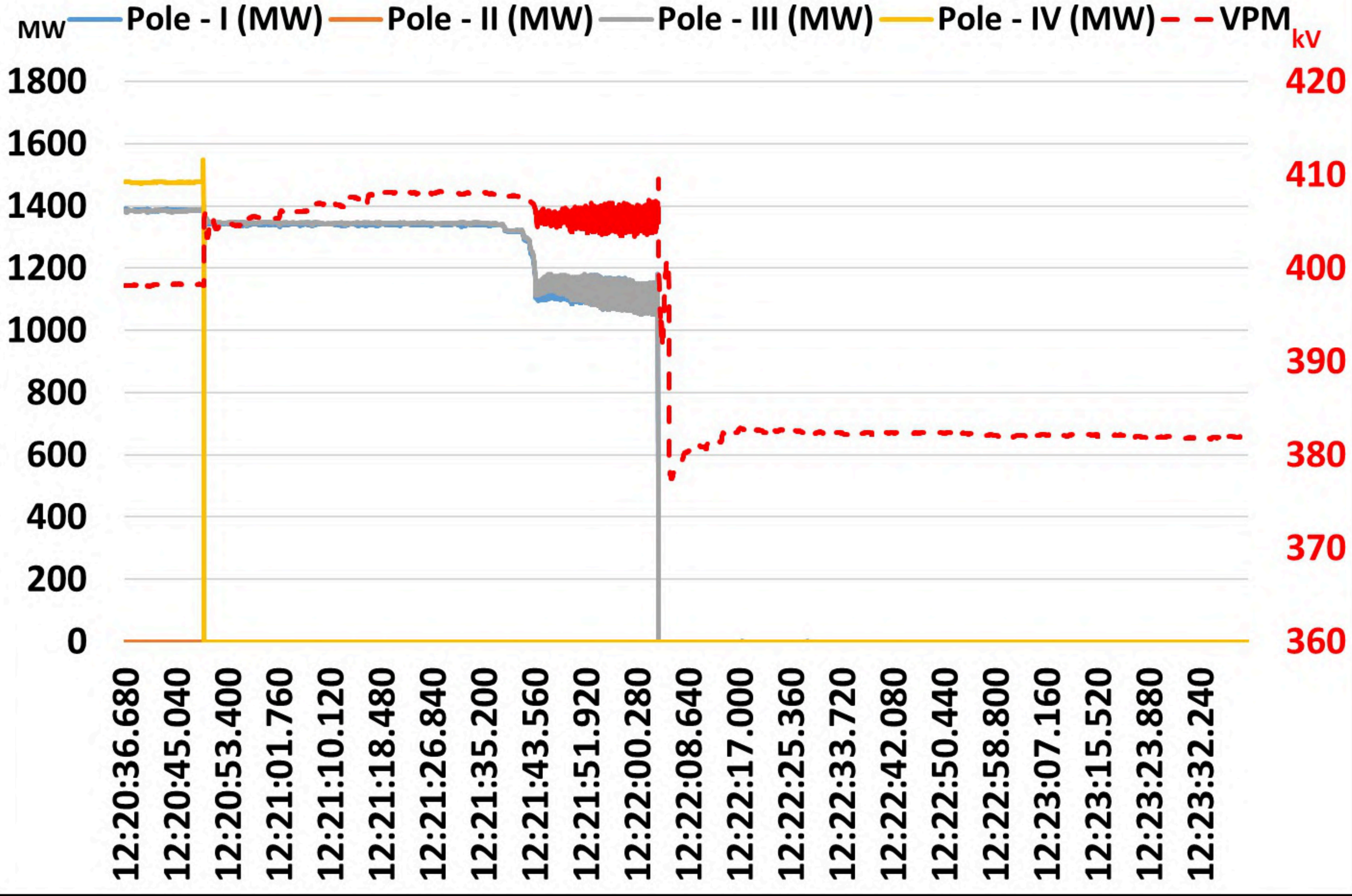


21. PMU Voltage

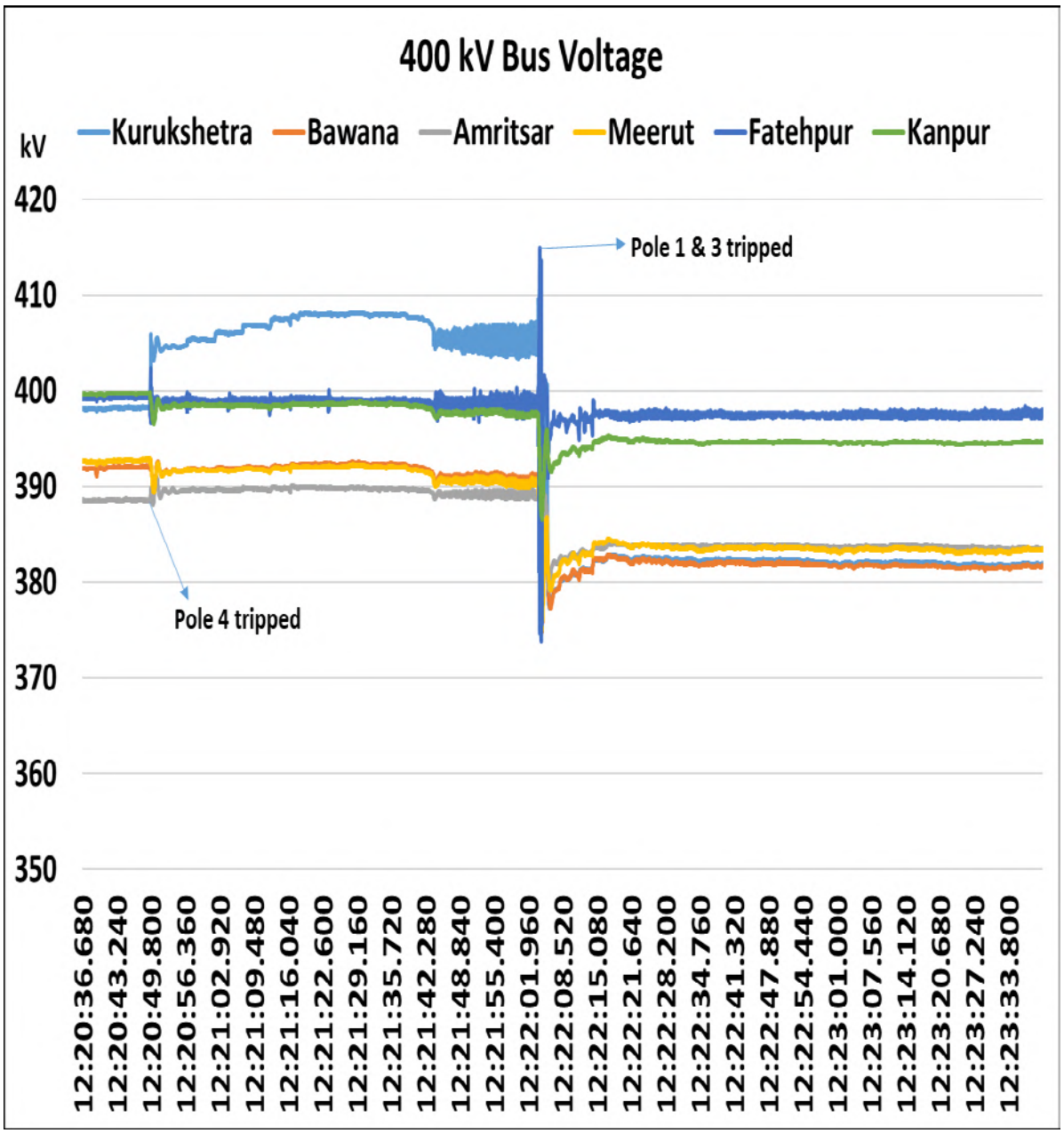


Annexure II

HVDC Champa - Kurukshetra Poles



Low voltages observed in 400 kV stations of Northern Region after outage of HVDC Champa-Kurukshetra Pole-1,3 & 4



Draft SOP in case of Tripping of HVDC Champa – Kurukshetra

HVDC Champa-Kurukshetra Bi-pole is vital link between Western region (WR) and Northern region (NR), supplying power majorly to Haryana, Punjab, Delhi, and Uttar Pradesh. It has been observed that frequent tripping of HVDC Champa – Kurukshetra link both during solar and nonsolar hours. The tripping of the HVDC Champa – Kurukshetra link, while operating at a higher power order, shall not only increase the loadings of the inter-regional and intra-regional transmission elements, but it will also lead to severe voltage dips at major load centres in NR, posing a threat of voltage instability, particularly during solar hours.

Immediate actions to be taken after tripping of HVDC Champa-Kurukshetra :-

To manage line/ICT loadings in NR region:

- Maximize inter-regional HVDC link power order towards Northern region in consultation with NLDC:
    - Maximise flow in HVDC Mundra – Mohindergarh towards NR subject to line loading limits in NR, WR
    - Maximize HVDC BtB Vindhyachal towards NR subject to other constraints near Singrauli, Rihand
    - Maximize BNC-Alipurdwar-Agra towards Agra subject to constraints in NER
- Maximize internal HVDC in NR region:
    - Maximize power from Rihand to Dadri subject to other transmission constraints around Dadri.
    - Maximize power flow from Balia to Bhiwadi (if HVDC is transferring power from Balia to Bhiwadi). Also, if HVDC is transferring power from Bhiwadi to Balia, bring power order to minimum value.
- Advise Tehri – PSP plants (operating under pump mode) to reduce pumping quantum or take out the pumping units out of bar based on the grid requirements.
- Maximize internal generation in NR:
    - Advise all generating units on bar (thermal as well as hydro) in the Northern Region to maximize their generation.
    - Switch on Hydro generators wherever possible in consultation with the generators.
    - Instruct NR states to maximize their internal generation.
- Load management:
    - Manually switch feeders as per the list provided by States under physical regulation to reduce overdrawl by states.
    - Instruct NR states to switch off non-essential loads to reduce overdrawl and manage ICT loadings.
- Monitor 765 kV Gwalior-Agra D/C line flows as the SPS is set to operate at 4000 MW flow on the double circuit.
- Monitor the critically loaded 765/400kV ICTs at Bhiwani, however, increase in power order of HVDC Mundra – Mohindergarh as well as HVDC Balia-Bhiwadi will help relieve loading on these ICTs.
- Contact Kurukshetra HVDC for earliest revival of poles.

To manage Voltages in NR region:

- Reactors:
    - Switch off line reactors and bus reactors at suitable stations to support voltage during low voltage conditions.
- Generators:
    - Advise thermal, hydro, and renewable generating stations to provide sufficient MVAR support to help manage voltages.
- States:
    - Instruct NR states to minimize their MVAr drawl to manage system voltages.
- HVDC:
    - Instruct HVDC Kurukshetra station to manually switch-in filters to stabilise voltage.
    - Switch off TCR at Kurukshetra if absorbing Reactive Power.
    - Bring the filter banks at Bhiwadi for the HVDC Balia–Bhiwadi link and at Dadri for the HVDC Rihand-Dadri link into service in consultation with the site.
- FACTS:
    - Advise Ludhiana SVC for revision in Vref to ensure higher MVAR injection.
    - Increase Vref for STATCOMs in RE pocket to increase MVAr injection.
    - Lucknow and Nallagarh STATCOMs to operate in Voltage control.

Sr.No.	Region (RLDC)	State and UT	City	Airport Name	Internation/Domestic	Name of lines for power supply to the Airport	Nearby 765,400,220 kV Substations	SLD of Substations
1	NRLDC	Delhi	New Delhi	Indira Gandhi International Airport	International			
2	NRLDC	Punjab	Amritsar	Sri Guru Ram Dass Jee International Airport	International			
			Mohali	Shaheed Bhagat Singh International Airport	International			
			Ludhiana	Ludhiana Airport	Domestic			
3	NRLDC	Rajasthan	Jaipur	Jaipur International Airport	International			
			Udaipur	Udaipur Airport	Domestic			
			Jodhpur	Jodhpur Airport	Domestic			
			Ajmer	Kishangarh Airport	Domestic			
4	NRLDC	Uttar Pradesh	Lucknow	Chaudhary Charan Singh International Airport	International			
			Varanasi	Lal Bahadur Shastri International Airport	International			
			Bareilly	Bareilly Airport	Domestic			
			Kanpur	Kanpur Airport	Domestic			
5	NRLDC	Uttarakhand	Dehradun	Jolly Grant Airport	Domestic			
			Pantnagar	Pantnagar Airport	Domestic			
6	NRLDC	Chandigarh	Chandigarh	Shaheed Bhagat Singh International Airport	International			
7	NRLDC	Jammu and Kashmir	Srinagar	Sheikh ul-Alam International Airport	International			
			Jammu	Jammu Airport	Domestic			
8	NRLDC	Ladakh	Leh	Kushok Bakula Rimpochee Airport	Domestic			

Sr.No.	Region (RLDC)	State and UT	Major cities	Name of 765 kV or 400 kV stations feeding the city	Embedded or nearest generating stataion	Estimated Demand met
1	NRLDC	Haryana	Faridabad			
			Gurgaon			
2	NRLDC	Himachal Pradesh	Shimla			
			Dharamshala			
3	NRLDC	Punjab	Ludhiana			
			Amritsar			
			Jalandhar			
4	NRLDC	Rajasthan	Jaipur			
			Jodhpur			
			Kota			
			Ajmer			
			Bikaner			
5	NRLDC	Uttar Pradesh	Lucknow			
			Kanpur			
			Agra			
			Varanasi			
			Meerut			
			Ghaziabad			
			Prayagraj			
			Noida			
6	NRLDC	Uttarakhand	Dehradun			
			Mussoorie			
			Haridwar			
7	NRLDC	Chandigarh (UT)	Chandigarh			
8	NRLDC	Delhi [National Capital Territory (NCT)]	Delhi			
9	NRLDC	Jammu & Kashmir (UT)	Srinagar			
	NRLDC		Jammu			
10	NRLDC	Ladakh (UT)	Leh			

Grid Event summary for June 2025

S.No.	Category of Grid Incident/ Disturbance	Name of Elements (Tripped/Manually opened)	Affected Area	Owner/ Agency	Outage		Revival		Duration (hh:mm)	Event (As reported)	Energy Unserved due to Generation loss (MU)	Energy Unserved due to Load loss (MU)	Loss of generation / loss of load during the Grid Disturbance		% Loss of generation / loss of load w.r.t Antecedent Generation/Load in the Regional Grid during the Grid Disturbance		Antecedent Generation/Load in the Regional Grid		Fault Clearance time (in ms)	Compliance of Protection Protocol/Standard			Remarks
	(GI-I to GD-V)				Date	Time	Date	Time					Generation Loss(MW)	Load Loss (MW)	% Generation Loss(MW)	% Load Loss (MW)	Antecedent Generation (MW)	Antecedent Load (MW)		Flash Report Submission (Y/N)	DR/EL Submission (Y/N)	Detail Tripping Report Submission (Y/N)	
1	GI-2	i)220KV Bus-A at Bamnauli ii)400/220 KV 500 MVA ICT 3 AT Bamnauli iii)220KV Bamnauli- DIAL (DTL) Ckt 1 iv)400/220 KV 500 MVA ICT 2 AT Bamnauli v)220KV Bamnauli- Pappankalan (DTL) Ckt 2 vi)400/220 KV 315 MVA ICT 4 AT Bamnauli	Delhi	DTL	1-Jun-25	16:34	1-Jun-25	19:22	02:48	i)400/220KV Bamnauli Sub-station has one and half breaker scheme in 400KV and double main & transfer bus system in 220KV voltage level. The 220KV system is divided into 2 sections consisting of 220KV Bus-A, 220KV Bus-B, 220KV Bus-C and 220KV Bus-D connected by a 220KV Bus Sectionalizer. ii)During antecedent condition, 400/220 KV 500 MVA ICT 2 & 3 and 400/220 KV 315 MVA ICT 4 were loaded 97MW each. 220KV Bamnauli – DIAL Ckt2, 220KV Dwarka-3 – Bamnauli Ckt 1 & 2 were in shutdown condition. iii)As reported, at 16:34 hrs, 220KV Bus-A tripped on Bus Bar protection due to Y phase to earth fault. The fault current was appx. 9KA. Following the tripping of 220KV Bus-A, 400/220 KV 500 MVA ICT 2 & 3, 220KV Dial – Bamnauli Ckt 1, 220KV Bus Section 1 and 220KV Bus Coupler tripped. DR/EL yet to be shared. iv)Again at 16:37 hrs, 220KV Bamnauli-Pappankalan Ckt-2 tripped due to B-N phase to earth fault. The fault current was 17KA and fault distance is 607 mtrs from Bamnauli end. At the same time, 400/220 KV 315 MVA ICT 4 caught fire on internal fault and tripped. DR/EL yet to be shared. v)As per PMU at Bamnauli(DTL), Y-N fault occurred at 16:34 and B-N fault was observed at 16:38 hrs. vi)As per SCADA, change in demand of appx 75MW observed in Delhi control area is observed.	0	0.215	0	75	0.000	0.125	49325	59982	120	Y(d)	Y(d)	N	
2	GI-2	i)50 MW SORANG - UNIT 1 ii)50 MW SORANG - UNIT 2 iii)400 KV WANGTO_GIS(HPS)-SORANG(GREENKO) (GREENKO) CKT-1	Himachal Pradesh	HPPCL & GREENKO	1-Jun-25	14:27	1-Jun-25	15:49	01:22	i)400KV Sorang sub-station has double main Bus system. The power is evacuated through 400 KV WANGTO_GIS(HPS)-SORANG(GREENKO) (GREENKO) CKT-1 and 400 KV KALA AMB-SORANG(GREENKO) (GREENKO) CKT-1. It has 2X50MW Generating units. ii)During antecedent condition, Sorang(HEP) was generating 43 MW of load Gen1(22MW) and Gen2(21MW). 400 KV WANGTO_GIS(HPS)-SORANG(GREENKO) (GREENKO) CKT-1 and 400 KV KALA AMB-SORANG(GREENKO) (GREENKO) CKT-1 were loaded 331MW and 369MW each. iii)As reported, at 14:27 hrs, 400 KV WANGTO_GIS(HPS)-SORANG(GREENKO) (GREENKO) CKT-1 tripped on Y-B phase to phase fault. Tripping details along with DR/EL are yet to be. iv)At the same time 50 MW SORANG - UNIT 1 and Unit-2 tripped. Tripping details alongwith DR/EL yet to be shared. v)As per PMU , Y-B phase to phase fault was observed along with fault clearance time of 120msec. vi)As per SCADA, Generation loss of 43MW at 400KV Sorang HEP is observed.	0	0	43	0	0.077	0.000	56186	65028	120	N (Partial details received)	N (Partial details received)	N	Details not received from SORANG
3	GI-2	i)800 kV HVDC Agra (PG) Pole-01 ii)800 kV HVDC Agra (PG) Pole-03	Uttar Pradesh	PGCIL	4-Jun-25	02:05	4-Jun-25	06:57	04:52	i)During antecedent condition, 800kV HVDC Agra-BNC was carrying total 800MW power from APD and BNC to Agra (Pole-1=191MW, Pole-2=194MW, Pole-3=192MW & Pole-4= 195MW). Power flow from BNC (P1+P2) was 500MW & from APD (P3+P4) was 300MW. ii)As reported, at 02:05 hrs, 800 kV HVDC Agra (PG) Pole-01 and Pole 3 tripped. iii)As per details received from POWERGRID sequence of event was as follows: a.At 02:05:41 hrs, HVDC Pole-3 at Agra (S3) initiated a protective Z-Block along with the activation of the Bipole Pair Operation (BPPO). Following this event, HVDC Pole-1 at BNC and Pole-3 at APD tripped sequentially due to DC line protection operations. b.At 02:05:44, a protective Y-Block command was issued, leading to the tripping of HVDC Pole-1 at BNC and Pole-3 at APD on a "DC Protection Trip." Subsequently, at 02:38:20, Pole-1 at Agra was manually blocked. At 22:50:25:229 hrs, Pole 2 was blocked from Champa end due to subsequent DC line fault. c.Due to tripping of both Pole-1 and Pole-3, 800KV Agra – BNC Ckt1 also tripped. However the power order remained the same as Pole-2 and Pole-4 remained in service. iv)The power order reduced from total "2450MW to "1300MW: Pole-1 = 657MW and Pole-3=660MW. v)As per PMU at Agra(PG), B-N phase to earth fault was observed with fault clearing time of 120msec was observed. vi)As per SCADA, 220MW change in load was observed in SLDC UP control area.	0	1.07	0	220	0.000	0.370	45043	59416	120	Y(d)	Y	Y	
4	GI-1	i) 220 kV Amritsar(PG)-Naraingarh(PS) (PSTCL) Ckt-1 ii) 220 kV Amritsar(PG)-Khasa(PS) (PSTCL) Ckt-2 iii) 220 kV Amritsar(PG)-Verpal(PS) (PSTCL) Ckt-1	Punjab	PGCIL & PSTCL	7-Jun-25	17:20	7-Jun-25	17:52	00:32	i)400/220kV Amritsar(PG) has one and half breaker scheme at 400kV side and double main and transfer bus arrangement at 220kV side. ii)As informed by PGCIL, towers of 220 KV Amritsar(PG)-Naraingarh(PS) (PSTCL) Ckt-1 and 220 KV Amritsar(PG)-Khasa(PS) (PSTCL) Ckt-2 are located in close proximity. iii)As reported, at 17:20 hrs, Y-ph jumper of 220 KV Amritsar(PG)-Naraingarh(PS) (PSTCL) Ckt-1 snapped and touched R-ph jumper of 220 KV Amritsar(PG)-Khasa(PS) (PSTCL) Ckt-2. Fault current in 220 KV Amritsar(PG)-Naraingarh(PS) (PSTCL) Ckt-1 was ~36kA from Amritsar(PG) end. iv)Due to this high current, earth wire of 220 KV Amritsar(PG)-Khasa(PS) (PSTCL) Ckt-2 also snapped as earth wires at tower peak were connected. v)This resulted in Y-N and R-N fault respectively in both the lines (exact nature and location of fault yet to be shared). vi)During the same time, 220 KV Amritsar(PG)-Verpal(PS) (PSTCL) Ckt-1 also tripped from Verpal(PS) end only (exact reason of tripping yet to be shared). vii)As per PMU at Amritsar(PG), Y-N phase to earth fault followed by R-N phase to earth fault with fault clearing time of 120ms is observed. viii)As per SCADA, load loss of approx. 430 MW is observed in Punjab Control area.	0	0.229	0	430	0.000	0.578	59485	74401	120	Y(d)	N (Partial details received)	N	Details not received from Punjab
5	GI-2	i)800 kV HVDC Kurukshetra (PG) Pole-04 ii)800 kV HVDC Kurukshetra (PG) Pole-03 iii)800 kV HVDC Kurukshetra (PG) Pole-01	Haryana	PGCIL	9-Jun-25	12:22	9-Jun-25	12:53	00:31	i)During antecedent condition, 800kV HVDC Champa-Kurukshetra was carrying total 4538MW power from Champa to Kurukshetra (Pole-1=1515MW, Pole-2=0MW, Pole-3=1526MW & Pole-4= 1497MW). 800 kV HVDC Kurukshetra (PG) Pole-04 was in shutdown condition. ii)As reported, at 12:20:49:679 hrs, 800 kV HVDC Kurukshetra (PG) Pole- Pole 4 tripped due to Differential Protection operation of YY – B phase. iii)As a result of the tripping, the power flow shifted to 3000 MW, with Pole-1 carrying 1526 MW and Pole-3 carrying 1523 MW. iv)At 12:22:03.848, Pole-3 was blocked from Champa due to power oscillations, which led to system instability. As a result, the rectifier instability protection operated at Champa, and both Pole-3 and Pole-1 were blocked from the Champa end and subsequently tripped in Kurukshetra end also. v)The power order reduced from total "3000MW to "0MW. Pole-1 was revived at 12:53 hrs. vi)As per PMU at Kurukshetra(PG), fluctuation in voltage was observed. vii)As per SCADA, Appx. 770 MW change in demand was observed in Northern region while appx 580MW change in demand was observed in Rajasthan control area (as per SCADA). However, no tripping of transmission element below 220KV level was reported. viii)PowerGrid reported that during site inspection, it was found that differential current above the set threshold appeared only in the Main 2 differential relay while Main 1 relay currents were normal. Remedial Action: PowerGrid replaced the faulty card in Main 2 relay.	0	0	0	0	0.000	0.000	70986	82622	NA	Y(d)	Y(d)	Y(d)	
6	GD-1	i)220 kV Nokhra SL_BHD2 (NTPC)-Bhadla_2 (PG) (NTPC_) Ckt ii)220/33 kV 100 MVA ICT 1 at Nokhra SL_BHD2 (NTPC) iii)220/33 kV 100 MVA ICT 2 at Nokhra SL_BHD2 (NTPC) iv)220/33 kV 100 MVA ICT 3 at Nokhra SL_BHD2 (NTPC)	Rajasthan	PGCIL & NTPC	9-Jun-25	12:41	9-Jun-25	13:05	00:24	i)Generation of 220KV Nokhra (IP) stations evacuate through 220 KV Nokhra SL_BHD2 (NTPC)-Bhadla_2 (PG) (NTPC_NOKHRA) Ckt. ii)During antecedent condition, 220kV Nokhra (IP) was generating approx. 212 MW (as per PMU). iii)As reported, at 12:41hrs, 220 KV Nokhra SL_BHD2 (NTPC)-Bhadla_2 (PG) (NTPC_NOKHRA) Ckt tripped on overvoltage protection. iv)During the same time, 220/33 kV 100 MVA ICT 1, 2 and 3 at Nokhra SL_BHD2 (NTPC) also tripped due to lack of evacuation path. v)The overvoltage setting received from Nokhra end shows that Stage-1 overvoltage protection will operate after 5 sec and phase – phase voltage above 132KV. And stage-2 overvoltage protection will operate after 100 msec and phase – phase voltage above 154KV. vi)However, as per per PMU, the Overvoltage protection operated at a voltage below 154KV and instantaneously. vii)As per PMU at 220kV Nokhra(NTPC), no fault was observed. viii)As per PMU, solar generation loss of approx. 358 MW in Rajasthan control area with 212MW in Nokhra(NTPC) were observed.	0	0	358	0	0.498	0.000	71868	82816	NA	N	N	N	
7	GD-1	i)220KV Kaithal(PG)-Kaithal(HR) (HR) Line-1 ii)220kV Kaithal(PG)-Kaithal(HR) (HR) Line-2 iii)220/kV Kaithal-Nisng Line-2 iv)220kV Kaithal-Nisng Line-2 v)220kV Kaithal-Phowa Line-1 vi)220KV Kaithal-Phowa Line-2	Haryana	PGCIL & HVPNL	10-Jun-25	00:20	10-Jun-25	00:55	00:35	i)220/132kV Kaithal(HR) has double main bus scheme. ii)As reported, at 00:20 hrs, all the elements connected at 220/132kV Kaithal(HR) tripped. 220kV lines tripped from remote end. iii)As per PMU at Kaithal(PG), B-N phase to earth fault followed by Y-B fault with delayed clearance of 560msec is observed. iv)It is suspected that due to non clearance of fault from Kaithal(HR), all the 220kV lines tripped from remote end in Z-2. v)As per SCADA, drop in Haryana demand of ~970 MW is observed out of which ~670 MW recovered within 05 minutes and complete load recovered within ~15 minutes. Reason of load drop yet to be received from SLDC-Haryana.	0	0.24	0	970	0.000	1.141	60648	84977	560	Y(d)	N (Partial details received)	N (Partial details received)	Detailed report yet to be received from HVPNL
8	GI-1	i)160MVA, 220/132KV ICT-1 at Rishikesh ii)160MVA, 220/132KV ICT-2 at Rishikesh iii)40 MVA, 132/33 KV, ICT-1 at Rishikesh iv)40 MVA, 132/33 KV, ICT-2 at Rishikesh v)40 MVA, 132/33 KV, ICT-3 at Rishikesh vi)132KV Rishikesh-Lalsapper Ckt vii)132KV Rishikesh-Bindal Ckt viii)132KV Rishikesh-Jwalapur Ckt ix)132KV Rishikesh-Bhoteawala Ckt	Uttarakhand	PTCUL	10-Jun-25	15:21	10-Jun-25	15:40	00:19	i)220/132kV Rishikesh has double main and transfer bus arrangement at in 220kV and 132KV side. ii)At 15:14 hrs, a heavy spark was noticed at the Y-phase jaw of the 220 kV side 'A' Bus isolator of 160 MVA ICT-I. At that time, each transformer was carrying around 400 A of load. As a precaution, all 33 kV feeders were manually opened, relieving about 33 MW per transformer, and SLDC Uttarakhand reduced another 20 MW. iii)As reported, at 15:20 hrs, 160MVA, 220/132KV ICT-1 was hand tripped due to due to continued sparking on ICT 1st 220 KV side jaw of "Y" phase "A" Bus isolator. iv)At 15:21 hrs, 160MVA, 220/132KV ICT-2 at Rishikesh tripped on Directional O/C & E/F Protection operation due to overload. Because of tripping of both 220/132KV ICTs, all the 132KV transmission elements tripped due to supply failure. v)However, all the transmission elements connected in 220KV level remained in service and no tripping was observed. vi)As per PMU at Roorkee(PG), no fault is observed. vii)As per SCADA, load loss of approx. 180 MW in Uttarakhand Control area (as SCADA). Uttarakhand SLDC has reported load loss of 252MW.	0	0.084	0	180	0.000	0.211	75917	85160	NA	Y(d)	Y(d)	Y(d)	
9	GD-1	i)220/132KV 160 MVA T/F-I at Jahangirabad ii)220/132KV 160 MVA T/F-II at Jahangirabad iii)220 KV Jahangirabad - Harduaganj Ckt iv)220 KV Jahangirabad - Rookhi Ckt v)220 KV Jahangirabad – Khurja Ckt	Uttar Pradesh	UPPTCL	11-Jun-25	08:40	11-Jun-25	09:45	01:05	i)220/132kV Jahangirabad has double main bus arrangement at in 220kV and 132KV side. 220kV Bus-2 was already in shutdown. ii)During the antecedent condition, 220 KV Jahangirabad - Harduaganj Ckt, 220 KV Jahangirabad - Rookhi Ckt and 220 KV Jahangirabad – Khurja Ckt were carrying 87MW, 39MW and 9MW of load respectively. iii)As reported, at 08:40 hrs, 220/132KV 160 MVA ICT-I at Jahangirabad (UP) tripped due to B phase differential protection operation. SLDC UP, reported that B- Phase CT on the 220KV side got damaged. iv)Since the fault wasn't cleared from 220KV side, 220KV Bus Bar Zone-1 and Zone-2 operated. This resulted in complete tripping of both the 220KV Buses and all the transmission elements connected to it. v)Following this, all elements connected in the 132KV side tripped (exact tripping details yet to be shared). vi)As per PMU at Aligarh(PG), B-N followed by Y-B phase to phase fault with fault clearing time of 280ms is observed. vii)As per SCADA, load loss of approx. 97 MW is observed in Uttar Pradesh Control area.	0	0.11	0	97	0.000	0.129	65704	75193	280	Y(d)	Y(d)	N (Partial details received)	
10	GI-2	i)400/220 KV 315 MVA ICT-3 at Sultanpur (UP) ii)200 MVA T/F-2 @220KV SULTANPUR iii)160 MVA T/F-3 @220 KV SULTANPUR iv)220 Kv Sultanpur-Amethi Ckt v)220 Kv Sultanpur-Sangipur Ckt vi)220 Kv Sultanpur-New tanda Ckt vii)220 Kv Sultanpur-Tanda Ckt viii)220 Kv Sultanpur-Pratapgarh Ckt ix)220 Kv Sultanpur-sohawal	Uttar Pradesh	UPPTCL	11-Jun-25	10:30	11-Jun-25	10:49	00:19	i)400/220/132kV Sultanpur has double main and transfer bus arrangement at in 400KV, 220kV and 132KV side. 400/220KV ICT 2 was under shutdown. ii)As reported, at 10:30 hrs, 400/220 KV 315 MVA ICT-3 at Sultanpur (UP) tripped due to B phase fault in the 220KV side Current Transformer of the ICT only (exact reason of tripping yet to be shared). iii)Since the fault wasn't cleared from 220KV side, 220KV Bus Bar Zone-1 and Zone-2 operated. This resulted in complete tripping of both the 220KV Buses and all the transmission elements connected to it. iv)However, no other fault was observed at 400KV and 132KV level. v)As per PMU at Sultanpur(UP), B-N phase to earth fault with fault clearing time of 120ms is observed. vi)As per SCADA, load loss of approx. 530 MW is observed in Uttar Pradesh Control area.	0	0.17	0	530	0.000	0.641	74482	82638	120	Y(d)	N (Partial details received)	Y(d)	
11	GI-2	400 KV AKAL-JAISALMER (RS) CKT-1	Rajasthan	RVPNL	12-Jun-25	13:34	12-Jun-25	17:16	03:42	i)400/220kV Jaisalmer(RS) has one and half breaker scheme at 400kV level and double main and transfer bus scheme at 220kV level. ii)As reported, at 13:34 hrs, 400 KV AKAL-JAISALMER (RS) CKT-1 tripped due to Y-B phase to phase fault. Z-1 distance protection operated. Fault Distance is 15.9KM from Akal end. Fault Current is Iy = 6.74KA and Ib= 7.98KA. iii)At the same time, 1636MW solar generation in Rajasthan RE complex dropped. The cause is suspected to be UVRT non-compliance. iv)As per PMU at Jaisalmer(RS), Y-B phase to phase fault is observed with fault clearance time upto 120msec. v)During this event, as per SCADA, 1636MW dip in generation was observed in NR solar generation and 96% of the generation recovered in 3 minutes vi)As per SCADA, no change in demand is observed in Rajasthan control area.	0	0	1636	0	2.145	0.000	76263	89053	120	N (Partial details received)	N (Partial details received)	N (Partial details received)	Details from RE stations not received
12	GI-1	i)220 kV BASSI(PG)-KUNDA KI DHANI(RS) (RS) CKT-1 ii)220 kV BASSI(PG)-KUKAS(RS) (RS) CKT-1	Rajasthan	RVPNL & PGCIL	13-Jun-25	12:54	13-Jun-25	14:28	01:34	i)400/220KV Bhiwani(PG) has one and half breaker scheme in 400KV levels. While 220KV has double main and transfer bus scheme. ii)During the antecedent condition, 220 KV BASSI(PG)-KUNDA KI DHANI(RS) (RS) CKT-1 and 220 KV BASSI(PG)-KUKAS(RS) (RS) CKT-1 were carrying 186MW and 216MW load respectively. iii)As reported, at 12:54 hrs, 220 KV BASSI(PG)-KUNDA KI DHANI(RS) (RS) CKT-1 tripped on earth fault. Z-1 distance protection operated, fault current was Ib = 5.2KA. Auto Reclosure wasn't successful. iv)Again at 12:59 hrs, 220 KV BASSI(PG)-KUKAS(RS) (RS) CKT-1 tripped on overloading. As per DR of Kukas, Y-B phase to phase fault was observed. Powe Swing Block protection operated. Fault current Iy= 3.64KA, Ib = 4.5KA. The loading of 220 KV BASSI(PG)-KUKAS(RS) (RS) CKT-1 increased to 328 MW before tripping. Details of Basi end not received yet. v)As per PMU at Basi (PG), B- N phase to earth at 12:54hrs and Y-B phase to phase fault at 12:59 hrs. Delayed fault clearance of 240msec was observed in 220 KV BASSI(PG)-KUNDA KI DHANI(RS) (RS) CKT-1 (at 12:54hrs). vi)As per SCADA, load loss of approx. 550 MW in Rajasthan Control area.	0	0.86	0	550	0.000	0.617	76144	89195	240	Y(d)	Y(d)	N (Partial details received)	Detailed report yet to be received from RVPNL
13	GI-2	i)220 KV Bhiwani(PG)-Bhiwani (HV) (HVPNL) Ckt-1 ii)400 KV Babai (RS)-Bhiwani (PG) (NRSS36) Ckt-2 iii)400 KV Babai (RS)-Bhiwani (PG) (NRSS36) Ckt-1 iv)400 KV Mahindergarh(APL)-Bhiwani(PG) (ATL) Ckt-1 v)400 KV Mahindergarh(APL)-Bhiwani(PG) (ATL) Ckt-2 vi)220 KV Bhiwani(PG)-Bhiwani (HV) (HVPNL) Ckt-2	Haryana	HVPNL &PGCIL	13-Jun-25	15:27	13-Jun-25	22:10	06:43	i)765/400/220KV Bhiwani(PG) has one and half breaker scheme in 765KV and 400KV levels. While 220KV has double main and transfer bus scheme. ii)As reported, at 15:27 hrs, 220 KV Bhiwani(PG)-Bhiwani (HV) (HVPNL) Ckt-1 tripped on B-N phase to earth fault. Z-1 distance protection operated, fault distance was 2.4 KM and fault current was 13.6kA from Bhiwani(HV) end. From Bhiwani(PG) end, Z-2 distance protection operated. Fault Current Ib= 10.82KA and fault distance is 16.29KM. iii)Again at 15:30 hrs, 400 KV Babai (RS)-Bhiwani (PG) (NRSS36) Ckt-1 & Ckt-2 and 400 KV Mahindergarh(APL)-Bhiwani(PG) (ATL) Ckt-1 & Ckt-2 tripped. As per DR of DR Of 400 KV Babai(RS)(end)-Bhiwani(PG) (NRSS36) Ckt-1, Y-B phase to phase , Z-2 distance protection operated. Fault Current Iy = 1.62kA, Ib = 1.71kA. Auto Reclosure was blocked due to permanent nature of the fault. iv)It was reported that due to severe thunderstorm, 02 Nos of Towers of 400 KV D/C Babai-Bhiwani lines collapsed at TL No. - 300 (DD+30) & TL No. -301 (DD+30), consequently both lines tripped on distance protection. v)400 KV Mahindergarh(APL)-Bhiwani(PG) (ATL) Ckt-1 & Ckt-2 tripped due to tower damage at location number 135 and 136. Further tripping details awaited. vi)As reported at 15:38 hrs, 220 KV Bhiwani(PG)-Bhiwani (HV) (HVPNL) Ckt-2 tripped on R-N phase to earth fault. As per DR of Bhiwani(HV), Z-1 distance protection operated, and fault distance was 8.09KM from Bhiwani(HV). From Bhiwani(PG), Z-2, Ir =9.73KA and fault distance is 11.92KM. vii)As per PMU at Bhiwani (PG), B- N phase to earth fault at 15:27 hrs, Multiple phase to phase and phase to earth fault at 15:30 hrs and R-N phase to earth fault at 15:40 hrs viii)As per SCADA, load loss of approx. 240 MW is observed in Haryana Control area.	0	1.6	0	240	0.000	0.278	72791	86247	120	Y(d)	N (Partial details received)	N (Partial details received)	No details received from ADANI
14	GD-1	i)220KV Maharanibagh-Gazipur (DTL) line-1 ii)220/kV Maharanibagh-Gazipur (DTL) line-2 iii)220/kV Maharanibagh-Pragati (DTL) Line-1 iv)220/kV Maharanibagh-Pragati (DTL) Line-2 v)220/kV Pragati-IPPDS (DTL) line-1 vi)220/kV Pragati-IPPDS (DTL) line-2 vii)220/kV Pragati-Park Street (DTL)line-1 viii)220/kV Pragati-Park Street (DTL) line-2 ix)220/66kV 160 MVA ICT-1 at Pragati(DTL) x)220/66kV 160 MVA ICT-2 at Pragati (DTL) xi)104 MW GT-1 at Pragati GPS xii)104 MW GT-2 at Pragati GPS xiii)122 MW STG-1 at Pragati GPS xiv)220kV Maharanibagh-Lodhi Road (DTL) line-2	Delhi	DTL	15-Jun-25	03:48	15-Jun-25	04:48	01:00	i)220kV Maharanibagh(DTL) is basically 220kV side of 400/220kV Maharanibagh(PG) station and has double main bus scheme. 220/66kV Pragati(DTL) also has double main bus scheme. ii)During antecedent condition, ,220kV Maharanibagh-Gazipur (DTL) D/C was feeding load of 220/66kV Gazipur and 220/66kV Patparganj. Further 220/66kV Pragati(DTL) was having generation from Pragati GPS (generating ~277 MW) and feeding load of 220/66kV Pragati and 220/66kV Parkstreet. iii)As reported at 03:48 hrs, 220kV Maharanibagh-Gazipur (DTL) line-1 & 2 tripped on Y-N phase to earth fault. As per PMU at Maharanibagh(PG) and DR of the line (Maharanibagh end), Y-N phase to earth fault with fault current of ~6.6kA and cleared with the delay of ~200msec is observed with no A/R operation. Auto reclosure was blocked due to permanent nature of fault, reason of delayed clearance and reason of tripping of both the lines yet to be received from DTL. iv)With the tripping of 220kV Maharanibagh-Gazipur (DTL) line-1 & 2, load of 220/66kV Gazipur(DTL) and 220/66kV Patparganj(DTL) affected. v)Further at 03:52 hrs, Y-ph bus bar differential protection, 18.1kA, Z-1 & Z-2 at 220kV Pragati(DTL operated leading to tripping of all the elements connected at 220kV Bus-1 & 2 at 220/66kV Pragati(DTL). As per PMU, Y-N phase to earth fault cleared within 120msec is observed. As per DR of Y-ph bus bar differential at 220kV Pragati(DTL), Z-1 bus bar protection followed by Z-2 bus bar protection operated. vi)Due to tripping of all the elements at 220/66kV Pragati(DTL), load of 220/66kV Park Street(DTL) and 220/66kV Pragati(DTL) affected. Approx. 277 MW generation of Pragati GPS also lost due to loss of evacuation path. vii)Further at 03:55 hrs, 220kV Maharanibagh-Lodhi Road (DTL) line-2 tripped on B-N fault. As per DR and PMU, B-N fault in Z-1, Ib=17.4kA with no A/R operation and cleared within 100msec is observed. viii)As reported by SLDC-Delhi, due to tripping of aforementioned elements, load loss of approx. 640 MW occurred in Delhi control area. Complete details of the load affected during the event are attached in Annexure. ix)As per SCADA, change in demand of approx. 700MW in Delhi control area and loss in generation of ~277 MW at Pragati GPS is observed. x)As reported, restoration started from 04:48 hrs and completed by 06:04 hrs.	0	0.64	0	640	0.000	0.805	56065	79507	200	Y(d)	Y(d)	Y(d)	
15	GD-1	1) 220 KV AD Hydro(AD)-Nallagarh(PG) (ADHPL) Ckt 2) 96 MW Unit-1 at AD Hydro HEP 3) 96 MW Unit-2 at AD Hydro HEP	Himachal Pradesh	ADHPL, PGCIL	17-Jun-25	17:09	17-Jun-25	23:35	06:26	i)Generation of AD Hydro HEP (2*96 MW) evacuates through 220kV AD Hydro-Nallagarh line (~175km) and 220kV AD Hydro-Phozal line(~14km)-> 220kV Phozal-Nallagarh Line. Both the lines are on same tower. There is LILO portion at 220/33kV Phozal in second line. ii)During antecedent condition, 96 MW Unit-1 and Unit-2 at AD Hydro HEP(IP) were generating approx. 194MW. 220kV Phozal-Nallagarh line was already tripped at 15:26 hrs due to snapping of jumper of R-phase conductor at tower location no. 178. Generation of AD Hydro was evacuating through 220kV AD Hydro-Nallagarh line only. iii)As reported at 17:09 hrs, 220 KV AD Hydro(AD)-Nallagarh(PG) (ADHPL) Ckt tripped due to B-N phase to earth fault followed by R-Y phase to phase fault. iv)As per DR of AD Hydro end, B-N fault (1.9kA) was sensed in Z-1(63.8km) and A/R started. However further after ~600msec, Y-B fault observed with fault current of ~1.5kA and A/R went under lockout and subsequently 3-ph tripping occurred. v)At the same time, 96 MW Unit-1 and Unit-2 at AD Hydro HEP (generating ~194MW) also tripped due to loss of evacuation path. vi)As per SCADA plot of AD Hydro HEP generation, loss of ~194 MW is observed and as per SCADA plot of HP demand, no change in HP demand is observed during the event time. vii)Line patrolling was done by AD Hydro for both the lines. No fault was found for 220 KV AD HYDRO (AD)-NALLAGARH (PG) (ADHPL) CKT-1 and while rectification work of 220 KV Phozal(HP)-Nallagarh(PG) (ADHPL) were conducted at site and line was charged in 23:28 hrs	0	0	194	0	0.356	0.000	54503	66272	120	Y(d)	Y(d)	Y(d)	
16	GD-1	1) 220kV Dwarka(400) – Dwarka1(DTL) ckt-1 2) 220kV Dwarka(400) – Dwarka1(DTL) ckt-2	Delhi	DTL	20-Jun-25	11:39	20-Jun-25	12:46	01:07	i)220/66kV Dwarka1(DTL) has double main Bus arrangement at 220kV side. 400/220KV Dwarka has one and half breaker scheme at 400KV level and double main bus scheme at 220KV level. ii)During antecedent condition, 220/66kV Dwarka1(DTL) S/s was being fed from 220kV Dwarka – Dwarka1 ckt-1 & 2 only which were carrying 113MW and 117 MW respectively. iii)As reported, at 11:39 hrs, 220kV Dwarka – Dwarka ckt-1 & 2 tripped and complete supply to 220/66kV Dwarka1(DTL) S/s lost. Reason of tripping of both the lines yet to be received. iv)As per PMU at Bamnauli, R-N phase to earth with fault clearance time of 120msec is observed. v)As oer SCADA. change in demand of aoorox. 271 MW in Delhi control area is observed.	0	0.302	0	271	0.000	0.367	61604	73903	120	N	N	N	
17	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	PGCIL, JKPTCL	20-Jun-25	23:25	21-Jun-25	03:26	04:01	i)400/220KV Wagoora(PG) has double main and transfer Bus arrangement at both 400KV and 220KV side. 220/132KV Pampore(J&K) has double bus scheme at 220kV level however SCADA data is not healthy there. ii)During antecedent condition, power flow from Wagoora(PG) S/s to Pampore(PDD) S/s was approx. 162 MW (81 MW each) through 220 KV Wagoora(PG)-Pampore(PDD) (PG) D/C. Load of 220/132KV Pampore(J&K) was being fed from Wagoora only. iii)As reported at 23:25 hrs, Y-phase Transformer Bushing at Pampore failed. On this fault, 220kV Wagoora(PG)-Pampore(PDD) (PG) Ckt-1 & 2 tripped from Wagoora end. iv)As per PMU at Kanjarghat(NDCNGRD), Y-N phase to earth fault clearing time of 160ms is observed. v)As per DR of Wagoora end, distance protection relay of both the lines sensed the fault in Z-2, fault current was ~11kA in line-2 and ~8.5kA in line-1. vi)Due to tripping of both the lines, load of 220/132kV Pampore(J&K) affected. As per SCADA, change in demand of approx. 190 MW is observed in J&K control area.	0	0.76	0	190	0.000	0.249	54249	76288	160	Y(d)	N (Partial details received)	N (Partial details received)	No details received from J&K

S.No.	Category of Grid Incident/ Disturbance	Name of Elements (Tripped/Manually opened)	Affected Area	Owner/ Agency	Outage		Revival		Duration (hh:mm)	Event (As reported)	Energy Unserved due to Generation loss (MU)	Energy Unserved due to Load loss (MU)	Loss of generation / loss of load during the Grid Disturbance		% Loss of generation / loss of load w.r.t Antecedent Generation/Load in the Regional Grid during the Grid Disturbance		Antecedent Generation/Load in the Regional Grid		Fault Clearance time (in ms)	Compliance of Protection Protocol/Standard			Remarks
	(GI-I to GD-V)				Date	Time	Date	Time					Generation Loss(MW)	Load Loss (MW)	% Generation Loss(MW)	% Load Loss (MW)	Antecedent Generation (MW)	Antecedent Load (MW)		Flash Report Submission (Y/N)	DR/EL Submission (Y/N)	Detail Tripping Report Submission (Y/N)	
18	GI-1	1) 220/66kV 80/100 MVA ICT-1 at Uperlanangal(HP) 2) 220/66kV 80/100 MVA ICT-1 at Uperlanangal(HP)	Himachal Pradesh	HPPTCL	21-Jun-25	14:07	21-Jun-25	14:22	00:15	i)220/66kV Uperlanangal(HP) S/s has double main bus scheme at 220kV level. During antecedent condition, 220/66kV ICT-1 & 2 were carrying ~90 MW however SCADA data seems suspected during the event. ii)As reported, at 14:07 hrs, 220/66kV 80/100 MVA ICT-1 & 2 at Uperlanangal(HP) tripped on overcurrent protection operation. iii)As ICTs rating is 100 MVA, considering 110% O/C protection setting, over current protection should operate when current > 288 A, but as per details communicated by HP vide mail dated 21.06.25, ICT tripping occurred at 273 A. Hence O/C protection setting of the 220/66kV, 100 MVA ICT-1&2 at 220kV Uperlanangal needs to be reviewed. iv)As per PMU at Nallagarh(PG), no fault in system is observed during the event. v)Due to tripping of both 220/66kV ICTs at Uperlanangal(HP), load of the stations affected. As per SCADA, change in demand of approx. 190 MW in HP control area is observed.	0	0.047	0	190	0.000	0.247	60246	76770	NA	Y(d)	N	N (Partial details received)	
19	GD-1	1) 765 KV Bhadla_2 (PG)-Fatehgarh_II(PG) (PBTL) Ckt-4 2) 220 KV Bhadla_2 (PG)-RSDCL(PS52)_SL_BHD2_PG (RSDCL) Ckt-1	Rajasthan	PGCIL, RSDCL	24-Jun-25	08:26	24-Jun-25	10:27	02:01	i)Generation of 220 KV RSDCL PS52(P) station evacuates through 220 KV Bhadla_2 (PG)-RSDCL(PS52)_SL_BHD2_PG (RSDCL) Ckt-1. During antecedent condition, 220 KV RSDCL PS52(P) was generating approx. 145 MW (as per SCADA). ii)As reported, at 08:26hrs, IPS AI tube between CT & CB of tie bay 723 (B-Ph) at Fatehgarh_II end dislocated due to bad weather. iii)As per SCADA SOE, DR and PMU, the sequence of the event is as follows: a.At 08:26:41.680 hrs (as per PMU): B-N phase to earth fault occurred in 765 KV Bhadla_2 (PG)-Fatehgarh_II(PG) (PBTL) Ckt-4 with fault current of ~3.03kA from Bhadla2(PG) end (as per DR). b.A/R operated on this fault and after dead time line auto-reclosed successfully. c.At 08:26:45.680 hrs (as per PMU): Again B-N phase to earth fault occurred in 765 KV Bhadla_2 (PG)-Fatehgarh_II(PG) (PBTL) Ckt-4 with fault current of ~2.33kA (as per DR) and fault distance of 193km from Bhadla2(PG) end (as reported). d.A/R was blocked in the line and as fault was within reclaim time, 765 KV Bhadla_2 (PG)-Fatehgarh_II(PG) (PBTL) Ckt-4 tripped on this fault. e.At 08:26:45.855 hrs (as per SCADA SOE): 220 KV Bhadla_2 (PG)-RSDCL(PS52)_SL_BHD2_PG (RSDCL) Ckt-1 also tripped (exact reason, nature and location of fault and details of protection operated yet to be shared). f.Due to tripping of 220 KV Bhadla_2 (PG)-RSDCL(PS52)_SL_BHD2_PG (RSDCL) Ckt-1, 220 KV RSDCL PS52(P) S/s lost its connectivity from grid and blackout occurred at 220 KV RSDCL PS52(P) S/s. iv)As per PMU at Bhadla2(PG), two consecutive B-N phase to earth faults were observed with fault clearing time of 80ms each. v)As per SCADA, dip in NR solar generation of approx. 340 MW was observed. Generation loss of 145 MW occurred at 220 KV RSDCL PS52(P).	0	0	340	0	0.629	0.000	54020	64106	80	N	N	N	No details received from RSDCL
20	GI-1	1) 220 KV Khodri(UK)-Majri(HP) (UK) Ckt-2 2) 220 KV Khodri - Chhibro (UK) Ckt-1 3) 220/132 kV 100 MVA ICT at Khodri(UK) 4) 30 MW Unit-1 at Khodri(UK) 5) 30 MW Unit-2 at Khodri(UK) 6) 30 MW Unit-4 at Khodri(UK) 7) 60 MW Unit-1 at Chhibro(UK) 8) 60 MW Unit-3 at Chhibro(UK) 9) 60 MW Unit-4 at Chhibro(UK)	Uttarakhand	PTCUL, HPPTCL	27-Jun-25	05:20	27-Jun-25	05:49	00:29	i)220KV Khodri(UK) and 220kV Chhibro(UK) generating station have 4 generating units each of 30MW and 60MW respectively and have double main bus scheme. ii)During antecedent condition, 30 MW Unit-1, 2 & 4 at Khodri(UK) were in running condition and were generating approx. 25 MW each. Also, 60 MW Unit-1, 3 & 4 at Chhibro(UK) were in running condition and were generating approx. 40 MW, 55 MW and 56 MW respectively (as per SCADA). iii)As reported, at 05:20 hrs, R-phase LA of Unit-2 at Khodri(UK) bursted which led to LBB protection operation resulting in tripping of 220 KV Khodri(UK)-Majri(HP) (UK) Ckt-2, 220 KV Khodri - Chhibro (UK) Ckt-1, 30 MW Unit-1, 2 & 4 at Khodri(UK) and 220/132 kV 100 MVA ICT at Khodri(UK) (exact reason, location and nature of fault yet to be shared). iv)As per SCADA SOE, during the same time, 60 MW Unit-1, 3 & 4 at Chhibro(UK) also tripped (exact reason yet to be shared). v)As per PMU at Dehradun(PG), R-N phase to earth fault with fault clearing time of 120 ms was observed. vi)As per SCADA, generation loss of approx. 236 MW was observed in Uttarakhand control area.	0	0	236	0	0.472	0.000	50006	67224	120	N (Partial details received)	N (Partial details received)	N	
21	GD-1	1) 220 KV Singoli Bhatwari (Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-1 2) 220 KV Singoli Bhatwari (Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-2 3) 33MW Unit-1 at Singoli Bhatwari HEP 4) 33MW Unit-2 at Singoli Bhatwari HEP 5) 33MW Unit-3 at Singoli Bhatwari HEP	Uttarakhand	Singoli, PTCUL	28-Jun-25	21:08	28-Jun-25	21:48	00:40	i)During antecedent condition, 33MW Unit-1, Unit-2 and Unit-3 at Singoli Bhatwari HEP was generating approx. 36MW each. Total generation of 108 MW of Singoli Bhatwari HEP was evacuating through 220 KV Singoli Bhatwari (Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-1 & 2. ii)As reported, at 21:08 hrs, 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-1 tripped on Y-N phase to ground fault with fault distance of 77km (100%) from Srinagar end (as per DR). As per DR of Srinagar(UK) end, fault current was Iy=~1.55kA, fault sensed in zone-2 and fault clearing time was ~55ms. iii)During the same time, 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-2 also tripped on Y-N phase to ground fault with fault distance of 77km (100%) from Srinagar end (as per DR). As per DR of Srinagar(UK) end, fault current was Iy=~1.21kA and fault distance was 77.0 (100.0%) from Srinagar(UK) end; fault sensed in zone-3 and fault clearing time was ~80ms. iv)Due to tripping of both 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-1 & 2, 33MW Unit-1, Unit-2 and Unit-3 at Singoli Bhatwari HEP tripped due to loss of evacuation path and complete blackout occurred at 220kV Singoli Bhatwari HEP. v)As per PMU at Muzaffarnagar(UP), Y-N double phase to ground fault is observed with fault clearing time of 120 ms. vi)As per SCADA, generation loss of approx. 108MW at Singoli Bhatwari HEP is observed.	0	0	108	0	0.195	0.000	55461	77927	120	Y(d)	Y(d)	Y(d)	

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

Time Period: 1st June 2025 - 30th June 2025

S. No.	Utility	Total No. of tripping	First Information Report (Not Received)		Disturbance Recorder (Not Received)	Disturbance Recorder (NA) as informed by utility	Disturbance Recorder (Not Received)	Event Logger (Not Received)	Event Logger (NA) as informed by utility	Event Logger (Not Received)	Tripping Report (Not Received)	Tripping Report (NA) as informed by utility	Tripping Report (Not Received)	Remark
			Value	%	Value		%	Value		%	Value		%	
1	ABC RENEWABLE_RJ01	1	1	100	1	0	100	1	0	100	1	0	100	DR, EL & Tripping report not submitted
2	ACME SOLAR HOLDINGS LIMITED	1	1	100	1	0	100	1	0	100	1	0	100	
3	AD HYDRO	3	0	0	0	2	0	0	2	0	0	2	0	Details received
4	ADANI GREEN ENERGY TWENTY FOUR LIMITED	1	1	100	1	0	100	1	0	100	1	0	100	DR, EL & Tripping report not submitted
5	ADANI SOLAR ENRGY RJ TWO PRIVATE LIMITED	1	0	0	0	0	0	0	0	0	0	0	0	Details received
6	AHEJ3L	1	1	100	1	0	100	1	0	100	1	0	100	DR, EL & Tripping report not submitted
7	AHEJ4L	1	0	0	0	0	0	0	0	0	0	0	0	Details received
8	AMP Energy Green Private Limited	1	1	100	1	0	100	1	0	100	1	0	100	DR, EL & Tripping report not submitted
9	ANTA-NT	1	1	100	1	0	100	1	0	100	1	0	100	
10	APL	2	2	100	2	0	100	2	0	100	2	0	100	
11	AREPRL	1	0	0	0	0	0	0	0	0	0	1	0	Details received
12	AURAIYA-NT	7	7	100	5	0	71	7	0	100	6	0	86	DR, EL & Tripping report not submitted
13	AYANA RENEWABLE POWER THREE PRIVATE LIMITED	1	1	100	1	0	100	1	0	100	1	0	100	
14	BAIRASUIL-NH	3	3	100	3	0	100	3	0	100	3	0	100	
15	BBMB	41	26	63	27	6	77	27	6	77	26	0	63	
16	CLEANSOLAR_JODHPUR	1	1	100	1	0	100	1	0	100	1	0	100	
17	CPCC1	75	15	20	34	5	49	39	5	56	45	0	60	
18	CPCC2	27	0	0	0	3	0	0	3	0	0	0	0	Details received
19	CPCC3	48	0	0	0	8	0	0	8	0	1	4	2	DR, EL & Tripping report not submitted
20	DADRIGAS-NT	1	1	100	1	0	100	1	0	100	1	0	100	
21	DADRI-NT	2	2	100	2	0	100	2	0	100	2	0	100	

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

Time Period: 1st June 2025 - 30th June 2025

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		%	
22	GORBEA SOLAR PRIVATE LIMITED(GSPL)	1	1	100	1	0	100	1	0	100	1	0	100	
23	INDIGRID	1	0	0	0	0	0	0	0	0	0	1	0	Details received
24	JHAJJAR	3	0	0	0	3	#DIV/0!	0	3	#DIV/0!	3	0	100	DR, EL & Tripping report not submitted
25	MAHINDRA	2	2	100	2	0	100	2	0	100	2	0	100	
26	NAPP	2	2	100	2	0	100	2	0	100	2	0	100	
27	PARBATI-II-NH	5	1	20	1	4	100	1	0	20	1	0	20	DR, EL & Tripping report not submitted
28	RAPPA	9	9	100	9	0	100	9	0	100	1	0	11	
29	RAPPB	4	0	0	2	0	50	2	0	50	4	0	100	
30	RENEW SOLARURJA (RSUPL)	1	0	0	0	0	0	0	0	0	0	0	0	Details received
31	RENEW SURYA AAYAN PRIVATE LIMITED	2	2	100	2	0	100	2	0	100	2	0	100	
32	RENEW SURYA VIHAAN PRIVATE LIMITED	1	1	100	1	0	100	1	0	100	1	0	100	DR, EL & Tripping report not submitted
33	RSDCL	4	4	100	4	0	100	4	0	100	4	0	100	
34	SEWA-2-NH	3	1	33	1	0	33	1	0	33	1	0	33	
35	SINGOLI	7	0	0	1	0	14	1	0	14	0	0	0	Details received
36	SINGRAULI-NT	1	1	100	0	1	0	1	0	100	1	0	100	DR, EL & Tripping report not submitted
37	SLDC-DV	31	8	26	8	3	29	8	3	29	13	0	42	
38	SLDC-HP	22	0	0	15	4	83	15	4	83	0	0	0	Details received

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

Time Period: 1st June 2025 - 30th June 2025

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		%	
39	SLDC-HR	21	12	**57**	12	4	**71**	12	4	**71**	10	0	**48**	DR, EL & Tripping report not submitted
40	SLDC-JK	10	0	**0**	10	0	**100**	10	0	**100**	0	2	**0**	Details received
41	SLDC-PS	26	0	**0**	17	8	**94**	17	8	**94**	25	0	**96**	DR, EL & Tripping report not submitted
42	SLDC-RS	92	0	**0**	16	0	**17**	16	0	**17**	16	0	**17**	
43	SLDC-UK	21	2	**10**	2	6	**13**	2	4	**12**	5	0	**24**	
44	SLDC-UP	101	21	**21**	24	13	**27**	21	22	**27**	28	0	**28**	
45	SORANG	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	
46	STERLITE	4	1	**25**	1	0	**25**	1	0	**25**	2	2	**100**	
47	TANAKPUR-NH	2	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	Details received
48	TANDA-NT	2	1	**50**	1	1	**100**	1	0	**50**	1	0	**50**	DR, EL & Tripping report not submitted
49	TEHRI	1	0	**0**	0	0	**0**	0	0	**0**	1	0	**100**	
Total in NR Region		**600**	**134**	**22**	**215**	**71**	**41**	**220**	**72**	**42**	**219**	**12**	**37**	

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

Status of Mock Test of SPS in NR during 2025-26

Sr. No.	Scheme Name	Owner / Agency	Mock testing conducted before 2025-26	Tentative Schedule of SPS Mock testing to be conducted during 2025-26	Date of SPS Mock testing conducted during 2025-26	Remarks
1	SPS for WR-NR corridor - 765kV Agra-Gwalior D/C	POWERGRID	27-03-2025	Feb-26		
2	SPS for contingency due to tripping of HVDC Mundra-Mahendergarh	ADANI		SPS Unhealthy		As reported by ADANI, Tentative timeline for revival of SPS by October 2025
3	SPS for high capacity 400 kV Muzaffarpur-Gorakhpur D/C Inter-regional tie-line related contingency	POWERGRID		Schedule awaited		Not conducted in 2024-25 also.
4	SPS for 1500 MW HVDC Rihand-Dadri Bipole related contingency	POWERGRID	19-03-2025 and 20-03-2025	Jan-26		During mock testing issue identified at Singrauli, Malerkotla. During recent operation on 21.05.2025, non-operation of SPS at Muradbagar, Modipuram, Malerkotla, Singrauli observed.
5	System Protection Scheme (SPS) for HVDC Balia-Bhiwadi Bipole	POWERGRID		Sep-25		Not conducted in 2024-25 also
6	SPS for reliable evacuation of power from NJPS, Rampur, Sawra Kuddu, Baspa Sorang and Karcham Wangtoo HEP	SJVN/HPPTCL/JSW/POWERGRID/ SORANG	19-12-2024	Dec-25		Case-6(i): Under implemetation stage (tentative by 15th August 2025), Case 6(ii): communication card issue at Wangtoo(HP)
7	SPS for Reliable Evacuation of Ropar Generation	PSTCL		SPS Unhealthy		As reported by PSTCL, SPS need to be re-installed, necessary followups are being done.
8	SPS for Reliable Evacuation of Rosa Generation	UPPTCL	20-04-2024	conducted	12-04-2025	Mock test report pending
9	SPS for contingency due to tripping of evacuating lines from Narora Atomic Power Station	NAPS / UPPTCL		Schedule awaited		Not conducted in 2024-25 also. As reported by UPPTCL, no SPS system is in service at Narora S/s.
10	SPS for evacuation of Kawai TPS, Kalisindh TPS generation complex	RVPNL	14-03-2025 (Partial)	conducted	26-04-2025	Automatic load shedding part yet to be implemented
11	SPS for evacuation of Anpara Generation Complex	UPPTCL	08-10-2024 (unit-7) and 19-10-2024 (unit-6)	Schedule awaited		
12	SPS for evacuation of Lalitpur TPS Generation	UPPTCL	21-05-2024	conducted	09-04-2025	Mock test report pending
13	SPS for Reliable Evacuation of Bara TPS Generation	UPPTCL	20-11-2024	conducted	23-05-2025	Mock test report pending
14	SPS for Lahal Generation	HPPTCL	08-07-2020	Schedule awaited		As reported by HPPTCL, SPS at Lahal not required now.
15	SPS for Transformers at Ballabhgarh (PG) substation	POWERGRID		Schedule awaited		Not conducted in 2024-25 also. SPS. SPS may be kept with revised logic (logic based on the loading)
16	SPS for Transformers at Maharanibagh (PG) substation	POWERGRID		conducted	Apr-25	Revised SPS implemented, mock test report is pending

17	SPS for Transformers at Mandola (PG) substation	POWERGRID		conducted	Apr-25	Revised SPS implemented, mock test report is pending
18	SPS for Transformers at Bamnauli (DTL) Substation	DTL		Schedule awaited		Not conducted in 2024-25 also. SPS. SPS may be kept with revised logic (logic based on the loading)
19	SPS for Transformers at Moradabad (UPPTCL) Substation	Uttar Pradesh	20-04-2024	conducted	02-04-2025	Mock test report pending
20	SPS for Transformers at Muradnagar (UPPTCL) Substation	UPPTCL	27-03-2025	Mar-26		
21	SPS for Transformers at Muzaffarnagar(UPPTCL) Substation	UPPTCL	27-03-2025	Mar-26		
22	SPS for Transformers at Greater Noida(UPPTCL) Substation	UPPTCL		SPS Unhealthy		SPS Unhealthy; SPS may be kept with revised logic (logic based on the loading)
23	SPS for Transformers at Agra (UPPTCL) Substation	UPPTCL	21-03-2025	Schedule awaited		
24	SPS for Transformers at 400kV Sarojininagar (UPPTCL) Substation	UPPTCL	15-05-2024	Schedule awaited		
25	SPS for Transformers at 220kV Sarojininagar (UPPTCL) Substation	UPPTCL	06-06-2024	Schedule awaited		
26	SPS for Transformers at 400kV Unnao (UPPTCL) Substation	UPPTCL	19-05-2023	SPS made healthy on 27.05.2025		Mock test report pending
27	SPS for Transformers at 400kV Sultanpur (UPPTCL) Substation	UPPTCL		SPS Unhealthy		SPS Unhealthy; At procurement stage
28	SPS for Transformers at 400kV Bareilly (UPPTCL) Substation	UPPTCL		SPS disabled without approval		Not conducted in 2024-25 also. SPS. SPS need to be enabled at the earliest.
29	SPS for Transformers at 400kV Azamgarh (UPPTCL) Substation	UPPTCL	06-05-2024	Schedule awaited		
30	SPS for Transformers at 400kV Mau (UPPTCL) Substation	UPPTCL	27-04-2024	Schedule awaited		
31	SPS for Transformers at 400kV Gorakhpur (UPPTCL) Substation	UPPTCL	27-04-2024	Schedule awaited		
32	SPS for Transformers at 400kV Sarnath (UPPTCL) Substation	UPPTCL	23-05-2024	Schedule awaited		
33	SPS for Transformer at 400kV Rajpura (PSTCL) Substation	PSTCL	31-01-2025	Schedule awaited		
34	SPS for Transformers at 400kV Mundka (DTL) Substation	DTL	03-02-2025	Schedule awaited		
35	SPS for Transformers at 400kV Deepalpur (JKTPL) Substation	HVPNL		conducted	08-05-2025	Mock test report pending
36	SPS for Transformers at 400kV Ajmer (RVPN) Substation	RVPNL	10-09-2024	10-09-2025		
37	SPS for Transformers at 400kV Merta (RVPN) Substation	RVPNL	12-09-2024	12-09-2025		
38	SPS for Transformers at 400kV Chittorgarh (RVPN) Substation	RVPNL	31-08-2024 and 05-09-2024	05-09-2025		
39	SPS for Transformers at 400kV Jodhpur (RVPN) Substation	RVPNL	24-09-2024	24-09-2025		
40	SPS for Transformers at 400kV Bhadla (RVPN) Substation	RVPNL	27-09-2024	27-09-2025		
41	SPS for Transformers at 400kV Ratangarh (RVPN) Substation	RVPNL	20-09-2024	20-09-2025		
42	SPS for Transformers at 400kV Nehtaur(WUPPTCL) Substation	UPPTCL	11-01-2025	Schedule awaited		
43	SPS for Transformers at Obra TPS	UPPTCL	20-05-2024	Schedule awaited		
44	SPS for Transformers at 400KV Kashipur (PTCUL) substation	PTCUL	Septemeber 2024	Sep-25		
45	SPS for Transformers at 400KV Fatehgarh Solar Park (AREPRL)	ADANI		conducted	19-04-2025	Mock test report received. OK
46	SPS to relive transmission congestion in RE complex (Bhadla2)	POWERGRID		Schedule awaited		Not conducted in 2024-25 also
47	SPS for Transformers at 400kV Bikaner (RVPN) Substation	RVPNL	26-09-2024	26-09-2025		

48	SPS for Transformers at 400kV Bawana (DTL) Substation	DTL	04-01-2025	Dec-25		
49	SPS for Transformers at 400kV Bhilwara (RVPN) Substation	RVPNL	09-07-2024 and 10-07-2024	10-07-2025		
50	SPS for Transformers at 400kV Hinduan (RVPN) Substation	RVPNL	26-09-2024	26-09-2025		
51	SPS for Transformers at 400kV Suratgarh (RVPN) Substation	RVPNL	20-10-2024	20-10-2025		
52	SPS for Transformers at 400kV Babai(RS) Substation	RVPNL	20-10-2024	20-10-2025		
53	SPS for Transformers at 400kV Allahabad(PG) Substation	UPPTCL		Schedule awaited		**Not conducted in 2024-25 also**
54	SPS for Transformers at 400kV Jaunpur(UP) Substation	UPPTCL				**Yet to be implemented**
55	SPS for Transformers at 765kV Jhatikara(PG) Substation (Bamnauli section)	POWERGRID		**conducted**	**Jun-25**	**Revised SPS implemented, mock test report is pending**
	SPS for Transformers at 765kV Jhatikara(PG) Substation (Mundka section)			**conducted**	**Jun-25**	