



सत्यमेव जयते

भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

उत्तर क्षेत्रीय विद्युत समिति

Northern Regional Power Committee

सं.-उक्षेविस/प्रचालन/106/01/2018/11873-914

दिनांक: 11/10/2018

विषय: प्रचालन समन्वय उपसमिति की 152वीं बैठक का कार्यसूची।
Subject: Agenda of 152nd OCC meeting.

प्रचालन समन्वय उप-समिति की 152वीं बैठक 16-10-2018 को 10:30 बजे से उ.क्षे.वि.स.सचिवालय, नई दिल्ली में आयोजित की जाएगी। उक्त बैठक की कार्यसूची उत्तर क्षेत्रीय विद्युत समिति की वेबसाइट <http://www.nrpc.gov.in> पर उपलब्ध है।

152nd meeting of the Operation Co-ordination sub-committee will be held on 16-10-2018 at 10:30am at NRPC Secretariat, New Delhi. The agenda of this meeting has been uploaded on the NRPC web-site <http://www.nrpc.gov.in>.

It is requested that the updated status of various points under follow up issues from previous OCC M may please be furnished.

-sd-

(उपेन्द्र कुमार)

अधीक्षण अभियंता(प्रचालन)

सेवा में : प्रचालन समन्वय उपसमिति के सभी सदस्य।

To: All Members of OCC

**Agenda for the 152nd Meeting of the Operation Coordination Sub-Committee (OCC) of
NRPC to be held on 16.10.2018.**

Date & time: 16-10-2018 at 10.30 hrs.

Venue: NRPC Secretariat, New Delhi

1. Confirmation of Minutes:

The minutes of the 151st OCC meeting held on 13.09.2018 and 14.09.2018 at New Delhi were issued vide letter of even number dated 01 .10.2018.

HVPNL has commented on the minutes as under:

“It is submitted that the anticipated peak demand for the month of October 2018 on month ahead basis was intimated as 8130 MW. May kindly consider for Correction in the MOM issued in Annexure IV .”

The sub-committee may kindly discuss and confirm the Minutes.

2. Review of Grid operations of September, 2018:

2.1 Supply Position (Provisional) for September , 2018

Anticipated Power Supply Position v/s Actual Power Supply Position (Provisional) of Northern Region during the month of September, 2018 is as given below:

State	Req/ Avl	Anticipated	Actual	%age Variation	Anticipated	Actual	%age Variation
		(MW)			(MU)		
Chandigarh	Req	320	257	-19.7	160	141	-12.0
	Avl	365	257	-29.6	165	141	-14.6
Delhi	Req	6000	5358	-10.7	3300	2901	-12.1
	Avl	6680	5358	-19.8	4160	2902	-30.2
Haryana	Req	10257	9008	-12.2	5170	4749	-8.1
	Avl	10270	9008	-12.3	6530	4749	-27.3
H.P.	Req	1440	1466	1.8	830	876	5.6
	Avl	1500	1466	-2.3	950	853	-10.2
J&K	Req	2840	2706	-4.7	1550	1434	-7.5
	Avl	2320	2165	-6.7	1230	1158	-5.9
Punjab	Req	11370	11440	0.6	6930	5654	-18.4
	Avl	12100	11440	-5.5	7927	5654	-28.7
Rajasthan	Req	10809	10612	-1.8	6630	6206	-6.4
	Avl	10190	10612	4.1	7142	6206	-13.1
U.P.	Req	21000	18121	-13.7	12360	10120	-18.1
	Avl	19170	18121	-5.5	11850	10120	-14.6
Uttarakhand	Req	2090	1996	-4.5	1210	1144	-5.5
	Avl	2180	1996	-8.4	1340	1131	-15.6

As per above, it has been observed that there are much variations (i.e. > 5.0%) in the Anticipated vis-à-vis Actual Power Supply Position (Provisional) for the month of September, 2018 in terms of Peak demand for Chandigarh, Delhi Haryana & Uttarakhand and in terms of Energy requirement for Chandigarh, Delhi, Haryana, Uttarakhand, HP, J&K, Punjab, Rajasthan & UP. **These states are requested to submit reasons for such variations in writing so that the same can be deliberated in the meeting.**

All SLDCs are requested to furnish the provisional and revised power supply position in prescribed formats by 2nd and 15th day of the month respectively in compliance to the provision 5.3 of IEGC.

2.2 Power Supply Position of NCR:

NCR Planning Board (NCRPB) is closely monitoring the power supply position of National Capital Region. Monthly power supply position for NCR till the month of July, 2018 is placed on NRPC website. (www.nrpc.gov.in/meetings/occ.html)

2.3 Detailed presentation on grid operation during September, 2018 by NRLDC.

3. Maintenance Programme of Generating Units and Transmission Lines:

3.1. Maintenance Programme for Generating Units.

The proposed maintenance programme for Generating Units for the month of November, 2018 will be discussed on 15.10.2018 at NRPC office, New Delhi.

3.2. Outage Programme for Transmission Elements.

The proposed Outage programme of Transmission lines for the month of October, 2018 will be discussed on 15.10.2018 at NRPC office, New Delhi.

4. Planning of Grid Operation:

4.1. Anticipated Power Supply Position in Northern Region for November, 2018 (As per 15th LGBR Sub-committee meeting)

The Anticipated Power Supply Position in Northern Region for November, 2018 is enclosed at **Annexure 4.**

SLDCs are requested to inform their updated estimate of power supply position for November, 2018 and measures proposed to be taken to bridge the gap in availability as well to dispose of the surplus, if any, in the prescribed format.

4.2 Data for the last quarter of 2018-19 required to be submitted by Designated ISTS Customers connected to ISTS.

All concerned are requested to submit the MW & MVAR Data for injection or drawal at various nodes or a group of nodes shall be submitted for maximum injection/maximum withdrawal for each application period. Such data shall include the power tied in long term contracts and approved medium term open access agreements.

5. **Information about variable charges of all the generating units in the Region.**

The variable charges details for different generating units are available on the Merit Order Portal.

All utilities are requested to confirm if the process of Scheduling is being done as per Merit Order Despatch and in case of variations the reasons may be highlighted.

6. **Reactive compensation at 220 kV/400kV level**

6.1 **In the 38th TCC & 41st NRPC following elements in NR were approved:**

- a) TCR of capacity 500 MVAR at Kurukshetra 400 kV bus.
- b) Bus Reactors at 30 no. 220 kV sub-stations and 18 no 400 kV level sub-stations subject to the availability of space.

6.2 **POWERGRID:**

Representative of POWERGRID had earlier informed that bids for 500 MVAR TCR at Kurukshetra have been opened and was under Technical evaluation and the LOA is expected to be placed by **October 2018** with commissioning schedule of 2 years from the issue of LOA.

Regarding the 125 MVAR reactor being installed at Kurukshetra to compensate for the prevailing High voltage conditions until the TCR gets commissioned it was informed by POWERGRID that the reactor was ready for charging and would be charged within **two days**.

About the installation of the reactors at 400 kV ISTS substations which as per the Gazette Notification dated 08.05.2018 is to be done through TBCB route, **POWERGRID representative was requested to update the progress of the same from CTU.**

DTL:

DTL has informed that as submitted to SCPSPNR held on 22.06.2018 and agreed, DTL will implement 7 fixed reactors, six 25 MVAR, 220 kV reactors at Mundka, Harsh Vihar, Peeragarhi, Electric lane, Bamnauli, Indraprastha substation and one 125 MVAR, 400 kV reactor at Mundka substation. DTL has submitted that these reactors shall be commissioned by **December 2020**. Out of the above, scheme for five reactors at 220 kV level are under approval.

DTL representative informed that order for the above 7 (Six 25 MVAR and one 125 MVAR) reactors is expected to be placed by **December 2018**.

PSTCL:

Tender for 400 kV level reactors at Dhuri substation has been opened (technical bid) and is in the evaluation stage. Price bid is likely to be opened within a month. As regards 220 kV level reactors to be commissioned at Dhuri and Nakodar substation, tender has been opened on 15-06-2018 (technical bid) & is under evaluation. DPR for installation of 400 kV & 220 kV reactors has been submitted for PSDF funding.

It was informed that there were certain observations of TESG of PSDF to which the clarifications have been reverted on 07.09.2018.

Uttarakhand:

PTCUL representative informed that for 125 MVAR reactors at Kashipur retendering is being done. The last of submission of the Bid is extended to 15.09.2018. 80 MVAR reactor at Srinagar has been received at site and shall be commissioned by 30.09.2018.

Rajasthan:

148th OCC meeting & 149th OCC meeting:

525 MVAR (450 MVAR + 75 MVAR) has been approved by WTD of RVPN and being proposed for PSDF funding. 3x25 MVAR (at 220 kV level) reactors one each at Suratgarh, Akal & Bikaner are to be funded by PSDF. As per the PSDF requirement, the DPR along with formats has been re-submitted to PSDF.

The reactive elements as per discussion in Techno-economic group of PSDF have been examined again through complete power system study. The study recommends size, rating & location suitable for providing reactive elements (Shunt reactors & STATCOMS) across various voltage levels i.e. 400 kV & 220 kV as per various level of “ Renewable Energy Integration – Reactive Compensation Elements/ Equipments for Reactive Power Management and Voltage Control for Transmission Grid under Smart Transmission Network and Asset Management System”. Therefore, DPR has been submitted for consideration & approval of standing committee / CEA vide letter dated 18.06.2018 (letter enclosed at Annexure 6B of the minutes of the 148th OCC meeting)

MS, NRPC asked Rajasthan to submit their plan for installation of reactors as per the decision of the SCPSPNR meeting and subsequent approval of NRPC. The above reactor finalized based on the plan are exclusive of the reactor plan study done by Power grid, also needs to be clarified. The updated information received from Rajasthan is placed at Annexure 6C of the minutes of the 148th OCC meeting.

MS, NRPC requested Rajasthan representative to clarify the issue of installation of the reactors. He added that non installation of reactors will lead to high voltage of the system due to which lines have to be opened compromising reliability of the system. He added that 450 MVAR agreed in the standing committee should have been got installed even if the locations had changed. MS NRPC requested Rajasthan representative to take up the new proposal in the next standing committee meeting but the reactors already agreed and approved in NRPC meeting should be commissioned at the earliest. The Sub-Committee decided to write letter to Rajasthan for expediting commissioning of 25 MVAR Reactors at Suratgarh, Akal & Bikaner each.

150th OCC meeting:

Rajasthan representative stated that the clarifications sought by PSDF in respect of revised DPR for 3x25 MVAR (at 220 kV level) reactors one each at Suratgarh, Akal & Bikaner was submitted to PSDF on 28.07.2018.

Rajasthan representative was requested to give the detailed status of 150 MVAR (25 MVAR at Barmer S/s and 125 MVAR at Jodhpur S/s) in writing regarding the installation of reactors as per the decision of the 39th SCPSPNR meeting and subsequent approval of NRPC.

151st OCC meeting:

Representative of Rajasthan stated that DPR for 3 Nos. each of 25 MVAR reactor (Akal, Bikaner & Suratgarh) i.e total 75 MVAR reactors has been submitted for PSDF funding on 27.04.2018. Further the reply of observations raised by NLDC has been submitted on

28.07.2018. The installation process of these 3 reactors shall be started on receipt of approval by PSDF. He further told that STU has been advised vide letter dated 27.08.2018 to study and send the DPR of already approved 450 MVAR (13*25+1*125MVAR) reactors for PSDF funding even if location had changed.

Regarding status of 150MVAR (25 MVAR at Barmer and 125MVAR at Jodhpur), it is to submit that reactors at these locations are already included in proposal of 450MVAR reactors of Rajasthan, approved in the 39th SCSPNR

All utilities are requested to update.

7. System Study for Capacitor Requirement in NR for the year 2019-20

7.1 38th TCC & 41st NRPC meeting: NRPC approved that the capacitor requirement study of NR shall be conducted at 11/33 kV level from CPRI so as to obtain the true requirement of capacitor for FY 2018-19.

Techno Commercial revised offer submitted by CPRI for System studies for assessment of capacitor requirements in Northern region for year 2019-20 for a peak and off peak load condition was enclosed at Annexure-VII of the Agenda of the 147th OCC meeting.

7.2 In the 147th OCC meeting MS, NRPC informed the Sub-Committee that CPRI has given a final (negotiated) Techno Commercial offer of Rs. 32 lakhs (Rs. 20 lakhs for previous study and Rs. 12 lakhs for additional assignment) excluding taxes. The approval of NRPC for the cost of the system study was obtained in the 39th TCC and 42nd NRPC held on 27.06.2018 and 28.06.2018.

7.3 149th OCC meeting: In the meeting members were informed about the methodology proposed by CPRI for conducting the study (Annexure-7 attached with the MOM of the 149th OCC meeting.) which provided with three options. Of the three options, members agreed to go with the third option of **working separately for each state utility(s) for its peak loading time & date to figure out the capacitor requirement for the state**. After having obtained the capacitor requirement for each state individually, the study will be carried out for the complete region so as to reduce the reactive power flow on ISTS lines (considering the capacitors which have been identified for each state).

All the utilities were advised to submit the data for their States in the prescribed format corresponding to date they have met peak requirement for their States. Utilities were requested to submit the data within a month so as to complete the study in time.

In case of any clarification at the time of data collection utilities were advised to directly contact Dr. Manohar Singh, CPRI (manoharsingh@cpri.in, +91-96329 40855).

7.4 150th OCC meeting: All the utilities expressed concern on the nature of the format. It was observed in general by all constituents that the format is very lengthy & will require some time for understanding the same and providing data accordingly.

MS, NRPC proposed that all utilities should highlight the problems being faced by them by the second week of September & thereafter a separate meeting will be held with CPRI representative for better understanding of the format and to resolve the issues.

7.5 151st OCC meeting: Representative of CPRI made a detailed presentation explaining the format in the meeting and based on the inputs received from the members, the format has been revised and has already been sent to the respective SLDC's through e-mail dated

24.09.2018. CPRI has also shared a video of the presentation explaining the format which can be viewed on Youtube at <https://youtu.be/QTxx7owPF3g>.

It was also requested to initially fill the data format for any one 220 kV or 132 kV substation and send it to CPRI (manoharsingh@cpri.in) to check its suitability for utilization in carrying out the study and further action

Till date no data has been received from any of the utility. All utilities are again requested to kindly submit the data at the earliest.

8. Phase nomenclature mismatch issue with BBMB and interconnected stations

The Protection Sub-Committee while discussing multiple elements tripping at 400/220/132kV Dehar HEP of BBMB in its 34th meeting held on 21.04.2017 recommended inter-alia that BBMB should modified nomenclature of phase sequencing at Dehar as Y-B-R instead of R-Y-B. The issue was further deliberated in the 138th OCC meeting held on 23.08.2017, wherein it was observed that nomenclature of phases at BBMB end has inadvertently been marked as outlined below:

Phase of the grid	Corresponding nomenclature of the phase at BBMB end
R Phase	B Phase
Y Phase	R Phase
B Phase	Y Phase

The BBMB was asked to rectify the nomenclature issue at their end accordingly.

However, BBMB raised concern that the issue could not be resolved in one go, as coordination would be required from all the concerned utilities to carry out this activity and requested NRPC to form a committee comprising of BBMB and its partner states, utilities with which BBMB has interconnection, NRPC Secretariat and POWERGRID for the same. NRPC in its 41st meeting held on 28th February, 2018 approved the proposed formation of the committee and advised BBMB to resolve the issue within six months.

BBMB drew a draft action plan which was duly deliberated by the Committee in its 1st meeting held on 04.06.18. The action plan was circulated to all the concerned utilities for - their comments and concurrence. The execution of the action plan was tentatively planned during month of November-December, 2018.

HPSEB and PSTCL agreed with action plan, however, PSTCL was of the view that 400kV Dehar-Rajpura line is owned by PGCIL and hence the work is to be executed by them. Comments on the action plan were also received from NTPC and POWERGRID BBMB has agreed with the comments from NTPC and has given their reply on the comments of POWERGRID.

The reply of BBMB vis-à-vis the comments of POWERGRID were deliberated in the 151st OCC meeting wherein members were of the view that reply of BBMB was generally in order. However, POWERGRID representative stated that the matter pertains with NR-I and NR-II

region of POWERGRID and final decision regarding the same is to be taken up at the level Executive Directors of respective regions.

Accordingly the matter stands taken up vide letter of even number dated 07.10.2018. POWERGRID is requested to update.

- 9. Follow up of issues from previous OCC Meetings – Status update**The detail of the updated status of Agenda items is enclosed at **Annexure 9**.
- 10. Status of FGD installation vis-à-vis installation plan at identified TPS.**
- 10.1** The list of FGDs to be installed as finalized in the 36th TCC (Special) meeting held on 14.09.2017 was enclosed as Annexure 13 with the Agenda of the 144th OCC meeting. All SLDCs are regularly being requested since 144th OCC meeting to take up with the concerned generators where FGDs is to be installed and submit the progress of FGD installation on monthly basis regularly to NRPC in the available on the NRPC website. This being a regular agenda item since 144th OCC, comments/deliberations on the issue is recorded in the respective OCCM.
- 10.2 151st OCC meeting:** MS NRPC stated that in the meeting CEA held a meeting with generators on 28.08.2018 in which CE, TR&M, CEA informed that the FGD installation deadlines have been advanced for stations falling in NCR and also for the stations above 500 MW capacity or in stations located in the area having population density more than 400 persons per square km or are in critically polluted area. He further added that many IPPs like NPL are waiting for guidelines from the SERCs regarding the FGD installation cost adjustment. In this regard, he briefed the sub-committee that Ministry is concerned about the issue and a policy decision is being made about the cost to be adjusted duly and CERC is being directed in this regard to pass an order to the SERCs. He asked all the generators to seriously make efforts to meet the deadline of installation of FGD.

Updated status of progress of FGD installation is enclosed at **ANNEXURE-10**.

All constituents are again requested to update the desired information in soft copy in excel format on a regular basis. All the utilities (except PSPCL) should give the contact details of the officer who is concerned with FGD installation so that the information can be expeditiously collected directly from him/her. All SLDCs shall coordinate and submit the information.

PSPCL submitted the contact details of the officer concerned with FGD installation. Randhir Singh Bains, Dy. CE/GGSSTP, Ropar- M. 9646117711

All utilities are requested to update.

11. LVRT compliance by wind generators.

- 11.1 As per the CERC order dated 05.01.2016 issued in Petition No. 420/MP/2014, CERC has directed that LVRT should be implemented in all wind turbines (except Stall Types) commissioned before 15.04.2014 having installed capacity equal to or more than 500 KW. Further, as per the CEA Technical Standard for connectivity to the Grid (Amend.) Reg.2013 (sub clause (3) of Clause B 2) of the station connected to the grid 06 months after publication of these regulations (i.e.15.04.2014) should have the LVRT capability as depicted in the sub-clause.

As LVRT are not installed in many of the wind turbines in State of Rajasthan, the issue is being regularly raised in the various meetings of NRPC so far without any result.

38th TCC/41st NRPC meeting: LVRT compliance was a pre-requisite according to CEA connectivity standards and these wind generators should not have been provided the connectivity in the first place itself. NRPC directed Rajasthan to issue a notice to all the LVRT non-compliant wind generators specifying a time period within which they need to get the LVRT compliance beyond which they would be constrained to deny scheduling to these generators. NRPC also advised other States to ensure compliance to the CEA connectivity standards and to not allow in future, connectivity to any LVRT non-compliant wind generators.

- 11.2 **145th OCC meeting:** RRVPNL submitted the letter from the Ministry of New & Renewable Energy in this regard in which the following is stated regarding LVRT compliance:

“A Concerned WTG manufactures may apply for LVRT testing to any internationally accredited testing body or NTWE by 15.3.2018, which should include the following:

i An affidavit that the manufacturer would comply with CEA Technical standards for connectivity to the grid.

ii A bank guarantee of Rs 1 crore per model, which would be returned on producing the compliance certificate for LVRT and other technical standards as stipulated by CEA.”

147th OCC meeting: MS, NRPC stated that all the wind generators shall be LVRT complaint for which retro fitment needs to be done & it shall be responsibility of Rajasthan SLDC to get it enforced. Rajasthan should comply with the decision of 38th TCC/41st NRPC meeting & write letters to wind generators communicating the decision of NRPC.

148th OCC meeting: MS, NRPC apprised the Committee that the above reference order facilitates WTG manufactures to obtain statement of compliance/confirmation standard for demonstrating the compliance to applicable CEA Technical standards for connecting to the Grid for their WTG models which were unable to get LVRT compliance certificate from accredited testing agencies. He further stated that the time period for applying for LVRT testing to any internationally accredited testing body or NIWE stands expired on 15.3.2018. He added that notice should be issued to all Wind generators who have not done the needful. Rajasthan SLDC representative has intimated the same has been issued (Copy of the letter was placed at Annexure 11 of the MoM of the 148th OCC meeting).

MS, NRPC added that as per 38th TCC and 41st NRPC decision, SLDC should not schedule the wind generators which are not LVRT complaint. Also he added that due to LVRT non compliance on part of the wind generators has lead to a near voltage collapse instances but

luckily the grid survived. NRLDC representative also added that the compliance of the wind generators is mandatory for the safety of the grid as 2-3 incidents have already occurred in the grid which could have resulted in the catastrophe.

11.3 149th OCC meeting:

Rajasthan representative intimated that a meeting of wind turbine manufacturers was held on 05.07.2018 to sort out the issue of LVRT and to get its compliance expeditiously. Further, the assessment of manufacturer wise non complied WTG has been identified and enclosed at Annex- XI of the MOM of the 149th OCC meeting. He informed the Sub-Committee that 638 generators are LVRT complaint & 106 do not require as per regulation. He further added that 2641 generators need to be LVRT complaint. The capacity of generators that are non – complaint is 3019 MW. He also informed that the cost of installing LVRT was 25-40 lakh per generator for which the generators will have to make arrangements. MS, NRPC stated that the cheaper solutions are available and they should be explored cost needs to be reviewed MS NRPC requested that Rajasthan should submit these details to their SERC. He informed additionally that the wind generators had requested for scheduling of power till they review the time line for getting work done.

Rajasthan representative also informed that the next meeting with WTG manufacturers is scheduled for 23.7.2108 for further deliberating the actions in this regard.

Director, GM division, CEA representative added that LVRT compliance is mandatory as per connectivity regulation requirement of CEA. He added that a single LVRT solution can be used on the plant which will be cheaper.

11.4 150th OCC meeting:

Rajasthan representative intimated that in line with the discussions in the last OCC meeting the WTG manufacturers in the meeting on 23.07.2018 has been advised to review the possibility of having a single LVRT for a plant. MS, NRPC requested that the MOM of the meeting may be shared so that the progress in this regard can be monitored.

11.5 151st OCC meeting:

The MOM of the meeting held on 23.07.2018 stands shared (Annexure 11 of the Agenda of the 151st OCC meeting).

MS NRPC briefed the forum that M/S Suzlon and Inox have filed a petition for waiver of installation of LVRT on account of the additional cost involved.

RRVPNL representative intimated that the next meeting with the WTG manufacturers is scheduled tentatively for 05.10.2018.

RRVPNL is requested to update about the deliberations held in the meeting and the progress made thereupon.

12. System Protection Scheme (SPS) in NR

12.1 Revised System Protection Scheme (SPS) for 765 kV Agra-Gwalior line:

In the 37th TCC and 40th NRPC meeting recommended for convening a separate meeting comprising members from NRLDC, NRPC Secretariat and POWERGRID for reviewing revised logic of the scheme presented by POWERGRID in 140th OCC meeting. A meeting

for reviewing the logic of the scheme was held on 07th November 2017 and scheme was revised and finalized.

Since OPGW has now been laid, POWERGRID agreed for utilizing the signals from circuit breaker (CB Open/ CB close) of both the ends for SPS logic so as to negate the chances of mis-operation/ mal-operation of the SPS.

POWERGRID had informed that the circuit breaker (ON/ OFF) signal was being utilized from Agra end in the logic. However, that from Gwalior end was not being utilized as the purpose of the scheme was being served by utilizing the CB signal from one end.

Representative of NRLDC stated that even if the scheme was functioning properly in normal circumstances there are chances that the scheme may not operate in case of breaker lockout from Agra end and the line getting tripped from Agra end.

NLDC also stressed on utilizing CB signals from both the ends as Agra-Gwalior is an important inter-regional transmission line and its implementation will make the scheme even more reliable.

POWERGRID agreed to implement the logic utilizing the CB signal from both the ends as per the decision of TCC. NRPC had concurred with the deliberations of TCC.

POWERGRID had informed that the work at Agra end was in progress but for the implementation at Gwalior end the issue needs to be taken up and highlighted with WRPC also

147th OCC Meeting:

POWERGRID representative stated that their management has enquired about the recovery of cost that will be incurred on implementation of the scheme. Representative of POWERGRID was informed that a decision regarding the same has already been taken in 129th OCC meeting and thereafter ratified in the 35th TCC and 39th NRPC meeting to book the cost of the implementation of revised SPS in some other ongoing project/work. POWERGRID was advised that the decision of NRPC to be implemented at the earliest as this is an important IR line between NR & WR.

NRLDC informed that average load now prevailing on the feeders approved for SPS might have changed and these feeders might not have remained radial and as such the list of feeders needs to be reviewed.

NRPC Secretariat has written a letter dated 28.5.18 regarding this issue to ED/ NR-III, POWERGRID (was placed at Annexure 12A of the minutes of the 148th OCC meeting). This issue has also been taken up with WRPC for implementation at Gwalior end by deliberating in their OCC/ RPC meetings. A letter in this regard had been written to WRPC & the reply received thereof was placed at Annexure 12A of the minutes of the 148th OCC meeting.

148th OCC Meeting:

POWERGRID representative intimated the Sub-Committee that for implementation of the scheme due coordination with the concerned States was required.

MS, NRPC requested each SLDCs to extend cooperation & provide all required support to Power Grid for early execution of the work.

39th TCC and 42nd NRPC meeting: MS, NRPC informed that there were 2 issues involved which needed to be discussed. One was for the utilization of CB signal from both the ends

(Gwalior and Agra) in the logic and the other was for incorporating additional 1000 MW load for load shedding in the already approved scheme.

Regarding the additional 1000 MW load, MS stated that the same has been identified and were now pending at POWERGRID's end for wiring with the logic.

POWERGRID representative informed that the material has been received at the site and for 2 locations viz. Dadri and Bhiwadi the scheme was almost completed. Regarding other locations under the ownership of other utility, POWERGRID requested to provide the details of nodal officers with whom they may coordinate. He further stated that, once the details of the nodal officers were received, additional load of 1000 MW shall be wired within 02 months (tentatively by end of August 2018).

MS, NRPC assured POWERGRID of all possible support by the utilities and to provide them with the list of nodal officers for each substation location identified for additional load shedding.

Regarding the issue of utilizing CB from both the ends (Gwalior & Agra) in the logic of SPS, MS, NRPC stated that even though the decision was already taken in NRPC/TCC forum, the issue of booking the cost of the scheme was again raised in the OCC forum. To this, Members expressed concerns and stated that once a decision has already been taken at NRPC/TCC forum, the issue shall not be raised again in any sub-committee of NRPC.

MS, NRPC requested POWERGRID to go ahead with the decision of 41st NRPC to utilize the CB signals from both the end in the logic of SPS so as to ensure more robust and reliable operation of the scheme. He further requested POWERGRID to not to cause any further delay in the implementation of the scheme as such delay may lead to some unforeseen catastrophic incident for the grid.

Representative of POWERGRID stated that the changed logic for utilizing CB signal from Gwalior end shall be provided to them so that the same may be incorporated in the SPS logic. Representative of NRLDC informed the committee that the logic had already been provided to POWERGRID and there was no need of again discussing the same. POWERGRID was advised to go ahead as per the decision of NRPC and complete the scheme in time.

149th OCC meeting:

MS NRPC stated that in the last OCC meeting the Name of the nodal officers for coordinating with Power grid was requested which have not been received till date. He added that as per directions of CERC a report has to be submitted within 15 days on the status of implementation of the scheme. Power grid stated that in the last week of July the mock testing can be done.

Further, on it was added by MS, NRPC that representative of CERC should also be called. SE (O) NRPC stated that the actual testing on the revised scheme be planned in the month of November in coordination with WRPC.

150th OCC meeting:

MS, NRPC apprised the Committee that mock testing for the Revised 765 kV Agra- Gwalior SPS is to be carried out after integration of additional 1000 MW load shedding and Hon'ble CERC has been intimated accordingly. He asked POWERGRID to complete the work at the earliest.

Representative of POWERGRID again requested for the Nodal Officers from the states as problems were being faced while working at the substation of state utilities.

It was informed that names of nodal officers have been requested again and again from the states but only U.P. has intimated the coordinator. MS, NRPC further asked representative of the concerned states present in the OCC to be coordinator for resolving any problems encountered by POWERGRID at substations of respective utilities. Accordingly, the following officers were nominated as Nodal officer:

Haryana – Shri. N. K. Makkar, EE, HVPNL

Punjab- Shri. Akshay Garg, ASE, PSTCL

Rajasthan – Shri. Kamal Patidar, EE, Rajasthan (SLDC)

Delhi – Shri. Loveleen Singh, GM, DTL

151st OCC meeting:

POWER GRID representative updated that the work for Delhi, UP & Haryana is completed. He further added that the work at 7 locations in Punjab & 6 locations in Rajasthan is remaining which is targeted to be completed by October 2018.

POWERGRID may update.

12.2 SPS for ICTs at 765 kV Unnao sub-station:

144th & 145th OCC meeting: UPRVUNL update: “Offer to incorporate the logic of SPS at Anpara “D” is pending with BHEL. The efforts are underway to get the offer from BHEL. The work is expected to be completed by 31.03.2018. The cost of the logic of SPS at Anpara “D” is to be indemnified by UPPTCL”.

150th OCC meeting: It was informed that on continuous pursuance of matter with BHEL, negotiated offer for SPS has been received from BHEL on 16.08.2018 (ANNEXURE 12 of the MOM of the 150th OCC meeting) and the order for the same shall be placed within a week with completion target of September, 2018.

The copy of the LOI placed on BHEL is placed at Annexure 12 of the Agenda of the 151st OCC meeting.

151st OCC meeting:

UPRVUNL updated that order has been placed on M/s BHEL vide letter no 310/C&D-VI /DTPP/T-1 dated 20.08.2018. The work is to be completed in around 40days. The cost of the work would be 54.20 lac & UPPTCL has been intimated about the same.

UPRVUNL may update.

12.3 SPS for Kawai – Kalisindh - Chhabra generation complex:

146th OCC meeting: RRVPNL updated as under:

“The communication scheme is being reviewed on PLCC/Optical fiber in place of earlier GPS scheme as tripping time on GPS scheme was higher. Tender is likely to be floated by 5/2018.”

147th OCC meeting: RRVPNL representative intimated that feeder identification has been done & tendering will be done shortly. He added that further communication scheme is being reviewed on PLCC/Optical fiber in place of earlier GPS scheme as tripping time on GPS scheme was higher. Tender is likely to be floated by May-18.

148th OCC meeting: RRVPNL representative intimated that the Technical specification is under preparation & communication link are under review. Tender is likely to be floated in July 2018. MS NRPC expressed concern over inordinate delay & requested RRVPNL to take up the issue with the communication wing expeditiously or else NRPC Secretariat will take up the matter with higher management.

149th OCC meeting: RRVPNL representative intimated that the details from the communication wing stand received. & the tender will be floated positively by next month. He explained that the details of the OPGW involved have been accounted for in the details received from the communication wing.

150th OCC meeting: RRVPNL representative intimated that the Technical Committee has rejected the proposal on the basis that the reliability of the PLCC system proposed for the load shedding at the time of outage of Kawai-Kalisindh units along with Anta-Phagi line is not present. It was added by the Committee that till March 2019 the OPGW will be laid in the entire network (12000 Kms) & the same can be used for the purpose.

MS NRPC requested RRVPNL to submit the written communication from their STU in this regard.

151st OCC meeting:

RRVPNL representative submitted the written communication from their STU in this regard is enclosed at Annexure 12A of the MOM of the 151st OCC meeting. It has been intimated that the Technical specification for implementation of Automatic load shedding scheme under SPS for Kawai Kalisindh generation complex is under process of approval and the whole procedure till award of contract may be completed within 4-5 months and complete implementation of above scheme may take further at least 6-7 months.

RRVPNL is requested to update.

13. Automatic Demand Management System

13.1 147th OCC meeting: All utilities were once again requested to submit update on the action plan & status of implementation of the ADMS in their utility as it is mandatory requirement of IEGC.

Delhi, Haryana, Uttarakhand, & UP (SLDC) representative were requested to take up the matter expeditiously with their distribution companies. SE NPC stated that the problems if

any in implementing the same may also be brought to the notice of the sub –committee as it is now 10 years, since the regulations were issued by CERC.

Punjab representative intimated that at SLDC level they were doing remote tripping for 96 locations. He added that the ADMS at 11 kV feeder level is to be implemented by Distribution Company. He added that the Tender specification had finalized and it has been targeted to be complete by 2020. The information was submitted by HP. MS, NRPC requested all SLDCs to plan and get the ADMS implemented soon in their States.

13.2 148th OCC meeting: TDDPL representative stated that the ADMS system is working well in their organization as per the latest regulations since last more than 5 years. He added that the scheme is also working in Rajadhani & Yamuna Power distribution companies.

Punjab SLDC representative stated that 26 locations remote tripping from SLDC has been tested. Around 10 percent of the running load can be disconnected through these locations. The latest status regarding implementation of ADMS by PSPCL is as under:

The matter of engaging a consultant for preparation of DPR of ADMS at balance location is under consideration with the higher authorities and work of ADMS would be implemented within stipulated time.

MS, NRPC stated that the all States should review their system demand and Automatic Demand Management System should be planned and implemented at the earliest for grid security.

13.3 149th OCC meeting: MS NRPC stated that the issue is lingering since many years & it is very important for the grid security. He stated that the States should submit a detailed scheme which they want to execute. Further Rajasthan representative stated as under:

That approval of PSDF for STNAMS (Smart Transmission Network & Assets Management System) project which is consisting of Automatic Demand Management System (ADMS) functionality at the level of 33 feeders at EHV Substation of RVPN under SCADA / EMS part of project has been received. Bid documents prepared and under final approval with the CMD, RVPN. Bidding process will be initiated immediately on approval as above. Tentative timeline is as under:-

1. Issue of NIT – June, 2018
2. Finalization of Tender / Purchase order issued – August, 2018
3. Proposed timeline to complete the work – 18 months from date of issue of LOI/NOA

Further, the Automatic Demand Management System (ADMS) functionality at 11 kV feeders from 33/11 kV substation are under the jurisdiction of the Discoms and matter is being perused with discoms authorities.

NRLDC representative added that the updated list of the feeders of the state that can directly be made available to NRLDC, and should also be shared by all states as it is required in line with CERC guidelines.

PTCUL representative added that the issue is being taken up with the DISCOMs but no update has been received.

UP representative stated that they had submitted the details of the remote operation of 132kV feeders under ADMS.

MS, NRPC advised UP to have a detailed study on their complete system. He also stated that this issue will be discussed in the meeting on 30.7.18 wherein issues related to DISCOMs will be highlighted.

13.4 150th OCC meeting:

Concerned states (UP, Haryana and PTCUL) were requested to update.

MS, NRPC stated that the responsibility lies with the SLDC & STU to get the data from the DISCOMs.

13.5 151st OCC meeting:

PTCUL representative intimated that the matter stands taken up with the Operation circle of Uttrakhand Power Corporation limited.

Representative of Rajasthan stated that Tender for Smart Transmission Network & Assets Management System having ADMS part has been floated and Techno commercial bid has been opened on 30.08.2018. Evaluation of Techno commercial bid is under process.

UP & Haryana representatives were requested to also update.

UP, Haryana and PTCUL are requested to update.

14. Status of implementation of recommendations of Enquiry Committee on grid disturbances on 30 & 31.7.2012

14.1 147th OCC meeting: All utilities were requested to update the information as per the letter enclosed at Annexure 18 with the Agenda of the 146th OCC meeting. Compliance report from POSOCO & NHPC has been received.

14.2 148th OCC meeting: SE(O) stated that it is regretted to state that no information has been received from any quarters till date in spite of repeated requests/ reminders. He added that the matter is viewed very seriously by CERC and would be taken up with higher authorities of each state utility.

MS, NRPC emphasized that it is very essential to get the protection audit done & it is for the betterment of the system of the State & the region as a whole.

14.3 149th OCC meeting: BBMB, PSTCL, Rajasthan, Koteshwar (THDC), HPGCL, NPCIL, POWRGRID (NR-2) have submitted the data. (Annexure 15 of the MOM of the 149th OCC meeting.)

14.4 150th OCC meeting:

NTPC submitted the information for NCR (Annexure 15 of the MOM of the 150th OCC meeting).

14.5 151st OCC meeting:

SE (O) requested all utilities (except NTPC, BBMB, PSTCL, Rajasthan, Koteshwar (THDC), HPGCL, NPCIL, POWRGRID (NR-2)) to update the status as per the prescribed Formats.

All utilities concerned to update.

15. Planning, procurement and the deployment of Emergency Restoration System.

The updated status in the 151st OCC meeting is as under:

DTL, PSTCL & UPPTCL - 02 nos. of ERS procured.

RRVNL: - For procurement of ERS, preparation of Tender documents has been completed and it's under approval. The Tender is likely to be floated in the month Sept' 2018.

HVPNL: - BOQ finalization it's under process.

MS NRPC once again stated that the deadline for finalization should be intimated as the matter is pending since long.

PTCUL: - 147th OCC: NIT was placed but due to no response same has been extended

148th OCC: PTCUL representative stated that no such action has been taken. He has been asked to clarify the matter with the management.

149th OCC: PTCUL representative stated that in light of tower being damaged issue is being discussed again and by September further progress will be intimated.

150th OCC: PTCUL representative stated that issue is under discussion.

151st OCC: PTCUL representative stated that they have taken up the matter for providing the definite status with the Chief Engineer O&M (Dehradun & Haldwani). **He further informed that a committee has been formed to finalize DPR.**

HPSEBL: - The process of arranging funds for procurement of ERS has been initiated. HPSEBL representative intimated that they were coordinating with PTCUL. He was advised to coordinate with J&K, citing the status of PTCUL

149th OCC: The process of arranging funds is being looked into.

150th OCC: The process of arranging funds is being looked into.

151st OCC: The matter is under consideration

J&K: - Order has been placed for 2 nos. ERS. No further update.

BBMB: - BBMB representative stated that the issue will be taken up in the Power Sub –Committee meeting of BBMB.

149th OCC: BBMB representative stated that the issue will be taken up in the Power Sub –Committee meeting of BBMB

CEA representative stated that being a transmission licensee they can go ahead with the procurement of their own ERS. He also added that instructions for procurement of ERS were issued from the Ministry. ERS are very essential for the safety of the nation also in case of any attack.

SE(O) NRPC stated that guidelines have been issued vide which the Ministry of Power has directed that for 500 ckt kms minimum 2 numbers of ERS are required (Annexure 16 of the MOM of the 150th OCC meeting). All utilities were requested to review accordingly.

BBMB was stressed in view of above to review their decision as two of their beneficiaries Haryana & Rajasthan have also not procured ERS yet.

BBMB was requested to update & review in light of the details discussed in the 150th OCC meeting.

HPSEBL, Haryana & Rajasthan were requested to expedite the issue of procurement of ERS. All other utilities were again requested to review & update in view of the Annexure 16 of the MOM of the 150th OCC meeting.

All are requested to update.

16. Cleaning and Replacement of porcelain insulators

16.1 All utilities were requested to plan insulator replacement work from September 2018 onwards. All utilities were requested to submit the insulator replacement targets set for the year 2018-19 so as proper planning of outages can be done.

16.2 148th OCC meeting:

SE (O) NRPC requested all utilities to submit the plan positively by the last week of July as the outages of transmission elements for replacement of insulators will be planned with effect from the OCC for the month of August, 2018. He added that in the absence of the said action, outage will not be allowed on this account.

16.3 149th OCC meeting:

BBMB & POWERGRID (NR 1) submitted the data .MS NRPC requested all other utilities to update so that better outage planning could be done as from September onwards outages for replacement of porcelain insulators will be allowed.

16.4 150th OCC meeting:

SE (O) NRPC requested all utilities to submit the plan meticulously & submit the data. MS, NRPC added that cleaning & replacement work be planned in such a way that before the onset of fog the requisite action is taken.

16.5 151st OCC meeting:

All utilities (except DTL, BBMB, POWERGRID (NR 3& 1)) were requested to update the plan for the replacement of porcelain insulators in the format available on NRPC website by the first week of October as the meeting for review of cleaning and replacement work will be called along with next OCC meeting.

The meeting for review of cleaning and replacement work is scheduled for 15.10.2018. All utilities are requested to ensure the proper submission of data.

17. Cyber Security Preparedness Monitoring

In the **37th TCC and 40th NRPC meeting** held on 27th and 28th October, Chief Engineer IT, CEA and Chief Information Security Officer, MoP, Sh. Vijay Menghani, gave a detailed presentation on potential cyber threats for power sector, the agencies working on this aspect, recent incidents of cyber attacks on and the action points to prevent the cyber threat. It was stated that in view of increasing incidents of cyber-attacks and threat to the integrated grid operation, all utilities need to monitor action being taken in regard to the following points and report the status to respective Computer Emergency Response Teams (CERTs):

- a. Appointment of organization-wise Chief Information Security Officers and its status.
- b. Identification of organization-wise Critical Infrastructure and its status.
- c. Preparation of organization-wise Crisis Management Plan and its status.
- d. Status of Cyber Security Mock Drill activity in coordination with CERT-In.
- e. Status of Training / Workshops on Cyber Security organized / participated by power sector entities.
- f. Status of action taken on CERT-In / NCIIPC advisories.

All the utilities were again requested to furnish the above information, however, except from TATA Power – DDL the information has not been received from any of the utilities. The report as submitted by TATA Power- DDL was attached at Annexure-21 with the Agenda of the 146th OCC meeting. NHPC have also submitted the status. All the other utilities were once again requested to furnish the information in the format as submitted by TATA Power.

147th OCC meeting: NTPC updated the information. All utilities (except NTPC, NHPC & TATA Power) to kindly update the status. Some of the members enquired about the training to be imparted by NRPC/CEA on cyber security. They were asked to contact CE (IT), CEA in this regard as they are organizing training on cyber security and other related issues.

148th OCC meeting: THDCIL submitted the information in the meeting. All other utilities (except NTPC, NHPC & TATA Power) were again requested to update the status. Rajasthan representative intimated that the issue is being taken up with their IT wing and information would be submitted shortly. Tata Power representative stated that they welcome any utility to visit their station for seeing the implementation of Cyber security done at their end.

149th OCC meeting & 150th OCC meeting: The information from NAPS & PSTCL stands received. **All utilities except NTPC, NHPC, Tata Power, THDCIL, NAPS & PSTCL were requested to update.** SE(O) stated that it is a long pending issue and the information in the desired format should be submitted by all utilities. Rajasthan representative stated that they had forwarded the information to CEA.

151st OCC meeting: The information has been received from NTPC, NHPC, Tata Power, THDCIL, PTCUL, NPCIL RAPS, NAPS, PSTCL, DTL & PTCUL.

Other utilities are requested to update

18. Requirement of Data for the GIS based Energy map being developed by Energy division of NITI Aayog.

The Sub –Committee was informed that a copy of a letter from the Chief Engineer (DP&T) was placed at Annexure 22 of the Agenda of the 147th OCC meeting.

148th OCC meeting: MS, NRPC requested all DISCOMs /Power Departments to furnish the information regarding the name, voltage level, capacity, longitude & latitude of 33 kV & 66 kV Substations and lines as detailed in the letter. He informed that RPCs have been given the work of collecting the data from States and forwarding to CEA.

Except NHPC, the data has not been received from any of the utilities.

UPPTCL representative intimated that the data needs to be collected from the DISCOMs and if a communication from the NRPC secretariat is sent to the DISCOMs the matter could be expedited.

Rajasthan representative intimated that they are also taking up the issue with their distribution companies.

SE (O) stated that SLDC being the nodal agency for the state, matter should take up by them with their DISCOMs for early submission of the data. All agreed for the same.

149th OCC meeting: All utilities were again requested to submit the desired information. Rajasthan representative stated that they are taking up matter with distribution companies. MS NRPC added that the issue will also be discussed in the meeting to be held on 30.7.2018 with the DISCOMs

150th OCC Meeting: All utilities were again requested to make all out efforts and submit the desired information by taking up expeditiously with the DISCOMs.

151st OCC Meeting:

Punjab has submitted the information that has been forwarded to concerned office of CEA. All other utilities were requested to make all out efforts and submit the desired information.

All utilities except Punjab are requested to update.

19. Distribution automation and development of smart grid in NCR

Smart grid will enable optimization of energy generation, transmission, distribution and consumption. It provides an opportunity for energy companies to make power delivery more efficient, whether by minimizing the visits of personnel to transmission and distribution locations or by enabling better decisions through timely information. Automation is the key to development of smart grid. The implementation of automation may be take up in the selected towns initially which would be the first step towards implementation of smart grid in the NCR.

SE(O) stated that at present, the level of preparedness of distribution sector to adopt smart grid is in a very preliminary stage and every DISCOM has to prepare a clear road map for implementing automation and smart grid in their area of operation along with the financial requirement and sources for all funding to roll out the plan in coming years.

MS, NRPC stated that Delhi DISCOMs are proactive in this case. He requested that the concerned (Haryana, Rajasthan & UP) STUs & SLDCs to coordinate with the respective DISCOM & take active action for upgradation of automation by deploying smart grid. All states to take note and intimate the progress in this regard in each OCC.

All members (Haryana, Rajasthan & UP) are again requested to update.

20. Problem of excessive vibrations in GTs of Rihand Stage – III and Vindhyachal Stage-IV during operation of Rihand - Dadri HVDC, on monopole mode with ground return.

148th OCC meeting:

NTPC representative highlighted as under:

- Shifting of 2x500MW Rihand Stage-III units (Unit# 5&6) from NR Grid to WR Grid through Vindhyachal Pooling Station was successfully done on 28th Nov' 17 with coordination in real time between POSOCO, NTPC and POWERGRID (WRTS-II).
- With Rihand stage-III units connected to Vindhyachal Pooling Station, problem of excessive vibrations in GTs of Rihand stage III (and Vindhyachal Stage-IV also) has been observed whenever Rh- Dadri HVDC is run on single pole in ground return mode. The observations during the period 27th Nov'17 to 5th March'18 at Rihand is enclosed in the attached sheet (ANNEXURE AA of the Additional Agenda OCC 148th Meeting).
- The issue was briefly discussed in the 142nd OCC Meeting against agenda point no 18 and where it was decided that system study was required to be done to further deal with this problem. Previous experience of NTPC in this regard was also sought which was subsequently provided to NRLDC by Rihand station.
- It is apparent that DC current passes through these GTs during above situation which is detrimental for the GTs and which may lead to their failure.
- It is therefore requested that a solution may kindly be arrived to deal with the above situation at the earliest.

The issue was deliberated in light of the discussions held earlier in the 142nd OCC meeting NTPC was requested to check transducer at Vindhyachal end as there was huge mismatch in MVAr and also get assessment of earthing system at Rihand done. Further it was decided that as per decision in the 38th TCC & 41st NRPC meeting the committee will look into resolving the issue. Nominations for committee has been sought from the utilities concerned vide this office letter dated 22.6.2018. MS NRPC requested that the nominations from CTU, POSOCO, CEA and NTPC may be submitted at the earliest so that the meeting can be called at an early date

149th OCC meeting: Nomination from CTU/POWERGRID and NTPC stands submitted. CEA & POSOCO were requested to send their nomination.

MS, NRPC proposed that the meeting should be held at Rihand. It was also stated that the nominations from BHEL & UPPTCL were also awaited. Also it was proposed that an expert in the field from it may also be included in the forum. In addition, he highlighted that the nominations from Vindhyachal & Rihand HVDC may also be included.

150th OCC meeting:

CEA, POSOCO, POWERGRID, CTU, UPPTCL & CG Power and Industrial Solutions Limited were requested to send their nomination so that further necessary action can be taken.

151st OCC Meeting:

Nomination from POSOCO & CEA stands received.

It has been decided that meeting of the committee would be held at 10:00 am on 15.10.2018.

21. Discrepancies in Generation Schedules (Agenda by NTPC):

It is being observed that Generation Schedules of NTPC Gas Stations posted on NRLDC scheduling web based portal are getting changed post facto w.r.t to real time schedules at the end of the day i.e., schedules are getting changed for the lapsed time blocks. This is happening due to malfunction of NRLDC on-line scheduling software necessitating resolving of discrepancies on post facto basis. The problems have been reported to NRLDC with a copy to NRPC many a times, but the same is not getting resolved. Such post facto changes of schedules creates confusion and difficult to detect at times. Discrepancies in scheduling leads to accounting related problems which has financial impact. A typical case of such discrepancies for 01.10.18 is placed at **Annexure-21**.

In view of above, NRLDC is requested to resolve the problem in a reliable manner at the earliest

OCC is requested to discuss and deliberate

22. Non Availability of Technical Minimum Schedules on Real time for Units on-bar (Agenda by NTPC):

Gas Stations are being often run on RRAS with RLNG/LF fuel to meet demand in grid. Most often, on-bar running gas stations are not being provided with technical minimum schedules by NRLDC citing that RRAS schedules are given by NLDC. Gas stations are instructed to keep running on technical minimum levels without real time schedules available to them. These schedules then needs to be taken up separately with NRLDC for post facto revision - burdening the executives involved in scheduling verification work on day to day basis which is avoidable.

NRLDC requested to ensure that if units are to be kept on-bar, then timely schedules must be provided on real time basis.

OCC is requested to discuss and deliberate

23. Improper Approval Procedure for Transmission Elements (Agenda by NTPC):

As per the laid down procedure, Transmission Elements shut down are proposed by uploading requests at NRPC TSOP web based portal. Element s/d are provisionally approved after discussions in NRPC OCC. However, confusion is being experienced by respective stations while obtaining outage code for the proposed date despite applying for the code 2-3 days in advance. The problem is predominant if s/d required is from 1st day of the week i.e., Monday or a day after public holiday. At times, it is stated that code cannot be given as concerned executive is on leave. Many a times, it is cited by NRLDC SCE that they are not aware of the approved s/d list and we have to provide them OCC approved list. In the absence of timely issue of outage code, manpower arranged at site for the purpose sits idle which in turn has contractual obligations.

TSOP system is not person specific and outage code should be given by SCEs manning NRLDC control room or else a separate 24x7 control room at NRLDC should be established for the purpose.

OCC is requested to discuss and deliberate

24. Heavy over drawl from the grid leading to very poor frequency profile.

A letter dated 18.09.2018 issued by Power System Operation Corporation Limited in this regard is attached at **Annexure24**. It has been highlighted that the frequency remained below the mandated minimum value of operating range for 42% and 27% of time on 15.9.2018 & 16.9.2018. During this period HP state control area has been overdrawing from the grid.

In light of the details given in the letter HP is requested to update on the measures taken by them for improving the system reliability.

25. Reactive Power Control Settings adopted at terminal stations of multi-terminal HVDC BNC-Alipurduar -Agra.

A letter dated 5.10.2018 issued by Power System Operation Corporation Limited in this regard is attached at **Annexure25**. It has been highlighted that the HVDC BNC-Alipurduar –Agra is a high power corridor which impacts transfer of power between three regions. Any contingency on this link affects parallel AC lines and the voltage variation tends to be alarming. The details of the RPC settings adopted for each terminal station needs to be known for ensuring a safe operation.

POWERGRID is requested to give a presentation on the HVDC settings and the operating procedure.

26. Observance of High Shaft Vibration at DADRI Stage 2 units (#5&6) during power system faults near its vicinity.

A letter dated 5.10.2018 issued by Power System Operation Corporation Limited in this regard is attached at **Annexure26**. In the letter the issue of vibrations in the machine at the time of fault in feeders emanating from 400kV Dadri bus has been observed.

OCC to deliberate and discuss the actions, which are required to be taken for mitigation of vibrations from Grid as well as from generators perspective.

27. Report of allocation of Anticipated Energy and the generation programme for the BBMB power houses for the month of September 2018

A letter dated 21.9.2018 issued by BBMB in this regard is attached at **Annexure27**. On review of the report it has been observed that the Auxiliary Consumption is greater than 2% .As per CERC Tariff regulations the consumption can be maximum 1.2%. Efforts need to be made to reduce it.

BBMB is requested to update in this regard.

28. Estimated SEM/DCD requirement for next 2 YEARS.

A letter dated 1.10.2018 issued by Power System Operation Corporation Limited in this regard is attached at **Annexure 28**.

POWERGRID is requested to update regarding the details of utilization of number of meters and DCDs since 2015 & the details of number of defective meters and DCs in store. POWERGRID is requested to update in addition the Annexure I & II attached with the Annexure 28.

29. New Construction Scheme of Series Bus Reactor at Mandola & Ballabgarh and Series Line reactor of Dadri line at Mandola end (Agenda by POWERGRID)

With the growth of the power transmission/generation network phenomenal increase in short circuit level in NCR areas has taken place. During the 32nd and 33rd Standing Committee meetings of Power System Planning of Northern Region held on 31/8/2013 and 23/12/2013, possibility of measures to control the short circuit level was discussed. Based on studies carried out to control the short circuit level, series reactors at various locations were proposed to enable security level as per CEA guideline.

However, considering this would be a new kind of element in the grid, it was agreed that initially two series bus reactors at 400kV Mandola & Ballabgarh and series line reactors on Dadri- Mandola 400kV D/c line may be taken up and subsequently with the acquired operational experience, series reactors proposed at other locations in the 400kV ring could be considered for implementation.

For Grid safety augmentation involving control of the high short circuit levels in the Delhi/NCR areas, provision of series reactors at following locations was agreed to be implemented by POWERGRID:

Series Bus reactors

- i. 1 no. of 12Ω Series Bus Reactor at Mandola 400/220 kV (POWERGRID)
Substation along with associated bays.
- ii. 1 no. of 12Ω Series Bus Reactor at Ballabgarh 400/220 kV (POWERGRID)
Substation along with associated bays.

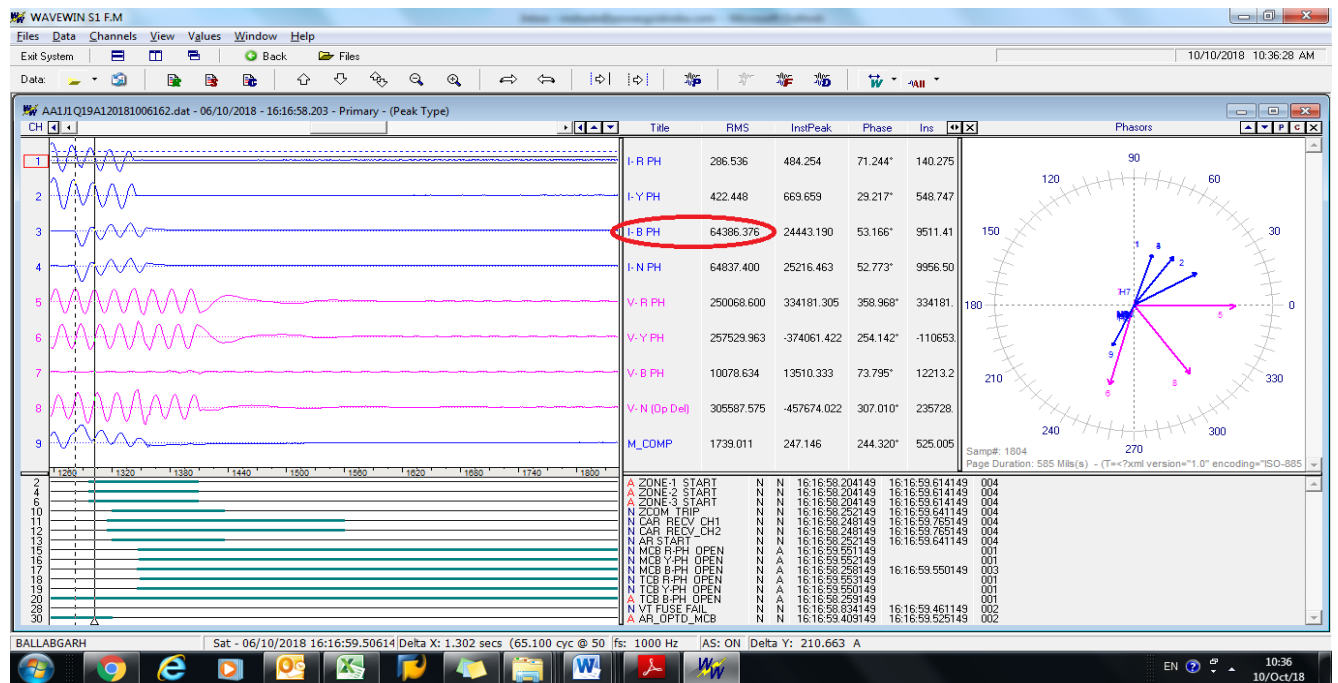
Series Line reactors:

- i. 1 no. of Series Line reactor of 12Ω in Dadri- Mandola 400kV Ckt-I at Mandola
- ii. 1 no. of Series Line reactor of 12Ω in Dadri- Mandola 400kV Ckt-II at Mandola

The above works have been agreed during the 32nd and 33rd Standing Committee meetings of Power System Planning of Northern Region held on 31/8/2013 and 23/12/2013. The scheme was also discussed and agreed in the 30th NRPC held 28/02/2014.

The NCR area has a 400kV high capacity D/c (Quad Moose) transmission ring, i.e., Dadri Generating station - Ballabgarh (via Maharaniabagh/Greater Noida/Navada) - Bamnauli - Jhatikara - Mundka - Bawana - Mandola, which is connected strongly with rest of the grid through high capacity 765kV network at Jhatikara & 400kV network at other buses.

Growth of the network & generation addition has resulted in phenomenal increased in short circuit levels beyond the rated capacity of existing equipment in various buses in NCR area which is endangering grid safety & security. In recent incident of “B” Phase LA failure of Mainpuri Ckt #2, Fault current recorded at Ballabgarh end was ~ 64.3kA which is immediately required to be addressed in the interest of grid safety & security levels.



The primary functions of a current limiting series reactor are:

- To reduce the flow of current during any short circuit so as to protect the power system apparatus and parts of the system from excessive mechanical stress/overheating/violent failures.
- To reduce the magnitude of voltage disturbances caused by short circuits/time graded/delayed fault clearance.
- To restrict impact by containing fault current and aid the fault to the source of fault location only.
- To reduce the duty imposed on switching and other associated EHV equipment during short circuits.

In view of above it is proposed that OCC members may deliberate and recommend expediting the early commissioning of the new construction series reactor schemes at Mandola & Ballabgarh for achieving augmentation of Grid safety and security level in the NCR areas.

Put up to members of OCC for kind information and approval of commissioning of above assets within the current calendar year itself.

30. New Construction Scheme of Transmission System associated with RAPP-7&8 (Part-B) (Agenda by POWERGRID)

For evacuation of power from RAPP- 5 to 8 (1840MW), RAPP-5&6 (440MW) and RAPP-7&8 (2x700MW), following composite system was evolved and was planned to be developed in a phased manner matching with generation development :

With RAPP-5&6

- (i) RAPP-Kankroli 400kV D/c
- (ii) RAPP-Kota 400kV S/c

With RAPP-7&8

- (i) RAPP-Jaipur (South) 400kV D/c (with one circuit via Kota)
- (ii) RAPP-Shujalpur 400kV D/c

RAPP-5&6 generation along with above mentioned transmission system for RAPP-5&6 have been commissioned and are in operation. NPCIL is presently implementing RAPP- 7&8 generation.

Some constraints are being faced in evacuation of power from RAPP-5&6 under certain conditions due to the changes in load generation scenario of that area. To overcome these constraints & to improve the power evacuation from RAPP generation complex, part of the composite system under RAPP-7&8 was preponed for early commissioning as:

Transmission System associated with RAPP - 7 & 8, Part A

- RAPP – Kota 400 kV D/c (bunched at both ends) – (part of RAPP – Jaipur (South) 400 kV D/c line with one ckt LILOed at Kota)
- One no of 400 kV bay at Kota

The transmission system associated with RAPP-7&8 has been commissioned and in operation.

Transmission System associated with RAPP - 7 & 8, Part B

- Kota – Jaipur (South) 400 kV D/c (part of RAPP – Jaipur (South) 400 kV D/c line with one ckt LILOed at Kota)
- 2 nos. of 400 kV line bays at Jaipur (South)
- 1 no. 400 kV line bay at Kota
- 2 nos. of 400 kV line bays at Shujalpur
- Realignment line works near Kota so as to achieve the approved system configuration which is RAPP – Jaipur 400kV D/c with one ckt LILOed at Kota.

RAPP-5&6 generating station is facing high voltage under certain conditions and one circuit of 400kV RAPP-Kankroli D/c is kept open to control the voltage. Under such condition, tripping of 400kV RAPP-Kota S/c resulted in oscillations as only one circuit of RAPP-Kankroli 400 kV line is available for evacuation of RAPP 5&6 units.

To overcome this problem, it was considered prudent that there should be two interconnections of RAPP generation with Kota. For providing second 400 kV connectivity of RAPP with Kota, it was agreed to prepone RAPP-Kota section of 400kV RAPP-Jaipur D/c (with one circuit via Kota) covered under the Transmission System associated with RAPP 7 & 8- Part A and balance works required to achieve the approved system configuration covered under present scheme i.e. Transmission System associated with RAPP 7 & 8- Part B to be matched with RAPP 7&8 generation.

It is learnt that generation by NPCIL under RAPP-7&8 is getting delayed and expected to be commissioned by 2020. Transmission line along with associated bays at Kota & Jaipur(S) end is expected to be completed within the current calendar year itself and line required to be charged for anti-theft purpose. The line length from Jaipur(S) to LILO point at Kota is ~ 180kM and charging of such long line on anti-theft for long time will leads to reactive power generation in transmission corridor where high voltage is already prevailed under present grid condition. Furthermore charging of above system will strengthen the grid connectivity and reliability of generation evacuation of RAPP-5&6 will further improve.

In view of above it is proposed that OCC members may deliberate and recommend the delinking of transmission system associated with RAPP-7&8 Part-B and commissioning of transmission system for Grid Strengthening and Security.

Put up to members of OCC for kind information and approval of commissioning of above assets within the current calendar year itself to ensure Grid Strengthening and Security.

31. Procedure when only one beneficiary is requesting for UNIT to be on BAR (Agenda by Tata Power-DDL)

One Unit of Aravali Jhajjar was brought on bar solely on request of Delhi while Haryana had refused to provide consent for the same. Tata Power-DDL even agreed to make whole MTL power of the plant. But it has been observed that Haryana has been scheduling power from this unit of Aravali Jhajjar in peak hours. MTL power was not schedule to Haryana for the whole period for which the unit was running

Tata Power-DDL plan our power management for next day considering Unit exclusively for us.

We should make a procedure that if the unit was brought on bar on request of one beneficiary only then the power should schedule to him only. If the other beneficiary is required then he can schedule the left over power through URS.

Such unplanned scheduling of other SLDC may result into undue problems in real time operations including load-shedding to a large extent considering an allocation of close to 580 MW to us

Sequence of event for 12th to 16th Sep 2018 are as follow:

On 10th Sep 2018

Tata Power-DDL requested full share of 582 MW from Aravali from 00:00 Hrs. of 11th Sep 2018

On 11th Sep 2018

Haryana started scheduling power from 2nd unit, Hence Tata power-DDL full schedule could not be reach to entitlement of 582 MW. We requested to run 3rd unit. Haryana SLDC did not give clearance for box-up of 3rd unit. Haryana SLDC has given in written through e-mail dated 11th Sep 2018 stated that “It is requested not to synchronize any additional unit of NTPC Aravali and ensure maximum 155 MW and Min. Nil power schedule to Haryana from the running two units from 00:00 Hrs of dated 12.09.2018 to 24:00 Hrs of dated 16.09.2018.”

Tata Power-DDL planned power management considering Haryana maximum schedule of 155 MW from 12th to 16th Sep 2018.

However Haryana schedule power more than 155 MW (350-450 MW) during peak time , resulting in shortage of 200 to 300 MW for Tata Power-DDL.

We request you to correct the same in implemented schedule.

DATE	Time slot	IMPLEMENTED SCHEDULE	CORRECTION REQUIRED BY NRLDC	DIFF
13-09-2018	17:30 - 17:45	466.83	654.97	188.14
15-09-2018	19:45 - 20:00	438.49	654.97	216.48

32. **TTC assessment considering temperature dependent rating of lines/terminal equipment**

In line with the decisions in the meetings of Sub-Group of NRCE for finalizing the methodology for computation of TTC/ATC/TRM, PGCIL vide letter dated 18.04.2018 has submitted the details of current rating of terminal equipment for high capacity 400kV lines owned by POWERGRID.

In response to the NPC Division letter dated 17.08.2018, seeking status report regarding compliance/implementation of ambient temperature adjusted TTC for all the transmission corridors of the country, POSOCO vide letter dated 31.08.2018 (**Annexure 32/A**) has informed that the terminal equipment rating of both ends for the lines were available only for 99 Nos. of 400 kV lines, out of 183 lines as per the data submitted by PGCIL& it had requested NPC to facilitate.. Therefore, we are again taking up with PGCIL to send the complete information. NPC vide letter dated 20.09.2018 (**Annexure-32/B**) had requested RPCs to furnish the terminal equipment ratings of the STUs' and other transmission utilities' transmission lines in respective Region

All STUs' and other transmission licensees' transmission lines are requested to compile & furnish the data as desired.

33. Replacement and Cleaning of Insulators of lines in Northern Region – Reg. (AGENDA from PSTCL)

In view of avoiding fog/pollution related trippings the use of Anti-fog Porcelain Disc insulators is in vogue in PSTCL on its 220KV Transmission lines. These are being procured for the last 8-10 years and the performance is satisfactory. However, since last 2-3 years PSTCL has started to use Long Rod Polymer Insulators (Non Ceramic Composite) in small proportions on its 220 KV Transmission Lines. On 400KV lines of PSTCL, at identified locations Long Rod Polymer Insulators have already been installed. The rest of the locations have conventional porcelain insulators.

The composite insulators are generally used for their good contamination and wetting performance, high ratios of strength to weight, easy transport and installation and cost advantages over conventional ceramic insulators. However, during the last few years some disadvantages of polymer insulator have surfaced and they are being widely reported in studies on internet. A summary of the main disadvantages of composite polymer insulators, based on such studies, is as follows:

- i. They are subjected to chemical changes on the surface due to weathering and form dry band arcing
- ii. Suffer from erosion and tracking which may lead ultimately to failure of the insulator
- iii. Life expectancy is difficult to evaluate,
- iv. Long term reliability is unknown,
- v. Faulty insulators are difficult to detect
- vi. Eating by rodents etc during storage
- vii. Notching by birds
- viii. Due to improper storage, petticoat has a tendency to shear. Polymers have also tendency to develop algae, fungus and lichens. This reduces ph value, lowers hydrophobicity and decolourisation, finally drying the bands leading to breakage of the insulators.
- ix. Aging, which leads to loss of hydrophobicity, tracking and erosion, and eventually to flashover is still one of the main problems with polymeric insulators.

Further, there have been no laboratory tests known to judge their performance in service or life expectancy though they are in use for the last 7-8 years. Suitability of composite insulator design and materials can be proven by long-term service experience only. Although the

polymer Insulators are Puncture proof yet these are prone to flash over due to ingress of moisture between outer silicone and inner FRP rod. Many Indian manufacturers now make Polymer Long Rod Insulators but the quality varies a lot. As per feedback from CPRI, failure of poor quality polymer insulator can happen within 5 years (Annexure-I). On the other hand Porcelain insulators have an established long life of 40-50 years and the performance of Anti-fog Insulators having high creepage in Pollution affected areas is quite satisfactory in Indian conditions.

Although the cost of Porcelain Insulators is higher than that of Polymer Insulators yet due to their established life of 40-50 years in comparison to life expectancy of 10-15 years in case of Polymer Insulators, the usage of Porcelain Insulators is considered much more beneficial.

Although NRPC has suggested for replacement of conventional insulators with polymer insulators & to build new lines with polymer insulators yet in light of the above mentioned analysis and report/analysis of shortcoming of Polymer Insulator as available on internet, it is felt that the recommendations of the expert committee of CEA constituted vide office order dated 27.1.2007, are still relevant and need to be followed to ensure fault free grid operations. Accordingly, PSTCL has decided to go in for use of Porcelain Long Rod Insulators instead of Polymer Long Rod Insulator, as they have an established life of 40-50 years against no certainty of life expectancy in case of Polymer Insulator.

As per recommendations of the Expert Committee of CEA, in areas exposed to heavy fog and medium pollution level antifog disc insulators of creepage distance of 440 mm or higher (corresponding to creepage distance of 22 mm /kV for 400 kV lines of the 23 disc) or Porcelain long rod insulators offering equal creepage distance may be employed with insulator profiles as per IEC 60815.

The area in the state of Punjab generally falls under heavy fog and medium pollution Category. Accordingly in line with the recommendations of the Expert Committee of CEA , PSTCL has decided to use 120 KN (For Suspension) and 160 KN (For Tension) Porcelain Long Rod Insulators with 23-25mm/kV creepage distance for replacement on PSTCL's existing 400 KV Transmission Lines, which are ideally suited to our conditions. To start with replacement of conventional insulators with Porcelain Long Rod Insulators is planned on the following lines and the NIT for the same is in final stage with work expected to be completed before next paddy:

- i) 400 kV Talwandi Sabo – Mukatsar D/C.

ii) 400 kV Talwandi Sabo – Nakodar D/C.

iii) LILO of Talwandi Sabo – Nakodar at 400 kV S/Stn Moga.

Rest of the replacement work will be carried out gradually in a phased manner.

OCC is requested to consider and ratify the use of Porcelain Long Rod Insulator instead of Polymer Long Rod Insulator as brought out above.

NRLDC AGENDA

1. Deviation by NR entities

NRLDC/NRPC has been advocating continuously to state utilities for portfolio management in advance so that deviations remain within permissible limits in real time. It has been discussed in number of previous meeting that load forecast should be carried out accurately and subsequently states shall plan their load generation balance. Deviation of NR utilities is being shown in every OCC meeting to sensitize the issues on regular basis still it has been observed that NR utilities are over/under drawing from the Grid on various instances. Deviation Graph for Sep-Oct'18 (10 Sep-10 Oct'18) is enclosed in **Annexure-I**.

Major observations are:

1. Himachal Pradesh and Haryana were seen to be highly overdrawing most of the time. Even though major simultaneous silt based outages were not reported this year, HP had over drawl for most of the time which needs to be restricted.
2. Uttar Pradesh and Rajasthan had over drawl for considerate (major) portion of the time.

This trend was also observed in Aug-Sep'18 when same was presented in 151st OCC meeting. However, actions are still to be taken. **States are requested to provide reasons for these deviations and actions being taken by them to avoid such deviations in future.**

2. Tap optimisation exercise in Northern region

NRLDC had requested utilities to provide present tap positions of ICTs for taking it into account while performing tap-change studies before winter season. Present tap positions were provided by NR-2, NR-3, and PSTCL which were taken into consideration. Moreover, for identifying nodes for tap change, the scatter plots of nodes for the month of September 2018 were also taken into account. NRLDC has performed tap change studies and study report is attached as **Annexure-II**. **Members are requested to discuss/ approve the tap change exercise at these nodes so that it could be completed before this winter season.**

3. Reliability issues in the grid

NRLDC would be assessing ATC/TTC limits for winter season for states in coming weeks. For better results from simulation studies, utilities are requested to provide details of new elements commissioned at 220kV & below voltage level. It is also requested that All India PSSe base case may checked for any shortcomings. Further, states are also requested to assess ATC/TTC limits at their end as well.

Reliability issues witnessed in past months are mentioned below:

Rajasthan: N-1 non-compliance issue at Akal ICTs has been addressed in various OCC/TCC meetings and also through various NRLDC communications vide letters & emails to concerned utilities. These issues were also flagged in 150th & 151st OCC meetings. At present, only one ICT-3 of 315 MVA is available out of 1445 MVA to evacuate the pooled wind power at Akal. In 151st OCC meeting, RVPN representative stated that although they have done some rearrangement of networks in that area, curtailment had to be done due to system constraints. As decided in last OCC meeting, Rajasthan is again requested to present a detailed report on the fire incidents, rearrangement of network carried out and renewable curtailment done during this time. It is observed that loading on 400kV Anta-Kota line which was commissioned on 7th July 2018 is crossing 800 MW very frequently (Plot for last 30 days is attached at **Annexure-III**). This is a single circuit short line with twin moose conductor which provides a shorter impedance path to cater the large part of the load of Rajasthan. Simulation studies suggest that the sensitivity on 765 kV Anta-Phagi lines with respect to 400 kV Anta-Kota power comes out to be around 67%. The loading on 400 kV Anta-Kota line is very high and in case of tripping of single/ both 765 kV Anta-Phagi lines, this line will not be able to survive. It is hereby requested that some load shifting arrangement may be sought at Rajasthan SLDC end to control the loading of this line to ensure the reliable operation in this corridor. Apart from this, planning studies done by STU for this element may also be shared with NRLDC. Also, actions need to be taken to ensure N-1 compliance at Jodhpur.

Delhi: LILO of 400kV Ballabgarh-Bamnoli D/C and 220kV Badarpur-Mehrauli D/C has been completed at 400/220kV Tughlaqabad S/s on 10.10.2018. The loading of 400/220kV Bamnoli ICTs and 220kV Ballabgarh-Badarpur has reduced considerably since commissioning of Tughlaqabad S/s.

UP: N-1 non-compliance has been observed at 400/220kV ICTs of Azamgarh. Evacuation constraints of Anpara-D, Lalitpur TPS, Paricha TPS and Bara TPS under N-1/N-1-1 compliance are still persisting. High generation at Anpara results in high line loadings in the complex (no generation at that time in Lalitpur). UPPTCL is requested to have some generation at Lalitpur also to reduce line loading in Rihand-Singrauli-Anpara complex.

Punjab: N-1 non-compliance at Rajpura and Dhuri ICTS were observed in the month of September.

4. Deviation by generators

In 151st OCC meeting, following issues were highlighted related to deviation by generators. These deviations are still persisting and need actions. Plots for deviations observed in last 30 days are attached as **Annexure-IV**:

Over injection at Rihand III: It was observed that Rihand-III has been over injecting most of the time. Even when Rihand-III was given schedule near its technical minimum, Rihand-

III continued to over inject into the grid by large quantum. NTPC is requested to provide reason for the same.

MW data at Singrauli showing under/ over injection: The injection figure of Singrauli (MW) available in SCADA was lower than the actual generation at Singrauli. It was reported that MW data for one of the units is showing lower value. Then, MW data for this unit was calculated using data of outgoing lines from Singrauli. Now, injection figure available is considerably higher and deviation is still persisting. NTPC is requested to kindly look into the matter.

MW data at Chamera-I: In 150th OCC meeting, NHPC representative had stated that on the basis of meter data it was clear that Chamera-I was not over generating (as appearing from SCADA data). In 151st OCC, NHPC representative stated that there was problem in RTU at Chamera-I. It was also informed that a communication has been sent to POWERGRID by Chamera-I to attend the issue of RTU who are taking up the issue with M/s Synergy. On the basis of data available to NRLDC control room it appears that the problem is yet to be attended. **NHPC may provide update on the same.**

5. Multiple element tripping events in Northern region in the month of Sep'18:

A total of **29** grid events occurred in the month of Sep-2018 of which **15** are of GD-1 category. The preliminary report of all the events have been issued from NRLDC. A list of all these events along with the status of details received by 05-Oct-18 is attached at **Annexure-V**.

Further, despite persistent discussions/follow-up in various OCC/PCC meetings, the compliance of the regulations is still much below to the desired level. In **6** out of 29 events, no detail has been received at all.

Maximum Fault Duration is **2520ms** in the event of multiple element tripping at Rosa substation on 17th Sep 2018 at 11:30hrs.

Delayed clearance of fault (more than 100ms for 400kV and 160ms for 220kV system) observed in total **9** events out of 29 events in the month.

Members may take expeditious actions to avoid such tripping in future and discuss the same. Moreover, utilities may impress upon all concerned for providing the Preliminary Report, DR/EL & Detailed Report of the events in line with the regulations.

Members may like to discuss.

6. Details of tripping of Inter-Regional lines from Northern Region for Sep'18:

A total of 26 inter-regional lines tripping within a month occurred in the month of Sep'18. The list is attached at **Annexure-VI**. The status of receipt of preliminary reports, DR/EL within 24hrs of the event and fault clearing time as per PMU data has also been mentioned in the table. The non-receipt of DR/EL & preliminary report within 24hrs of the event is in violation of various regulations. As per regulations, all the utilities shall furnish the DR/EL, flag details & preliminary report to RLDC/RLDC/RLDC within 24hrs of the event. They shall also

furnish the detailed investigation report within 7 days of the event if fault clearance time is higher than mandated by CEA (Grid Standard) Regulations.

It could be observed from attached table that not all information regarding the tripping is received from the utilities.

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

7. Mock black start exercise in NR:

As per Indian Electricity Grid Code (IEGC) clause 5.8(b) “Mock trial runs of the procedure for different sub-systems shall be carried out by the Users/ CTU/ STU at least once every six months under intimation to the RLDC”.

Mock Black-start exercise of power stations are therefore needs to be carried out in-order to ensure healthiness of black start facility. The winter months are off peak hydro period and therefore good time to carry out such exercises.

Therefore, the schedule of mock exercise dates for different hydro & Gas power station is proposed. The power stations may confirm and inform to all the concerned persons of control centre/ substations to facilitate the exercise.

The summary/schedule of mock black start exercise of ISGS hydro stations carried out in previous season is tabulated below:

S. No.	Proposed Date	Revised Date	Generating station	Remarks
1	24-Oct-17		Koldam	Carried out successfully.
2	31-Oct-17	28-Mar-18	Nathpa Jhakri & Rampur	Partially successful. Blackstart could not be extended due to repeated tripping of 400kV Nalagarh-Rampur line on over voltage while charging.
3	3-Nov-17	08-Mar-18	Dhauliganga	Carried out successfully. However, plant was not able to synchronize the island with grid. The same was carried out at Bareilly.
4	7-Nov-17		Salal	Deferred due to pending consent from SLDC-J&K.
5	10-Nov-17	3-Nov-17	Sewa-2	Carried out successfully.
6	14-Nov-17		Budhil	
7	17-Nov-17		Malana-2	Deferred by Plant
8	21-Nov-17		Parbati-3	Carried out successfully. Island

				collapsed while carving out.
9	24-Nov-17	04-Dec-17	Chamera-3	Carried out successfully.
10	30-Nov-17		Uri-I, II HEP, Lower Jhelum HEP, Pampore GT's & Upper Sindh	Deferred due to pending consent from SLDC-J&K.
11	5-Dec-17	1-Dec-17	Chamera-2	Carried out successfully. Island collapsed during stage-1.
12	8-Dec-17	1-Dec-17	Chamera-1	
13	20-Dec-17		Bairasiul	Carried out successfully. Unit tripped after island synchronization with grid.
14	4-Jan-18		Koteshwar	Carried out successfully.
15	9-Jan-18	07-Mar-18	AD Hydro	Carried out successfully. However, plant was not able to synchronize the island with grid. The same was carried out at Nalagarh.
16	16-Jan-18		Karcham Wangtoo	Carried out successfully.
17	23-Jan-18		Tehri	Partially successful. Initial Island collapsed due to tripping of 400kV Koteshwar-Meerut ckt.

Out of 17 planned exercises 13 were carried out. The exercises which could not be done are highlighted in the above table. Out of 13 exercises carried out, there was change in scheduled date in 7 of them. Thus, in more than half of the exercises carried out the schedule was maintained due to reasons like load not being available, plant personnel not ready, coordination problem. **In 144th OCC meeting, constituents were requested to adhere to the finalised schedule of mock exercises during the season.**

The proposed schedule for the Mock Black start exercise is as follows:

Hydro Power Stations:

Date	Name of stations
18-Oct-18	*Kishanganga (new plant)
24-Oct-18	*Malana-2
26-Oct-18	Dhauliganga (Proposed by NHPC: 15-Jan-2019)
02-Nov-18	*Salal

13-Nov-18	Nathpa Jhakri & Rampur
16-Nov-18	*Uri-I, II HEP, Lower Jhelum HEP, Pampore GT's & Upper Sindh
19-Nov-18	*Budhil
28-Nov-18	Chamera-3
30-Nov-18	Sewa-2
03-Dec-18	Chamera-1 & Chamera-2
11-Dec-18	Parbati-3
Not to be done	Bairasiul (Plant shall be under complete shutdown since 01.10.2018 for R&M of power plant)
19-Dec-18	Koteshwar
28-Dec-18	AD Hydro
04-Jan-19	Tehri
08-Jan-19	Karcham Wangtoo
11-Jan-19	Koldam

** Mock black-Start exercise not carried out during Year 2017-18.*

NHPC has submitted some modification in the dates, confirmation from other utility is still awaited.

Mock black-Start procedure circulated during last exercise/ previous year may be used. The unit selection may be changed from the one taken during last year exercise.

Gas Power Stations:

Date	Name of stations
09-Oct-18	*Auraiya GPS
12-Oct-18	Dadri GPS
30-Oct-18	*Anta GPS

** Mock black-Start exercise not carried out during Year 2017-18, procedure to be developed..*

As informed by Bawana GPS, it does not have black start capability.

SLDC's may also carryout mock black-start of station in their respective control area & inform the tentative dates to the OCC as well as outcome of these exercises. The proposed Hydro Power Stations to undergo the exercise are as follows:

S. NO.	Utility	Hydro Power Station	Installed Capacity(MW)
1	J&K	Baglihar	3x150
2		Baglihar stage-2	3x150
3		Lower Jhelum	3x35
4		Upper Sindh	2x11+3x35
5	HP	Sainj	2x50
6		Larji	3x42
7		Bhabha	3x40
8		Malana -I	2x43
9		Baspa	3x100
10	Punjab	Anandpur Sahib	4x33.5
11		Ranjit Sagar	4x150
12	Rajasthan	Mahi-I&II	2x25+2x45
13		Rana Pratap Sagar	4x43
14		Jawahar Sagar	3x33
15		Gandhi Sagar	5x23
16		Dholpur GPS	3x110
17		Ramgarh GPS	1x35.5+2x37.5+1x110
18	UP	Rihand	6x50
19		Obra	3x33
20		Vishnuprayag	4x100
21		Srinagar (Alaknanda)	4x82.5
22	Uttarakhand	Gamma Infra	2x76+1x73
23		Shravanti	6x75
24		Ramganga	3x66
25		Chibro	4x60
26		Khodri	4x30
27		Chilla	4x36
28		Maneri Bhali-I&II	3x30+4x76
29	Delhi	IP Extn GTs	6x30+3x30
30		Pragati GPS	2x104.6+1x121.2
31		Rithala	3x36
32	Haryana	Faridabad GPS	2x137.75+1x156.07

During last winter, SLDCs had been requested to carry out mock drills and share their experiences. However, the information was received from HP (Sainj, Baspa) and Rajasthan (only schedule of exercises) only. The information may please be shared by SLDCs and program for this year's mock black start exercises shall also be shared.

SLDCs shall submit the reports of black start exercise in their respective control area. SLDCs may also identify further generating stations/unit for black start exercise.

Members may please discuss.

- 8. High Shaft Vibration observed in Dadri stage-II during electrical fault in nearby area:**
On 28-Jun-18, LLG fault occurred in 400 kV Dadri-G. Noida line and it resulted into high vibration in unit-5 & 6 of Dadri stage-II. During the incident Dadri unit-5 & 6 of 490MW was also tripped due to tripping setting in the units on vibration level above the certain value.

After the incident, many times during fault in nearby area of Dadri station, high vibration sensed at Dadri stage-II units. NTPC has given details of vibrations observed in Dadri stage-2 units since 01st Jun 2018 to 23rd September 2018. This issue was also discussed in 150th OCC meeting and meeting held on 09th Aug 2018 in between NTPC and POSOCO member.

FSC of 400kV Ballabgarh-Kanpur ckt-2 & 3 (ckt-1 FSC already out) was also by-passed on 09-Aug-18 on test basis based on the inputs from NTPC and likelihood of Ferro-resonance phenomena.

NTPC shared the Disturbance Record (DR) csv file of Dadri unit-5 &. PMU has not captured any oscillations and further the prony analysis of the raw data of Disturbance Record (DR) of unit #5 and # 6 received from NTPC, also does not show any dominant frequency component in electrical signals.

In this regard, NRLDC already wrote a letter to CTU and CEA (SP&PA wing) seeking for remedial measures. NRLDC Letter is attached as **Annexure-VII**

After shifting of Rihand-III from NR to WR, NTPC also raised the issue of high GT vibration in Rihand-III during monopolar operation of HVDC Rihand-Dadri. Main cause of GT vibration is high magnitude of earth current inward from GT neutral.

NRLDC suggested NTPC to kindly also look into the matter of earth fault current inward from GT neutral during fault in nearby area of Dadri. It may be the reason of shaft vibration during fault in the system.

Member may like to discuss.

- 9. Coordination and document furnishing responsibilities for new element charging and for LILO work of existing line in following cases.**

1. Having single ownership of the line and connecting substations but commissioning is carried out by different transmission licensees/Agency.
2. Having different owner ship of line and substation's and commissioning is carried out by one of the existing owner or different transmission licensees/agency
3. In case of LILO of a line, commissioning transmission licensees is different from the original owners of the line or substation.

In recent past, numbers of new ISTS elements were integrated into the grid in different category as mentioned above in serial no. 1, 2 and 3.

NRLDC has faced some problems during integration of such new elements as follows-

- I. Shutdown co-ordination.
- II. Documents furnishing
- III. Certification of clearances such as telemetry, Protection settings, metering and statutory clearances etc. before charging of new element with proper time frame.

Member may like to discuss

10. Minimize gap between supply and demand:

As maximum market prices shoot up to Rs. 18 during peak and average price remained around Rs. 5 to 8 during all India high demand period. Sensitization of NR constituents to evaluate such scenario to keep machines on bar in order to minimize gap between supply and demand.

Member may like to discuss

11. Reserve Shutdown of IGSTPP Jhajjar having Delhi and Haryana as major beneficiaries (46.2% share each):-

NRLDC faces problem while taking the machines of IGSTPP Jhajjar under reserve shutdown either by Delhi or by Haryana. Issues faced during scheduling are list as under:

1. The beneficiary consented for keeping the machines On Bar ensures technical minimum schedule during peak hours or other hours of its choice but reduce its share during off peak hours resulting scheduling to other party consented for keeping the machines under RSD.
2. The beneficiary consented for keeping the machines under RSD schedules the power from On Bar machines as per its entitlements during requirement resulting reduced share of the beneficiary consented for keeping the machine on Bar.
3. Machines under RSD kept on Bar under RRAS and beneficiaries consented for RSD scheduling their entitlements during requirement.

Similar case also happens for Dadri-T-I and Dadri-T-II where Delhi is major beneficiary.

Way Forward:

Detailed Operating Procedure for Backing down of Coal/Lignite/Gas unit(s) of the Central Generating Stations, Inter-State Generating Stations and other Generating Stations and for taking such units under Reserve Shut Down on scheduling below Technical Minimum Schedule.

Machines may be taken under Reserve shut down as per the detailed operating procedure except under the following conditions mentioned in the same procedure.

RLDC shall suo-moto revise the schedule of any generating station as per clauses 6.5.14 and 6.5.20 of the Grid Code to operate at or above technical minimum in the ratio of under-requisitioned quantum (with respect to technical minimum) in the interest of smooth system operation under the following conditions:

- i. Extreme variation in Weather Conditions
- ii. High Load Forecast
- iii. To maintain reserves on regional or all India basis i
- v. Network Congestion
- v. Any other event which in the opinion of RLDC/NLDC shall affect the grid security.

Member may like to discuss

Annexure 4

	MU	MW
	Nov-18	Nov-18
Availability	115	330
Requirement	100	195
Surplus/Shortfall (MU)	15	135
Surplus/Shortfall (%)	15.0%	69.2%
Availability	3250	5210
Requirement	1960	3800
Surplus/Shortfall (MU)	1290	1410
Surplus/Shortfall (%)	65.8%	37.1%
Availability	5170	8020
Requirement	3560	7346
Surplus/Shortfall (MU)	1610	674
Surplus/Shortfall (%)	45.2%	9.2%
Availability	1010	2210
Requirement	870	1600
Surplus/Shortfall (MU)	140	610
Surplus/Shortfall (%)	16.1%	38.1%
Availability	750	1950
Requirement	1560	2590
Surplus/Shortfall (MU)	-810	-640
Surplus/Shortfall (%)	-51.9%	-24.7%
Availability	4648	7547
Requirement	3310	6410
Surplus/Shortfall (MU)	1338	1137
Surplus/Shortfall (%)	40.4%	17.7%
Availability	7722	11298
Requirement	6711	11749
Surplus/Shortfall (MU)	1011	-451
Surplus/Shortfall (%)	15.1%	-3.8%
Availability	9786	16700
Requirement	9900	19000
Surplus/Shortfall (MU)	-114	-2300
Surplus/Shortfall (%)	-1.2%	-12.1%

(%)		
Availability	990	1880
Requirement	1140	1960
Surplus/Shortfall (MU)	-150	-80
Surplus/Shortfall (%)	-13.2%	-4.1%
Availability	33440	53265
Requirement	29111	49700
Surplus/Shortfall (MU)	4329	3565
Surplus/Shortfall (%)	14.9%	7.2%

SNO	Description of Agenda point	Details	STATUS TO BE UPDATED
1	Monitoring of schemes funded from PSDF (Agenda by NPC)	The latest status of the schemes for which grant has been sanctioned from PSDF for the schemes in Northern Region. Utilities are requested to expedite implementation of the schemes and submit information of physical as well as financial progress in the prescribed format by first week of every month on regular basis to Member Convener, PSDF Project Monitoring Group (AGM, NLDC and POSOCO) with a copy to NPC Division The updated status was received from Punjab, Rajasthan, Delhi & UP in the last OCC meeting.	The updated status available was attached as Annexure 9/1 of the Agenda.
2	Sub-stations likely to be commissioned in next 6 months.	All the concerned states were requested to submit the details of the downstream network associated SPECIFICALLY with THESE POWERGRID substations along with the action plan of their proposed/approved networks.	The details of the substations of Power Grid and their required downstream network as updated in the meeting is enclosed as Annexure 9/2. All concerned to update.
3	Progress of installing new capacitors and repair of defective capacitors	The available up to date status of installation of new capacitors and revival of defective capacitor by the State constituents is enclosed as ANNEXURE 10/3 OF THE AGENDA OF THE 146TH OCC MEETING. 151st OCC meeting: UP & RAJASTHAN submitted the data as per prescribed format (Annexure9/3) All other utilities were requested to update regularly.	All utilities to update.
4.	Healthiness of defence mechanism: Self- certification	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” . Reports ending march 2018 stands received from all states.	All utilities are requested to submit the reports of UFR testing of period ending September 2018.

		<p>151st OCC meeting: All utilities are requested to submit reports of testing in every quarter in soft copy. All the states were requested that the reports for period ending September 2018 by all the states should be submitted positively by First week of October.</p>	
5	<p>Strengthening of Intra-State transmission system</p>	<p>Also all SLDCs are requested to give half yearly feedback ending 6/2018 in the month of 7/2018 to STU regarding bottlenecks, constraints and overloading in the State transmission network for proper transmission planning</p> <p>151st OCC meeting: PTCUL & Rajasthan have submitted the data regarding the constraints / bottlenecks observed in the system to their STU. Punjab has submitted the data</p> <p>All states were again requested by SE(O) to update regularly as this information is very crucial for better planning of the grid.</p>	<p>PTCUL & Rajasthan have submitted the data regarding the constraints / bottlenecks observed in the system to their STU. Punjab has submitted the data including the action taken by PLANNING wing on the constraints / bottlenecks observed.</p> <p>PTCUL & Rajasthan to submit the action taken by Planning wing on the constraints intimated. HVPNL & UPPTCL to submit the information.</p>
6	<p>Mapping of Feeders in SCADA</p>	<p>In the 141st OCC meeting members were informed about the “Compendium of SPS in NR” (<i>Annexure-9 of the MOM</i>) which was released in the 40th NRPC meeting. All the utilities were requested to go through the compendium and identify feeders concerning their state and map the same in SCADA. 150th OCC meeting: PSTCL submitted information all other were requested to update.</p> <p>NRPC stated that as per the Compendium of SPS in NR” which was released in the 40th NRPC meeting. All the utilities are requested to go through the compendium and identify feeders concerning their state and map the same in SCADA. This document is available on NRLDC & NRPC website. NRLDC representative added that it is very important that the feeders should be mapped in SCADA. It was stated that this issue will be discussed in the Test committee meeting also.</p>	<p>All states except Punjab are requested to update.</p>

POWER SYSTEM DEVELOPMENT FUND(PSDF)

Status of Schemes Submitted by the Entities for funding from PSDF

Annexure-9/1

Status as on 30-09-2018														
Schemes approved under PSDF											All figures in Rs Crore			
SLNo	Name of State/Entity	Region	Name of Entity	Name of Scheme and Unique ID No	Project Cost accepted by Appraisal Committee.	Category of Funding	Quantum of Funding Recommended by Appraisal Committee	Grant Approved by Monitoring Committee	Date of Issuance of sanction order by MoP	Date of Signing of Agreement	Completion schedule (in Month)	Date of release of first Installment	Proposed Completion date as per sanction order	Amount Disbursed as on 31-07-2018
I	II		III	IV	IX	X	XI	XIII	XV	XVI				
1	Rajasthan	NR	RRVNL	Renovation and Upgradation of protection system of substations (003)	159.53	5.1 (c)	90.00	143.58	31-Dec-14	6-Feb-15	24	31-Mar-16	31-Mar-18	14.85
2	Rajasthan	NR	RRVNL	Installation of Bus Reactors (005)	23.87	5.1(b)	90.00	21.48	31-Dec-14	6-Feb-15	18	22-Mar-16	22-Sep-17	19.33
3	Uttar Pradesh	NR	UPPTCL	Installation of Capacitors and FSC. (025)	39.29	5.1(b)	90.00	35.36	11-May-15	26-Nov-15	18	8-Mar-16	8-Sep-17	29.77
4	Uttar Pradesh	NR	UPPTCL	Renovation and Upgradation of protection system of substations. (026)	202.94	5.1 (c)	90.00	182.65	11-May-15	26-Nov-15	18	31-Mar-16	30-Sep-17	89.47
5	NRPC	Central	NRPC	Study Program on the integration of renewable energy resources (054)	6.45	5.1 (e)	100.00	6.45	28-Oct-15	24-Nov-15	3	29-Dec-15	29-Mar-16	4.49
6	Jammu & Kashmir	NR	PDD-J&K	Renovation and Upgradation of protection system of substations in Jammu(023)	140.04	5.1(c)	100.00	140.04	28-Oct-15	5-Apr-16	18	14-Jul-17	14-Jan-19	26.40
7	Himachal Pradesh	NR	HPSEBL	Renovation and Upgradation of Protection System (049)	55.44	5.1(C)	100.00	55.44	5-Jan-16	8-Jun-16	18	31-May-17	30-Nov-18	34.44
8	Jammu & Kashmir	NR	PDD-J&K	Renovation and Upgradation of protection system of substations in Kashmir(024)	146.12	5.1 (c)	100.00	146.12	17-Mar-16	22-Apr-16	18		16-Sep-17	26.40
9	Delhi	NR	DTL	Renovation and Upgradation of Protection System.(049)	125.98	5.1(c)	90.00	113.38	17-Mar-16	4-May-16	27	25-Nov-16	25-Feb-19	20.75
10	Uttarakhand	NR	PTCUL	Renovation and Upgradation of Protection System.(051)	125.05	5.1(c)	100.00	125.05	17-Mar-16	8-Jun-16	18	8-Nov-16	16-Sep-17	101.75
11	Punjab	NR	PSTCL	Bus bar protection (052)	18.21	5.1(c)	90.00	16.39	17-Mar-16	29-Dec-16	18		16-Sep-17	
12	Uttar Pradesh	NR	UPPTCL	Reconductoring of existing line by HTLS conductor for relieving congestion. (027)	80	5.1(d)	75.00	60.00	17-Mar-16	Scheme withdrawn	18	20-Sep-17	16-Sep-17	
13	Haryana	NR	DHVBVN	Renovation and modernisation of distribution system of DHVBVN, Haryana(077)	364.27	5.1(d)	75.00	273.20	2-Jan-17	24-Nov-17	18		18-Feb-18	28.35
14	Punjab	NR	PSTCL	Provision of second DC Source at 220KV & 132KV Grid Sub Station of PSTCL. (70)	15.3	5.1 (c)	90.00	13.77	2-Jan-17	23-Mar-17	18		1-Jul-18	3.01
15	POWERGRID	Central	POWERGRID	Funding of BNC Agra HVDC (94)	5778	4(3)(A)	50.00	2889.00	10-Mar-17	23-May-17	54		9-Sep-21	
16	Uttar Pradesh	NR	UPPTCL	Replacement of existing ACSR conductor by HTLS conductor for relieving cogestion. (89)	63.31	5.1(d)	75.00	47.48	16-May-17	27-Jul-17	18		15-Nov-18	4.74
17	Rajasthan	NR	RRVNL	" Smart Transmission Operation Management System (STOMS) " in Rajasthan Power System. (110)	13.18	5.1(c)	90.00	11.86	19-May-17	10-Oct-17	12		18-May-18	1.186
18	Rajasthan	NR	RRVNL	Communication Backbone "Smart Transmission Network & Asset Management System " Part-B (136)	569.77	5.1(c)	50.00	284.89	22-May-17	10-Oct-17	18		21-Nov-18	56.969
19	BBMB	Central	BBMB(038)	Renovation and Upgradation of protection system of substations. (038)	25.86	5.1 (c)	90.00	23.27	15-Nov-17	19-Feb-18	22			2.33
20	Rajasthan	NR	RRVNL	Real Time Data Acquisition System for Monitoring & Control of Transmission Grid under STNAMS (PART A-1) (153)	185.19	5.1(c)	50.00	92.60	15-Nov-17	23-Feb-18	24			
21	Uttarakhand	NR	PTCUL	Implementation of OPGW based reliable communication at 132 kv and above substations. (129)	37.46	5.1(c)	50.00	18.73	15-Nov-17		36			
22	Punjab	NR	PSTCL	Reliable Communication and data Acquisition System upto 132kV Substation in Punjab. (138)	66.1	5.1(c)	50	33.05	27-Jul-18		36			

Status as on 30-09-2018														
Schemes approved under PSDF					All figures in Rs Crore									
SL No	Name of State/Entity	Region	Name of Entity	Name of Scheme and Unique ID No	Project Cost accepted by Appraisal Committee.	Category of Funding	Quantum of Funding Recommended by Appraisal Committee	Grant Approved by Monitoring Committee	Date of Issuance of sanction order by MoP	Date of Signing of Agreement	Completion schedule (in Month)	Date of release of first Installment	Proposed Completion date as per sanction order	Amount Disbursed as on 31-07-2018
I	II		III	IV	IX	X	XI	XIII	XV	XVI				
23	Himachal Pradesh	NR	HPSEBL	Strengthening of Transmission System incidentals to Inter-State-Transmission System in the State of HP (134)	24.38	5.1(d)	100	24.38	27-Jul-18		18			
24	Himachal Pradesh	NR	HPSEBL	Reliable Communication and data Acquisition System upto 132kV Substation in Himachal Pradesh (135)	18.64	5.1(c)	50	9.32	27-Jul-18		18			
25	NRPC	Central	NRPC	Creation and Maintenance of Web based Protection Database Management and PC based Protection Setting Calculation Tool for Northern Region Power System Network. (203)	28.00	5.1(e)	100	28.00	27-Jul-18		18			
				Total	8,312.38			4,795.49						464.24

ANNEXURE 9/2

S. No.	Substation	Downstream network requirement	Schedule	Planned system and Implementation Status
1	400/220 kV, 3x315 MVA Samba	2 nos. bays utilized under ISTS. Balance 4 Nos to be utilized	Commissioned	LILO of 220kV Bishnha – Hiranagar D/c line : under tendering (PMDP) (status as available with CEA) Status as updated by J&KPDD in 38 th TCC/ 41 st NRPC: LoA has been issued and Material has reached the site. Anticipated – Nov'19 Targeted Completion is required to be updated by J&KPDD
2	400/220kV, 2x315 MVA New Wanpoh	6 Nos. of 220 kV bays to be utilized	Commissioned	220kV New Wanpoh –Mirbazar D/c line: under tendering (PMDP) 220 kV Alusteng- New Wanpoh line Anticipated – Nov'19 Targeted Completion is required to be updated by J&KPDD
3	400/220kV, 2x315 MVA Parbati Pooling Station	2 Nos. of 220 kV bays to be utilized.	Commissioned	220kV Charor- Banala D/c line (18km) : under construction Target completion -December 2018 as intimated by HPPTCL
4	400/220kV, 2x500 MVA Kurukshetra (GIS)	8 nos. of 220 kV bays to be utilized	Commissioned	LILO of one circuit of Kaul-Pehowa 220kV D/c line LILO of one circuit of Kaul-Bastara 220kV D/c line Work awarded. Contractual Completion period upto 31.10.2019 HVPNL requested to update further progress
5	400/220kV, 2x500 MVA Bagpat GIS	3 nos. of 220 kV d/s lines to Shamli, Muradnagar and Bagpat commissioned. Balance 5 Nos. of bays to be utilized	Commissioned	Bagpat- Baraut - energised(D/C) Bhagpat-Shamli- energised(S/C) LILO of 220kV Muradnagar II - Baghpat (PG) at Baghpat UP Bagpat(PG)-Modipuram New 220kV D/c-is under planning stage. UPPTCL to update .
6	400/220kV, 2x315 MVA Dehradun	Out of 6 bays, only two bays used. Balance 4 bays to be utilised.	Commissioned	02 bays for Yamuna Basin (Mori substation) 2 bays for proposed S/s at Selakui PTCUL requested to update.
7	400/220 kV, 2x315 MVA Sohawal	6 Nos 220 kV bays to be utilized.	Commissioned	Sohawal-Sohawal (UP) D/C line energised Sohawal-Barabanki D/C line

ANNEXURE 9/2

S. No.	Substation	Downstream network requirement	Schedule	Planned system and Implementation Status
				<p>energised. 2 nos of bay of utilized for 220kV New Tanda-Sohawal line .There is a litigation process on & expected to be completed by November 2018 UPPTCL to update.</p> <p>Sohawal-Behraich and Sohawal-Gonda lines are under construction and expected to be completed by January, 2019. PGCIL requested to provide the estimate for construction of Bays at PGCIL end. UPPTCL& PGCIL to update.</p>
8	Shahjahanpur , 2x315 MVA 400/220 kV	Partially utilized. Balance 5 Nos. of 220 kV bays to be utilized.	Commissioned	<p>Shajahnapur-Hardoi commissioned Shajahnapur-Azimpur D/C line is planned, land of substation identified. UPPTCL to update.</p>
9	Moga	Partially utilized. Balance 2 nos. of 220kV bays to be utilized.	Commissioned	<p>Moga-Mehalkalan 220kV D/c line Work completed. Approval from NGT for tree cutting is awaited for balance work to commission line. NGT clearance received and by 31.12.2018 work will be completed PSTCL to update progress.</p>
10	Hamirpur 400/220 kV 2x 315 MVA Sub-station (Augmentation by 3x105 MVA ICT)	04 nos. 220 kV downstream lines commissioned under ISTS. Balance two bays to be utilised by HPSEBL	August 2020	<p>2x220 kV bays to be utilized for connecting 220/132kV Kangoo substation of HPSEBL by 220 kV Kangoo-Hamirpur D/c line. HPPTCL requested to update.</p>
11	Kaithal 400/220 kV 1x 315 MVA Sub-station	July 2017 (Shifting of Transformer from Ballabgarh).	Commissioned	<p>220kV Kaithal(PG)- Neemwala D/c line - Work awarded on 13.7.2018. Tentative completion date 31.12.2019. 220kV S/s Neemwala-Tenders opened on 30.3.2018 & awarded on 13.7.2018. HVPNL requested to update further progress.</p>

Establishment of new 400/220kV substations of POWERGRID in Northern Region. All concerned utilities are requested to update.

Sl. No.	Name of Substation	MVA Capacity	Expected Schedule	Downstream connectivity furnished by States
1	400/220kV Dwarka-I GIS	4x 500	Oct'18	DTL may update.
2	400/220kV Tughlakabad GIS	4x 500	Oct'18	
3	220/66kV Chandigarh GIS	2x160	Feb'19	Out of 8 nos. of 66kV bays 6 no. of bays shall be utilized as per the timeline given by POWERGRID.
4	400/220kV Jauljivi GIS	2x315	December 2019	2 bays for 220kV Almorajauljibi line 2 bays for 220kV Brammah-Jauljibi line
5	400/220kV Sohna Road GIS	2x500	May'19 (Under TBCB) (8 bays)	-
6	400/220kV Prithla GIS	2x500	May'19 (Under TBCB) (8 bays)	Two nos. of 220kV bays for Prithla(400)-Prithla (HVPNL) 220kV D/c line Four nos. of 220kV bays for LILO of existing 220kV Palwal-RangalaRajpur D/c line at Prithla (400) (FY 2019-20) Two nos. of 220kV bays for 220kV Prithla (400)-Sector-78, Faridabad S/s D/c (FY-2020-21)
7	400/220kV Kadarapur GIS	2x500	May'19 (Under TBCB) (8 bays)	
8	400/220kV Kala Amb GIS	7*105	Commissioned (Jul'17)	HPSEBL has planned one no. of 220kV D/c line from Kala Amb 400/220kV S/s to 220/132kV Kala Amb S/s. Details for remaining 4 nos. of line bays may be provided. .
9	400/220kV Amargarh GIS	7X105	Oct'18 (Under TBCB) (Sterlite Grid planning to prepone)	JKPDD to confirm for LILO of 220kV D/c Zainkote - Delina line at Amargarh. 20 ckm work completed June-18.

Name of Project	Sector	State	Unit No	Total Capacity	DT-of COMMISSIONING	Revised Phasing Plan (Shutdown)	Status of FGD installation
PANIPAT TPS	State Sector	Haryana	6	210	31-03-01	March-April 2021	
PANIPAT TPS	State Sector	Haryana	7	250	28-09-04	Jan-Feb 2021	
PANIPAT TPS	State Sector	Haryana	8	250	28-01-05	Nov-Dec 2020	
RAJIV GANDHI TPS	State Sector	Haryana	1	600	31-03-10	March-April 2022	
RAJIV GANDHI TPS	State Sector	Haryana	2	600	01-10-10	Jan-Feb 2022	
YAMUNA NAGAR TPS	State Sector	Haryana	1	300	01-11-07	Nov-Dec 2021	
YAMUNA NAGAR TPS	State Sector	Haryana	2	300	29-03-08	Sept-Oct 2021	
INDIRA GANDHI STPP	Central Sector	CS Haryana	1	500	31-10-10	Sept-Oct 2020	Award in Spetember, 2018
INDIRA GANDHI STPP	Central Sector	CS Haryana	2	500	05-11-11	March-April 2020	Award in Spetember, 2018
INDIRA GANDHI STPP	Central Sector	CS Haryana	3	500	07-11-12	Jan-Feb 2020	Award in Spetember, 2018
GOINDWAL SAHIB	Private Sector	Punjab	1	270	14-02-16	March-April 2020	
GOINDWAL SAHIB	Private Sector	Punjab	2	270	15-03-16	Jan-Feb 2020	
Nabha TPP (Rajpura TPP)	Private Sector	Punjab	1	700	24-01-14	March-April 2021	Awaiting approval from PSERC for grant of in-principle approval under change in law
Nabha TPP (Rajpura TPP)	Private Sector	Punjab	2	700	06-07-14	Jan-Feb 2021	Awaiting approval from PSERC for grant of in-principle approval under change in law
GH TPS (LEH.MOH.)	State Sector	Punjab	1	210	29-12-97	March-April 2022	
GH TPS (LEH.MOH.)	State Sector	Punjab	2	210	16-10-98	March-April 2022	
GH TPS (LEH.MOH.)	State Sector	Punjab	3	250	03-01-08	Jan-Feb 2022	
GH TPS (LEH.MOH.)	State Sector	Punjab	4	250	31-07-08	Jan-Feb 2022	
TALWANDI SABO TPP	Private Sector	Punjab	1	660	17-06-14	Jan-Feb 2021	Initiated tendering process with publishing EOI on 05th June, 2018. Tender to be opned tentatively on 16.08.2018
TALWANDI SABO TPP	Private Sector	Punjab	2	660	25-10-15	Nov-Dec 2020	Initiated tendering process with publishing EOI on 05th June, 2018. Tender to be opned tentatively on 16.08.2018
TALWANDI SABO TPP	Private Sector	Punjab	3	660	29-03-16	Sept-Oct 2020	Initiated tendering process with publishing EOI on 05th June, 2018. Tender to be opned tentatively on 16.08.2018
KAWAI TPS	Private Sector	Rajasthan	1	660	28-05-13	July-Aug 2020	Consultancy services to assess the feasibility in commissioned/ likely to be commissioned Units for implementation of revised emission norms in Power Stations of RVUNare being provided by M/s Fichtner Consulting Engineers (India) Pvt. Lts, Chennai vide order dated 01.02.2018. Draft DPR for implementation of revised emission norms in these power Plants has been received and final DPR submission is expected in July - 2018
KAWAI TPS	Private Sector	Rajasthan	2	660	24-12-13	May-June 2020	-do--
CHHABRA TPP	State Sector	Rajasthan	1	250	30-10-09	Nov-Dec 2021	-do--
CHHABRA TPP	State Sector	Rajasthan	2	250	04-05-10	Sept-Oct 2021	-do--
CHHABRA TPP	State Sector	Rajasthan	3	250	14-09-13	July-Aug 2021	-do--
CHHABRA TPP	State Sector	Rajasthan	4	250	30-06-14	July-Aug 2021	-do--
CHHABRA TPP	State Sector	Rajasthan	5	660	04-04-17	March-April 2020	-do--
KALISINDH TPS	State Sector	Rajasthan	1	600	02-05-14	May-June 2021	-do--
KALISINDH TPS	State Sector	Rajasthan	2	600	06-06-15	March-April 2021	-do--
KOTA TPS		Rajasthan	5	210	26-03-94	Nov-Dec 2022	-do--
KOTA TPS	State Sector	Rajasthan	6	195	30-07-03	Nov-Dec 2022	-do--
KOTA TPS	State Sector	Rajasthan	7	195	30-08-09	Sept-Oct 2022	-do--
SURATGARH TPS	State Sector	Rajasthan	1	250	10-05-98	Nov-Dec 2022	-do--
SURATGARH TPS	State Sector	Rajasthan	2	250	28-03-00	Sept-Oct 2022	-do--
SURATGARH TPS	State Sector	Rajasthan	3	250	29-10-01	July-Aug 2022	-do--
SURATGARH TPS	State Sector	Rajasthan	4	250	25-03-02	May-June 2022	-do--
SURATGARH TPS	State Sector	Rajasthan	5	250	30-06-03	March-April 2022	-do--
SURATGARH TPS	State Sector	Rajasthan	6	250	29-08-09	Jan-Feb 2022	-do--
LALITPUR TPS	Private Sector	Uttar Pardesh	2	660	08-01-16	Jan-Feb 2021	
LALITPUR TPS	Private Sector	Uttar Pardesh	3	660	01-04-16	Sept-Oct 2020	
LALITPUR TPS	Private Sector	Uttar Pardesh	1	660	26-03-16	Nov-Dec 2020	
ANPARA C TPS	Private Sector	Uttar Pardesh	1	600	12-10-11	July-Aug 2022	
ANPARA C TPS	Private Sector	Uttar Pardesh	2	600	18-01-12	May-June 2022	
DADRI (NCTPP)	Central Sector	CS Uttar Pardesh	1	210	21-12-91	Nov-Dec 2020	
DADRI (NCTPP)	Central Sector	CS Uttar Pardesh	2	210	18-12-92	Sept-Oct 2020	
DADRI (NCTPP)	Central Sector	CS Uttar Pardesh	3	210	23-03-93	July-Aug 2020	
DADRI (NCTPP)	Central Sector	CS Uttar Pardesh	4	210	24-03-94	May-June 2020	
DADRI (NCTPP)	Central Sector	CS Uttar Pardesh	5	490	25-01-10	March-April 2020	Awarded in June,18
DADRI (NCTPP)	Central Sector	CS Uttar Pardesh	6	490	16-07-10	Jan-Feb 2020	Awarded in June,18
RIHAND STPS	Central Sector	CS Uttar Pardesh	1	500	31-03-88	Jan-Feb 2021	Combustion tuning after overhaul

RIHAND STPS	Central Sector	CS Uttar Pradesh	2	500	05-07-89	Nov-Dec 2021	Combustion tuning after overhaul
RIHAND STPS	Central Sector	CS Uttar Pradesh	3	500	31-01-05	Sept-Oct 2021	NIT in Sept,18
RIHAND STPS	Central Sector	CS Uttar Pradesh	4	500	24-09-05	March-April 2021	NIT in Sept,18
RIHAND STPS	Central Sector	CS Uttar Pradesh	5	500	25-05-12	Jan-Feb 2021	NIT in Sept,18
RIHAND STPS	Central Sector	CS Uttar Pradesh	6	500	17-10-13	Nov-Dec 2020	NIT in Sept,18
SINGRAULI STPS	Central Sector	CS Uttar Pradesh	1	200	14-02-82	Nov-Dec 2021	
SINGRAULI STPS	Central Sector	CS Uttar Pradesh	2	200	25-11-82	Nov-Dec 2021	
SINGRAULI STPS	Central Sector	CS Uttar Pradesh	3	200	28-03-83	July-Aug 2021	
SINGRAULI STPS	Central Sector	CS Uttar Pradesh	4	200	02-11-83	July-Aug 2021	
SINGRAULI STPS	Central Sector	CS Uttar Pradesh	5	200	26-02-84	March-April 2021	
SINGRAULI STPS	Central Sector	CS Uttar Pradesh	6	500	23-12-86	Jan-Feb 2021	Combustion tuning after overhaul
SINGRAULI STPS	Central Sector	CS Uttar Pradesh	7	500	24-11-87	Nov-Dec 2020	Combustion tuning after overhaul
UNCHAHAH TPS	Central Sector	CS Uttar Pradesh	1	210	21-11-88	Nov-Dec 2022	
UNCHAHAH TPS	Central Sector	CS Uttar Pradesh	2	210	22-03-89	Nov-Dec 2022	
UNCHAHAH TPS	Central Sector	CS Uttar Pradesh	3	210	27-01-99	Sept-Oct 2022	
UNCHAHAH TPS	Central Sector	CS Uttar Pradesh	4	210	22-10-99	Sept-Oct 2022	
UNCHAHAH TPS	Central Sector	CS Uttar Pradesh	5	210	28-09-06	March-April 2022	
UNCHAHAH TPS	Central Sector	CS Uttar Pradesh	6	500	31-03-17	July-Aug 2020	
PRAYAGRAJ TPP	Private Sector	Uttar Pradesh	1	660	25-12-16	March-April 2020	
PRAYAGRAJ TPP	Private Sector	Uttar Pradesh	2	660	06-09-15	May-June 2020	
PRAYAGRAJ TPP	Private Sector	Uttar Pradesh	3	660	22-05-17	Jan-Feb 2020	
ROSA TPP Ph-I	Private Sector	Uttar Pradesh	1	300	10-02-10	Nov-Dec 2021	
ROSA TPP Ph-I	Private Sector	Uttar Pradesh	2	300	26-06-10	Nov-Dec 2021	
ROSA TPP Ph-I	Private Sector	Uttar Pradesh	3	300	28-12-11	Sept-Oct 2021	
ROSA TPP Ph-I	Private Sector	Uttar Pradesh	4	300	28-03-12	Sept-Oct 2021	
ANPARA TPS	State Sector	Uttar Pradesh	1	210	24-03-86	Sept-Oct 2022	
ANPARA TPS	State Sector	Uttar Pradesh	2	210	28-02-87	July-Aug 2022	
ANPARA TPS	State Sector	Uttar Pradesh	3	210	12-03-88	May-June 2022	
ANPARA TPS	State Sector	Uttar Pradesh	4	500	19-07-93	March-April 2022	
ANPARA TPS	State Sector	Uttar Pradesh	5	500	04-07-94	Jan-Feb 2022	
ANPARA TPS	State Sector	Uttar Pradesh	6	500	08-06-15	May-June 2021	E- tender invited on 20.07.2018 and opening of Techno-commercial bid on 20.09.2018
ANPARA TPS	State Sector	Uttar Pradesh	7	500	06-03-16	March-April 2021	E- tender invited on 20.07.2018 and opening of Techno-commercial bid on 20.09.2018
HARDUAGANJ TPS	State Sector	Uttar Pradesh	8	250	27-09-11	Nov-Dec2021	An order of Pre-award consultancy service has been placed to M/s NTPC vide letter dated 22.06.2018
HARDUAGANJ TPS	State Sector	Uttar Pradesh	9	250	25-05-12	Sept-Oct 2021	An order of Pre-award consultancy service has been placed to M/s NTPC vide letter dated 22.06.2018
OBRA TPS	State Sector	Uttar Pradesh	9	200	26-10-80	July-Aug 2022	
OBRA TPS	State Sector	Uttar Pradesh	10	200	14-01-79	Sept-Oct 2022	
OBRA TPS	State Sector	Uttar Pradesh	11	200	31-12-77	Nov-Dec 2022	
OBRA TPS	State Sector	Uttar Pradesh	12	200	28-03-81	May-June 2022	
OBRA TPS	State Sector	Uttar Pradesh	13	200	21-07-82	March-April 2022	
PARICHHHA TPS	State Sector	Uttar Pradesh	3	210	29-03-06	March-April 2022	An order of Pre-award consultancy service has been placed to M/s NTPC vide letter dated 22.06.2018
PARICHHHA TPS	State Sector	Uttar Pradesh	4	210	28-12-06	March-April 2022	An order of Pre-award consultancy service has been placed to M/s NTPC vide letter dated 22.06.2018
PARICHHHA TPS	State Sector	Uttar Pradesh	5	250	24-05-12	Jan-Feb 2022	An order of Pre-award consultancy service has been placed to M/s NTPC vide letter dated 22.06.2018
PARICHHHA TPS	State Sector	Uttar Pradesh	6	250	11-03-13	Nov-Dec 2021	An order of Pre-award consultancy service has been placed to M/s NTPC vide letter dated 22.06.2018
MAHATMA GANDHI TPS	Private Sector	Haryana	1	660	12-01-12	Dec 18 -Jan 19	
MAHATMA GANDHI TPS	Private Sector	Haryana	2	660	11-04-12	Dec 18 -Jan 19	

Station : Anta for 01.10.2018

Block No	Time	DC	Total SG	SG to be corrected	Remark
1	00:00	260	241	246	Revision No. 80 @ 21:22 hrs SG changed retrospectively from block No. 1 to 86. Hence SG to be done as per revision No. 79
2	00:15	260	254	260	
3	00:30	260	254	260	
4	00:45	260	254	260	
5	01:00	260	254	260	
6	01:15	260	254	260	
7	01:30	260	254	260	
8	01:45	260	254	260	
9	02:00	261	255	261	
10	02:15	261	255	261	
11	02:30	261	235	241	
12	02:45	261	251	256	
13	03:00	263	253	259	
14	03:15	263	254	260	
15	03:30	263	254	260	
16	03:45	263	254	260	
17	04:00	265	256	262	
18	04:15	265	257	263	
19	04:30	265	258	263	
20	04:45	265	220	225	
21	05:00	265	254	259	
22	05:15	265	254	260	
23	05:30	265	255	261	
24	05:45	265	256	262	
25	6:00	263	257	263	
26	6:15	263	220	225	
27	6:30	263	253	259	
28	6:45	263	254	260	
29	7:00	263	248	254	
30	7:15	263	249	254	
31	7:30	263	248	253	
32	7:45	263	249	254	
33	8:00	261	247	252	
34	8:15	261	247	252	
35	8:30	261	247	252	
36	8:45	261	247	252	
37	9:00	259	245	250	
38	9:15	259	245	250	

39	9:30	259	246	251
40	9:45	259	248	254
41	10:00	257	247	253
42	10:15	257	248	253
43	10:30	257	249	254
44	10:45	257	212	216
45	11:00	277	174	178
51	12:30	382	202	207
52	12:45	382	220	225
53	13:00	379	220	225
54	13:15	379	257	263
55	13:30	379	294	301
56	13:45	379	332	339
57	14:00	376	364	372
58	14:15	376	363	371
59	14:30	376	362	370
60	14:45	376	361	369
61	15:00	373	360	367
62	15:15	373	355	361
63	15:30	373	360	367
64	15:45	373	361	368
65	16:00	375	364	371
66	16:15	375	365	371
67	16:30	375	364	371
68	16:45	375	326	333
69	17:00	378	326	333
70	17:15	378	326	333
71	17:30	378	371	378
72	17:45	378	371	378
73	18:00	380	329	336
74	18:15	380	373	380
75	18:30	380	373	380
76	18:45	380	374	380
77	19:00	383	377	383
78	19:15	383	377	383
79	19:30	383	377	383
80	19:45	383	377	383
81	20:00	386	380	386
82	20:15	386	380	386
83	20:30	386	380	386
84	20:45	386	342	348
85	21:00	386	304	310
86	21:15	386	266	272
87	21:30	386	229	249

88	21:45	386	192	225	
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Station : Auraiya for 01.10.18

Date	Time	Block	DC	SG	Remark
01-10-2018	01:00	4	630.00	309.71	SG till 14th revision 01:23 was 315 MW
01-10-2018	01:15	5	630.00	309.71	
01-10-2018	01:30	6	630.00	309.71	
01-10-2018	03:15	13	630.00	299.89	SG was 305 MW till 03:10 9th revision
01-10-2018	03:30	14	630.00	272.36	SG was 277 MW till 03:10 9th revision.
01-10-2018	03:45	15	630.00	208.45	SG was 212 MW till 03:10 9th revision.
01-10-2018	05:45	23	630.00	269.40	In 27 th revision at 5:37 Hrs SG was 274 MW
01-10-2018	06:00	24	630.00	196.64	In 27 th revision at 5:37 Hrs SG was 200 MW,
01-10-2018	06:45	27	624.00	234.99	In 30th revision at 06:34 hrs was 239 MW.
01-10-2018	12:15	49	610.00	204.51	SG was 208 MW in 50th revision at 12:10
01-10-2018	12:30	50	610.00	201.07	SG was 204 MW at 12:38 52nd revision
01-10-2018	12:45	51	610.00	268.92	SG was 273 MW at 12:38 52nd revision
01-10-2018	13:00	52	610.00	262.51	SG was 267 MW at 12:38 52nd revision
01-10-2018	13:30	54	640.00	278.31	SG was 283.05 MW at 13:21 55th revision
01-10-2018	13:45	55	640.00	364.84	SG was 371MW at 13:21 55th revision
01-10-2018	14:15	57	610.00	443.49	SG was 451 MW at 13:53 57th revision
01-10-2018	14:30	58	610.00	443.49	
01-10-2018	14:45	59	610.00	369.36	SG was 375 MW in 59 th revision at 14:39 Hrs
01-10-2018	15:45	63	610.00	380.50	SG was 387 in 62nd revision at 15:35 Hrs
01-10-2018	16:00	64	610.00	492.58	SG was 501 in 62nd revision at 15:35 Hrs
01-10-2018	16:15	65	610.00	489.63	SG was 498 MW in 63rd revision at 16:03
01-10-2018	16:45	67	610.00	469.35	SG was 472 MW in 65th revision 16;44 hrs
01-10-2018	17:00	68	610.00	461.29	SG was 463.8 MW in 65th revision 16;44 hrs
01-10-2018	17:15	69	610.00	461.29	SG was 563.8 in 66th revision at 17:03 Hrs
01-10-2018	19:15	77	615.00	609.96	SG was 615 MW, in 75th revision at 20:02 Hrs.
01-10-2018	19:30	78	615.00	609.96	
01-10-2018	19:45	79	615.00	609.96	
01-10-2018	20:00	80	615.00	609.96	
01-10-2018	20:45	83	615.00	461.81	SG was 464.32 in 77th revision at 20:40 Hrs

उत्तरी क्षेत्रीय भार प्रेषण केन्द्र / NORTHERN REGIONAL LOAD DESPATCH CENTRE
कार्यालय : 18-ए, शहीद जीत सिंह सनसनवाल मार्ग, कटवारिया सराय, नई दिल्ली- 11001
OFFICE : 18-A, Shaheed Jeet Singh Sansanwal Marg, Katwaria Sarai, New Delhi- 11001
CIN : U40105DL2009GOI188682, Website : www.nrldc.org, www.nrldc.in, Tel.: 011- 26519406, 26523869, Fax : 011- 268527

संदर्भ संख्या : NRLDC/TS-11\ 2064-2067

दिनांक: 18 सितम्बर 2018

Annexure-24

सेवा में,

1. प्रबंधन निदेशक
एचपीएसईबी लिमिटेड
कुमार हाउस, विद्युत भवन
शिमला - 171004

2. निदेशक, राज्य भार प्रेषण केन्द्र
एसएलडीसी परिसर
टोट्टू, शिमला- 171001



विषय: Heavy overdrawl from the grid leading to very poor frequency profile - Request for action

महोदय,

This is in reference to deteriorating frequency profile of the grid for past few days and heavy overdrawl from the grid. The frequency remained below the mandated minimum value of operating range for 42% and 27% of time on 15th and 16th September 2018 respectively. The frequency profile of the grid for these dates is given below for perusal.

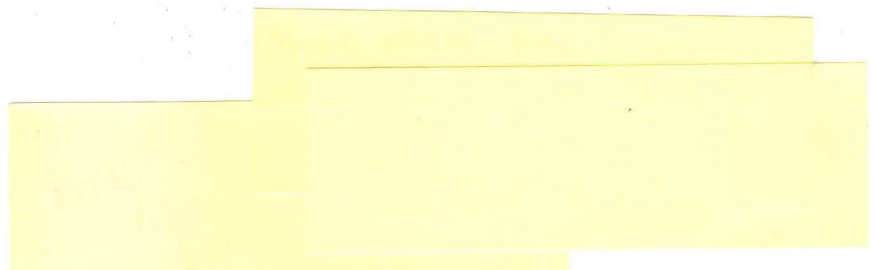
Date	Frequency range (in % of time)		Min. freq (Hz)	FVI	Standard deviation
	<49.9 Hz	49.9-50.05 Hz			
15.09.18	42.2	55.2	49.60 ✓	0.144	0.079
16.09.18	27.4	69.5	49.67 ✓	0.096	0.071

- During this low frequency time, HP state control area has been overdrawing from the grid. The frequency and overdrawl of HP state control area is plotted at Annex-1. It is clear from the plots that overdrawl of HP state control area has been one of the reason for such low frequency operation.

During the recently held Operation Coordination Committee (OCC) meeting of Northern Region, NRLDC has mentioned that during September month every year, there is high demand coupled with declining hydro generation resulting in low frequency operation and therefore, other generation needs to be increased in order to cope with the increasing demand. However, nearly 192 MW in HP state control area remained under reserve shutdown on 15th and 16th September 2018 (Annex-2). Last year in the month of September NR met demand as high as 54558 MW. This year on 15th, 16th and 17th September NR has met maximum demand of 53504MW, 54202MW and 55371MW respectively which is expected to rise further.

The Indian Meteorological Department (IMD) has forecasted mostly dry weather in Northern region for the next five days and therefore, demand is expected to rise and remain high. It has been discussed in OCC meetings that hydro generation is less this year (plot attached as Annexure) which would further decline in coming weeks. If the dry spell continues in the coming days as forecasted, the load is likely to increase and hence requires preparedness measures by states. Therefore, the following is requested:


1. Managing the demand portfolio and making prearrangements for procurement of power.
2. More units shall be kept on bar in order to meet the increased demand safely as well as maintaining reserves



3. Restricting deviations from schedule.

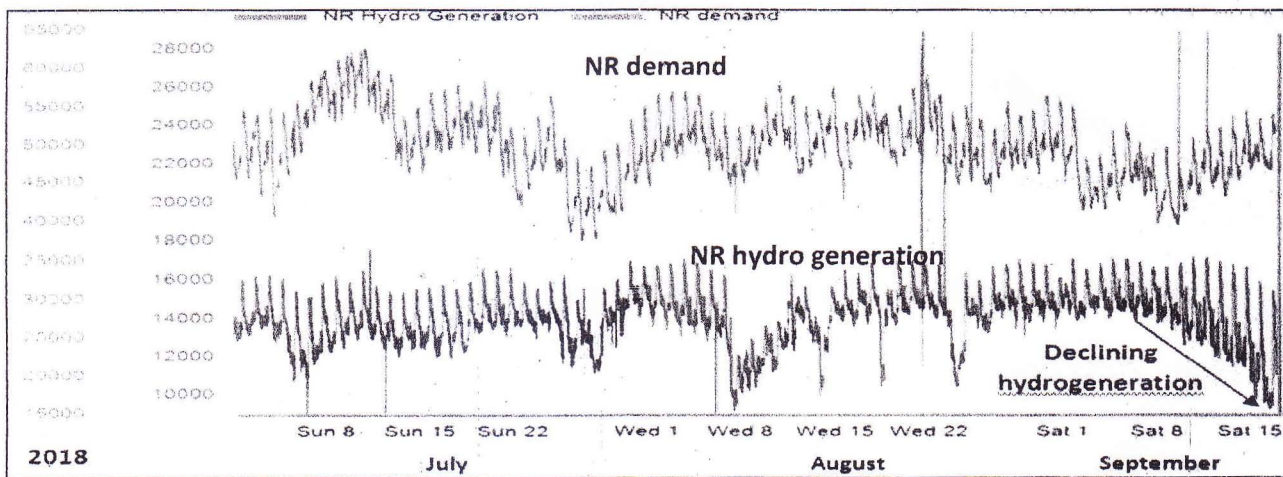
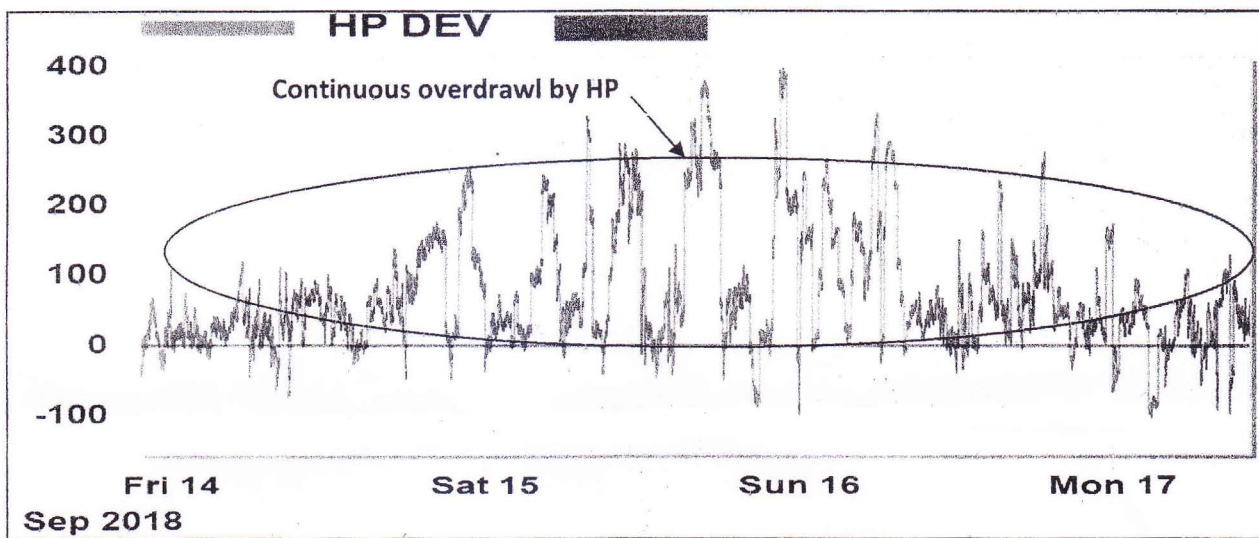
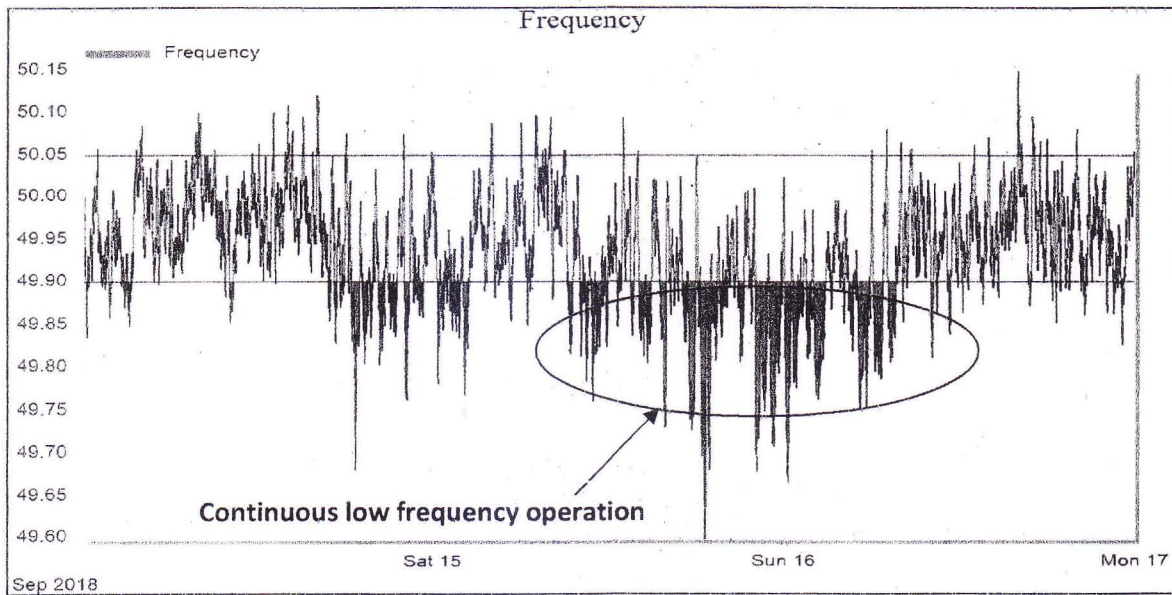
4. Advance action is required for bring the units on bar to avoid situation such as encountered on 15th and 16th September 2018.

Kindly advise all the concerned to take the above measure so as to improve the system reliability. A line of confirmation on action points taken is requested.

भवदीय

राजीव पोरवाल
(उप महाप्रबंधक)

प्रतिलिपि विनम्र सूचनार्थः

1. सदस्य सचिव, एन°आर°पी°सी°, 18 ए, SJSS मार्ग, कटवारिया सराय, नई दिल्ली -110016
2. अध्यक्ष एवं प्रबंध निदेशक, पोसोको, बी9-, कुतुब इन्स्टीट्यूशनल एरिया, नई दिल्ली -110016



Annexure-2

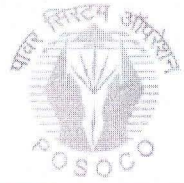
S. No.	Station	Owner	Unit No.	Capacity (MW)	Outage date	Outage time	Revival date	Reason
1	Pong HPS	BBMB	2	66	28/3/2018	16:20	-	Repair and Replacement of draft tube gates.
2	Pong HPS	BBMB	1	66	2/5/2018	22:42	-	Replacement of digital governor
3	Bairasiul HPS	NHPC	2	60	29/8/2018	21:20	-	Others
Total outage in HP state control area : 192MW								

पावर सिस्टम ऑपरेशन कॉर्पोरेशन लिमिटेड

(भारत सरकार का उद्यम)

POWER SYSTEM OPERATION CORPORATION LIMITED

(A Govt. of India Enterprise)



पंजीकृत एवं केन्द्रीय कार्यालय : प्रथम तल, बी-9, कुतुब इंस्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली-110016
Registered & Corporate Office : 1st Floor, B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi -110016
CIN : U40105DL2009GOI188682, Website : www.posoco.in, E-mail : posococcc@posoco.in, Tel.: 011- 41035696, Fax : 011- 26536901

सदरुधः POSOCO/NLDC/SO/Oct18/

Annexure-25

दिनांक: 05th October 2018

सेवा मे,

Executive Director
Asset Management
Power Grid Corporation of India Limited
Gurugram

Executive Director
Engg.-HVDC
Power Grid Corporation of India Limited
Gurugram

विषय: Regarding – Reactive Power Control(RPC) settings adopted at terminal stations of multi-terminal HVDC BNC-Alipurduar-Agra

महोदय,

The multi-terminal HVDC BNC-Alipurduar-Agra is a high power corridor which impacts the transfer of power between three regions i.e. Northern, North-Eastern and Eastern region. Any contingency on this link affects the parallel AC line corridor and under certain circumstances, the AC system voltage varies to alarming levels. Therefore terminal voltages of this multi-terminal link are closely monitored in real time as well as on post-facto basis.

The reactive power optimization of terminal station of the HVDC transmission is performed by reactive power controller (RPC). Each RPC operates independently from the RPC in the other end of the HVDC transmission. The filter bank switching takes place as per RPC settings to optimize the voltage at terminal stations. It becomes very important to understand the RPC controls in order to modulate the HVDC power order in real time grid operations.

The fault level of MTDC terminal stations differ widely and therefore have different requirements for RPC control philosophy, e.g. RPC settings at Agra terminal which is strong bus need not be same as that of Biswanath-Cheriali(BNC) terminal. The voltage profile could be managed better if the real time operator has information about RPC settings in each HVDC terminal station and during the coming winter season MTDC operation can be optimized well. The list of queries regarding RPC settings is enclosed as Annexe-I.

Therefore it is kindly requested that queries regarding RPC settings adopted for each terminal station (Agra, Alipurduar and Biswanath Cheriali) may be shared with us for ensuring safe and reliable system operation.

सधन्यवाद,

भवदीय

ooc

प्र. नं. 2324
(एन. नल्लारसन) जी. 10/18

उपमहाप्रबंधक (रा. भा. प्र. के.)

संलग्न : उपरोक्तानुसार

प्रतिलिपि सूचनार्थः

1. Member Secretary, NRPC/ERPC/NERPC
2. Executive-Director, NRLDC/ERLDC/NERLDC

स्वहित एवं राष्ट्र हित में ऊर्जा बचायें
Save Energy for Benefit of Self and Nation

Annexe-1

Queries on Operating Instruction-HVDC ± 800 kV, 6000 MW HVDC Multi Terminal

The information on RPC settings is requested as per table given below:

Filter settings for RPC in Auto mode-Monopolar operation

Power order	RPC in Auto mode With AC Voltage- 390kV	RPC in Auto mode With AC Voltage- 400kV	RPC in Auto mode With AC Voltage- 410kV	RPC in Auto mode With AC Voltage- 420kV
100				
200				
2000				

Filter settings for RPC in Auto mode-Bipolar operation

Power order	RPC in Auto mode With AC Voltage- 390kV	RPC in Auto mode With AC Voltage- 400kV	RPC in Auto mode With AC Voltage- 410kV	RPC in Auto mode With AC Voltage- 420kV
100				
200				
4000				

Filter settings for RPC in Manual mode- Monopolar operation

Power order	RPC in Manual mode With AC Voltage- 390kV	RPC in Manual mode With AC Voltage- 400kV	RPC in Manual mode With AC Voltage- 410kV	RPC in Manual mode With AC Voltage- 420kV
100				
200				
2000				

Filter settings for RPC in Manual mode-Bipolar operation

Power order	RPC in Manual mode With AC Voltage- 390kV	RPC in Manual mode With AC Voltage- 400kV	RPC in Manual mode With AC Voltage- 410kV	RPC in Manual mode With AC Voltage- 420kV
100				
200				
4000				

Col. 1/2/3/4/5

Annexe-1

In addition to the above additional queries on the RPC control are given in next page :

- a) The settings adopted at each of the terminal station Q-control/U-control with the exact values may be provided.
- b) Settings adopted for "Min filter", "Absmin", "U-maximum", "U-minimum" etc.
- c) Whether predefined criteria ("Min filter", "Absmin", "U-maximum", "U-minimum") always super cedes operator managed criteria?
- d) Whether limits U-maximum, U-minimum in predefined criteria can be changed at a station or is it fixed during the design stage?
- e) In U-control mode ,whether the HVDC can sense the AC fault and distinguish it from normal steady state low voltage and low voltage due to AC side fault?
- f) In Q-control mode, can operator set the reactive power limit exchange with grid from HVDC to zero under any value of active power transfer?

Qd-110126



उत्तरी क्षेत्रीय भार प्रेशण 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.org, www.nrldc.in, Tel.: 011- 26519406, 26523869, Fax : 011- 26852747

संदर्भ संख्या: NRLDC/TS-15\ 2137-2143

Annexure-26

दिनांक: 05 अक्टूबर 2018

सेवा में,

महाप्रबंधक (CTU), पावर ग्रिड, सौदामिनी, प्लॉट नंबर-2, सैक्टर-29, इफको चौक, गुडगाँव-122001

मुख्य अभियंता (SP&PA), 3rd फ्लोर, केंद्रीय विद्युत प्राधिकरण, सेवा भवन, रामकृष्णापुरम, नई दिल्ली-110066



विषय: Observance of High shaft vibration at Dadri stage-2 units (#5 & 6) during power system faults near its vicinity

पूर्व संदर्भ /Reference: NRLDC Letter dated 16-Aug-18 on observance of high vibration at Dadri stage-2

महोदय,

Please refer to the above letter through which reported incidence of vibration in unit #5 & #6 at Dadri TPS stage-2 and their subsequent tripping on 28-Jun-18 due to LLG fault in 400 kV Dadri-G. Noida was brought to your kind notice. A few of the actions taken were also informed such as:

- FSC of 400kV Ballabgarh-Kanpur ckt-2 & 3 (ckt-1 FSC already out) was by-passed on 09-Aug-18 on test basis based on the inputs from NTPC and likelihood of ferro-resonance phenomena.
- NTPC was requested to provide the raw data file of respective DRs.

The further advise on the issue based on system studies is awaited and therefore, the above mentioned FSCs are still being kept out of service. As informed earlier, the PMU has not captured any oscillations and further the prony analysis of the raw data of Disturbance Record (DR) of unit #5 and # 6 received from NTPC, also does not show any dominant frequency component in electrical signals. The analysis is attached as Annexure-1.

Further, to above, NTPC has given details of vibrations observed in Dadri stage-2 units since 01st Jun 2018 to 23rd September 2018. The same are attached as Annexure-2 for perusal and further taking these as inputs in the studies at your end. The details include date/time, nature of fault, vibration (in micron) observed in Dadri stage-2. A total of 22 incidents occurred in this period in which vibration in the machine has occurred at the time of fault in feeders emanating from 400kV Dadri bus. Out of these, significant vibration was observed in 7 incidents.

It is therefore requested to kindly advise the course of actions for mitigation of vibrations based on the study both from Grid perspective as well as from generator's perspective. The study results may please also be shared with NRLDC.

धन्यवाद,



भवदीय
एम वरुण्डा 5/10/18
(एस० एस० बरुण्डा)
महाप्रबंधक

प्रतिलिपि विनम सूचनार्थः

1. मुख्य कार्यकारी अधिकारी(CTU), पावर ग्रिड, सौदामिनी, प्लॉट नंबर-2, सैक्टर-29, इफको चौक, गुडगाँव-122001
2. सदस्य सचिव, एन०आर०पी०सी०, 18 ए, SJSS मार्ग, कटवारिया सराय, नई दिल्ली- 110 016
3. सदस्य (PS), केंद्रीय विद्युत प्राधिकरण, सेवा भवन, रामकृष्णापुरम, नई दिल्ली - 110 066
4. सदस्य (Go&D), केंद्रीय विद्युत प्राधिकरण, सेवा भवन, रामकृष्णापुरम, नई दिल्ली - 110 066
5. अध्यक्ष एवं प्रबंध निदेशक, पोसोको, बी-9, कुतुब इन्स्टीट्यूशनल एरिया, नई दिल्ली - 110 016

Results of Prony analysis carried out on R-phase current of LV side of GT

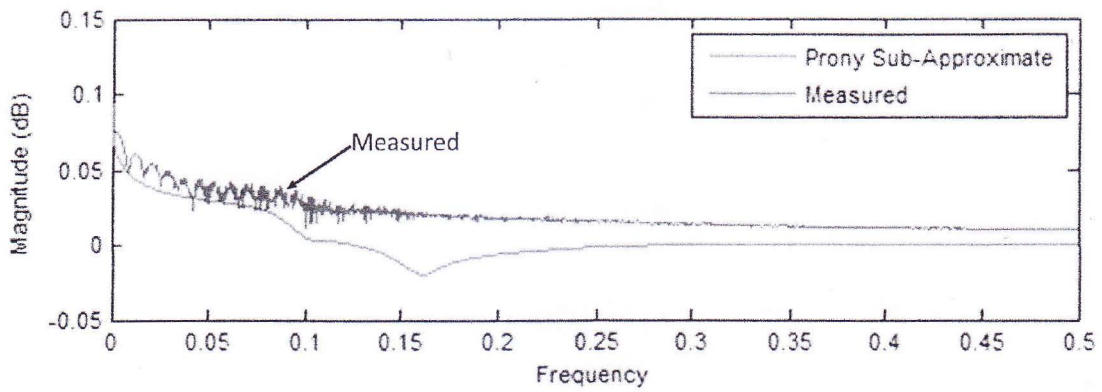


Fig.1 Different modes of frequency (unit #5) indicating no dominant mode

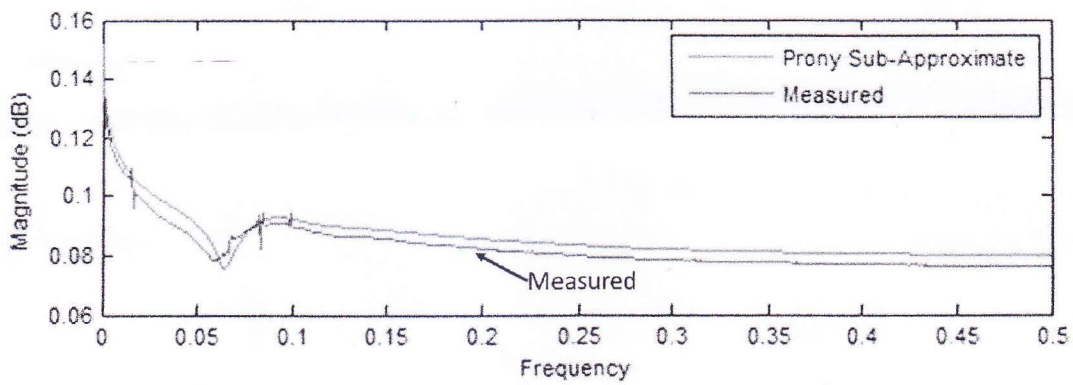
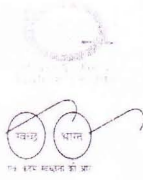


Fig.2 Different modes of frequency (unit #5) indicating no dominant mode

Record of Dadri Unit Vibrations with Fault in the system (As reported by NTPC)

S.No.	Date	Time	Line Tripped	Max. Voltage Dip (PMU/ DR details)	Nature of fault	Generation		Unit Displacement(in micron)			
						Unit-5	Unit-6	Unit-5		Unit-6	
								brg.	shaft	brg.	shaft
1	19.06.2018	04:59 hrs	400KV Dadri-Kaithal	2.7 KV	L-G (21km)	430	442	6y- 18 to 43	6y- 34 to 67	6y- 28 to 58	6x- 35 to 78
2	23.06.2018	12:42hrs	400KV Dadri-Panipat-2	171KV (Phase to ground)	L-G (109km)	475	500	6y- 21 to 22	6x- 55 to 56	6x-18 to 10	6y- 50 to 51
3	28.06.2018	01:17hrs	400 kV Dadri-GreaterNoida	140 kV(Phase to ground)	L-L (0.1km)	295	325	6y- 17 to 201	6x- 57 to 403	6x- 17.5 to 200.4	6y- 45 to 592
4	10.07.2018	02:54hrs	400KV Dadri-Kaithal	3.4 KV	L-G (22.2km)	485	500	6x- 19 to 25	6x- 75 to 82	6y- 29 to 31	6y-62 to 78
5	14.07.2018	07:14hrs	400KV Dadri-Kaithal	189KV	Over Voltage	300	307	6y- 17 to 18	6x- 70 to 71	6y- 26 to 27	6y- 57 to 58
6	25.07.2018	15:10hrs	400KV Dadri-Harsh Vihar-1	2.2KV	L-G (2km)	330	315	6y- 17 to 110	6y- 25 to 175	6y- 29 to 176	6y- 56 to 251
7	27.07.2018	22:12hrs	400KV Dadri-Kaithal	1.3KV	L-G (24.7km)	478	509	6y- 18 to 19	6x- 65 to 66	6x- 22 to 23	6x- 27 to 28
8	02.08.2018	04:10hrs	400KV Dadri-Kaithal	5.8KV	L-G (37.8km)	310	308	6x- 18 to 25	6x- 68 to 74	5x- 25 to 30	6y- 55 to 78
9	03.08.2018	17:13hrs	400 kV Dadri-GreaterNoida	REL-S21 TYPE RELAY,NOT POSSIBLE	L-L (6.4km)	305	290	6x- 18 to 81	6y- 27 to 136	6y- 27 to 74	6y- 55 to 134
10	10.08.2018	02:46hrs	400KV Dadri-Kaithal	9.6KV	L-G (90.7km)	313	301	6x- 18 to 19	5y- 63 to 64	6y- 25 to 26	6y- 58 to 59
11	13.08.2018	02:58hrs	400KV Dadri-Harsh Vihar-2	2.4KV	L-G (34.4km)	267	265	6y- 16 to 31	6y- 25 to 43	6x- 19 to 42	6x- 33 to 51
12	17.08.2018	16:39 hrs	Champa- Kurukshetra HVDC Line (Both Poles) & Bhiwani -Jhatikara 765KV line tripped			395	392	6y- 16 to 70	6x- 67 to 125	6x- 20 to 110	6x- 29 to 141
13	23.08.2018	21:37hrs	400KV Dadri-Kaithal	1.9KV	L-G (12.7km)	480	480	6y- 18 to 41	6y- 30 to 64	6y- 29 to 57	6x- 28 to 67
14	28.08.2018	05:23hrs	400KV Dadri-Maharanibagh	95 KV	L-G (5.4km)	301	305	6x- 18 to 48	6x-65 to 99	6y- 25 to 47	6x-34 to 65
15	29.08.2018	23:20hrs	400KV Dadri-Panipat-2	187KV	L-G (32.5km)	375	335	6x- 19 to 23	6y- 20 to 26	6y- 26 to 27	6y- 55 to 56
16	01.09.2018	20:54hrs	400KV Dadri-Panipat-1	Not triggered	L-G (7.4km)	350	410	6x- 18 to 44	6x- 62 to 77	6y- 29 to 43	6y- 56 to 91
17	03.09.2018	20:28hrs	400KV Dadri-Panipat-2	198 KV	L-G (67.4km)	310	346	6x- 17 to 17.5	6x- 61 to 62	6y- 27 to 28	6y- 54 to 55
18	05.09.2018	10:45hrs	400KV Dadri-Harsh Vihar-2	7.1 KV	L-L (21.6km)	266	272	6x- 18 to 120	6x- 64 to 186	6x- 19 to 144	6y- 55 to 241
19	06.09.2018	22:40 hrs	Dadri Greater Noida line	13 KV	L-G	272	276	6X 19 to 119	6X 65 to 174	6Y 28 to 151	6Y 52 to 212
20	09.09.2018	09:30 hrs	Dadri Panipat-2 Autoreclosed			346	323	6Y 18 to 29	6Y 29 to 37	6Y 27 to 33	6X 29 to 34
21	19.09.2018	21:28 hrs	Dadri Panipat-1 Autoreclosed	14.8 KV	L-G	385	476	6X 17 to 43	6X 67 to 82	6Y 28 to 52	6Y 60 to 105
22	23.09.2018	19:53 hrs	400 KV Bus-2 tripped on Bus bar Protection	72KV	L-G	404	434	6x 19 to 136	6X 66 to 184	6Y 27 to 172	6Y 59 to 255



भाखड़ा ब्यास प्रबन्ध बोर्ड
मध्य मार्ग, सैक्टर 19-बी, चंडीगढ़-160019
दूरभाष: 0172-5011761,
फैक्स-0172-2549857
E-Mail: spsecy@bbmb.nic.in



प्रेषक

विशेष सचिव

सेवा में,

निदेशक (हाइड्रो),
भारत सरकार,
विद्युत मंत्रालय,
श्रम शक्ति भवन, रफी मार्ग,
नई दिल्ली ।

क्रमांक 35532-35 /दी-1760/पावर/1पी दिनांक: 21-9-2018

विषय: मंत्रालय को विद्युत उत्पादन निष्पादन एवं प्रत्याशित ऊर्जा का आबंटन की सूचना देने के सम्बन्ध में।

उपर्युक्त विषय पर भा.ब्या.प्र.बोर्ड के सम्बन्ध में माह 09/2018 के प्रत्याशित आंकड़ों के अनुसार सूचना संलग्न की जाती है जी ।

संलग्न/यथोपरि

21/9/18
(आर.एस. जालटा)
विशेष सचिव

प्रतिलिपि:-

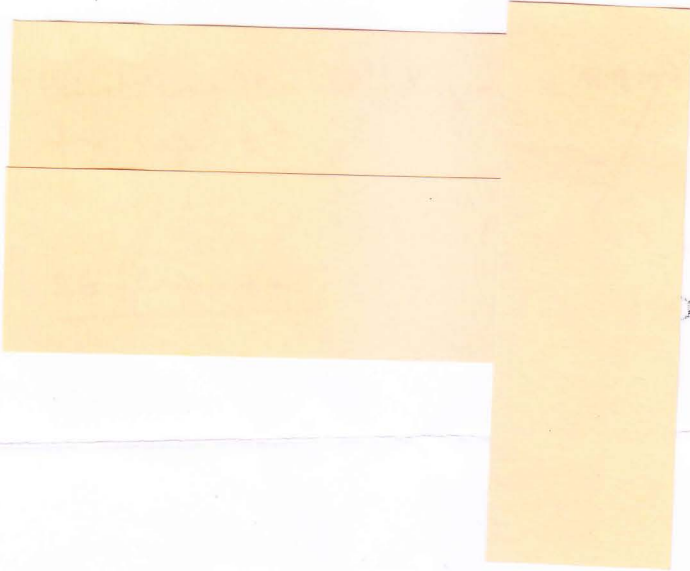
1. सदस्य सचिव, एनआरईबी, 18ए शहीद जीत सिंह मार्ग, कटवारिया सराय, नई दिल्ली।
2. निदेशक/जल विनियम, बीबीएमबी, नंगल ।
3. मुख्य अभियन्ता/प्रणाली परिचालन, बीबीएमबी, चण्डीगढ़ ।

संलग्न/यथोपरि



**ALLOCATION OF ANTICIPATED ENERGY
FOR THE MONTH OF Sep-18**
माह के लिए प्रत्याशित उर्जा का आबंटन

Sr. No. क्रम संख्या	Name of State राज्य का नाम	Energy Allocation in LU लाख यूनिट में आबंटन
1	Punjab पंजाब	4249
2	Haryana हरियाणा	3077
3	Rajasthan राजस्थान	2723
4	Chandigarh चंडीगढ़	617
5	H.P. हिमाचल प्रदेश	626
6	N. F. L. एन एफ एल	22
7	B. S. L. बी एस एल	38
8	Aux. Consumption अतिरिक्त खपत	232
	TOTAL कुल	11583



Satw
13.9.18
Dy Director
D/o Director/Power Regulation
B.B.M.B, Chandigarh

GENERATION PROGRAMME FOR THE BBMB POWER HOUSES FOR THE MONTH OF Sep-18

मास SEPTEMBER - 2018 में बीबीएमबी विद्युत गृहों के लिए उत्पादन निष्पादन

Month	Bhakra Reservoir (Ft)		Pong Reservoir (Ft)		Anticipated Generation (LU)			
	भाखड़ा जल स्तर (फीट)		पोंग जल स्तर (फीट)		प्रत्याशित उत्पादन लाख यूनिट			
	Actual Reservoir Level as on 1st of this Month	Actual Reservoir Level as on 1st of Corresponding Month of Last Year	Actual Reservoir Level as on 1st of this Month	Actual Reservoir Level as on 1st of Corresponding Month of Last Year	Bhakra	Dehar	Pong	Total
माह	इस माह की प्रथम को वास्तविक जल स्तर	गत वर्ष इसी माह की प्रथम को वास्तविक जल स्तर	इस माह की प्रथम को वास्तविक जल स्तर	गत वर्ष इसी माह की प्रथम को वास्तविक जल स्तर	भाखड़ा	देहर	पोंग	कुल
Sep-18	1641.15 ✓	1669.97 ✓	1371.74 ✓	1381.50 ✓	6098	3680	1804	11583

Sahi
13.9.18
Dy Director
Dy Director Power Reservoirs
B.B.M.B. Chandigarh

पावर सिस्टम ऑपरेशन कारपोरेशन लिमिटेड

(भारत सरकार का उद्यम)

POWER SYSTEM OPERATION CORPORATION LIMITED

(A Govt. of India Enterprise)



उत्तरी क्षेत्रीय भार प्रेषण केन्द्र / NORTHERN REGIONAL LOAD DESPATCH CENTRE

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

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

CIN : U40105DL2009GOI188682, Website : www.nrlc.org, www.nrlc.in, Tel.: 011- 26519406, 26523869, Fax : 011- 26852747

Ref.: NRLDC/MO/Metering/ 1606-1613

Annexure-28

Dated: 01st October 2018

To,

DGM (Asset Management), NRTS-I

Power Grid Corporation of India Limited,

B-9, Qutab Institutional Area,

Katwaria Sarai, New Delhi -110016



Sub.: Estimated SEM/DCD requirement for next 2 years

Sir,

Based on the information received from POWERGRID, the meters were last procured in the year 2015 and the present availability of SEM & DCDs are as follows:

S.No	Region	SEM Procured		DCD Procured	SEM Available		DCD Available	Utilised No. of SEM		DCD utilised
		Type-A	Type-B		Type-A	Type-B		Type-A	Type-B	
1	NR-1	772	52	180	128	52	30	429	0	143
2	NR-3				215		7			
3	NR-2	358	46	96	187	44	1	171	2	95
Total NR		1130	98	276	530	96	38	600	2	238

* SEM/DCD utilisation worked out considering even zero inventory. However the actual utilisation as per POWERGRID may be more.

NRLDC has reviewed its record and based on NRLDC record only 510 number of Meters (as against 602 as per POWERGRID record) and 102 DCDs (as against 238 as per POWERGRID record) has been utilised since January 2015. Details as per NRLDC record is enclosed as Annexure-I. Therefore, POWERGRID is requested once again to review the status of availability of DCDs and SEMs in POWERGRID Stores and provide details where these meters/DCDs has been utilised. Further, the following information may kindly be forwarded by POWERGIRD for updation of record at NRLDC end:

- Details of utilisation of No of meters and DCDs since 2015
- Details of number of defective meters and DCDs in POWERGRID store

Based on the anticipated commissioning of conventional inter-State generating stations, new inter-State Transmission elements, ICTs, Regional entity renewable generators, Solar Park/Wind park etc

in next two years, NRLDC has worked out the requirement of new energy meters and DCDs as follows:

Sl. No.	Particulars	No. of SEMs	No. of DCDs
1.	Conventional inter-State Generating Stations	40	10
2.	Renewable Generators / Solar Park / Wind Park etc	400	40
3.	Transmission elements/Sub-Stations	150	30
4.	Replacement of defective meters	40	48**+ 32= 80
	Total	630	130

** Based on the feedback received from sites, NRLDC has worked out that at present immediately 48 Nos of DCDs are to be provided. The reasons furnished by site is that either DCD is not available or defective. The details compiled as per telephonic information received from sites regarding this is enclosed as Annexure-II. However, POWERGRID is requested to verify the same as per their record/Store entry.

Considering the above it is proposed that POWERGRID may procure at least 130 Nos. of DCDs (combining NR1, NR2, NR3) immediately. As per information provided by POWERGRID, around 625 nos of meters are already available at present. Further, there is a proposal for replacement of 15 minute meters with 5 minute meters in near future. Therefore, it is proposed that at present there is no need to procure additional meter and requirement can be reviewed once again after one year.

Thanking you,

Yours faithfully,

Manoj Kumar Agrawal
01/10/2018
(Manoj Kumar Agrawal)
DGM (MO)

CC :

1. DGM (Asset Management), NRTS-II, RHQ, PGCIL, Grid Bhawan, Near Bahu Plaza, Rail Head Complex, Jammu-180012
2. DGM (Asset Management), NRTS-II, RHQ, PGCIL, 12, Rana Pratap Marg, Lucknow -226 001 (U.P)

Copy for kind information:

1. SE, Commercial, NRPC
2. General Manager (AM), NR-1
3. General Manager (AM), NR-2
4. General Manager (AM), NR-3
5. ED, NRLDC

Annexure-I (a)

List of meters added/replaced in new locations/new element/existing locations from Jan-15 to Sept-18 (NR-I region)

A. New Sub-Station

S.No	Name of the Location	Type of meter	No of meters	DCD Qty
1	Nehtaur	elster/L&T	2	2
2	Bikaner-RVPNL	elster	2	1
3	Ajmer-RVPNL	elster	2	1
4	Babai-RVPNL	elster	2	1
5	Ajmer-PG	elster	6	1
6	Chittorgarh-PG	elster	4	1
7	Dehradun-PG	elster	8	1
8	Gr. Noida	L&T	2	1
9	Alkankanda	L&T	2	1
10	Phagi	L&T	5	1
11	BaghpatPG	L&T	6	1
12	Rishikesh	L&T	2	1
13	Kashipur	L&T	6	1
14	Srinagar	L&T	2	1
15	Chittorgarh RVPNL	elster & L&T	7	2
16	Anta	elster	1	1
Sub-Total			59	18

B. Substation Extension

1	RAP-C	L&T	9	0
2	RAP-7&8	L&T	2	1
3	Bhiwani-BBMB	L&T	1	1
4	Sikar-PG	elster & L&T	10	1
5	Gurgaon-PG	L&T	4	1
6	Sohawal-PG	L&T/elster	4	1
7	Mainpuri-PG	elster/L&T	6	1
8	Mainpuri- UP	elster	2	0
9	Jhatikara-PG	L&T	1	0
10	Bhiwani-PG	L&T	6	0
11	Bhiwadi-PG	L&T	4	0
12	Kota-PG	L&T	3	0
Sub-Total			52	6

C. Meter Replacement

1	Anta	elster/L&T	3	1
2	Dadri	L&T	4	0
3	Tanakpur	L&T/elster	2	1
4	RAP-C	elster	1	1
5	Tehri	L&T	1	0
6	Khara	L&T	1	0
7	Hissar-BBMB	elster/L&T	2	1
8	Rohtak-BBMB	L&T	5	0
9	Sahibabad	elster	1	0

S.No	Name of the Location	Type of meter	No of meters	DCD Qty
10	Greater Noida UP	L&T	1	0
11	Moradabad UP	L&T	2	0
12	Fatehpur UP	L&T	1	0
13	Khurja UP	L&T	1	0
14	Mainpuri	L&T	1	0
15	Chirawa	elster	1	1
16	Bhilwara	elster	1	1
17	Bharatpur	L&T	1	0
18	Merta	L&T	1	0
19	Mia	L&T	1	0
20	Bhilwara	elster	2	1
21	Bahadurgarh-PG	elster	2	1
22	Sikar-PG	elster	1	1
23	Bamnaluli	elster/L&T	6	1
24	Bawana-PPCL	L&T	1	0
25	Narela-DTL	elster/L&T	2	1
26	Gazipur-DTL	L&T	2	0
27	Mandola-PG	L&T	1	0
28	Hissar-PG	L&T	1	0
29	Gurgaon-PG	L&T	1	0
30	Manesar-PG	L&T	3	0
31	Bhiwadi-PG	L&T	1	0
32	BhiwaniPG	L&T	1	0
33	Maharanibagh-PG	L&T	1	0
34	Pitoragarh-PG	L&T	1	0
35	Bhiwani-HVPN	elster	1	0
36	Mohindergarh-HVPN	elster	2	1
37	Dhalipur	L&T	1	0
Sub-Total			61	12
Grand- Total			172	36

Annexure-I (b)

List of meters added/replaced in new locations/new element/existing locations from Jan-15 to Sept-18 (NR-2 region)

A. New Sub-Station

S.No	Name of location	Type of Meter	No of meters	DCD Qty
1	Unchahar	L&T	8	1
2	Parbati-2	elster	7	1
3	Kurukshetra-HVDC	elster & L&T	18	2
4	Amargarh	elster	10	1
5	Karian	l&T	1	1
6	Sainj	elster	6	1
7	Kalamb	elster	6	1
8	Delina	elster	2	1
9	koldam	L&T	12	1
10	Samba-PG	L&T	3	2
		Elster	3	
11	Chajpur	L&T	2	1
12	Kabulpur	L&T	2	1
13	Nakodar	L&T	4	1
14	Talwandi	L&T	4	1
15	Patran	Elster	6	1
16	Rajpura	L&T	2	1
17	Sorang-HEP	L&T	6	1
18	Phojal	Elster	4	1
19	Banala-PG	elster	10	1
20	kishenganga	elster	11	1
Sub-Total			127	22

B. Substation Extension

1	Parbati-3	L&T	2	0
2	dulhasti	elster	3	1
3	Kishenpur-PG	elster	2	1
4	Kaithal-PG	elster	4	1
5	Neemrana-PG	elster	1	1
6	Nalagarh-PG	L&T	1	0
7	New Wanpoh-PG	L&T	2	0
8	Moga-PG	L&T	3	0
9	Patiala-PG	L&T	2	0
10	Amritsar-PG	elster	2	1
11	Ludhiana-PG	L&T	1	0
12	Jalandhar-PG	L&T	4	0
13	Chamba-PG	L&T	1	0
14	Hamirpur-PG	L&T	4	0
15	Panchkula-PG	L&T/elster	4	1
Sub-Total			36	6

S.No	Name of location	Type of Meter	No of meters	DCD Qty
C.Meter Replacement				
1	chamera-3	elster	1	1
2	uri	elster/L&T	3	1
3	uri-2	elster	3	1
4	Bhakra Left Bank	L&T	1	0
5	Dehar	L&T	1	0
6	Gangual	elster	1	1
7	pong	elster/L&T	3	1
8	Panipat-BBMB	elster/L&T	8	1
9	Jagadhari-BBMB	L&T	1	0
10	Samaypur-BBMB	L&T	2	0
11	Kurukshetra-BBMB	L&T	1	0
12	Narela-BBMB	L&T	2	0
13	Jamalpur-BBMB	L&T	3	0
14	Jalandhar-BBMB	elster	1	1
15	Sangrur-BBMB	elster	2	1
16	Miss Gangual-BBMB	L&T	1	0
17	Nalagarh-PG	elster	1	1
18	Jalandhar-PG	elster/L&T	4	1
19	Amritsar-PG	elster	1	1
20	Samba-PG	elster	1	1
21	Sonepat-PG	L&T	3	0
22	Malerkotla-PG	L&T	1	0
23	Wagoora-PG	L&T	1	0
24	Merrut-PG	L&T	1	0
25	Mahendragarh-HVNL	elster	1	1
26	Hira Nagar	elster	2	1
27	Jessore-HP	L&T	1	0
28	Udhampur	L&T	1	0
29	Jammu	L&T	1	0
30	Ropar	L&T	1	0
31	Kartarpur	L&T	1	0
32	Sarna	L&T	1	0
33	Mohali	L&T	2	0
Sub-Total			58	14
Grand- Total			221	42

Annexure-I (c)

List of meters added/replaced in new locations/new element/existing locations from Jan-15 to Sept-18
(NR-3region)

A. New Sub-Station

S.No	Name of Location	Type of Meter	No of Meter	DCD Qty
1	Sarnath	L&T	2	1
2	Meja	L&T	2	1
3	Orai-UPPCL	elster	2	1
4	Sikandara	elster	1	1
5	Kanpur-GIS	elster	4	1
6	Naini-Railways	elster	2	1
7	Orai-PG	elster	8	1
8	Aligarh-PG	elster	6	1
9	Kanpur-GIS	L&T	7	1
10	Agra-HVDC	L&T/Elster	19	2
11	New Bareley-PG	L&T	7	1
12	Varanasi-PG	Elster	12	1
13	Saharanpur-PG	L&T	6	1
Sub-Total			78	14

B. Substation Extension

1	Singrauli Solar	L&T	2	0
2	Singrauli Hydro	elster	2	1
3	Lucknow-PG	elster	2	1
4	Fatehpur-PG	elster	2	1
5	Allahabad-PG	L&T	4	0
6	Sohwal-PG	L&T/elster	4	1
7	Gorakhpur-PG	L&T	2	0
8	Bahadurgarh-PG	L&T	2	0
9	Sahjahanpur-PG	L&T	4	0
Sub-Total			24	4

C. Meter Replacement

1	Allhabad-Rihand 1&2 (Elster)	elster	3	1
2	Auraiya	elster&L&T	2	1
3	tanakpur	elster	1	1
4	Pilibhit	elster	1	1
5	Fatehpur-PG	L&T	1	0
6	Ballia-PG	L&T	3	0
7	Sahjahanpur-PG	elster	1	1
8	Allahabad-PG	elster	2	1
9	Lucknow-PG	L&T	1	0
Sub-Total			15	6
Grand- Total			117	24

Summary

Region	Total nos. of Meter Installed/Replaced	Total nos. of DCD distributed	Remark
NR- 1	172	36	
NR- 2	221	42	
NR- 3	117	24	
Total	510	102	

Annexure-II

Status of DCD requirement Region Wise as per information recieved from Site

NR-1

S.No	Name of the SS	No of DCD required	Make of DCD	DCD Availability Status	Remarks
1	Khetri	1	L&T	YES	Charger/Cable
2	Amarpura Thedi	1	L&T	YES	Charger
3	Bharatpur	1	L&T	YES	MRI Faulty
4	Udaipur	1	L&T	NO	
5	Bawana DTL	1	L&T	NO	
6	Sahaibabad	1	Elster	NO	
7	Ghazipur	1	L&T	Yes	MRI Faulty
8	Hissar Jindal	1	L&T	NO	
9	Swai Madhopur	1	L&T/Elster	YES	Charger Problem
10	Greater Noida	1	L&T	NO	
11	BTPS	1	L&T	NO	
12	Harsh-Vihar	1	L&T	YES	Defective
13	Dhalipur	1	L&T	NO	
14	Dhakrani	1	L&T	NO	
15	Kiccha	1	L&T	NO	
16	Kotdwar	1	L&T	NO	
17	Roorkee	1	L&T	NO	
18	PantNgar	1	L&T	NO	
19	Sitarganj	1	L&T	NO	
20	Mahukheraganj	1	L&T	NO	
21	Noida-62	1	L&T	NO	
22	Noida-20	1	L&T	NO	
23	Noida-400kv (Greater Noida)	1	L&T	NO	
24	Mainpuri	1	L&T/Elster	NO	
25	Khurja	1	L&T	NO	
26	Gorakhpur	1	L&T	NO	
Sub-Total		26			

NR-2

S.No	Name of the SS	No of DCD required	Make of DCD	DCD Availability Status	Remarks
1	Dipalpur	1	L&T	YES	Display Prob
2	Bassi_HPSEB	1	L&T	NO	
3	Mahanpur	1	L&T	NO	
4	Jagadhari	1	L&T	NO	
5	Samaypur	1	L&T	NO	
6	Mahilpur	1	L&T	YES	Optical cable & Port Not working
7	Kartarpur	1	L&T	YES	Not Working
8	Delind-PDD	1	Elster	no	
Sub-Total		8			

NR-3

S.No	Name of the SS	No of DCD required	Make of DCD	DCD Availability Status	Remarks
1	Sarnath	1	L&T	NO	
2	Sahupuri	1	L&T	NO	
3	CB Ganj	1	L&T	NO	
4	Sarnath	1	L&T	NO	
5	sahupuri	1	L&T	NO	
6	Kiratpur	1	L&T	NO	
7	Anpara	1	L&T	NO	
8	Baithantpur	1	L&T	NO	
9	Chanduali	1	L&T	NO	
10	Sirshi	1	L&T	NO	
11	Naubasta	1	L&T	NO	
12	Mau	1	L&T	NO	
13	Renusagar	1	L&T	NO	
14	Lalitpur	1	L&T	NO	
Sub-Total		14			
Grand-Total (NR1+NR2+NR3)		48			

Note: The status regarding non availability/faulty DCD has been compiled on the basis of information received by site. WERGRID may please recheck the same if the DCD has been provided or not.



भारत सरकार/Government of India

विद्युत मंत्रालय/Ministry of Power

केंद्रीय विद्युत प्राधिकरण/Central Electricity Authority

राष्ट्रीय विद्युत समिति प्रभाग/National Power Committee Division

सं.: 3/NRCE/NPC/CEA/2018/ 942 - 948

दिनांक: 20.09.2018

To

1. Member Secretary, NRPC, 18-A, SJSS Marg, Katwaria Sarai, New Delhi-110016
2. Member Secretary, WRPC, MIDC Area Marol, Andheri(East), Mumbai - 400093
3. Member Secretary, SRPC, No. 29, Race Course Cross Road, Bengaluru - 560009
4. Member Secretary, ERPC, 14, Golf Club Road, Tolly Gunge, Kolkata-700033
5. Member Secretary, NERPC, Dong Parmaw, Lapalang Shillong-793006

विषय: Ambient temperature adjusted TTC –Reg.**संदर्भ: NLDC letter No. NLDC/SO/NPC/TempadjustedTTC/222 dated 31.08.2018**

Sir,

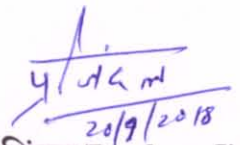
In line with the decisions in the meetings of Sub-Group of NRCE for finalizing the methodology for computation of TTC/ATC/TRM, PGCIL vide letter dated 18.04.2018 has submitted the details of current rating of terminal equipment for high capacity 400kV lines owned by POWERGRID.

In response to the NPC Division letter dated 17.08.2018, seeking status report regarding compliance/implementation of ambient temperature adjusted TTC for all the transmission corridors of the country, POSOCO vide letter dated 31.08.2018 (copy enclosed) has informed that the terminal equipment rating of both ends for the lines were available only for 99 Nos. of 400 kV lines, out of 183 lines as per the data submitted by PGCIL. Therefore, we are again taking up with PGCIL to send the complete information.

POSOCO has further requested that terminal equipment ratings of the STU and other transmission licensees would also be required for full implementing of temperature adjusted TTC.

It is, therefore, requested that the terminal equipment ratings of STUs' and other transmission licensees' transmission lines in your region, may please be compiled and furnished to POSOCO with a copy to NPC Division, CEA on priority basis.

Encl.: As Above.


(प्रदीप जिंदल/Pardeep Jindal)
मुख्य अभियन्ता / Chief Engineer

Copy to:

ED, NLDC, New Delhi- With request that while calculating the TTC for Short Term Transactions the terminal equipment rating as available may please be considered.

Copy for kind information to:

Member (GO&D), CEA, New Delhi

पावर सिस्टम ऑपरेशन कॉर्पोरेशन लिमिटेड

(भारत सरकार का उद्यम)

POWER SYSTEM OPERATION CORPORATION LIMITED

(A Govt. of India Enterprise)



पंजीकृत एवं केन्द्रीय कार्यालय : प्रथम तल, बी-9, कुतुब इंस्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली-110016

Registered & Corporate Office : 1st Floor, B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi -110016

CIN : U40105DL2009GOI188682, Website : www.posoco.in, E-mail : posococc@posoco.in, Tel.: 011- 41035696, Fax : 011- 26536901

Ref: NLDC/SO/NPC/TempadjustedTTC/222

Date: 31st August 2018

To
The Chief Engineer,
National Power Committee (NPC),
NRPC Building, 18-A,
Shaheed Jeet Singh Marg, Katwaria Sarai,
New Delhi – 110016

Annexure-32/A

Sub: Review of Ambient temperature adjusted TTC

Ref:

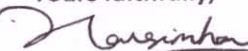
1. NPC letter 3/NRCE/NPC/CEA/2017/827-834 dtd. 17.08.2018
2. PGCIL letter no. C/CTU/N/01/NRCE dtd. 18.04.2018

Sir,

- I. This is in reference to the above communication from NPC. In the meetings of sub-group of NRCE, it was decided to finalise the methodology for computation of TTC/ATC/TRM, taking into account variations in thermal capability of lines with respect to variations of ambient temperature.
- II. Examining the details furnished by POWERGRID vide letter dtd. 18.04.2018, it was observed that details of terminal equipment ratings of both ends for the line were available for 99 nos. of 400 kV lines, out of total 183 lines. Regionwise summary is given at **Annexure-I**. Details of lines for which terminal equipment ratings of both ends are available is given at **Annexure-II**.
- III. For conducting studies in PSSE for assessment of inter control-area transfer capability, POSOCO considers thermal ratings of lines as specified in CEA's Manual on Transmission Planning Criteria 2013. These ratings are considering ambient temperature of 45^o C.
- IV. Amongst the lines in Annexure-II, 20 nos. of lines had terminal equipment rated higher than the thermal ratings considered by POSOCO in studies. The list of lines are indicated as per **Annexure - III**. Consequently there is scope for considering temperature adjusted thermal ratings in these lines. POSOCO is in the process of populating the temperature adjusted thermal rating for these lines in the PSSE study cases. It is also to mention that most of the lines were not found to be in the path of inter-regional transfer.
- V. ✓ NPC may take up with POWERGRID, STUs and other transmission licensees to furnish terminal equipment ratings at all transmission lines at 400 kV and above to ensure that there is no gap in security assessment.

Thanking you,

Yours faithfully,


(S.R.Narasimhan) 31/8/2018

Executive Director, NLDC

Copy To: Executive Director, WRLDC / ERLDC / NERLDC / NRLDC / SRLDC

Annexure - I

**Summary of details of terminal equipment ratings of 400 kV lines furnished by
POWERGRID**

Region	No. of lines for which data furnished	No. of lines with terminal equipment ratings of both ends	No. of lines requiring review
NR	65	31	8
WR	32	14	4
SR	38	26	2
ER	34	16	4
NER	2	2	0
Inter-regional	12	10	2
Total	183	99	20

Annexure - II

400 kV transmission lines with information of terminal equipment ratings at both ends

Name of the Transmission Line	Length in Ckt KM	Voltage Level in kV	Type of Conductor	Configuration	Temp Deg C	End-1Rating (MVA)	End-2 Rating (MVA)	Line rating (MVA)	Line rating as per CEA Tx Planning Criteria (MVA)
Ballabgarh-M. Bagh	60.68	400	Bersimis	Quad	75	1385.6	2078.4	1385.6	2029
Lucknow(Old)-Lucknow(New)-I	2.862	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Lucknow(Old)-Lucknow(New)-II	2.862	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Sikar-Agra-1	386	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Sikar-Agra-2	386	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Bareilly (New) - Bareilly (Old) I	1.7	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Bareilly (New) - Bareilly (Old) I	1.7	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Roorkee-Saharanpur-I	36.535	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Roorkee-Saharanpur-II	36.535	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Varanasi-Sarnath I	107.577	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
Varanasi-Sarnath II	107.577	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
Kanpur-Kanpur GIS I	21.233	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Kanpur-Kanpur GIS II	21.233	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Hissar-Kaithal I	113.12	400	ACSR	Tripple	75	1385.6	1385.6	1385.6	1270
Hissar-Kaithal I	113.12	400	ACSR	Tripple	75	1385.6	1385.6	1385.6	1270
Kaithal- Patiala I	126	400	ACSR	Tripple	75	1385.6	1385.6	1385.6	1270
Kaithal- Patiala II	126	400	ACSR	Tripple	75	1385.6	1385.6	1385.6	1270
Nalagarh- Patiala I	93.78	400	ACSR	Tripple	75	1385.6	1385.6	1385.6	1270
Nalagarh- Patiala II	93.78	400	ACSR	Tripple	75	1385.6	1385.6	1385.6	1270
Bahadurgah- Sonapat I	53.4	400	ACSR	Tripple	75	1385.6	1385.6	1385.6	1270
Bahadurgah- Sonapat II	53.4	400	ACSR	Tripple	75	1385.6	1385.6	1385.6	1270
Baghpat-Kaithal-2	153.672	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Baghpat-Kaithal-2	153.672	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Merrut-Baghpat-1	70.976	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Merrut-Baghpat-2	70.976	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Abdullapur-Kurukshetra- I	51.65	400	ACSR	Tripple	85	1385.6	1385.6	1385.6	1623
Kurukshetra- Sonapat I	124.66	400	ACSR	Tripple		2078.4	1385.6	1385.6	1623
Abdullapur-Kurukshetra- II	51.65	400	ACSR	Tripple	85	1385.6	1385.6	1385.6	1623
Kurukshetra- Sonapat I	124.66	400	ACSR	Tripple		2078.4	1385.6	1385.6	1623
Abdullapur-Panchkula- I	63	400	ACSR	Tripple	85	1385.6	1385.6	1385.6	1623
Abdullapur-Panchkula- II	63	400	ACSR	Tripple	85	1385.6	1385.6	1385.6	1623
Nalagarh-Parbati PS	47.264	400	ACSR Moose	Quad	85	1385.6	2182.32	1385.6	2211
400kV Kurukshetra- Jalandhar	267	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Gooty - Raichur-I (PG)	128.7	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Raichur (PG) - Raichur-I	22.219	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Gooty - Raichur-II (PG)	128.7	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Raichur (PG) - Raichur-II	22.219	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Nellore - Nellore PS I	3.65	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Nellore - Nellore PS II	3.65	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Nellore PS - SEPL	3.83	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Nellore PS - MEPL	3.85	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Neylore PS - Gooty I	289.004	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Neylore PS - Gooty II	289.004	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Neylore PS - TPCIL I	32.488	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Neylore PS - TPCIL II	32.73	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Kurnool - Nannoor (Kurnool) I	9.881	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Kurnool - Nannoor (Kurnool) II	9.881	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Nellore - Tiruvellum-I	172.964	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Nellore - Tiruvellum-II	172.964	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Nellore PS - NCC I	33.58	400	ACSR Moose	Quad		2078.4	2078.4	2078.4	2211
Nellore PS - NCC II	33.58	400	ACSR Moose	Quad		2078.4	2078.4	2078.4	2211
Thirunelveli - Kudankulam I	72.489	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
Tuticorin PS - Madurai I	94.924	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
Tuticorin PS - Madurai II	94.924	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211

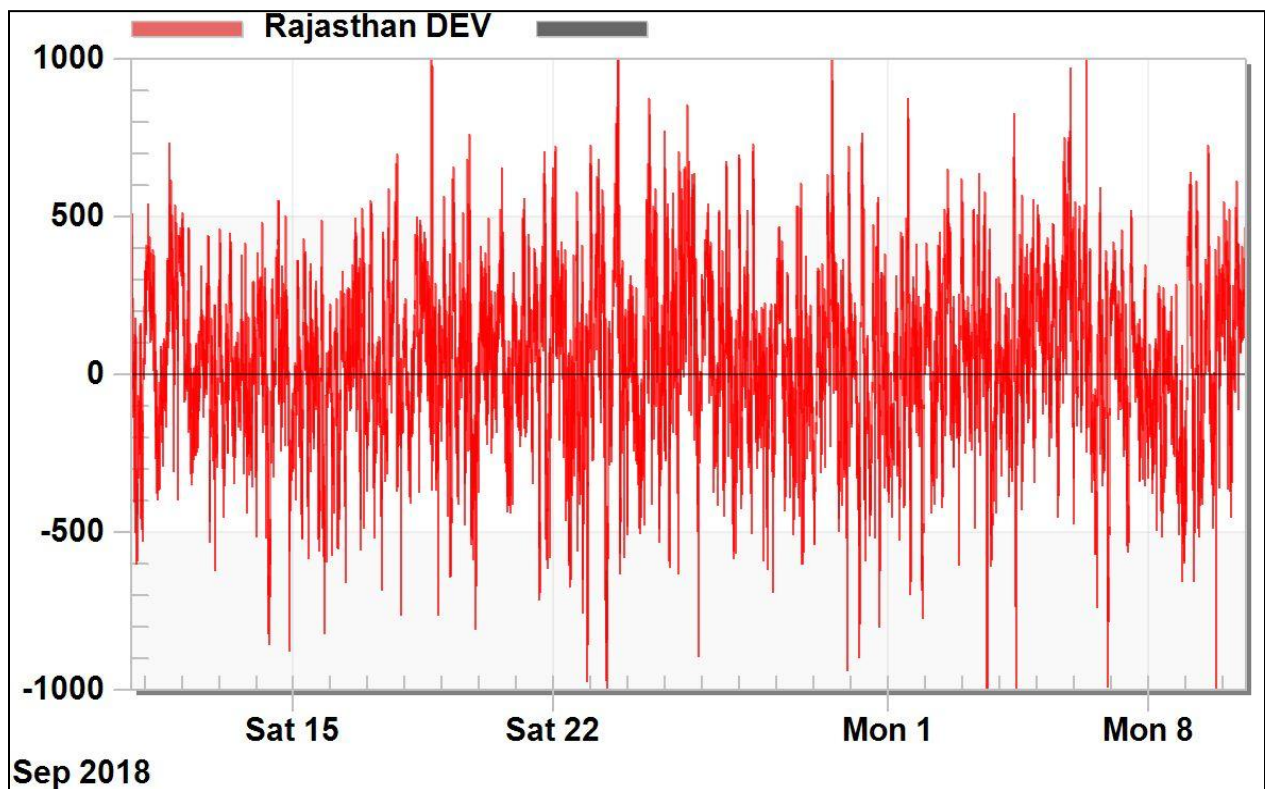
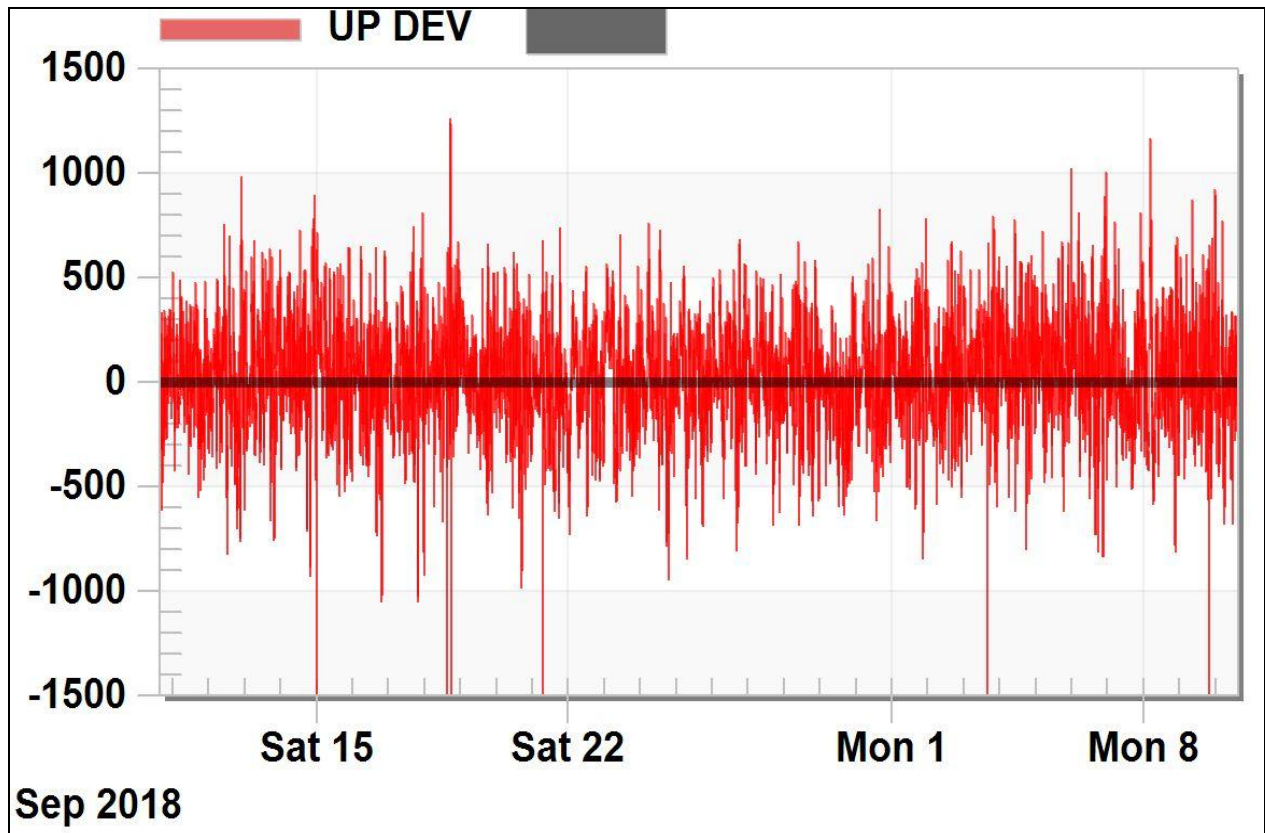
S. No.	Name of the Transmission Line	Length in Ckt KM	Voltage Level in kV	Type of Conductor	Configuration	Temp Deg C	End-1 Rating (MVA)	End-2 Rating (MVA)	Line rating (MVA)	Line rating as per CEA Tx Planning Criteria (MVA)
94	Kochi - Trichur I	78.197	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
95	Kochi - Trichur II	78.197	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
97	Tiruvelam - Chittoor II	21.022	400	ACSR Moose	Quad	85	2182.32	1385.6	1385.6	2211
100	Jeypore - Gazuwaka-I	220	400	AAAC	Twin	75	1385.6	1385.6	1385.6	874
101	Jeypore - Gazuwaka-II	220	400	AAAC	Twin	75	1385.6	1385.6	1385.6	874
106	Narendra - Kudgi I	176.13	400	Zebra	Quad	85	2078.4	2182.32	2078.4	1948
107	Narendra - Kudgi II	176.13	400	Zebra	Quad	85	2078.4	2182.32	2078.4	1948
108	Aurangabad(PG) - Aurangabad I	52.563	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
109	Aurangabad(PG) - Aurangabad II	52.563	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
110	Wardha - Parli I	336.939	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
111	Wardha - Parli II	336.939	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
120	Jabalpur - Itarsi-I	232	400	ACKC	Twin	75	1385.6	1385.6	1385.6	874
121	Jabalpur - Itarsi-II	232	400	ACKC	Twin	75	1385.6	1385.6	1385.6	874
122	Seoni - Khandwa-I	351.729	400	AAAC	Quad	75	2182.32	2182.32	2182.32	1680
123	Seoni - Khandwa-II	351.729	400	AAAC	Quad	75	2182.32	2182.32	2182.32	1680
128	Indore - Indore II (MP)	49.73	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
129	Indore - Indore I (MP)	49.73	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
132	Jabalpur PS - Jabalpur I	15.456	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
133	Jabalpur PS - Jabalpur II	15.456	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
134	Pirana - Vadodara I	131.549	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
136	Pirana - Vadodara II	131.549	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
142	Ballia-Biharshariff I	241.79	400	ACSR	Quad	85	2078.4	2078.4	2078.4	2211
143	Ballia-Biharshariff II	241.79	400	ACSR	Quad	85	2078.4	1385.6	1385.6	2211
144	Patna-Ballia I	195.323	400	ACSR	Quad	85	2078.4	2078.4	2078.4	2211
145	Patna-Ballia II	195.323	400	ACSR	Quad	85	2078.4	2078.4	2078.4	2211
148	Patna-Ballia III	185	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
149	Patna-Ballia IV	185	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
150	Biharshariff - Sasaram III (now purnea-I)	324.185	400	ACSR Moose	Quad	85	1385.6	1385.6	1385.6	2211
151	Biharshariff - Sasaram IV(now purnea-II)	324.185	400	ACSR Moose	Quad	85	1385.6	1385.6	1385.6	2211
158	Ranchi (New) - Ranchi I	78.617	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
159	Ranchi (New) - Ranchi II	78.617	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
160	Ranchi (New) - Ranchi III	78.542	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
161	Ranchi (New) - Ranchi IV	78.542	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
162	Patna-Kishanganj I	346.72	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
163	Patna-Kishanganj II	346.72	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
166	New Ranchi - Chandwa I	68	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
168	New Ranchi - Chandwa II	68	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
172	New Purnea - New Siliguri I	168	400	HTLS	Twin	75	2078.4	2078.4	2078.4	1748
173	New Purnea - New Siliguri II	168	400	HTLS	Twin	75	2078.4	2078.4	2078.4	1748
174	Newpurnea - Kishanganj-I (LILO portion)		400	ACSR Moose	Quad		1385.6	2078.4	1385.6	2211
176	Newpurnea - Kishanganj-II (LILO portion)		400	ACSR Moose	Quad		1385.6	2078.4	1385.6	2211
78	Durgapur-Maithon I	70.77	400	ACSR	Twin	85	1385.6	1385.6	1385.6	1106
79	Durgapur-Maithon II	70.77	400	ACSR	Twin	85	1385.6	1385.6	1385.6	1106
82	Balipara - Bongaingaon III	309	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
83	Balipara - Bongaingaon IV	309	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211

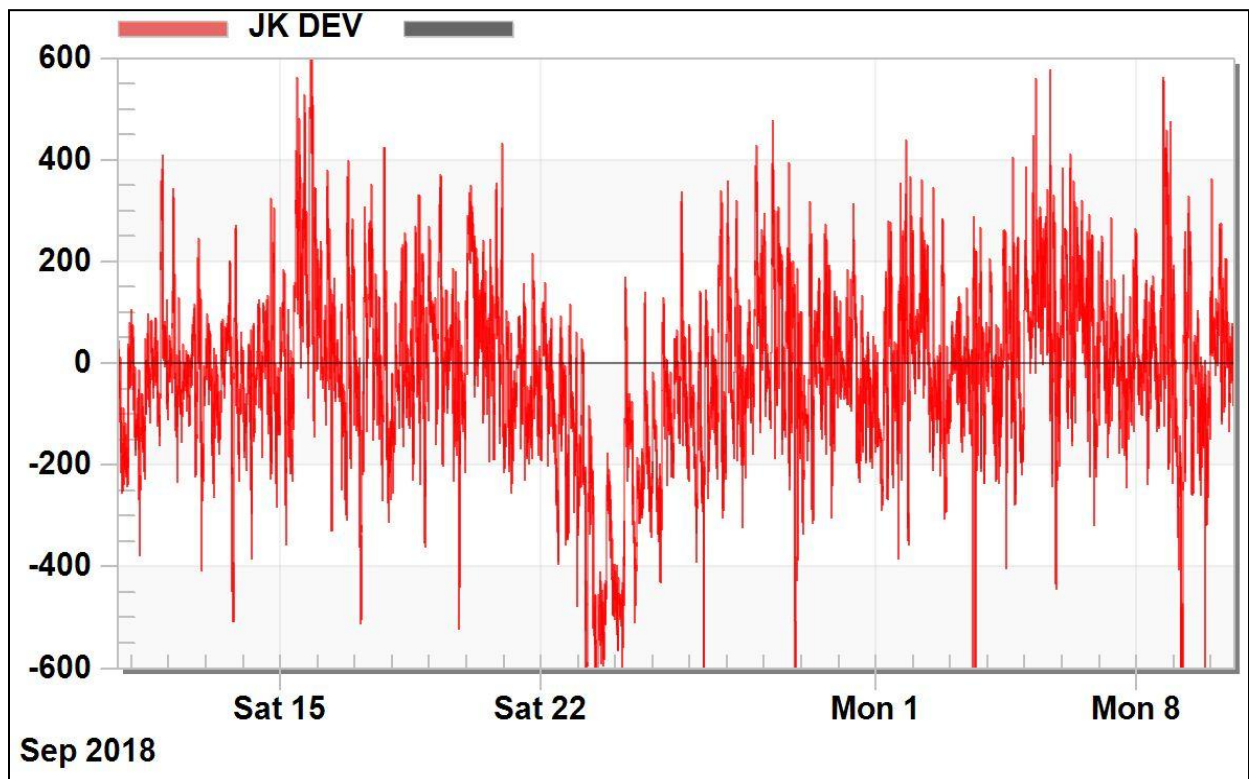
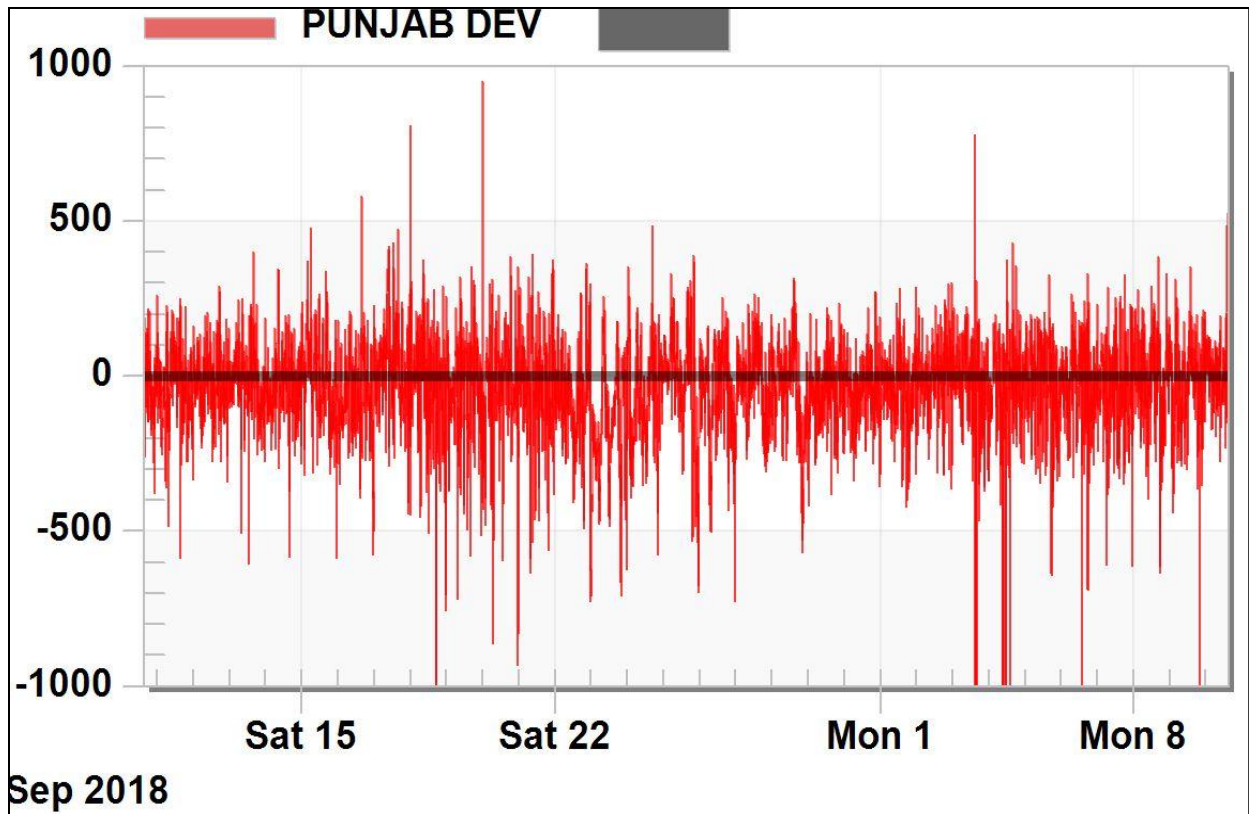
Note : Sl.Nos. in this document are as per Annexure to letter received from POWERGRID on 18.04.18

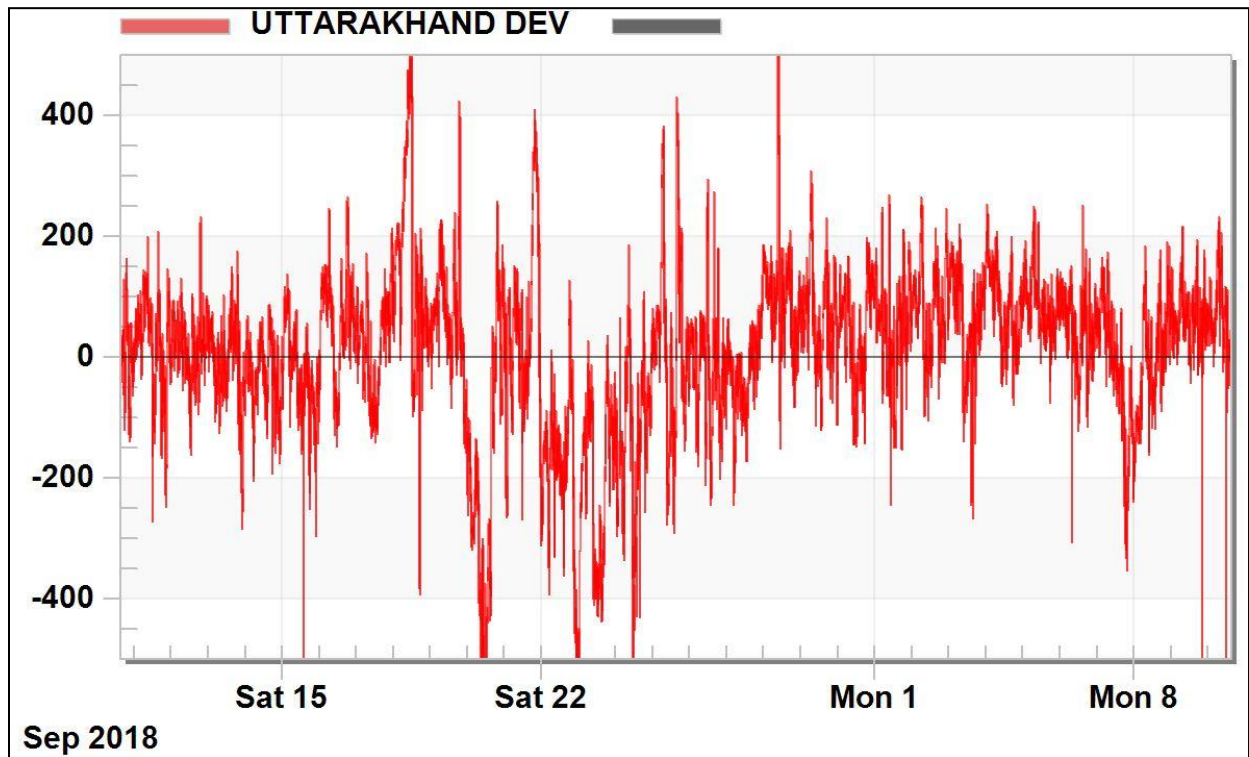
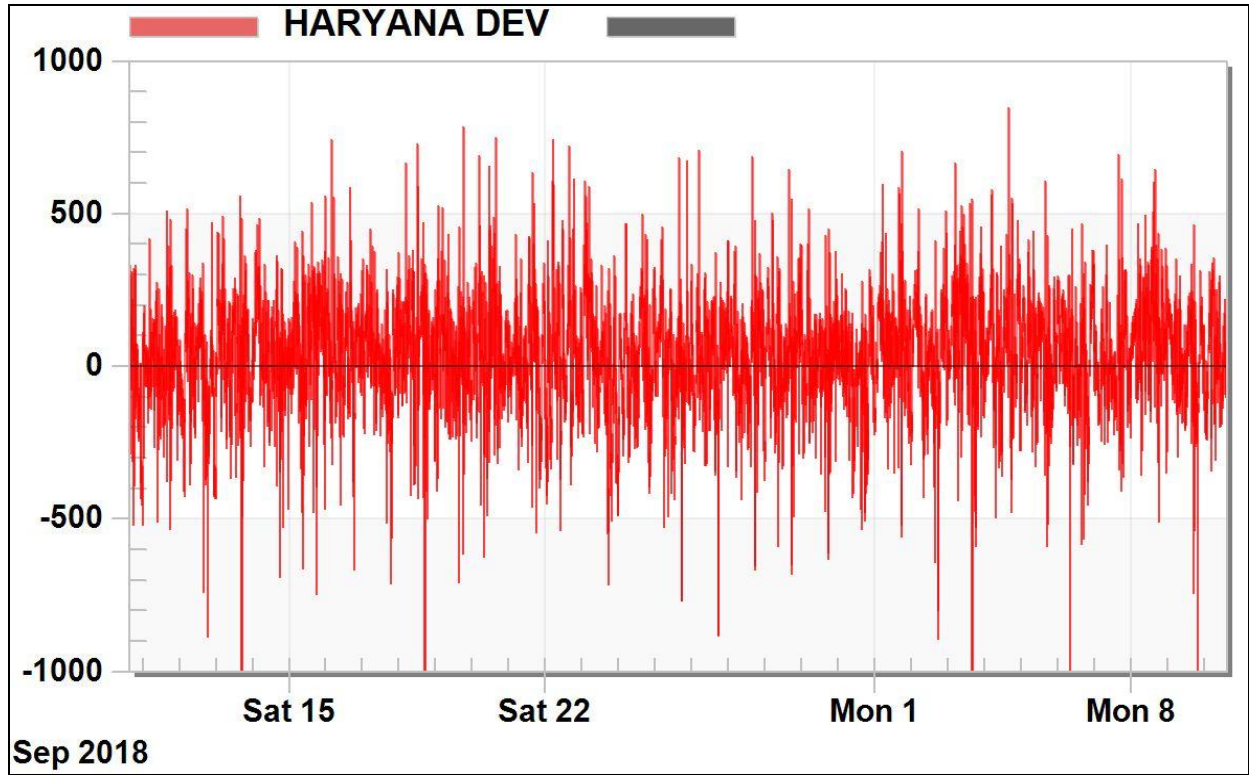
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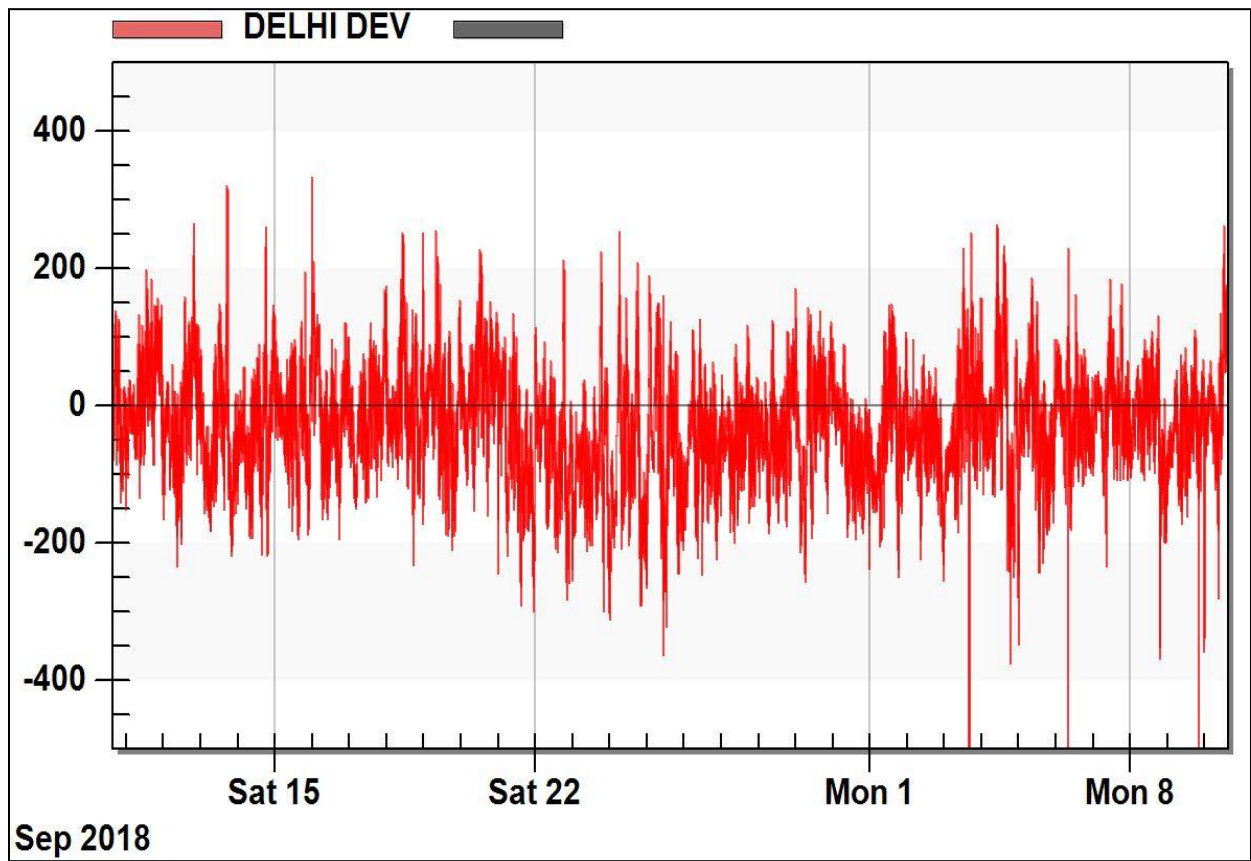
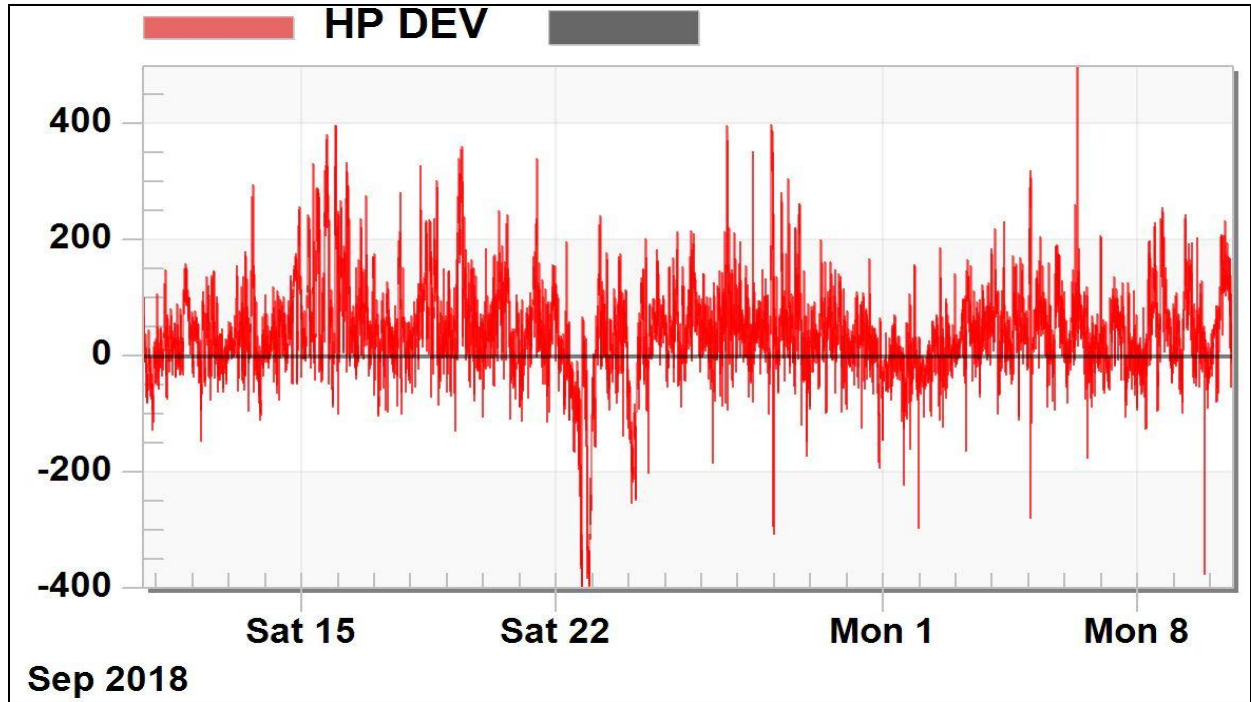
400 kV Transmission lines with need for review considering variation in ambient temperature

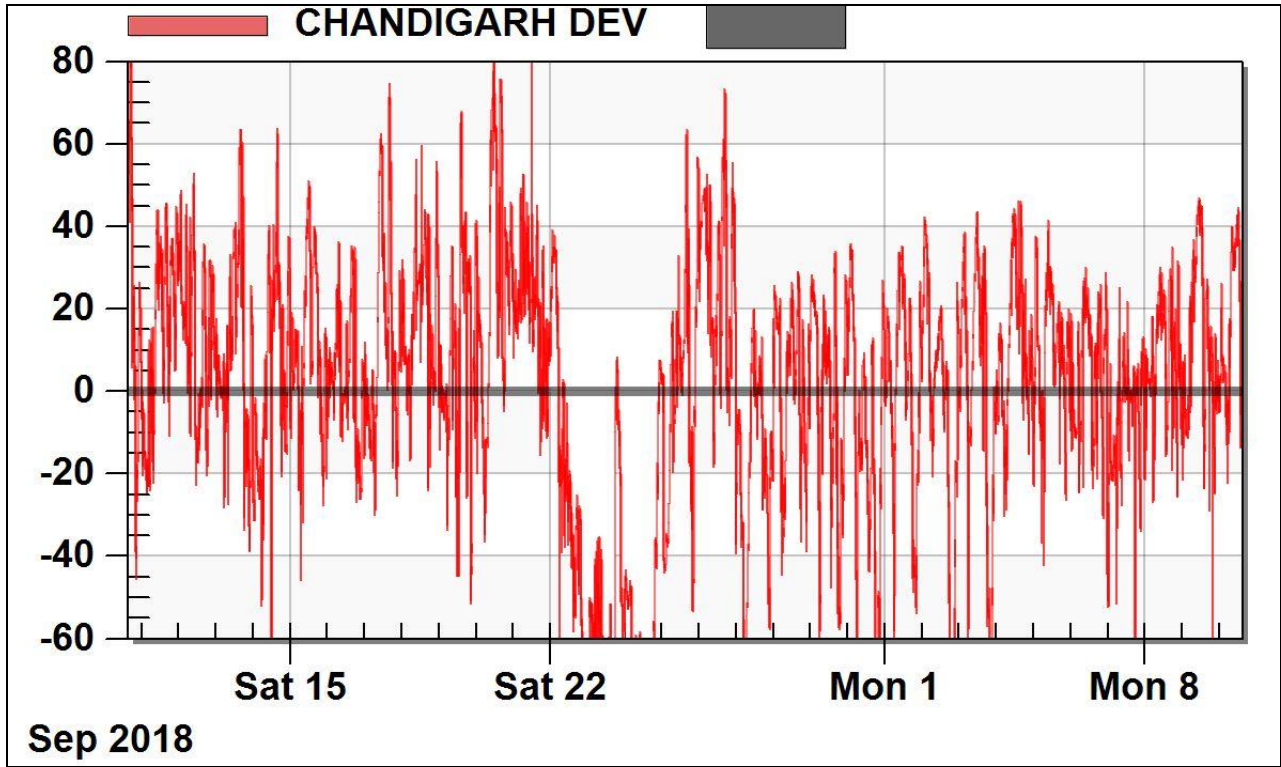
Sl.No.	Line	Thermal rating as per limitations on terminal equipment	Thermal rating as per CEA's Manual on Tx Planning criteria (45⁰C ambient temperature)
1	400 kV Hissar - Kaithal I	1386	1270
2	400 kV Hissar - Kaithal II	1386	1270
3	400 kV Kaithal - Patiala I	1386	1270
4	400 kV Kaithal - Patiala II	1386	1270
5	400 kV Nalagarh - Patiala I	1386	1270
6	400 kV Nalagarh - Patiala II	1386	1270
7	400 kV Bahadurgarh - Sonapat I	1386	1270
8	400 kV Bahadurgarh - Sonapat II	1386	1270
9	400 kV Jeypore - Gazuwaka I	1386	874
10	400 kV Jeypore - Gazuwaka II	1386	874
11	400 kV Narendra - Kudugi I	2078	1948
12	400 kV Narendra - Kudugi II	2078	1948
13	400 kV Jabalpur - Itarsi I	1386	874
14	400 kV Jabalpur - Itarsi II	1386	874
15	400 kV Seoni - Khandwa I	2182	1680
16	400 kV Seoni - Khandwa II	2182	1680
17	400 kV New Purnea - New Siliguri I	2078	1748
18	400 kV New Purnea - New Siliguri II	2078	1748
19	400 kV Durgapur-Maithon I	1386	1106
20	400 kV Durgapur-Maithon II	1386	1106











Transformer Tap Optimization Study for Northern Region
9th October 2018
NRLDC, POSOCO



Objective: Tap changing studies of ICTs in Northern Region for maintaining healthy voltage profile at 400 & 765 kV level during the winter season of 2018.

Methodology:

1. Voltages at 765/400 and 400/220 kV stations were examined from SCADA data.
2. Reactive energy accounts issued by NRPC were examined to observe the MVAR injection at high voltage.
3. Present tap positions (Sep'18) were available from NR-2, NR-3, and Punjab. These were incorporated in basecase.
4. Terminal voltage settings for generators were changed in basecase to match MVAR generations with real time (last winter).
5. Offline tap changing studies were carried out using PSSe software. Tap positions of 400/220kV ICTs were changed from present tap setting and changes in voltages/reactive power flow were observed.

Assumptions in Offline Studies:

1. Anticipated Load-Generation scenario of December 2018 is simulated in PSSe.
2. All major elements in Northern Region are considered to be in service.

S. No.	Name of State/Area	Load (MW)	Generation (MW)
1	Punjab	4483	3187
2	Haryana	4884	2002
3	Rajasthan	8564	5045
4	Delhi	2504	493
5	Uttar Pradesh	11853	7417
6	Jammu & Kashmir	1809	167
7	Uttarakhand	1522	685
8	Himachal Pradesh	1139	237
9	Chandigarh	129	-
Total NR		36944	19233+10732= 29965 States+Others=Regional

Observations:

1. High voltages observed as per SCADA data (2017-18):

S. No.	400/220 kV Substation	Nov'2017		Dec'2017		Jan'2018		Average 2017-18 winter	
		>410 kV	>420 kV	>410 kV	>420 kV	>410 kV	>420 kV	>410 kV	>420 kV
1	Talwandi Saboo	99%	95%	100%	99%	100%	99%	100%	98%
2	Rajpura	99%	94%	99%	88%	100%	87%	99%	90%
3	Parichha	99%	86%	100%	93%	100%	89%	100%	89%
4	Agra	100%	95%	100%	88%	100%	84%	100%	89%
5	Mahindergarh	100%	92%	100%	85%	100%	80%	100%	86%
6	MGTPS	99%	89%	100%	85%	100%	74%	100%	83%
7	Makhu	99%	86%	100%	78%	100%	80%	100%	81%
8	Jalandhar	100%	89%	99%	76%	99%	75%	99%	80%
9	Fatehpur	100%	74%	100%	77%	98%	67%	99%	73%
10	Suratgarh	99%	74%	98%	64%	100%	74%	99%	71%
11	Dhuri	99%	78%	100%	59%	100%	55%	100%	64%
12	Nuhiyawali	87%	49%	92%	59%	96%	65%	92%	58%
13	Nallagarh	100%	62%	100%	56%	100%	54%	100%	57%
14	Harshvihar	99%	53%	99%	61%	99%	56%	99%	57%
15	Nakodar	99%	77%	100%	35%	data error		99%	56%
16	Karcham Wangtoo	98%	65%	96%	49%	93%	49%	96%	54%
17	Jodhpur	94%	54%	85%	54%	data error		74%	54%
18	Fatehabad	97%	63%	96%	68%	93%	30%	95%	54%
19	Allahabad	100%	35%	100%	68%	100%	55%	100%	53%
20	Bhiwani	100%	59%	94%	53%	98%	45%	97%	52%
21	Muzaffarnagar	99%	59%	90%	49%	92%	46%	94%	51%
22	Abdullapur	99%	56%	99%	55%	95%	40%	98%	50%
23	Bhiwadi	98%	54%	91%	29%	98%	68%	96%	50%
24	Maharanibagh	82%	42%	98%	50%	97%	58%	92%	50%
25	Kabulpur	97%	56%	99%	49%	97%	40%	98%	48%
26	Dehar	99%	56%	97%	44%	95%	41%	97%	47%
27	Bhiwani (BBMB)	99%	53%	98%	46%	95%	41%	97%	47%
28	Malerkotla	100%	49%	100%	45%	94%	39%	98%	44%
29	Mainpuri	99%	54%	99%	53%	96%	25%	98%	44%
30	Mandola	99%	47%	99%	42%	98%	43%	99%	44%
31	Sonepat	99%	50%	98%	43%	92%	33%	96%	42%
32	Amritsar	99%	47%	98%	38%	99%	39%	99%	41%
33	CCGTB	99%	43%	99%	43%	96%	35%	98%	40%
34	Jhatikara	96%	34%	99%	45%	96%	42%	97%	40%

S. No.	400/220 kV Substation	Nov'2017		Dec'2017		Jan'2018		Average 2017-18 winter	
		>410 kV	>420 kV	>410 kV	>420 kV	>410 kV	>420 kV	>410 kV	>420 kV
35	Panchkula	99%	48%	99%	39%	94%	31%	97%	39%
36	Parbati 3	93%	48%	99%	35%	98%	35%	97%	39%
37	Jhajjar	86%	39%	99%	40%	99%	38%	95%	39%
38	Nathpa Jhakri	99%	48%	99%	44%	92%	24%	97%	39%
39	Parbati pool	98%	38%	99%	49%	97%	27%	98%	38%
40	Koldam	99%	42%	99%	33%	98%	31%	99%	35%
41	Bawana	95%	30%	93%	35%	94%	35%	94%	33%
42	Agra UP	81%	20%	94%	48%	86%	29%	87%	32%
43	Dadri	95%	22%	96%	37%	97%	36%	96%	32%
44	Chamera-1	86%	33%	82%	23%	98%	38%	89%	31%
45	Khedar	95%	69%	90%	13%	90%	12%	92%	31%
46	Neemrana	88%	31%	85%	28%	87%	29%	87%	29%
47	Shree cement	75%	13%	88%	43%	89%	32%	84%	29%
48	Panipat	90%	30%	94%	35%	73%	20%	86%	28%
49	Lucknow	97%	56%	93%	21%	68%	7%	86%	28%
50	Kaithal	95%	25%	95%	29%	90%	28%	93%	27%
51	Baspa	88%	33%	96%	35%	85%	13%	90%	27%
52	Sikar	75%	27%	75%	22%	80%	22%	77%	24%
53	Patiala	96%	26%	98%	23%	90%	16%	95%	22%
54	Shahjahanpur	98%	16%	97%	26%	87%	16%	94%	19%
55	Sohawal	99%	16%	98%	21%	90%	21%	96%	19%
56	Koteshwar	97%	36%	72%	18%	57%	3%	75%	19%
57	Lucknow	99%	13%	96%	22%	83%	12%	93%	16%
58	Mundka	97%	6%	96%	8%	92%	17%	95%	10%

2. From Reactive Energy Accounts (NRPC website):

Area	Reactive energy injection at High Voltage (2017-18 winter)
UP	Anpara, Mainpuri (PG), Rosa, Panki
Rajasthan	Hissar (BBMB), Khetri(BBMB), Bhinmal, Heerapura, Jaipur-South (PG), Sikar
Delhi	Bamnoli, Bawana, Maharani Bagh, Mundka, Narela(BBMB)
Haryana	Dipalpur, Gurgaon (PG), Hissar

Area	Reactive energy injection at High Voltage (2017-18 winter)
Punjab	Gobindgarh, Jamsher, Amritsar(PG), Moga(PG), Patiala(PG), Sarna
HP	Jessore (BBMB)
J&K	-

3. Offline Study Results:

Table: Offline tap changing study results

S. No	Location	Station (400/220kV)	CASE-1				CASE-2							CASE-3						
			Present Tap	400 kV Voltage	220 kV Voltage	Reactive Power Flow HV to LV	Modified Tap	400 kV Voltage	220 kV Voltage	Reactive Power Flow HV to LV	Change in 400 kV voltage	Change in 220 kV voltage	Change in Reactive Power Flow HV to LV	Modified Tap	400 kV Voltage	220 kV Voltage	Reactive Power Flow HV to LV	Change in 400 kV voltage	Change in 220 kV voltage	Change in Reactive Power Flow HV to LV
				kV	kV	MVA		kV	kV	MVA	kV	kV	MVA		kV	kV	MVA	kV	kV	MVA
			A	B	C	D	E	F	G	H	F-B	G-C	H-D	I	J	K	L	J-B	K-C	L-D
1	Delhi	Bamnoli	9	409	220	271	11	408	225	274	-1	5	4	13	407	231	279	-2	11	8
2		Maharani bagh	9	411	225	38	11	410	230	35	-1	5	-3	13	409	236	35	-2	11	-3
3		Mundka	9	410	223	64	11	409	227	117	-1	4	53	13	408	231	178	-2	8	114
4		Harshvihar	9	408	222	73	11	407	227	83	-1	5	10	13	406	232	94	-2	10	22
5		Mandola	9	410	223	203	11	409	228	225	-1	4	22	13	408	232	241	-2	9	38
6	Rajasthan	Akal	9	410	227	-62	11	404	227	-52	-6	1	10	13	400	229	-132	-10	3	-71
7		Bhiwadi	9	419	226	133	11	418	231	161	-1	5	28	13	417	236	183	-2	10	50
8		Neemrana	9	418	228	33	11	416	233	61	-2	4	28	13	415	237	91	-3	9	58
9		Jodhpur	9	412	222	65	11	408	224	116	-4	2	51	13	406	226	172	-6	4	106
10		Sikar	9	420	229	77	11	419	232	152	-1	4	76	13	418	236	232	-2	7	155
11	UP	Sohawal	9	414	225	47	11	412	229	88	-2	3	41	13	410	232	124	-4	7	77
12		Mainpuri (PG)	13	416	226	89	11	415	231	130	-1	4	41	13	414	235	175	-3	9	85

S. No	Location	Station (400/220kV)	CASE-1				CASE-2							CASE-3						
			Present Tap	400 kV Voltage	220 kV Voltage	Reactive Power Flow HV to LV	Modified Tap	400 kV Voltage	220 kV Voltage	Reactive Power Flow HV to LV	Change in 400 kV voltage	Change in 220 kV voltage	Change in Reactive Power Flow HV to LV	Modified Tap	400 kV Voltage	220 kV Voltage	Reactive Power Flow HV to LV	Change in 400 kV voltage	Change in 220 kV voltage	Change in Reactive Power Flow HV to LV
				kV	kV	MVAr		kV	kV	MVAr	kV	kV	MVAr		kV	kV	MVAr	kV	kV	MVAr
			A	B	C	D	E	F	G	H	F-B	G-C	H-D	I	J	K	L	J-B	K-C	L-D
13		Lucknow (UP)	9	414	224	78	11	413	228	119	-1	4	40	13	412	231	161	-3	7	83
14		Muzaffarnagar	9	409	219	170	11	408	223	218	-1	4	48	13	406	227	271	-3	8	101
15		Shahjahanpur	9	418	229	14	11	417	234	34	-1	5	20	13	416	239	55	-2	10	41
16		Allahabad	13	417	227	63	11	416	230	141	-1	3	77	13	415	234	223	-2	7	160
17		Fatehpur	9	420	228	71	11	419	231	129	-1	3	58	13	418	234	191	-2	6	120
18		Lucknow (PG)	9	415	226	57	11	414	230	92	-1	4	35	13	413	234	128	-2	9	71
19		Meerut	9	410	220	221	11	409	225	276	-1	4	55	13	407	229	84	-2	9	-137
20	J&K	Kishenpur	11	404	221	191	11	405	222	183	1	1	-8	13	402	225	245	-3	3	54
21	HP	Hamirpur	11	407	228	39	11	407	228	35	1	1	-4	13	404	222	35	-3	-6	-4
22		Nallagarh	10	411	222	109	11	411	227	170	0	4	62	13	408	231	182	-3	8	73
23	Punjab	Amritsar	11	409	227	123	11	409	227	122	0	0	-1	13	406	231	154	-3	4	30
24		Dhuri	9	412	225	31	11	411	229	94	-1	4	63	13	410	233	140	-2	8	109
25		Jalandhar	11	409	228	108	11	409	228	112	1	1	4	13	406	232	129	-3	4	21
26		Ludhiana	11	403	226	76	11	404	226	71	1	1	-5	13	401	230	104	-2	4	28

S. No	Location	Station (400/220kV)	CASE-1				CASE-2							CASE-3						
			Present Tap	400 kV Voltage	220 kV Voltage	Reactive Power Flow HV to LV	Modified Tap	400 kV Voltage	220 kV Voltage	Reactive Power Flow HV to LV	Change in 400 kV voltage	Change in 220 kV voltage	Change in Reactive Power Flow HV to LV	Modified Tap	400 kV Voltage	220 kV Voltage	Reactive Power Flow HV to LV	Change in 400 kV voltage	Change in 220 kV voltage	Change in Reactive Power Flow HV to LV
				kV	kV	MVAr		kV	kV	MVAr	kV	kV	MVAr		kV	kV	MVAr	kV	kV	MVAr
			A	B	C	D	E	F	G	H	F-B	G-C	H-D	I	J	K	L	J-B	K-C	L-D
27		Makhu	11	410	227	86	11	410	227	75	0	0	-11	13	408	232	80	-2	5	-5
28		Malerkotla	11	409	228	95	11	410	229	104	1	1	9	13	407	233	93	-2	5	-3
29		Moga	11	408	227	173	11	409	227	146	0	1	-28	13	407	232	161	-2	5	-12
30		Muktsar	9	411	224	21	11	410	229	45	-1	5	24	13	409	234	49	-2	10	28
31		Nakodar	9	412	226	-13	11	411	229	48	-1	3	61	13	409	233	80	-3	7	93
32		Patiala	11	408	226	189	11	409	228	122	1	2	-68	13	407	232	136	-1	7	-53
33		Haryana	Abdullapur	11	415	229	237	11	415	229	236	0	0	-2	13	413	233	286	-2	4
34	Ballabgarh		9	412	225	99	11	411	229	204	-2	4	105	13	410	234	216	-3	9	117
35	Bahadur garh		9	413	225	60	11	412	230	75	-1	5	15	13	410	235	77	-2	10	17
36	Bhiwani		9	412	225	27	11	412	228	62	-1	4	34	13	411	232	88	-2	8	61
37	Daultabad		9	414	225	68	11	413	230	84	-1	5	16	13	412	235	94	-2	10	25
38	Dhanoda		9	417	226	82	11	417	232	101	-1	5	19	13	415	237	114	-2	10	32
39	Deepalpur		9	414	225	55	11	413	230	58	-1	6	3	13	412	236	59	-2	11	4
40	Fatehabad		13	411	224	24	11	410	228	64	-1	4	41	13	408	232	101	-2	7	77

S. No	Location	Station (400/220kV)	CASE-1				CASE-2						CASE-3							
			Present Tap	400 kV Voltage	220 kV Voltage	Reactive Power Flow HV to LV	Modified Tap	400 kV Voltage	220 kV Voltage	Reactive Power Flow HV to LV	Change in 400 kV voltage	Change in 220 kV voltage	Change in Reactive Power Flow HV to LV	Modified Tap	400 kV Voltage	220 kV Voltage	Reactive Power Flow HV to LV	Change in 400 kV voltage	Change in 220 kV voltage	Change in Reactive Power Flow HV to LV
				kV	kV	MVAr		kV	kV	MVAr	kV	kV	MVAr		kV	kV	MVAr	kV	kV	MVAr
			A	B	C	D	E	F	G	H	F-B	G-C	H-D	I	J	K	L	J-B	K-C	L-D
41		Gurgaon	9	414	226	89	11	413	231	123	-2	5	34	13	412	236	126	-3	10	37
42		Kabulpur	9	414	224	74	11	414	229	88	-1	5	14	13	412	234	95	-2	10	21
43		Manesar	9	414	226	58	11	413	230	78	-2	5	19	13	411	236	82	-3	10	24
44		Nuhyawali	9	411	225	32	11	410	228	64	-2	3	33	13	409	233	72	-3	9	40
45		Panchkula	11	411	228	151	11	412	229	124	1	1	-27	13	409	233	144	-2	5	-7
46		Panipat	9	407	221	56	11	406	226	78	-1	5	22	13	405	231	90	-3	9	33
47		Sonepat	9	412	223	72	11	412	228	86	-1	5	14	13	410	233	88	-3	10	16

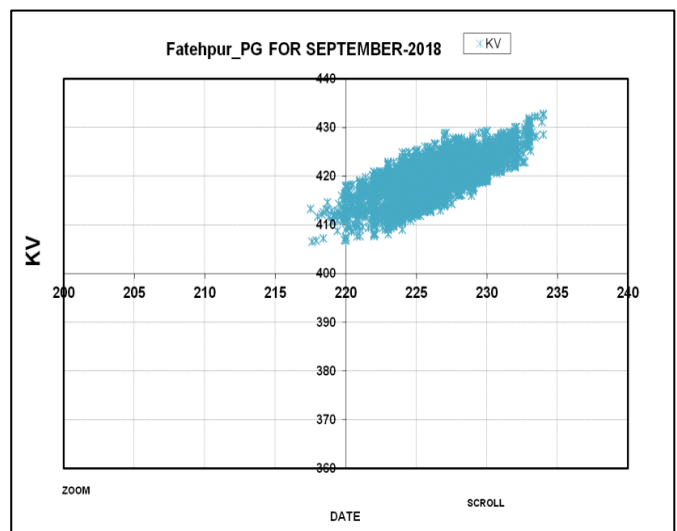
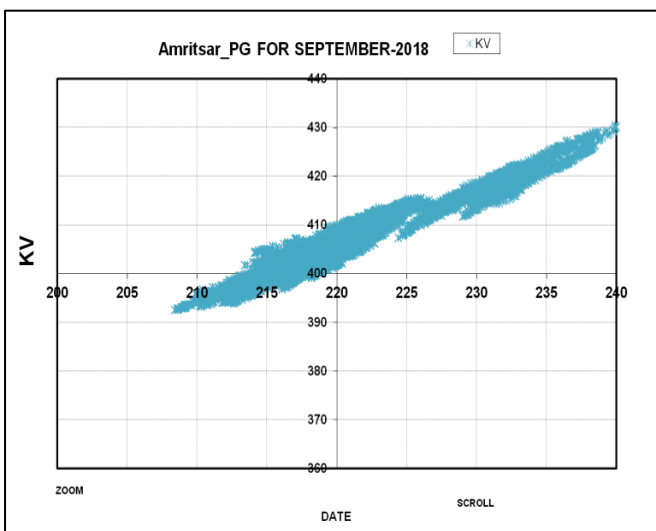
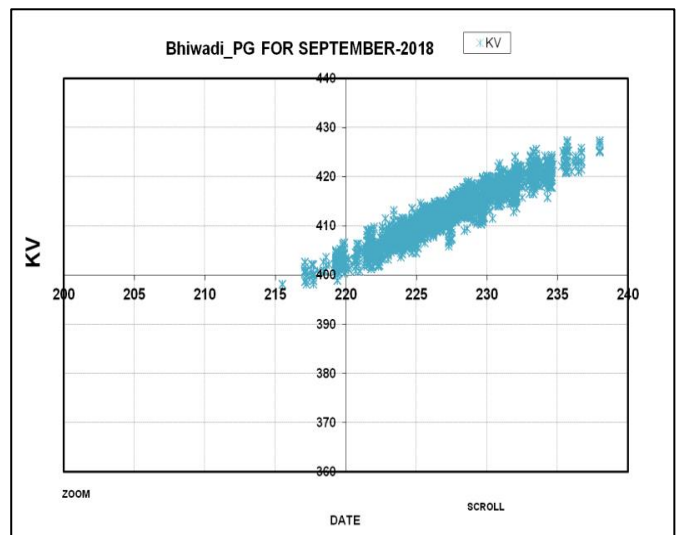
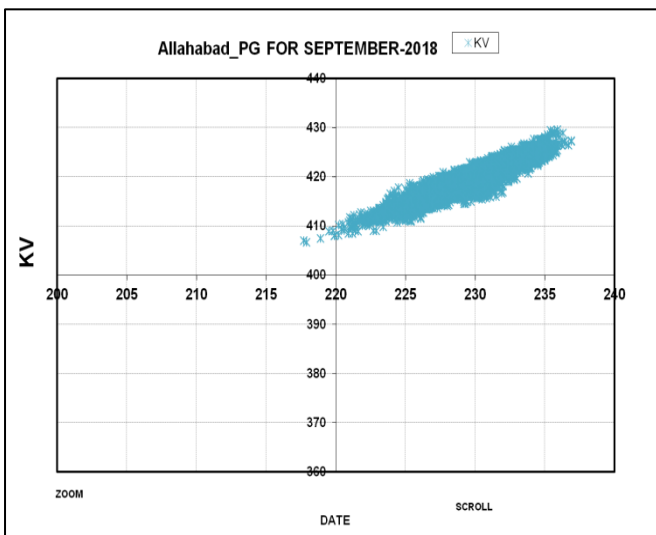
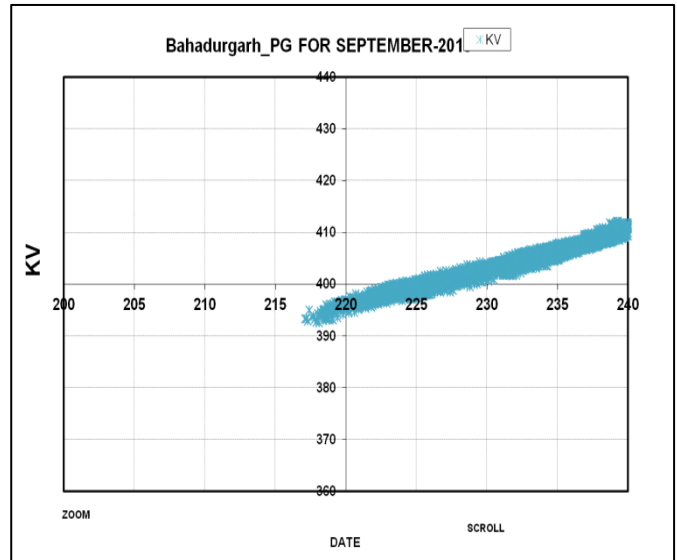
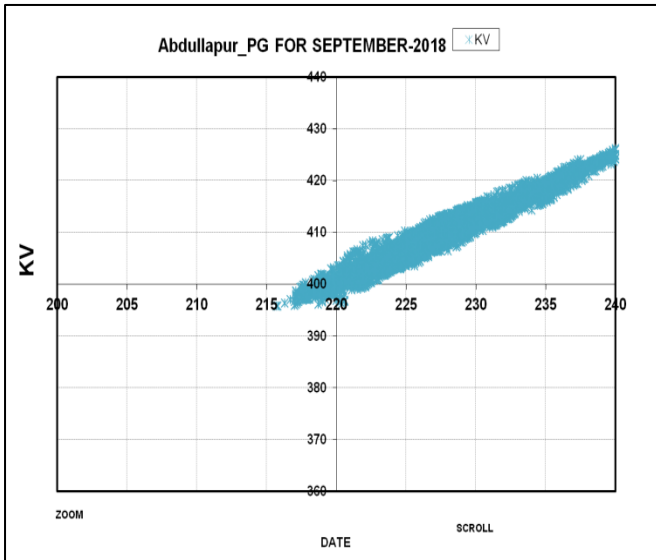
4. Suggestions/ Inference:

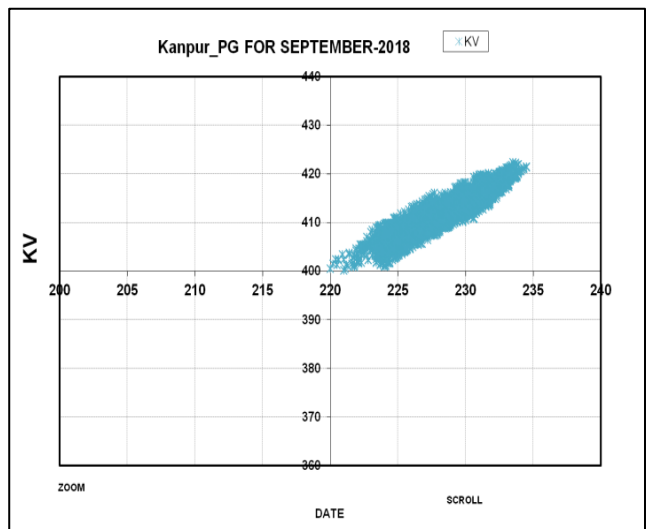
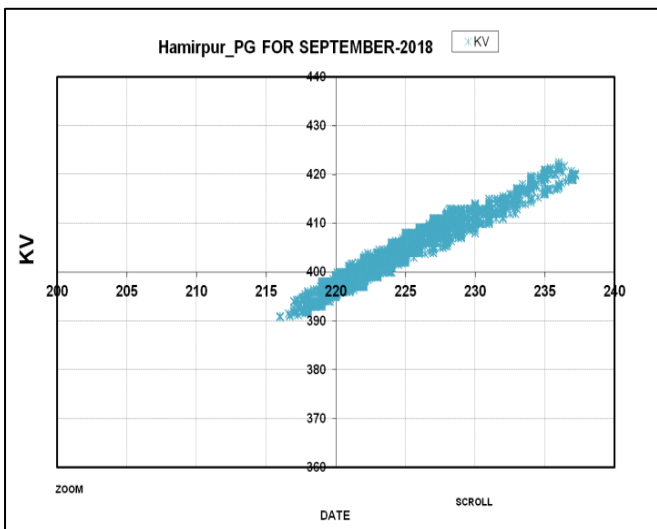
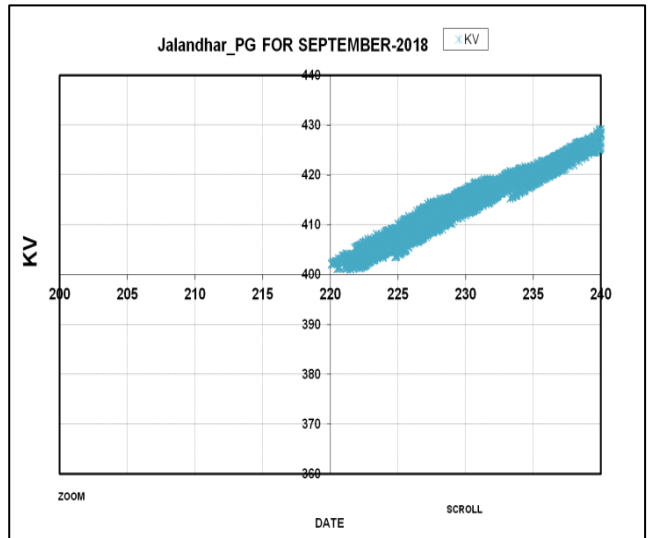
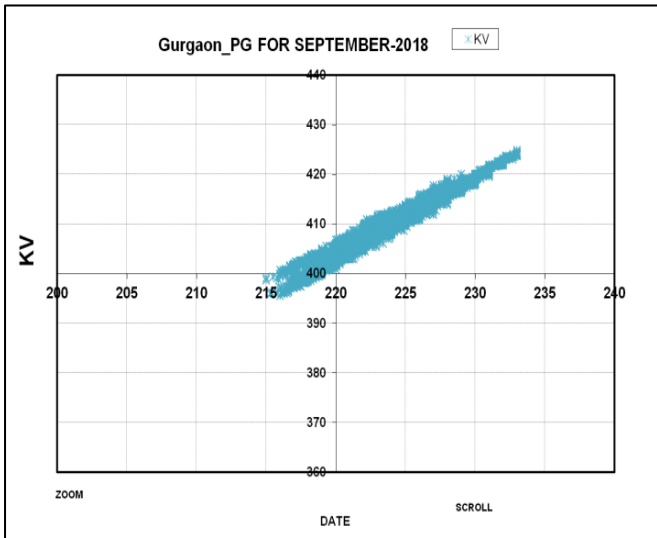
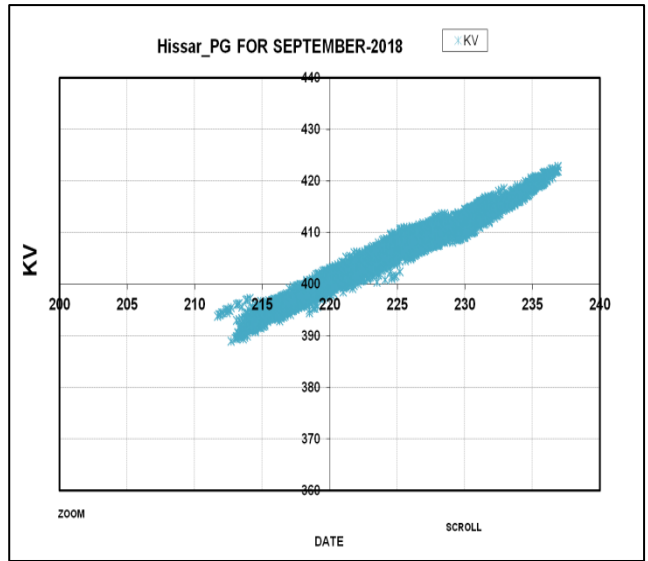
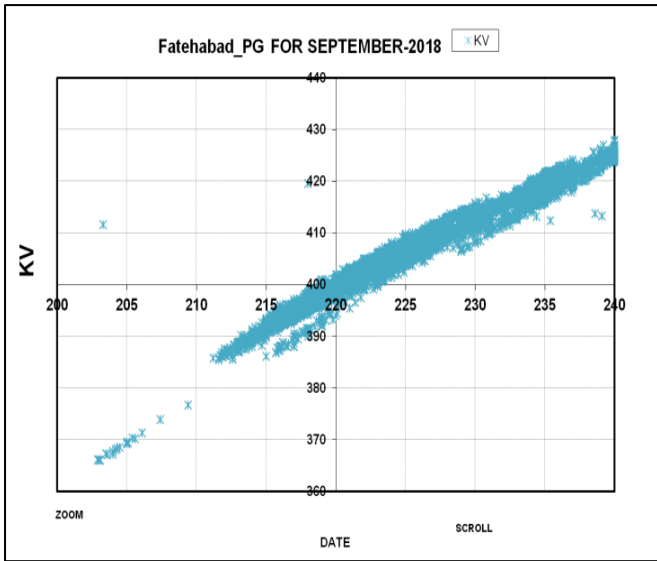
1. It can be observed that the voltages at many 400 kV and 765 kV Nodes remain high for 70 % of the time during winter season.
2. Available scatter plots for different nodes are attached as Annexure. Scatter plots of September 2018 and results obtained from simulation studies were used to recommend nodes for tap change exercise.
3. Considering the present tap positions of ICTs at different locations, it is recommended that the tap position of 400/220 kV ICTs at the following locations may be changed:

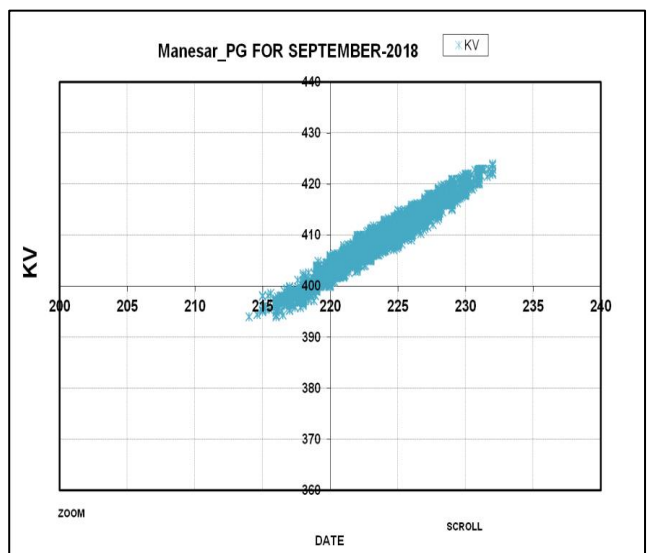
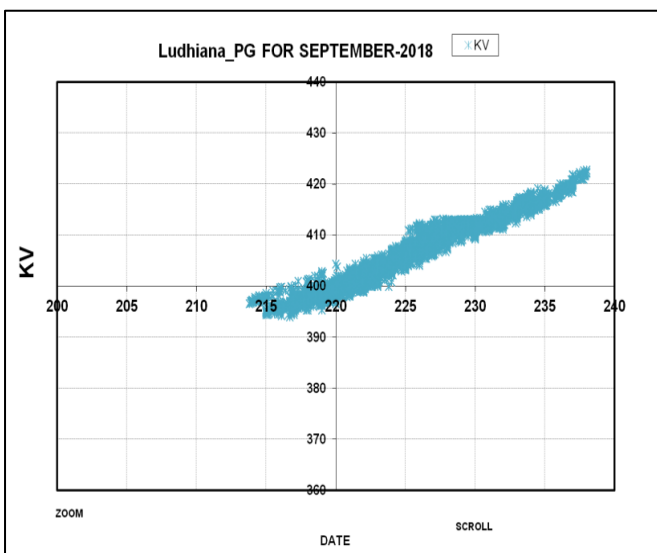
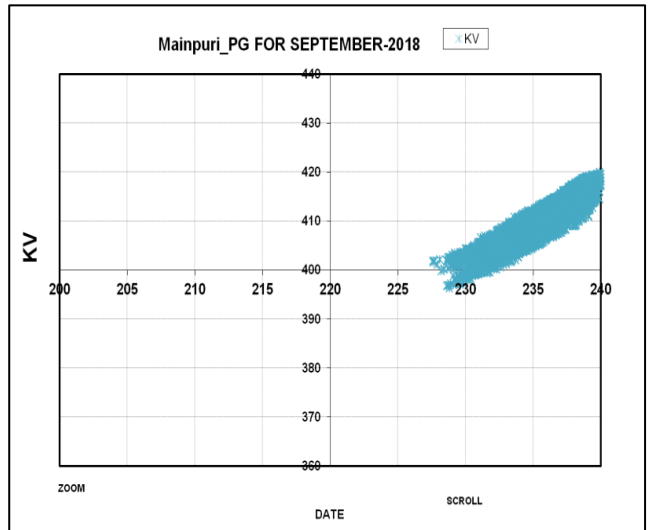
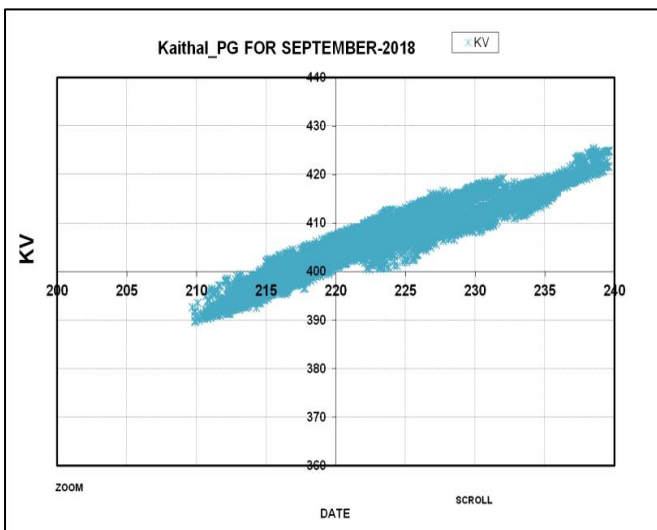
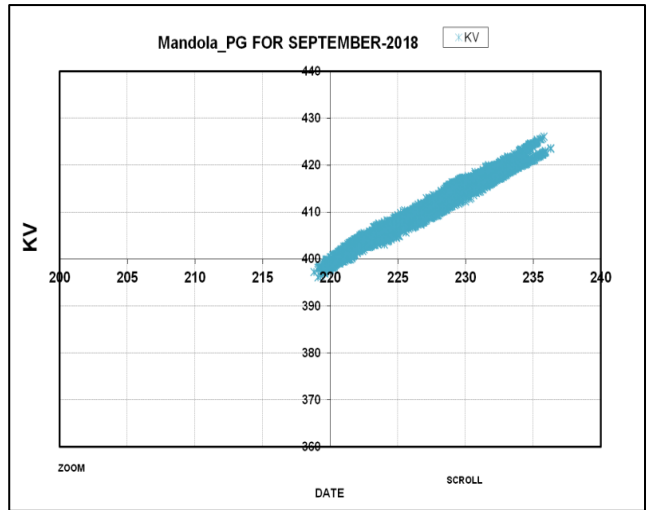
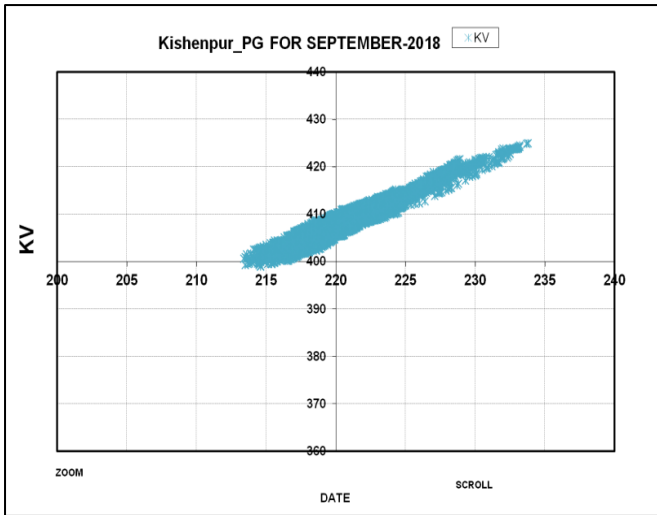
Tap Change from 9 to 11		
S. No.	State	Nodes
1	Rajasthan	Sikar
2	Haryana	Gurgaon
3		Kabulpur
4		Manesar
5		Nuhiyawali
6	Himachal Pradesh	Dehar
7	Punjab	Muktsar
8		Nakodar
9		Dhuri
10	Uttar Pradesh	Mainpuri (13 to 11)
11		Sohawal
12		Meerut
Tap Change from 9 to 13		
1	Punjab	Amritsar
2	Rajasthan	Jodhpur
3	J&K	Kishenpur
4	Uttar Pradesh	Fatehpur

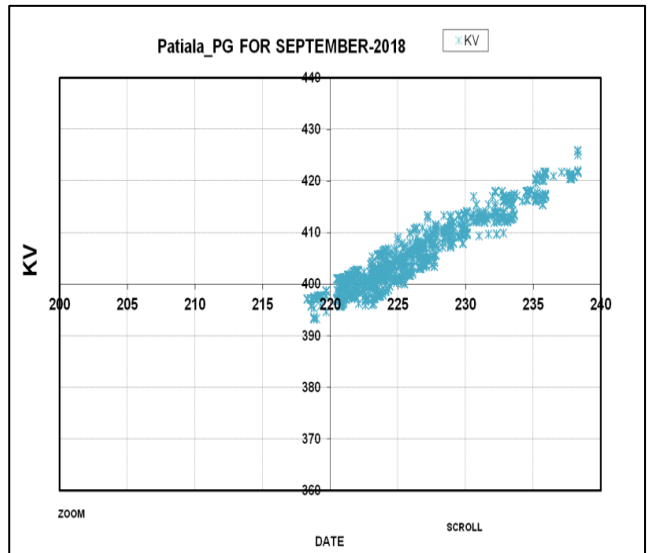
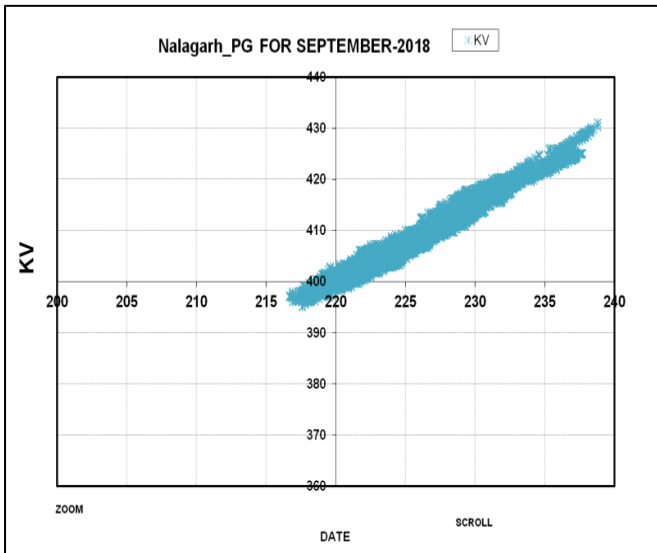
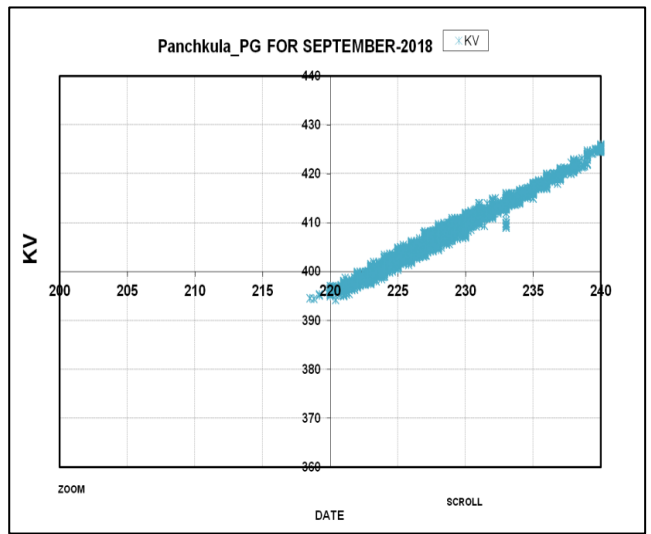
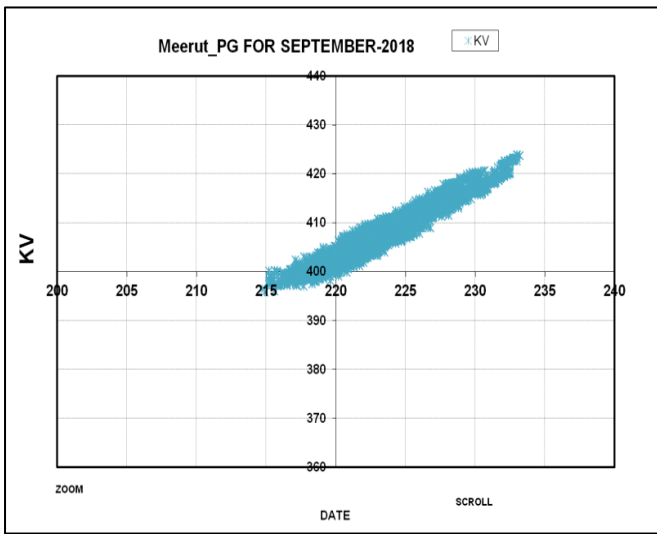
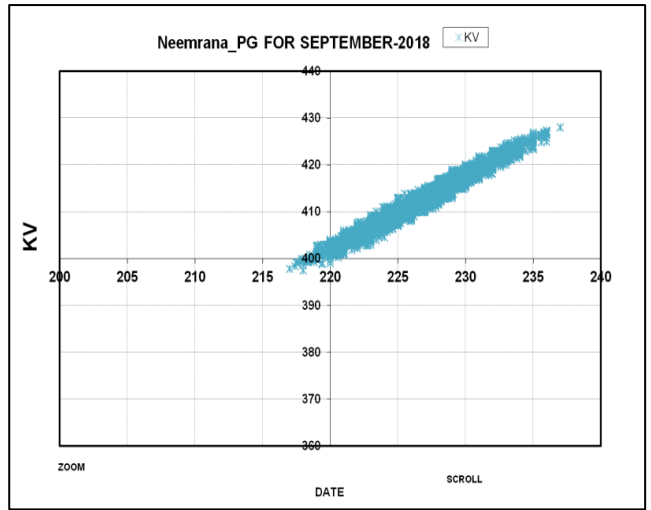
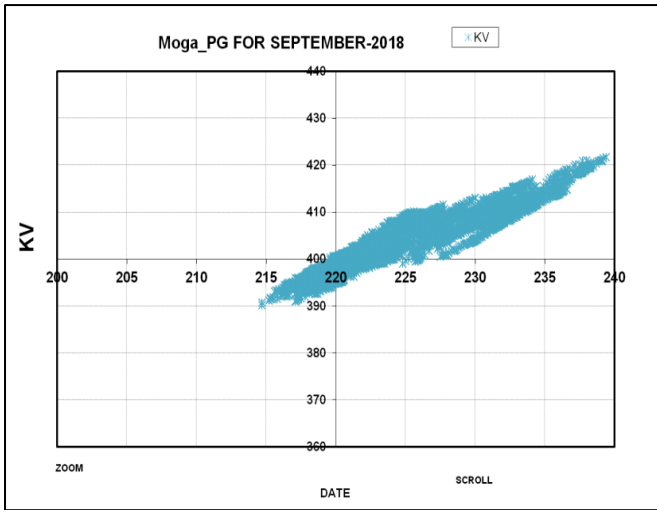
4. Apart from this tap positions of **765/400kV ICTs at Agra(PG), Fatehpur & Unnao** shall also be changed to reduce voltage on 400kV side in consultation with NLDC.

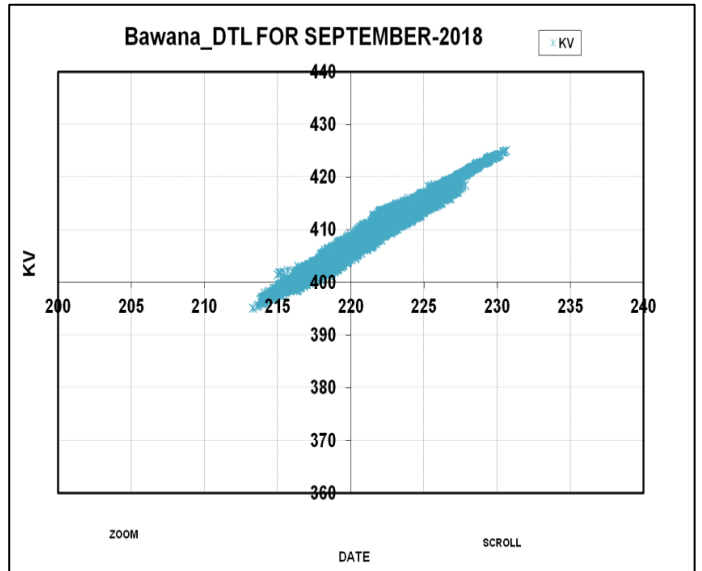
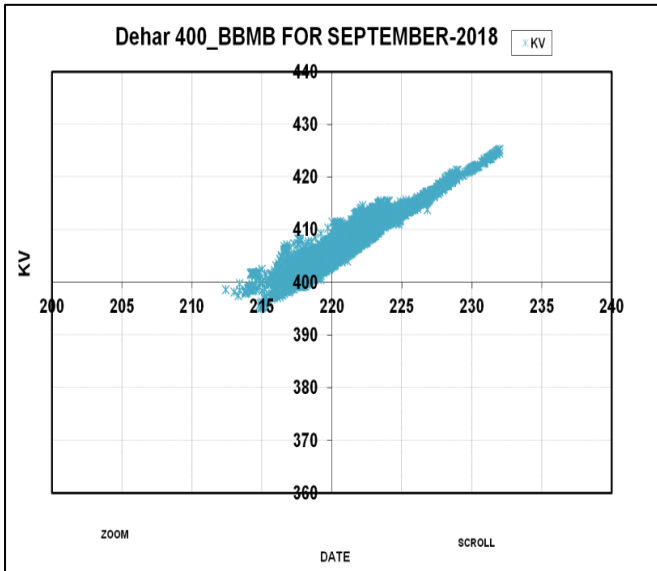
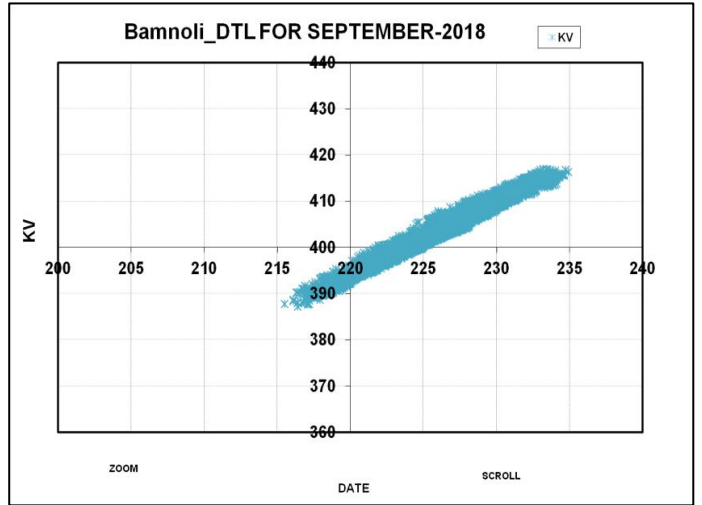
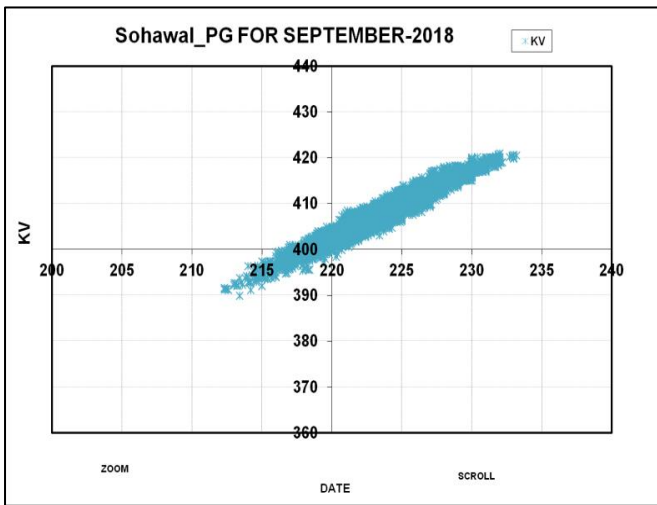
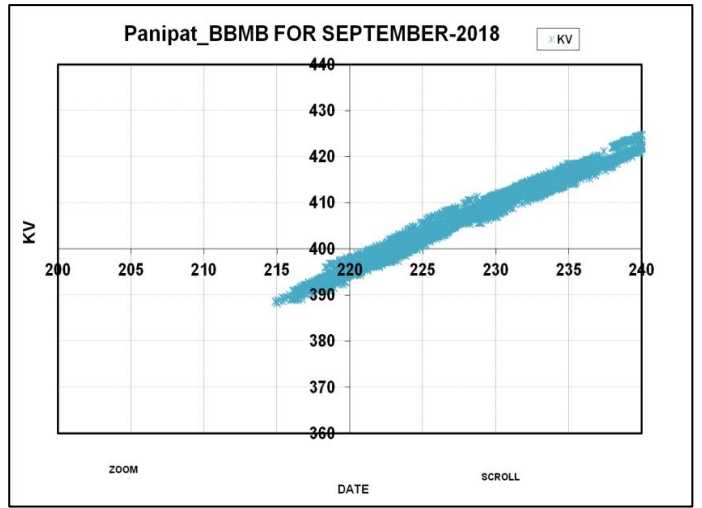
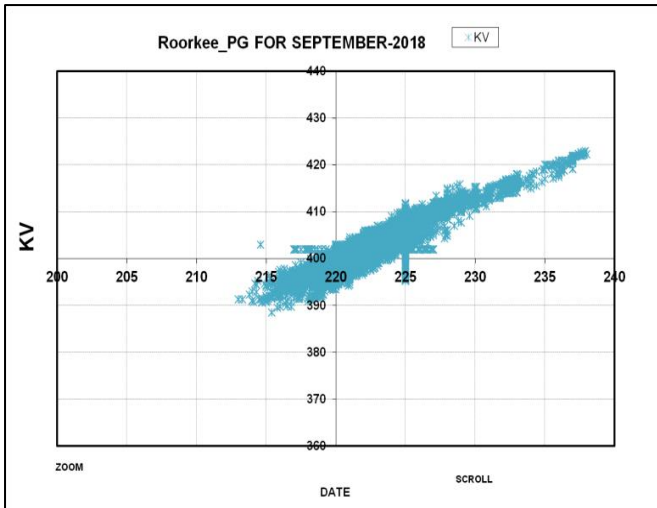
Annexure

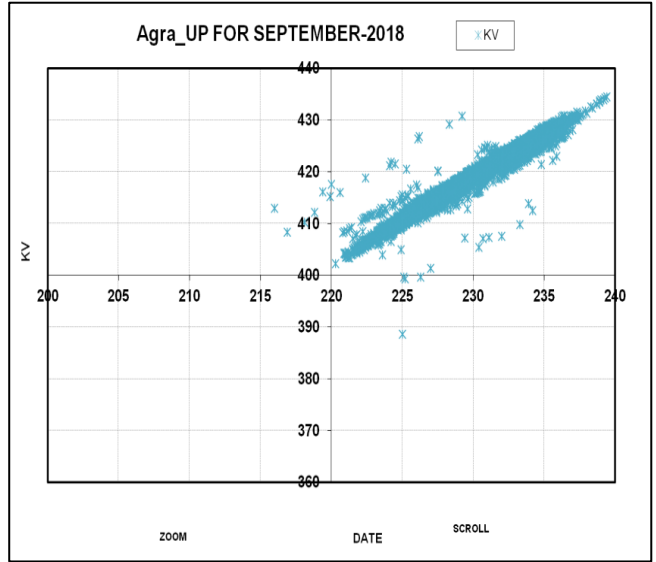
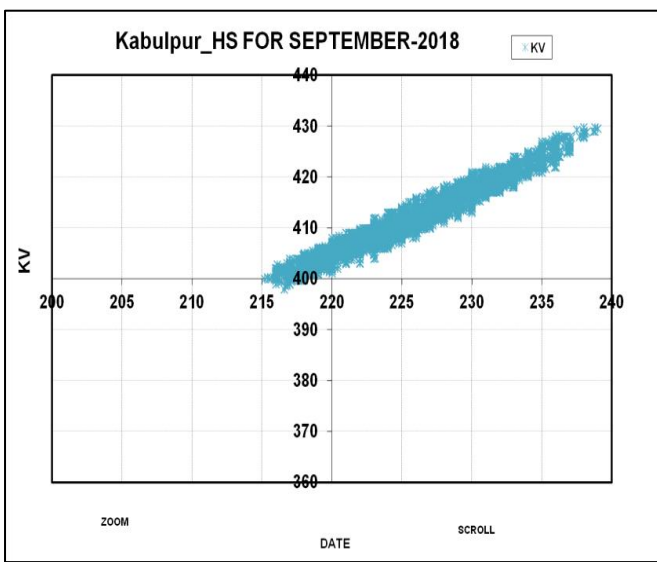
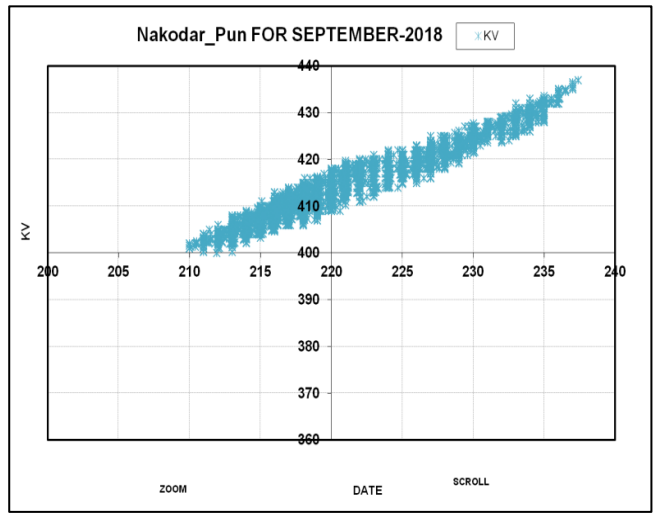
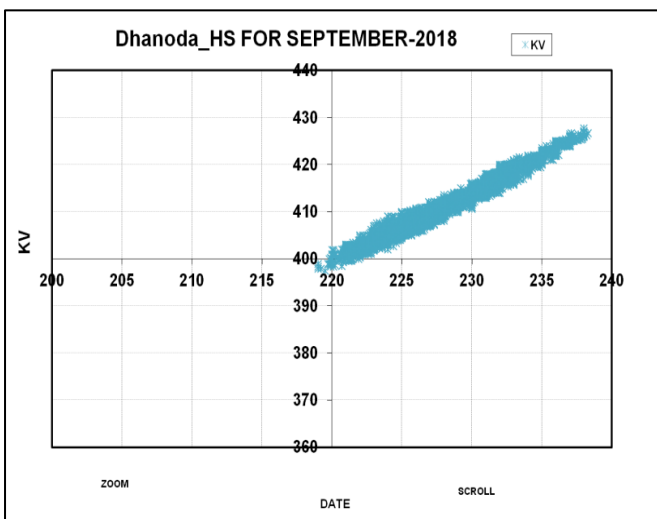
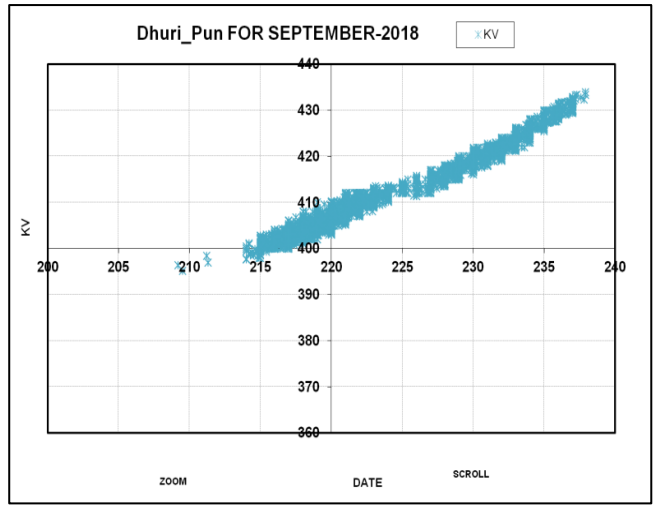
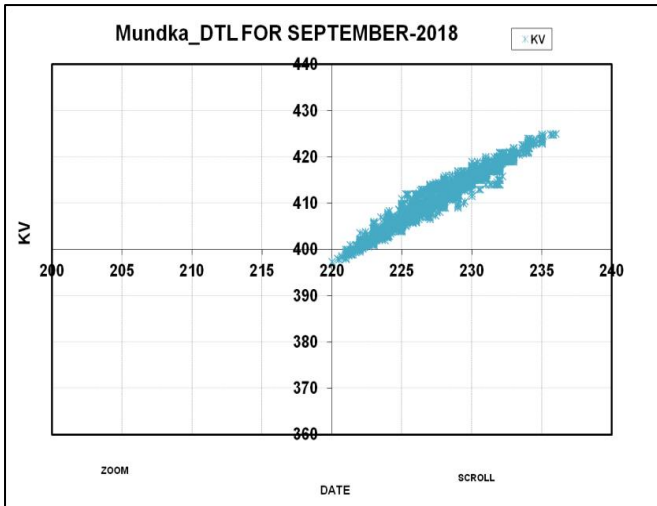


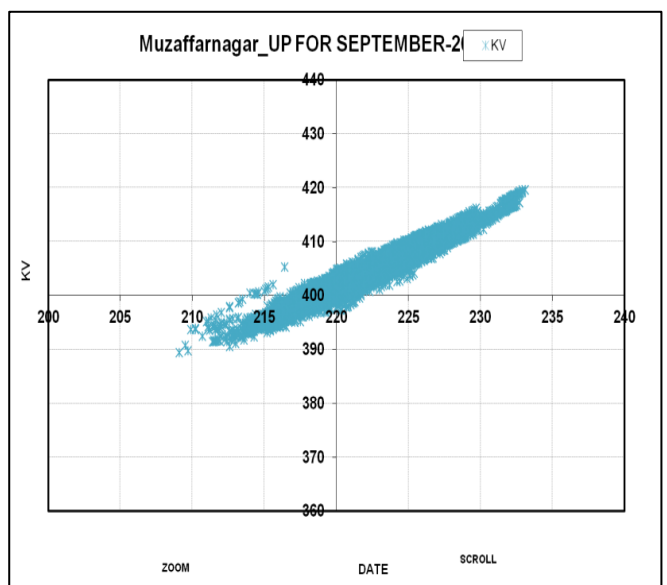
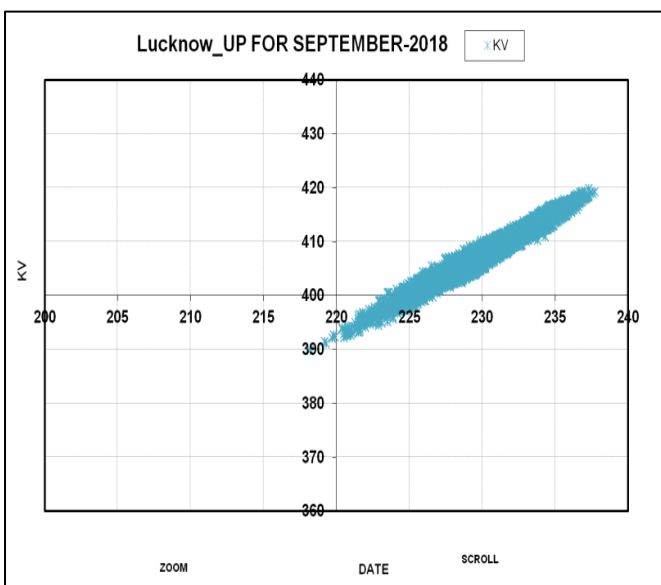
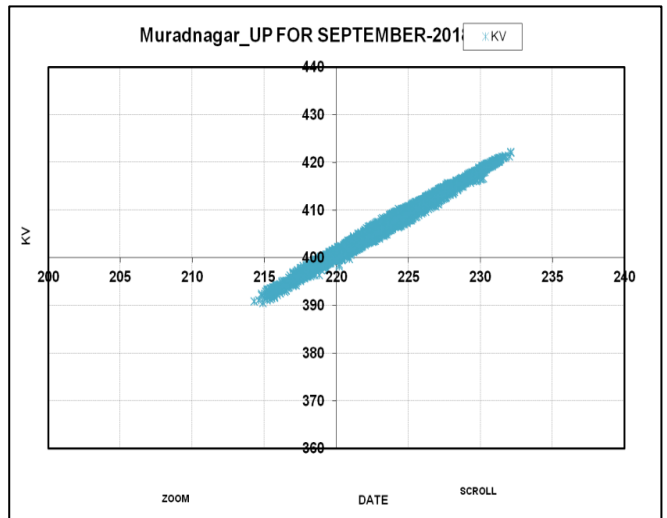
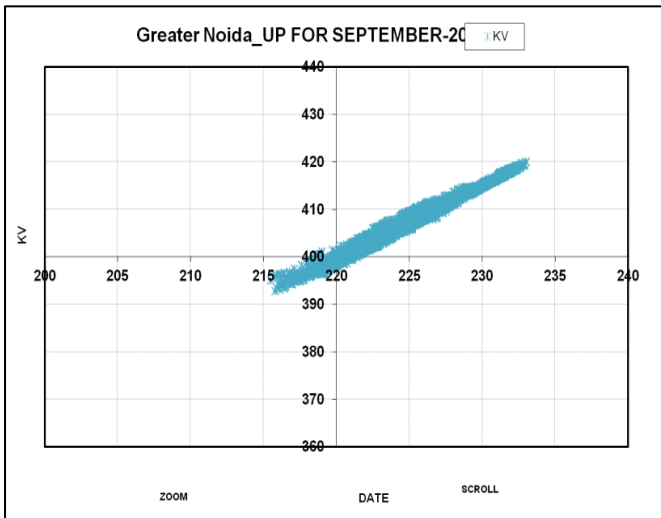
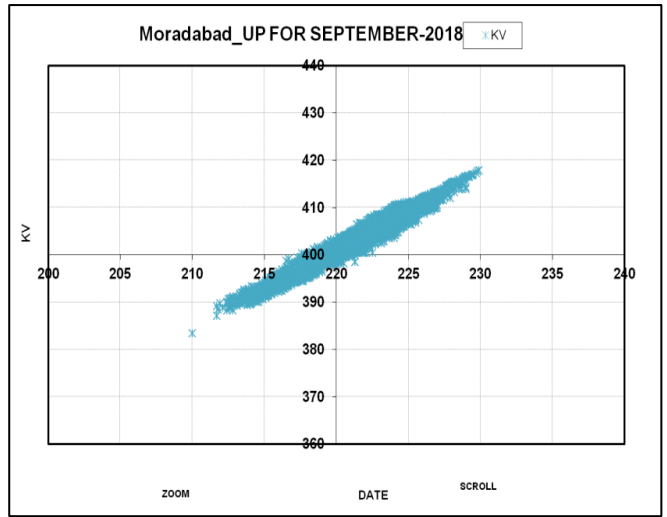
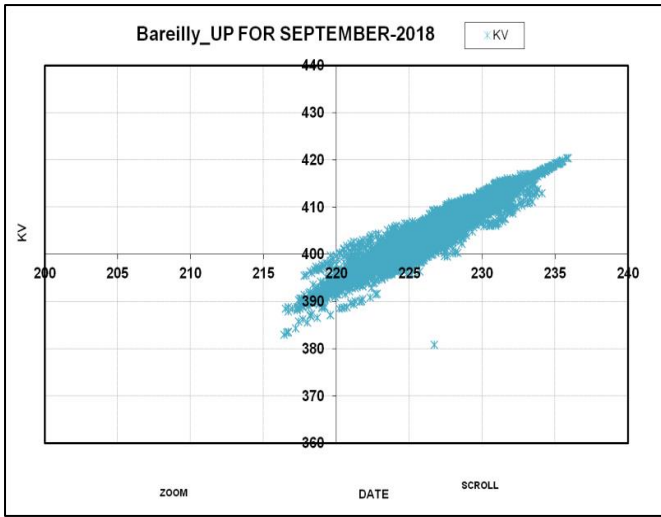


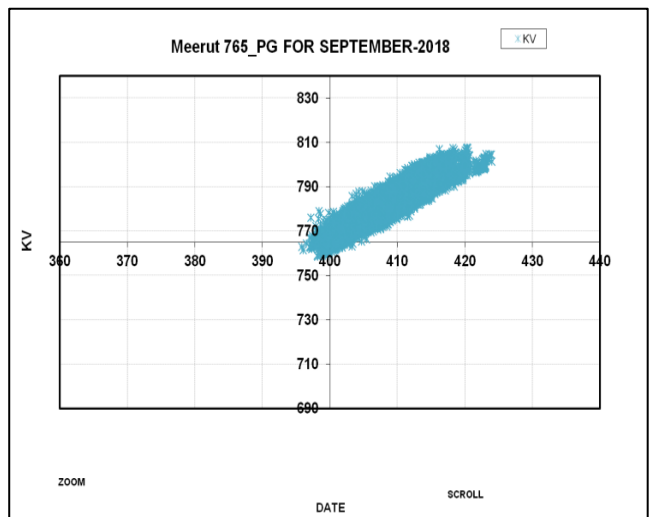
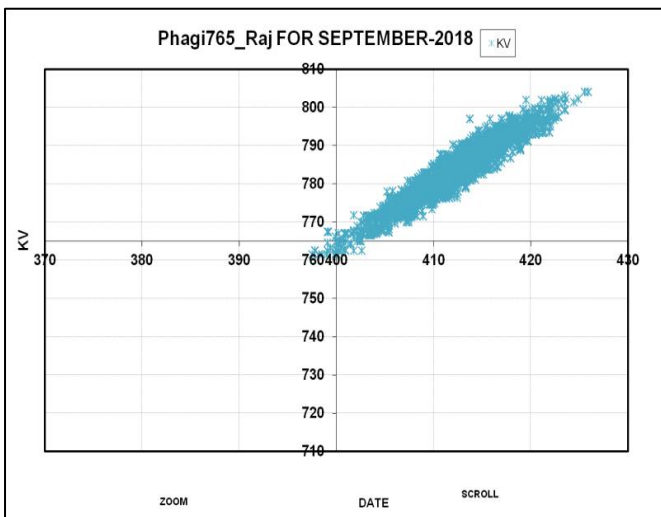
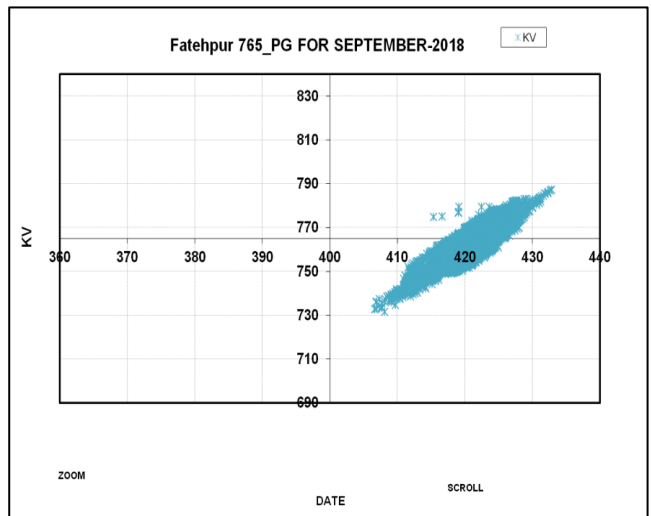
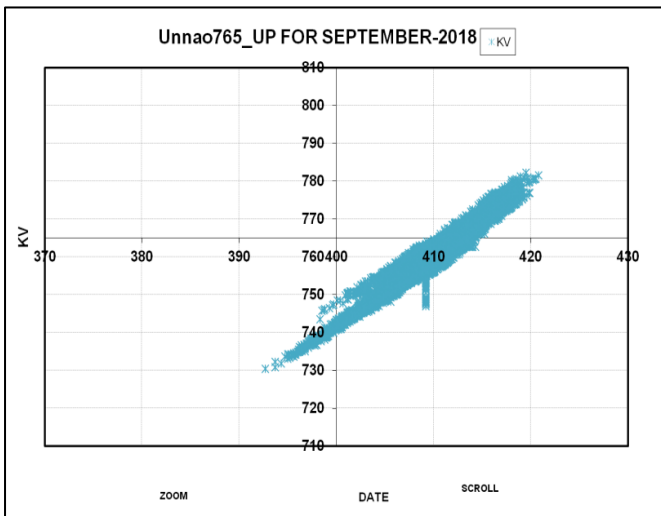
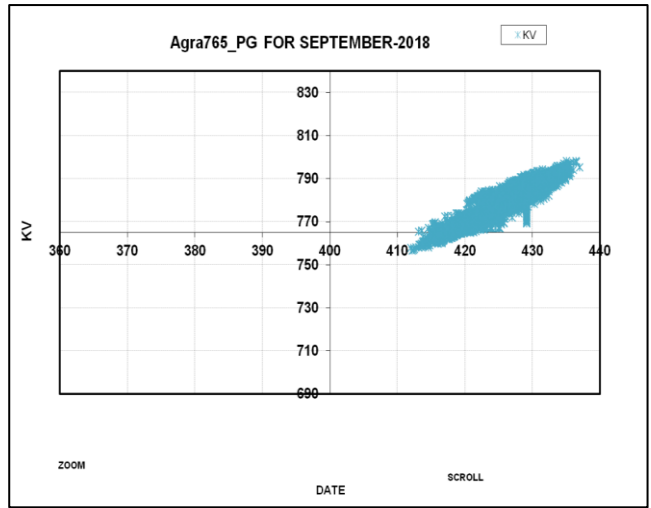
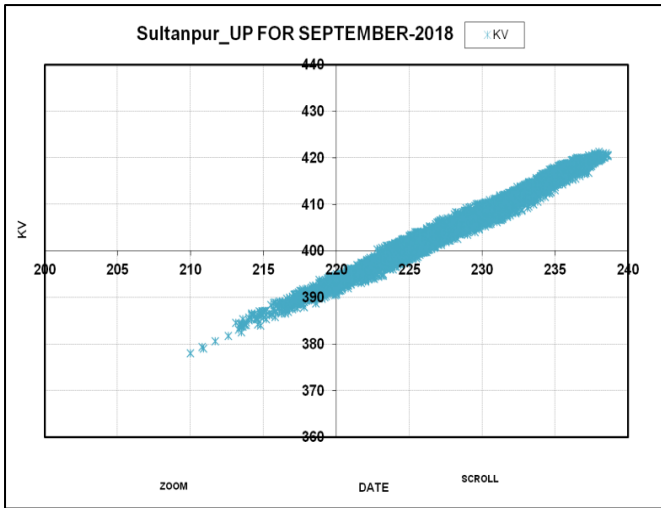


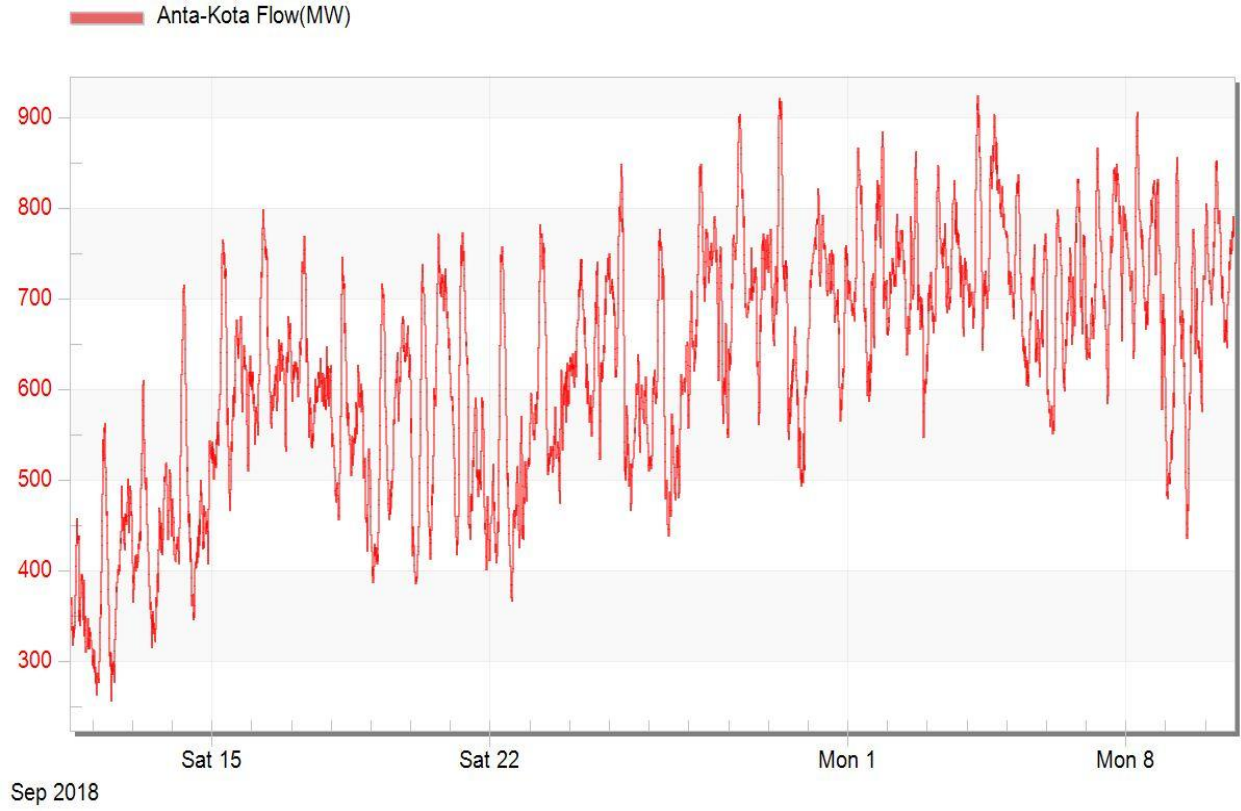


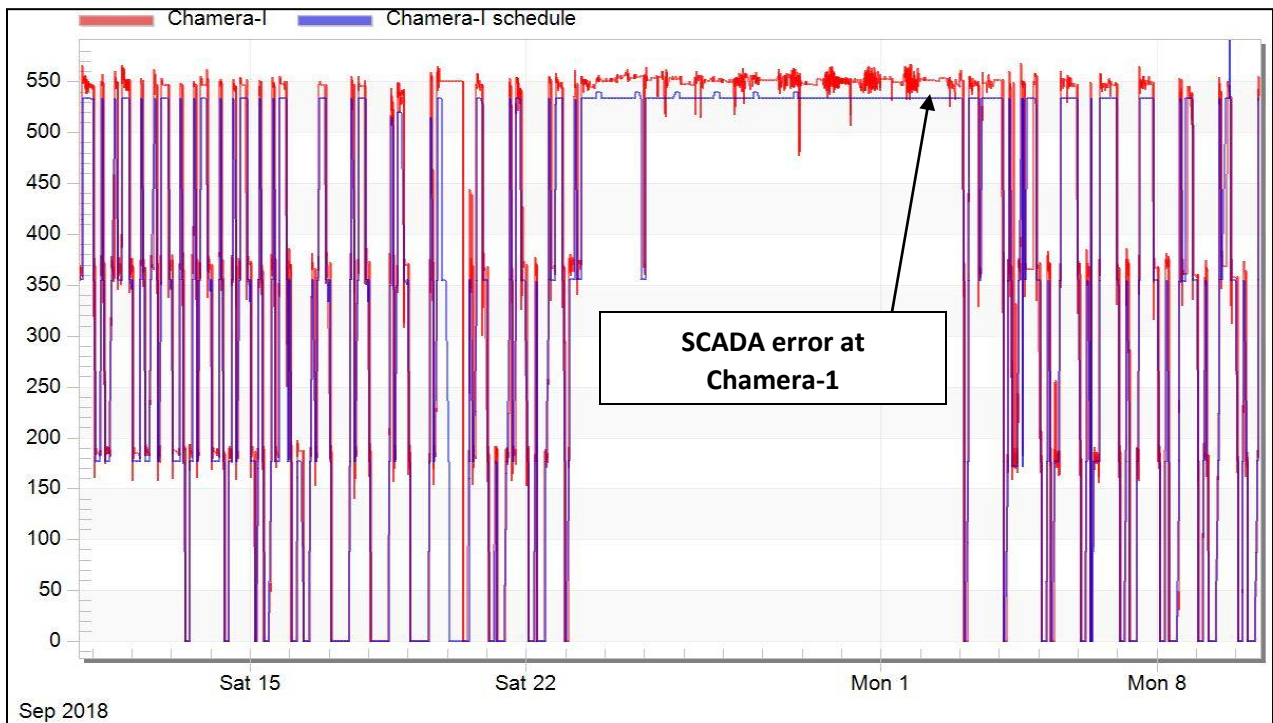
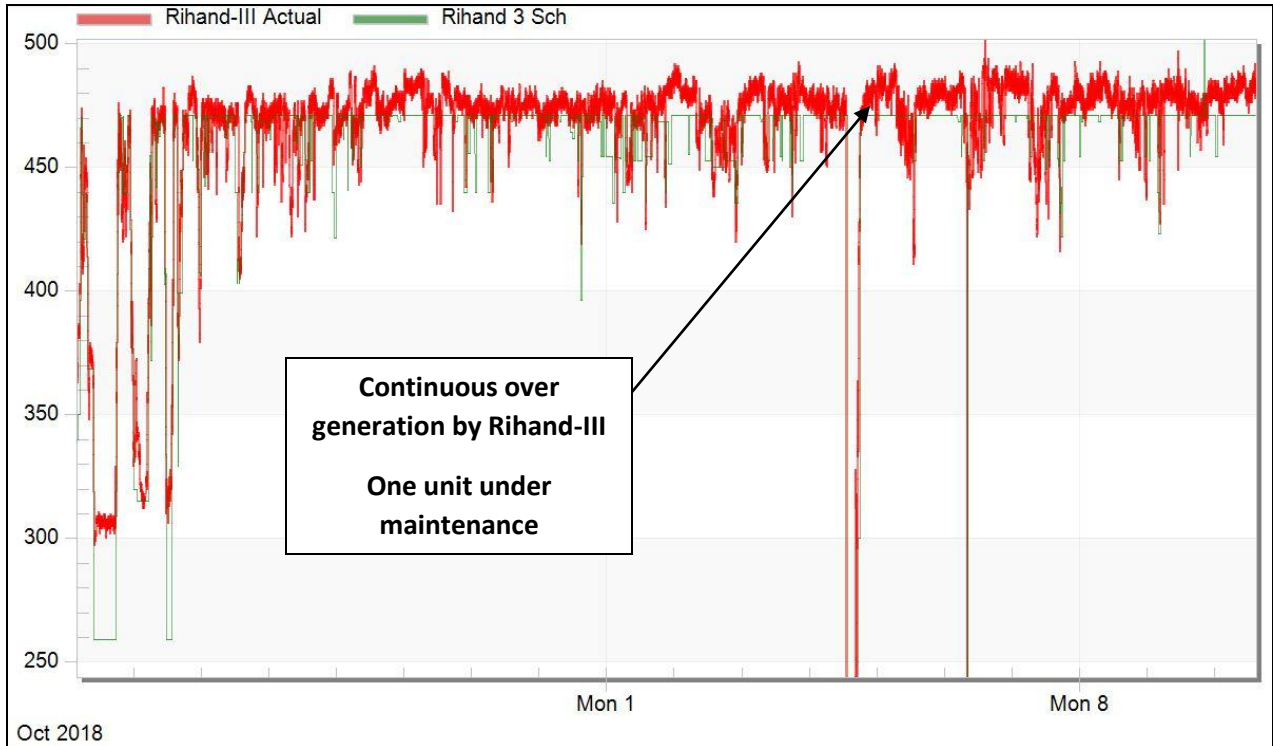


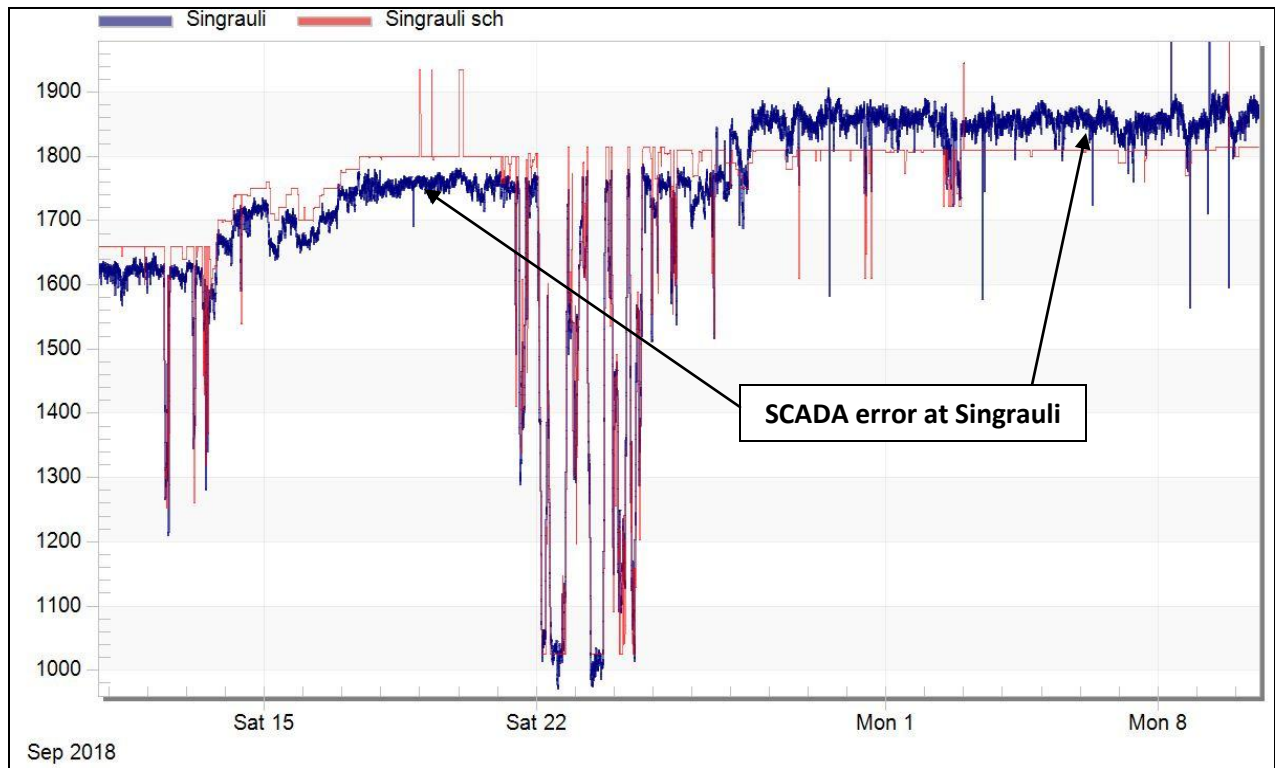












Grid Events occurred in NR: Sep'18

Annexure-5

S.No.	Name of Elements (Tripped/Manually opened)	Owner/ Agency	Outage		Event (As reported)	Generation Loss(MW)	Load Loss(MW)	Category as per CEA Grid Standards	Energy Unservd (in MU)	Preliminary Report receipt status			DR/EL receipt status			Detailed Report receipt status		Fault Clearance time (in ms)
			Date	Time						within 24hrs	after 24hrs	Not Received	within 24hrs	after 24hrs	Not Received	Received	Not Received	
18	1) 800KV HVDC Champa(PG)-Kurukshetra(PG) ckt-1 2) 800KV HVDC Champa(PG)-Kurukshetra(PG) ckt-2	POWERGRID	24-Sep-18	16:51	800KV HVDC Champa(PG)-Kurukshetra(PG) ckt 1 & 2 tripped due to DC Earth fault in auxiliary DC panel at Champa(PG) end; In antecedent condition, 800KV HVDC Champa(PG)-Kurukshetra(PG) ckt 1 & 2 carrying 650 MW each. As per PMU, fluctuations observed in the phase voltages. Both circuits again tripped at 1816 Hrs due to same reason.			GI-2		Y(PG)			Y(PG)			Y(PG)	Not applicable	
19	1) 400KV RosaTPS (UP)-Shajahanpur(PG) ckt-2 2) 200 MVA ICT1 at 400/220KV Rosa(UP) 3) 200 MVA ICT2 at 400/220KV Rosa(UP)	UP	24-Sep-18	20:37	400KV RosaTPS (UP)-Shajahanpur(PG) ckt-2 tripped on phase to earth fault. At the same time, 200 MVA ICT1 & ICT2 at 400/220KV Rosa(UP) tripped due to operation of Differential protection. In antecedent condition, both ICTs carrying 64MW each. As per PMU, Y-N fault is observed.			GI-2			Y(UP)		Y(UP)			Y(UP)	160ms	
20	1) 220KV Bus 3 at 400/220KV Mandola(PG) 2) 220KV Bus 4 at 400/220KV Mandola(PG) 3) 500 MVA ICT 1 at 400/220KV Mandola(PG) 4) 500 MVA ICT 3 at 400/220KV Mandola(PG) 5) 220KV Mandola(PG)-Wazirabad(DTL) ckt-1 6) 220KV Mandola(PG)-Wazirabad(DTL) ckt-2 7) 220KV Mandola(PG)-Wazirabad(DTL) ckt-4	POWERGRID & Delhi	25-Sep-18	10:54	220KV Mandola(PG)-Wazirabad(DTL) ckt-1 tripped on R-N fault. 220KV Mandola(PG)-Wazirabad(DTL) ckt-3 was under shutdown and line was earthed at both ends, due to which current through line CT which was earthed from both sides flowed. This current flow in 220KV Mandola(PG)-Wazirabad(DTL) ckt-3 caused SOTF optd in this line. As CB was already open and current was continuous through CT, LBB operated. 220KV Bus 4 tripped on LBB protection. Due to CT selection relay contacts malfunction trips of bus 4 and 3 got coupled resulting in bus 3 tripping. 220KV Mandola(PG)-Wazirabad(DTL) ckt-1 tripped on R-N fault. As per PMU, R-N fault is observed. In antecedent condition, 500 MVA ICT 1 & ICT 3 carrying 157 MW & 154 MW respectively.		139	GD-1		Y(PG), Y(DTL)			Y(PG), Y(DTL)		Y(PG)			360ms
21	1) 800KV HVDC Champa(PG)-Kurukshetra(PG) ckt-1 2) 800KV HVDC Champa(PG)-Kurukshetra(PG) ckt-2	POWERGRID	25-Sep-18	11:54	800KV HVDC Champa(PG)-Kurukshetra(PG) ckt 1 & 2 tripped due to Filter Control block due to filter power limit alarm because of malfunction of RPC; In antecedent condition, 800KV HVDC Champa(PG)-Kurukshetra(PG) ckt 1 & 2 carrying 150 MW each. As per PMU, fluctuations observed in the phase voltages.			GI-2					Y(PG)		Y(PG)	Y(PG)	Not applicable	
22	1) 220KV Bus 2 at 400/220KV Jalandhar(PG) 2) 315 MVA ICT 2 at 400/220KV Jalandhar(PG) 3) 220KV Dasuya(PSTCL)-Jalandhar(PG) ckt-2 4) 220KV Hamirpur(PG)-Jalandhar (PG) ckt-2 5) 220KV Jalandhar(PG)-Kartarpur(PSTCL)	POWERGRID & Punjab	25-Sep-18	13:32	Bus bar protection of 220KV Bus 2 operated due to mal operation during S/D of 500 MVA ICT-3 at Jalandhar leading to tripping of 315 MVA ICT 2 and 220KV lines. As per PMU, No fault is observed. In antecedent condition, 315 MVA ICT 2 at 400/220KV Jalandhar(PG) carrying 84 MW.		50	GD-1	0.04	Y(PG)		Y(Pun)	Y(PG)	Y(Pun)		Y(PG)	Not applicable	
23	1) 800KV HVDC Champa(PG)-Kurukshetra(PG) ckt-1 2) 800KV HVDC Champa(PG)-Kurukshetra(PG) ckt-2	POWERGRID	26-Sep-18	16:37	800KV HVDC Champa(PG)-Kurukshetra(PG) ckt 1 & 2 tripped during testing; In antecedent condition, 800KV HVDC Champa(PG)-Kurukshetra(PG) ckt 1 & 2 carrying 150 MW each. As per PMU, fluctuations observed in the phase voltages.			GI-2		Y(PG)				Y(PG)		Y(PG)	Not applicable	
24	1) 220KV Bairasul(NHPC)-Pong(BBMB) 2) 220KV Bairasul(NHPC)-Jasor(HP) 3) Unit#3(60MW) at 220KV Bairasul(NHPC) 4) Unit#3(60MW) at 220KV Bairasul(NHPC)	NHPC, BBMB & HP	27-Sep-18	18:17	LBB operated while synchronizing Unit#1(60MW) at 220KV Bairasul(NHPC) due to problem in breaker leading to tripping of 220KV Bairasul(NHPC)-Pong(BBMB), 220KV Bairasul(NHPC)-Jasor(HP), Unit#1 & Unit#3. In antecedent condition, Unit#1 & #3 generating 59 MW & 57 MW respectively. As per PMU, No fault is observed.		117	GD-1			Y(NHPC)	Y(BBMB), Y(HP)	Y(NHPC)	Y(BBMB),Y(H P)		Y(NHPC)	Not applicable	
25	1) 220KV Parichha(UP)-Orai(UP) ckt-1 2) 220KV Parichha(UP)-Orai(UP) ckt-2 3) 220KV Parichha(UP)-Orai(UP) ckt-3 4) 220KV Parichha(UP)-Jhansi(UP) ckt-1 5) 220KV Parichha(UP)-Jhansi(UP) ckt-2 6) 220KV Parichha(UP)-Bharthana(UP) 7) 220KV Parichha(UP)-Mahoba(UP) 8) Unit#3 & #4(210MW) at 220KV Parichha(UP)	UP	28-Sep-18	10:58	B-N fault occurred on 220KV Parichha(UP)-Jhansi(UP) ckt-2 due to which trip coil of this circuit at 220KV Parichha(UP) burnt causing bus fault at 220KV Parichha(UP) resulting into tripping of all 220KV lines and generating units. As per PMU, Voltage dip in all the three phases is observed. In antecedent conditions, Unit#3 & #4 generating 113 MW & 109 MW respectively.		530	GD-1		Y(UP)				Y(UP)		Y(UP)	1520ms	
26	1) 220KV Hisar(PG)-Hisar-IA(HVPNL) ckt-1 2) 220KV Hisar(PG)-Hisar-IA(HVPNL) ckt-2 3) 220KV Hisar(BBMB)-Hisar-IA(HVPNL) ckt-1 4) 220KV Hisar(BBMB)-Hisar-IA(HVPNL) ckt-2	Haryana, BBMB & POWERGRID	28-Sep-18	11:45	220KV Bus-bar protection operated at Hisar(IA) due to blasting of Y-ph CT of 220KV Hisar(IA)-Masudpur ckt-2 leading to tripping of 220KV Hisar(PG)-Hisar-IA(HVPNL) ckt-1 & 2, 220KV Hisar(BBMB)-Hisar-IA(HVPNL) ckt-1 & 2. As per PMU, Y-N fault is observed. In antecedent condition, 220KV Hisar(PG)-Hisar-IA(HVPNL) ckt-1 & 2 carrying 111 MW & 113 MW respectively.			GI-2				Y(Har), Y(BBMB), Y(PG)		Y(Har), Y(BBMB), Y(PG)		Y(Har)	80ms	
27	1) 400KV Akal(Raj)-Jodhpur(Raj) 2) 400KV Jodhpur(Raj)-Merta(Raj) ckt-1 3) 400KV Bus 1 at 400KV Jodhpur(Raj)	Rajasthan	29-Sep-18	4:07	Differential Protection of Busbar-1 operated at 400KV Jodhpur(Raj) leading to tripping of 400KV Akal(Raj)-Jodhpur(Raj) & 400KV Jodhpur(Raj)-Merta(Raj) ckt-1. As per PMU, No fault is observed. In antecedent conditions, 400KV Jodhpur(Raj)-Merta(Raj) ckt-1 carrying 84 MW.			GI-2		Y(Raj)				Y(Raj)		Y(Raj)	Not applicable	
28	1) 400KV Allahabad(PG)-Fatehpur(PG) ckt-1 2) 400KV Allahabad(PG)-Fatehpur(PG) ckt-2 3) 400KV Allahabad(PG)-Fatehpur(PG) ckt-3 4) 400KV Allahabad(PG)-Mainpuri(PG) ckt-1 5) 400KV Allahabad(PG)-Singrauli(PG) 6) 315 MVA ICT 1 & ICT 2 at 765KV/400KV Fatehpur(PG) 7) 1500 MVA ICT 3 & ICT 4 at 765KV/400KV Fatehpur(PG) 8) 220KV Fatehpur(PG)-Fatehpur(UP) ckt-1	POWERGRID & UP	29-Sep-18	12:18	315 MVA ICT 1 & ICT 2 at 765KV/400KV Fatehpur(PG) tripped due to operation of directional earth fault. At the same time other 400KV lines and 1500 MVA ICT3 & ICT 4 also tripped. As per PMU, Y-N fault is observed. In antecedent conditions, 1500 MVA ICT 3 & ICT 4 carrying 141 MW & 139 MW respectively.		220	GD-1	0.08		Y(UP), Y(PG)		Y(UP), Y(PG)		Y(PG)		400ms	
29	1) 200 MVA ICT 1 at 400/132KV Mau(UP) 2) 200 MVA ICT 2 at 400/132KV Mau(UP)	UP	29-Sep-18	20:37	200 MVA ICT 1 & ICT 2 at 400/132KV Mau(UP) tripped due to overloading. As per PMU, fluctuations observed in the phase voltages. In antecedent conditions, 200 MVA ICT 1 & ICT 2 carrying 155 MW & 162 MW respectively.		250	GD-1	0.17		Y(UP)			Y(UP)		Y(UP)	Not applicable	

Northern Regional inter regional lines tripping for Sep-18

Annexure-VI

S. No.	Name of Transmission Element Tripped	Owner/ Utility	Outage		Load Loss/ Gen. Loss	Brief Reason (As reported)	Category as per CEA Grid standards	Restoration		# Fault Clearance Time (>100 ms for 400 kV and 160 ms for 220 kV)	*FIR Furnished (YES/NO)	DR/EL provided in 24 hrs (YES/NO)	Other Protection Issues and Non Compliance (inference from PMU, utility details)	Remedial Action	Remarks
			Date	Time				Date	Time						
1	Champa(WR) - Kurukshehra(NR) line -1	PGCIL	1-Sep-18	17:49	Nil	Commutation fail at Kurukshehra and DC line pickup at Champa	GI-2	1-Sep-18	18:23	520ms	NO	YES	Commutation failure within 500ms of fault occurrence. Pole tripping on suspected	Commutation failure setting of Champa-Kurukshehra to be checked and rectified	Information received from NR end. From PMU, maximum dip in B-phase and remained for 500ms,
2	Champa(WR) - Kurukshehra(NR) line -2	PGCIL	1-Sep-18	17:49	Nil	Commutation fail at Kurukshehra and DC line pickup at Champa	GI-2	1-Sep-18	18:23	520ms	NO	YES	Commutation failure within 500ms of fault occurrence. Pole tripping on suspected AC system fault.	Commutation failure setting of Champa-Kurukshehra to be checked and rectified	Information received from NR end. From PMU, maximum dip in B-phase and remained for 500ms, slight recovery after 200ms.
3	Mohindergarh-Mundra Pole 1	APL	2-Sep-18	8:39	Nil	External protection trip received from OLTC of Pole-1 B-Phase converter transformer. After thorough check, no concrete evidence was found.	NA	2-Sep-18	10:41	NA	YES	YES	Tripped without any fault in the system	Protection needs to be checked and rectified.	Information received from NR end. From PMU, no fault observed.
4	Auraiya(NTPC)-Malanpur(PG)	PGCIL	3-Sep-18	16:26	Nil	Phase to earth fault. R-N Fault, 93.6 KM from Auraiya end	NA	3-Sep-18	17:38	NO	YES	YES	A/R not operated at Auraiya end	Auto reclosure shall put in service	Information received from NTPC end. From PMU, max dip in R-phase
5	Auraiya(NTPC)-Mahgaon(PG)	PGCIL	6-Sep-18	4:15	Nil	Phase to earth fault. R-N. Zone-1. 82.63 kms from Auraiya	NA	6-Sep-18	6:08	NO	NO	NO	A/R not operated at Auraiya end	Auto reclosure shall put in service	Information received from NTPC end. From PMU, max dip in R-phase
6	Agra - Biswanath Cherialli line -1	PGCIL	6-Sep-18	4:02	Nil	Phase to earth fault. DC line earth fault.	NA	6-Sep-18	5:23	NA	NO	NO		Details of tripping yet to be received.	From PMU, no fault observed.
7	Gorakhpur(PG)-Muzaffarpur(PG) 1	PLINK	7-Sep-18	15:24	Nil	Problem in TCSC at Gorakhpur end.	NA	7-Sep-18	16:02	NA	NO	NO		Details of tripping yet to be received.	From PMU, no fault observed.
8	Gorakhpur(PG)-Motihari(DMTCL) 1	PGCIL	8-Sep-18	12:58	Nil	Y-N fault ,150.5km from Gorkhpur end	NA	8-Sep-18	13:39	NO	NO	NO	It seems A/R not operated	Details of tripping yet to be received.	From PMU, Y-N fault.
9	Gorakhpur(PG)-Motihari(DMTCL) 2	PGCIL	9-Sep-18	11:51	Nil	B-N Fault , 168.7km from Gorakhpur end	NA	9-Sep-18	12:25	NO	NO	NO	It seems A/R not operated	Details of tripping yet to be received.	From PMU, B-N fault.
10	Champa(WR) - Kurukshehra(NR) line -1	PGCIL	11-Sep-18	10:47	Nil	Tripped due to fault in VBE (at Kurukshehra end).	NA	11-Sep-18	15:45	NA	YES	YES		Software logic of VBE in Bipole to be checked and corrected	From PMU, no fault observed.
11	Balia-Biharsharif 2	PGCIL	14-Sep-18	14:58	Nil	Tripped on R-Y fault, 26.4KM from Balia end.	NA	14-Sep-18	18:36	NO	NO	NO		Details of tripping yet to be received.	From PMU, R-Y phase to phase fault.
12	Auraiya(NTPC)-Mahgaon(PG)	PGCIL	17-Sep-18	1:08	Nil	Phase to earth fault. R-N fault, 67km (from Auraiya end).	NA	17-Sep-18	1:38	NO	NO	NO	A/R not operated at Auraiya end	Details of tripping yet to be received.	From PMU, slight dip in R-phase.
13	Vindhyachal HVDC BtB Block 1	PGCIL	20-Sep-18	20:06	Nil	DC over current protection operated.	NA	20-Sep-18	23:20	NA	NO	NO	Tripping without any fault in the system	Details of tripping yet to be received.	From PMU, no fault observed.
14	Gorakhpur(PG)-Motihari(DMTCL) 1	PGCIL	20-Sep-18	15:13	Nil	Phase to earth fault. Y-N. 132.8 kms from Gorakhpur.	NA	20-Sep-18	16:00	NO	NO	NO	It seems A/R not operated	Details of tripping yet to be received.	From PMU, Y-N fault.
15	Champa(WR) - Kurukshehra(NR) line -1	PGCIL	23-Sep-18	23:52	Nil	Tripped during de-blocking of HVDC pole-2. Temporary Over-voltage (TOV) protection optd. at Kurukshehra end.	NA	24-Sep-18	0:21	NA	NO	NO		Details of tripping yet to be received.	From PMU, no fault observed.
16	Champa(WR) - Kurukshehra(NR) line -1	PGCIL	24-Sep-18	16:51	Nil	DC Earth fault in auxiliary,DC panel at Champa	GI-2	24-Sep-18	17:42	NA	YES	YES	Control mal operation	VESDA control mal operation to be checked and corrected at Champa end	From PMU, no fault observed.
17	Champa(WR) - Kurukshehra(NR) line -2	PGCIL	24-Sep-18	16:51	Nil	DC earth fault in auxiliary,DC panel at Champa.	GI-2	24-Sep-18	22:28	NA	YES	YES	Control mal operation	VESDA control mal operation to be checked and corrected at Champa end	From PMU, no fault observed.
18	Champa(WR) - Kurukshehra(NR) line -1	PGCIL	24-Sep-18	18:16	Nil	DC earth fault in auxiliary,DC panel at Champa.	GI-2	24-Sep-18	22:28	NA	YES	YES	Control mal operation	VESDA control mal operation to be checked and corrected at Champa end	From PMU, no fault observed.
19	Champa(WR) - Kurukshehra(NR) line -2	PGCIL	24-Sep-18	18:16	Nil	DC earth fault in auxiliary,DC panel at Champa.	GI-2	24-Sep-18	22:28	NA	YES	YES	Control mal operation	VESDA control mal operation to be checked and corrected at Champa end	From PMU, no fault observed.
20	Champa(WR) - Kurukshehra(NR) line -1	PGCIL	25-Sep-18	11:54	Nil	Tripped due to Filter Control block due to filter power limit alarm due to malfunction of RPC	GI-2	25-Sep-18	12:29	NA	NO	NO	Control mal operation	Details of tripping yet to be received.	From PMU, no fault observed.
21	Champa(WR) - Kurukshehra(NR) line -2	PGCIL	25-Sep-18	11:54	Nil	Tripped due to Filter Control block due to filter power limit alarm due to malfunction of RPC	GI-2	25-Sep-18	12:29	NA	NO	NO	Control mal operation	Details of tripping yet to be received.	From PMU, no fault observed.
22	Champa(WR) - Kurukshehra(NR) line -1	PGCIL	26-Sep-18	16:37	Nil	Tripped during pole-1 blocking during testing. RPC filter removed 1A type filter due to blocking of one pole. However, bipole to monopole operation didn't update immediately. Hence, pole-2 tripped on min. filter requirement.	GI-2	26-Sep-18	17:53	NA	YES	YES		Preventive measures are now implemented to ensure the minimum number of filters shall be available to RPC prior to manual blocking of one pole	From PMU, no fault observed.

S. No.	Name of Transmission Element Tripped	Owner/ Utility	Outage		Load Loss/ Gen. Loss	Brief Reason (As reported)	Category as per CEA Grid standards	Restoration		# Fault Clearance Time (>100 ms for 400 kv and 160 ms for 220 kv)	*FIR Furnished (YES/NO)	DR/EL provided in 24 hrs (YES/NO)	Other Protection Issues and Non Compliance (inference from PMU, utility details)	Remedial Action	Remarks
			Date	Time				Date	Time						
23	Champa(WR) - Kurukshehra(NR) line -2	PGCIL	26-Sep-18	16:37	Nil	Tripped during pole-1 blocking during testing. RPC filter removed 1A type filter due to blocking of one pole. However, bipole to monopole operation didn't update immediately. Hence, pole-2 tripped on min. filter requirement.	GI-2	26-Sep-18	17:53	NA	YES	YES		Preventive measures are now implemented to ensure the minimum number of filters shall be available to RPC prior to manual blocking of one pole	From PMU, no fault observed.
24	Auraiya(NTPC)-Mahgaon(PG)	PGCIL	26-Sep-18	11:45	Nil	Phase to earth fault. (R-N), 4.5 Km from Auaiya	NA	26-Sep-18	12:52	NO	YES (After 24hrs)	YES (After 24hrs)	A/R not operated at Auraiya end	Auto reclosure shall put in service	From PMU & DR details, R-N fault.
25	Champa(WR) - Kurukshehra(NR) line -2	PGCIL	27-Sep-18	15:22	Nil	Pole-2 tripped due to under voltage protection at Champa end	GI-2	26-Sep-18	17:53	NA	YES	YES			From PMU, no fault observed.
26	HVDC (Agra-BNC) Pole-2 at Agra HVDC	PGCIL	30-Sep-18	2:15	Nil	Tripped due to dc line fault(116.8km from BNC end)	NA	30-Sep-18	12:45	NO	YES	YES			From PMU, fault observed.

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

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

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

Reporting of Violation of Regulation for various issues for above tripping

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

पावर सिस्टम ऑपरेशन कारपोरेशन लिमिटेड

(भारत सरकार का उद्यम)

POWER SYSTEM OPERATION CORPORATION LIMITED

(A Govt. of India Enterprise)



उत्तरी क्षेत्रीय भार प्रेशण केन्द्र / NORTHERN REGIONAL LOAD DESPATCH CENTRE

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

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संदर्भ संख्या: NRLDC\TS-15\ 2137-2143

दिनांक: 05 अक्टूबर 2018

सेवा में,

महाप्रबंधक (CTU), पावर ग्रिड, सौदामिनी, प्लॉट नंबर-2, सैक्टर-29, इफको चौक, गुड़गाँव-122001

मुख्य अभियंता (SP&PA), 3rd फ्लोर, केंद्रीय विद्युत प्राधिकरण, सेवा भवन, रामकृष्णापुरम, नई दिल्ली-110066

विषय: Observance of High shaft vibration at Dadri stage-2 units (#5 & 6) during power system faults near its vicinity

पूर्व संदर्भ /Reference: NRLDC Letter dated 16-Aug-18 on observance of high vibration at Dadri stage-2

महोदय,

Please refer to the above letter through which reported incidence of vibration in unit #5 & #6 at Dadri TPS stage-2 and their subsequent tripping on 28-Jun-18 due to LLG fault in 400 kV Dadri-G. Noida was brought to your kind notice. A few of the actions taken were also informed such as:

- FSC of 400kV Ballabgarh-Kanpur ckt-2 & 3 (ckt-1 FSC already out) was by-passed on 09-Aug-18 on test basis based on the inputs from NTPC and likelihood of ferro-resonance phenomena.
- NTPC was requested to provide the raw data file of respective DRs.

The further advise on the issue based on system studies is awaited and therefore, the above mentioned FSCs are still being kept out of service. As informed earlier, the PMU has not captured any oscillations and further the prony analysis of the raw data of Disturbance Record (DR) of unit #5 and # 6 received from NTPC, also does not show any dominant frequency component in electrical signals. The analysis is attached as Annexure-1.

Further, to above, NTPC has given details of vibrations observed in Dadri stage-2 units since 01st Jun 2018 to 23rd September 2018. The same are attached as Annexure-2 for perusal and further taking these as inputs in the studies at your end. The details include date/time, nature of fault, vibration (in micron) observed in Dadri stage-2. A total of 22 incidents occurred in this period in which vibration in the machine has occurred at the time of fault in feeders emanating from 400kV Dadri bus. Out of these, significant vibration was observed in 7 incidents.

It is therefore requested to kindly advise the course of actions for mitigation of vibrations based on the study both from Grid perspective as well as from generator's perspective. The study results may please also be shared with NRLDC.

धन्यवाद,

भवदीय

एस एस बरपंडा 5/10/18
(एस० एस० बरपंडा)

महाप्रबंधक

प्रतिलिपि विनम्र सूचनार्थः

1. मुख्य कार्यकारी अधिकारी(CTU), पावर ग्रिड, सौदामिनी, प्लॉट नंबर-2, सैक्टर-29, इफको चौक, गुड़गाँव-122001
2. सदस्य सचिव, एन०आर०पी०सी०, 18 ए, SJSS मार्ग, कटवारिया सराय, नई दिल्ली- 110 016
3. सदस्य (PS), केंद्रीय विद्युत प्राधिकरण, सेवा भवन, रामकृष्णापुरम, नई दिल्ली - 110 066
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5. अध्यक्ष एवं प्रबंध निदेशक, पोसोको, बी-9, कुतुब इन्स्टीट्यूशनल एरिया, नई दिल्ली - 110 016

Results of Prony analysis carried out on R-phase current of LV side of GT

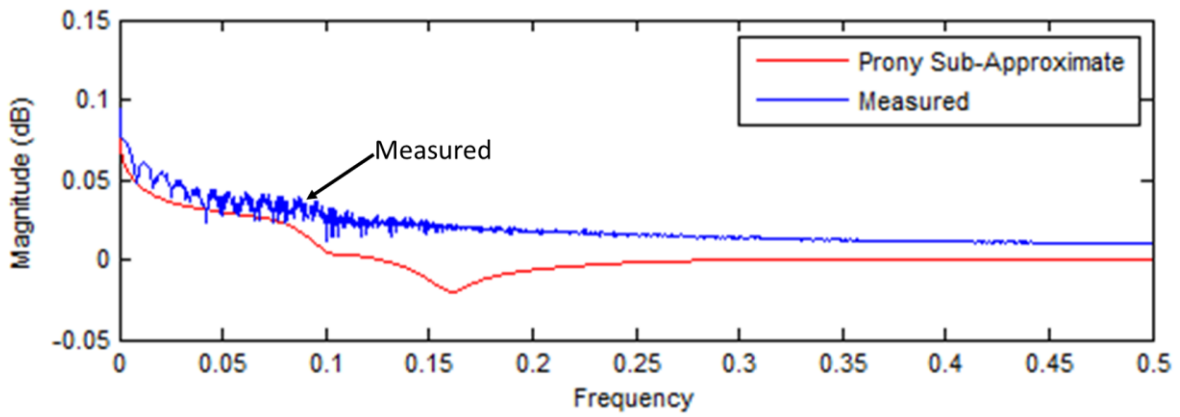


Fig.1 Different modes of frequency (unit #5) indicating no dominant mode

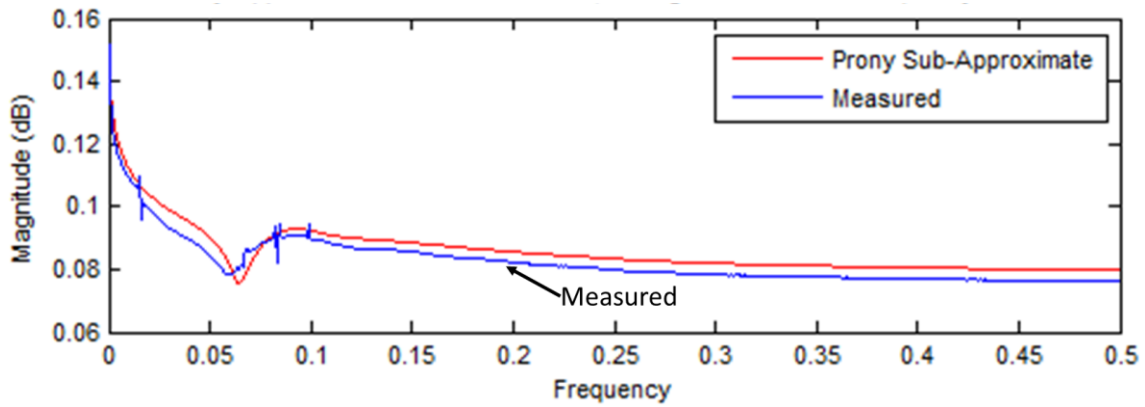


Fig.2 Different modes of frequency (unit #5) indicating no dominant mode

Record of Dadri Unit Vibrations with Fault in the system (As reported by NTPC)											
S.No.	Date	Time	Line Tripped	Max. Voltage Dip (PMU/ DR details)	Nature of fault	Generation		Unit Displacement(in micron)			
						Unit-5	Unit-6	Unit-5		Unit-6	
								brg.	shaft	brg.	shaft
1	19.06.2018	04:59 hrs	400KV Dadri-Kaithal	2.7 KV	L-G (21km)	430	442	6y- 18 to 43	6y- 34 to 67	6y- 28 to 58	6x- 35 to 78
2	23.06.2018	12:42hrs	400KV Dadri-Panipat-2	171KV (Phase to ground)	L-G (109km)	475	500	6y- 21 to 22	6x- 55 to 56	6x-18 to 10	6y- 50 to 51
3	28.06.2018	01:17hrs	400 kV Dadri-GreaterNoida	140 kV(Phase to ground)	L-L (0.1km)	295	325	6y- 17 to 201	6x- 57 to 403	6x- 17.5 to 200.4	6y- 45 to 592
4	10.07.2018	02:54hrs	400KV Dadri-Kaithal	3.4 KV	L-G (22.2km)	485	500	6x- 19 to 25	6x- 75 to 82	6y- 29 to 31	6y-62 to 78
5	14.07.2018	07:14hrs	400KV Dadri-Kaithal	189KV	Over Voltage	300	307	6y- 17 to 18	6x- 70 to 71	6y- 26 to 27	6y- 57 to 58
6	25.07.2018	15:10hrs	400KV Dadri-Harsh Vihar-1	2.2KV	L-G (2km)	330	315	6y- 17 to 110	6y- 25 to 175	6y- 29 to 176	6y- 56 to 251
7	27.07.2018	22:12hrs	400KV Dadri-Kaithal	1.3KV	L-G (24.7km)	478	509	6y- 18 to 19	6x- 65 to 66	6x- 22 to 23	6x- 27 to 28
8	02.08.2018	04:10hrs	400KV Dadri-Kaithal	5.8KV	L-G (37.8km)	310	308	6x- 18 to 25	6x- 68 to 74	5x- 25 to 30	6y- 55 to 78
9	03.08.2018	17:13hrs	400 kV Dadri-GreaterNoida	REL-521 TYPE RELAY,NOT POSSIBLE	L-L (6.4km)	305	290	6x- 18 to 81	6y- 27 to 136	6y- 27 to 74	6y- 55 to 134
10	10.08.2018	02:46hrs	400KV Dadri-Kaithal	9.6KV	L-G (90.7km)	313	301	6x- 18 to 19	5y- 63 to 64	6y- 25 to 26	6y- 58 to 59
11	13.08.2018	02:58hrs	400KV Dadri-Harsh Vihar-2	2.4KV	L-G (34.4km)	267	265	6y- 16 to 31	6y- 25 to 43	6x- 19 to 42	6x- 33 to 51
12	17.08.2018	16:39 hrs	Champa- Kurukshetra HVDC Line (Both Poles) & Bhiwani - Jhatikara 765KV line tripped			395	392	6y- 16 to 70	6x- 67 to 125	6x- 20 to 110	6x- 29 to 141
13	23.08.2018	21:37hrs	400KV Dadri-Kaithal	1.9KV	L-G (12.7km)	480	480	6y- 18 to 41	6y- 30 to 64	6y- 29 to 57	6x- 28 to 67
14	28.08.2018	05:23hrs	400KV Dadri-Maharanibagh	95 KV	L-G (5.4km)	301	305	6x- 18 to 48	6x-65 to 99	6y- 25 to 47	6x-34 to 65
15	29.08.2018	23:20hrs	400KV Dadri-Panipat-2	187KV	L-G (32.5km)	375	335	6x- 19 to 23	6y- 20 to 26	6y- 26 to 27	6y- 55 to 56
16	01.09.2018	20:54hrs	400KV Dadri-Panipat-1	Not triggered	L-G (7.4km)	350	410	6x- 18 to 44	6x- 62 to 77	6y- 29 to 43	6y- 56 to 91
17	03.09.2018	20:28hrs	400KV Dadri-Panipat-2	198 KV	L-G (67.4km)	310	346	6x- 17 to 17.5	6x- 61 to 62	6y- 27 to 28	6y- 54 to 55
18	05.09.2018	10:45hrs	400KV Dadri-Harsh Vihar-2	7.1 KV	L-L (21.6km)	266	272	6x- 18 to 120	6x- 64 to 186	6x- 19 to 144	6y- 55 to 241
19	06.09.2018	22:40 hrs	Dadri Greater Noida line	13 KV	L-G	272	276	6X 19 to 119	6X 65 to 174	6Y 28 to 151	6Y 52 to 212
20	09.09.2018	09:30 hrs	Dadri Panipat-2 Autoreclosed			346	323	6Y 18 to 29	6Y 29 to 37	6Y 27 to 33	6X 29 to 34
21	19.09.2018	21:28 hrs	Dadri Panipat-1 Autoreclosed	14.8 KV	L-G	385	476	6X 17 to 43	6X 67 to 82	6Y 28 to 52	6Y 60 to 105
22	23.09.2018	19:53 hrs	400 KV Bus-2 tripped on Bus bar Protection	72KV	L-G	404	434	6x 19 to 136	6X 66 to 184	6Y 27 to 172	6Y 59 to 255

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CEA	(i) Sh. Vikram Singh, Director; Fax-26170385,26108834 (ii) Chief Engineer, NPC, New Delhi
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