सत्यमेव जयते

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

संख्या: NRPC/OPR/106/01/2019/2876-2917 **दिनांक:25.03.2019**

विषय: उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 157वीं बैठक का कार्यवृत
Minutes of 157th OCC meeting of NRPC.

उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 157वीं बैठक 07.03.2019 को आयोजित की गयी थी। उक्त बैठक का कार्यवृत्त उत्तर क्षेत्रीय विद्युत समिति की वेबसाइट http://www.nrpc.gov.in पर उपलब्ध है। यदि कार्यवृत पर कोई टिप्पणी हो तो कार्यवृत जारी करने के एक सप्ताह के अन्दर इस कार्यालय को भेजेंI

157th meeting of the Operation Co-ordination Sub-Committee of NRPC was held on 07.03.2019. The Minutes of this meeting have been up-loaded on the NRPC web-site http://www.nrpc.gov.in. Any comments on the minutes may kindly be submitted within a week of issuance of the minutes.

संलग्नक: यथोपरि

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(सौमित्र मजूमदार)
अधीक्षण अभियंता (प्रचालन)

सेवा में,
प्रचालन समन्वय उप-समिति के सभी सदस्य

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Minutes of the 157th Meeting of the Operation Coordination Sub-Committee (OCC) of NRPC.

157th meeting of OCC of NRPC was held on 07.03.2019 at NRPC Secretariat, New Delhi. The list of participants of the meeting is attached at Annexure-1.

MS, NRPC welcomed all the members of the sub-committee to the 157thOCC meeting. He briefed members that a meeting was convened by CERC to discuss the issues related to CERC (DSM) (4th Amendment) Regulation wherein the issues of NR constituents like discrepancies in SEM & SCADA data, zero crossing violations for HVDC, problems related zero scheduling etc. were put forth by NRPC. He stated any directions from CERC on these issues, if received, would be informed to the member.

He further informed that NLDC has published draft detailed procedure for implementation of SCED on their website requesting comments. NRPC has submitted the comments on this draft procedure. He further requested utilities should also submit their comments at the earliest.

He then requested SE(O), NRPC to take up agenda items.

PART-A: NRPC

1. Confirmation of Minutes

The minutes of the 156th OCC meeting held on 11.02.2019 and 12.02.2019 at New Delhi were issued vide letter of even number dated 01.03.2019.

Following comments on the minutes were received from various entities:

a) HVPNL: Anticipated MW of Haryana for March 2019 (in Annexure-4 of the minutes) may be considered as 6960 MW and for February 2019, this may be considered as 7056 MW.

b) APCPL: The additional agenda point regarding "DSM 4th amendment sign reversal mandate" submitted by APCPL-IGSTPS Jhajjar be included in the minutes.

c) ADHPL: Under item no. 28 – Certification of Non-ISTS line for inclusion in PoC charges for hydro rich States (Agenda by HPPTCL), the following will be incorporated in the Minutes of the Meeting.

i. The ADHPL-Nalagarh Transmission Line is a dedicated Transmission Line.

ii. During the meeting in CEA for the approval of the sub-station after commissioning, it was agreed that the connectivity arrangement of the sub-station with ADHPL Dedicated Transmission Line by LILO in one circuit is an interim arrangement only so that the small hydro generations is not bottled up.

iii. ADHPL-Nalagarh Dedicated Transmission Line does not fulfill the planning criteria prescribed in Indian Electricity Grid Code for ISTS system.

iv. ADHPL Dedicated Transmission Line has already lost the N-1 criteria and is not capable of taking enough power for transmission. CEA has already recorded the fact in its minutes of meeting dated 04.02.2013.

v. The issue of terms for the use of the dedicated transmission line is subjudice before CERC pursuant to the order of the Hon'ble Supreme Court of India.

d) The highlights of grid operation during December, 2018 are as under: In the paragraph word 'more' is replaced by 'less'.

e) HVPNL: The clause 13.4 amended as below:

In the 156th OCC meeting, it was clarified that according to the IEGC clause 5.4.2 (d), it was the joint responsibility of SLDC/SEB/DISCOMs for the implementation of ADMS scheme.

Sub–Committee confirmed the minutes of the 156th OCC meeting with above modification.

2. Review of Grid operations of February 2019:

2.1. Anticipated vis-à-vis Actual Power Supply Position (Provisional) February 2019.

Sub Committee was informed that there are variations (i.e. > 5.0%) in the Anticipated vis-à-vis Actual Power Supply Position (Provisional) for the month of February, 2019 in terms of Energy Requirement for Haryana, Punjab, Uttarakhand & UP and in terms of Peak Demand for J&K, Punjab, Chandigarh, Delhi & Haryana. Reasons for variation submitted by utilities are as below.

Punjab

Decrease in demand in terms of MW to the extent of 5716 MW in actual against anticipations of 6890 MW and decline in demand in terms of MU to the extent of 2881 MU in actual against anticipations of 3350 MU attributed to rain in Feb 2019 and reduction of consumption in agricultural sector.

Uttarakhand:

Decrease in demand in terms of MU to the extent of 1038 MU in actual against anticipations of 1170 MU attributed to rain.

Uttar Pradesh:

Decline in demand in terms of MU to the extent of 7177 MU in actual against anticipations of 7980 MU attributed to mild weather and better demand side management during Feb-2019.

Haryana:

Decline in demand in terms of MU to the extent of 3310 MU in actual against anticipations of 3510 MU attributes to mild weather. Anticipated MW requirement during Feb-2019 was 7550 MW thereby variations with Actual MW (6946 MW) was -8%.

The Sub-Committee requested all SLDCs to furnish the provisional and final 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 for NCR:**

2.2.1. The Sub-Committee was informed that the 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 01/2019 is placed on NRPC website (www.nrpc.gov.in/meetings/occ.html).

2.3. The highlights of grid operation during February 2019 are as follows: -

2.3.1. Frequency remained within the IEGC band for 70.73% of the time during February 2019, which is less than that of last year during same month (February 2018) when frequency (within IEGC band) remained 80.25% of the time. The maximum and minimum

frequencies recorded were 50.23 Hz (11.02.2019 at 03:25 hrs) and 49.72 Hz(01.02.2019 at 12:40) respectively.

2.3.2. Utilities were requested to take necessary action to further improve the frequency regime viz. by not changing abruptly the loads at block boundaries and assuring primary response from the generators.

2.3.3. Maximum and minimum load for the region during February 2019 were 46675 MW (02.02.2019 at 18:35 hrs) and 25768 MW (08.02.2019 at 04:00 hrs).

2.3.4. The average consumption, of the Northern Region, for February 2019, decreased by 2.46% (22.44 MU per day) with respect to the corresponding month in previous year.

2.3.5. The average Thermal generation in February 2019 decreased by 0.72% (6.5 MU/Day) with respect to the corresponding month in previous year. The details are enclosed at **Annexure II (A).**

2.3.6. The average Hydro generation in February 2019 increased by 36.84 MU/day with respect to the corresponding month in previous year.

2.3.7. The average Renewable generation in February 2019 increased by 21.93 MU/Day with respect to the corresponding month in previous year. All utilities were requested to send the data for renewable generation regularly. The reason for the increase was highlighted as capacity addition, better sunshine & wind. Also, it was added that the telemetry of renewable had improved.

2.3.8. The average nuclear generation in February 2019 decreased by 7.12 MU/day per day as compared to corresponding month in previous year.

2.3.9. The net Average Inter-Regional import decreased by 9.83 MU/day during the month of February 2019, as compared to the corresponding month in previous year.

2.3.10. The net Average Import from WR increased by 0.1 MU/day during February 2019 as compared to corresponding month in previous year.

2.3.11. The net Average Import from ER increased by approximately 6.4 MU/day during February 2019 as compared to corresponding month in previous year.

2.3.12. The net Average Import from NER was approximately 15.36 MU/day during February 2019.

2.3.13. The transmission losses are depicted at **Annexure II (B).**

2.3.14. The outages of generating Units were discussed in detail and the same is placed at **Annexure II (C).**

2.3.15. Long outages of transmission lines were discussed & all constituents were requested to revive the elements under long outages at the earliest **Annexure II (D).**

2.3.16. The new elements charged were discussed and the list is attached at **Annexure II (E).**

2.3.17. Total outages during February 2019 were 784 including Planned S/D (425) and Forced S/D (Trippings-259+Emergency S/D-100).

3. Planning of Grid Operation

3.1. Anticipated Power Supply Position in Northern Region during April, 2019 as per LGBR for 2018-19:

3.1.1. Modified Anticipated Power Supply Position in Northern Region during April, 2019 is placed at **Annexure-4.**

4. Maintenance Programme of Generating Units and Transmission Lines

4.1. **Maintenance Programme for Generating Units.**

The maintenance programme for Generating Units for the month of April, 2019 will be on 11.03.2019 at NRPC Secretariat, New Delhi.

4.2. **Outage Programme for Transmission Elements.**

The maintenance programme for Generating Units for the month of April, 2019 will be on 11.03.2019 at NRPC Secretariat, New Delhi.

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

All SLDCs were requested to confirm if the process of Scheduling was being done as per Merit Order Despatch and in case of variations, the reasons may please be furnished.

6. Reactive compensation at 220 kV/400kV level

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

a) 500 MVAr TCR at 400 kV bus at Kurukshetra S/S of Powergrid.

b) 30 no. 220 kV bus reactors at 220 kV sub-stations and 18 no. 400 kV bus reactors at 400 kV sub-stations subject to the availability of space.

POWERGRID:

500 MVAr TCR at Kurukshetra:Award placed in January 2019 with completion schedule of 22 months. It was intimated that kick off meeting has been held. Possibility of time squeezing would be explored.

DTL:

The updated status of the reactors as received from DTL is placed below:

S.No.	Bus Name	Voltage level (kV)	Reactor (MVAR)	Plg. Status
1	Peeragarhi	220	1x50	PR No 1100002017 Raised.
2	Mundka	400	1x125	Scheme is being placed before BOD,DTL for approval
		220	1x25	
3	Harsh Vihar	220	2x50	**Scheme has been approved by the Board. Tendering would be done.**
4	Electric Lane	220	1x50	Feasibility report received from SS&LM division and site revisited. Accordingly, the Scheme is under preparation.
5	Bamnauli	220	2x25	Under financial concurrence
6	Indraprastha	220	2x25	Under financial concurrence
TOTAL			**450**	

DTL was requested to pre-pone the commissioning schedule before the onset of winter of 2020.

PSTCL:

PSTCL representative stated that for 400 kV bus reactor at Dhuri substation and 220 kV bus reactors at Dhuri and Nakodar substations, the Technical bids has already been opened and Price bidswere put on hold due to pending PSDF approval.

As per the conditions of PSDF funding, it was decided that the LOA would be placed only after approval for PSDF funding.

However, the delay in obtaining the PSDF funding approval has delayed the tendering process and the Bidder is now refusing to extend Bid validity which could lead to jeopardizing the whole process only because of delay in approval of PSDF funding.

157th OCC Meeting: Representative from Punjab informed that PSDF funding approval is still pending and bidder has declined to extend the bid validity due to which tender is now being cancelled. He told that heavy interest liability arises due to delay in PSDF funding and agenda regarding the same has been put forth in upcoming NRPC meeting. He told that queries of PSDF have already been clarified and delay was due to shortage of Funds in PSDF. Complete process has to be done again which may take one year.

Uttarakhand:

125 MVAr reactors at Kashipur: Technical Evaluation has been completed.Further, it would be discussed in CPC meeting.

Rajasthan:

Item	Background	Status
3 Nos. each of 25 MV A (220KV) reactors for Akal, Bikaner &Suratgarh.	DPR submitted for PSDF funding on 27.04.2018. Reply to the observations of NLDC submitted on 28.07.2018	Approved in the Monitoring Committee of PSDF. Minutes of the Monitoring Committee meeting to be issued.
1 No. of 25 MVAR (220KV) reactor for Barmer& 125 MVA (400KV) reactor for Jodhpur, included in 450 MVA (13x25+1x125MVA) proposal	Revised DPR for 450 MVAR Reactor after separating STATCOM was submitted vide letter dtd. 12.10.2018 to POSOCO for approval.	**Clarifications which were sought have been submitted for PSDF funding.**

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

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 2019-20.

7.1. **39th TCC and 42nd NRPC** approved the Techno Commercial offer of CPRI of**Rs. 32 lakhs (Rs. 20 lakhs for previous study and Rs. 12 lakhs for additional assignment) excluding taxes** for conducting the capacitor study. In the meeting the format for data submission was shared with the members and they were requested to ensure timely submission of the data so that the study may be carried out in the stipulated time frame.

7.2. In the **150th OCC meeting**, members expressed concerns on the nature of the format and submitted that the format being lengthy would require some time for better understanding the format and submission of data accordingly.

- To address the concerns of the members of OCC forum, in the **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 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 uploaded on Youtube at https://youtu.be/QTXx7owPF3g.

7.3. Members were 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.

7.4. **152nd OCC meeting:** No progress has been made so far in submission of data. All the utilities were again requested to make all are efforts to submit the data so that study can be completed the time.

7.5. **40th TCC & 43rd NRPC meeting:** Members were again requested to expedite submission of the data to CPRI in the format prescribed for studies to be conducted for Capacitor requirement in NR for the year 2019-20.

7.6. **153rd OCC meeting:** MS, NRPC expressed his concerns as no data in the specified format has been received from any of the state even for a single substation which was desired to verify its suitability for utilization in carrying out the capacitor study.

Representative of Haryana stated that they had submitted data to which the representative of CPRI replied that the data submitted by Haryana was not in the format as decided in the 151st OCC meeting which was forwarded to all the utilities via e-mail dated 24.09.2018.

Representative of Rajasthan SLDC stated that the load data at 11 kV substations was not being maintained. Therefore, it was not possible for them to furnish the same.

EE (O), NRPC and representative of JVVNL stated that the load data was maintained at 11 kV sub-station and the same may be made available.

Representative of Rajasthan SLDC stated that the same would be verified and the data shall be submitted at the earliest.

7.7. The issue of non-submission of data for system study of capacitor requirement in NR for the year 2019-20 has been taken up with the highest management of DISCOMs, STUs and SLDCs. The letter regarding the same dated 06.11.2018 is enclosed at Annexure – Agenda item no 7 of the Agenda of the 154th OCC meeting, for reference.

7.8. **154th OCC meeting:** SE (O) stated that the matter is being pursued with the top management of the DISCOMs (refer Annexure – Agenda item no 7 of the Agenda of the 154th OCC meeting). He stated that all SLDCs should take up the issue with their respective DISCOMs for submission of the data as desired at the earliest**.**

7.9. **155th OCC meeting:** MS, NRPC stated that the sample data as received from most of the utilities were not in line as per the requirement of CPRI and the same has also been informed through mail by CPRI to the respective utilities. He further stated that due to non-availability of data in proper format, the study could not be performed and low voltage profile issue may be encountered in future.Representative of DTL stated that they have incorporated the changes as suggested by CPRI and has again submitted the same to CPRI. Once approved, DTL would start compiling data for their whole network and submit the same to CPRI.

7.10. **156th OCC meeting:** All utilities were advised to expedite the collection of data, in the absence of which the study may not be got conducted.

7.11. **157th OCC meeting:** MS, NRPC stated that utilities have been pursued for collection of data but with no success. He suggested that third party may be hired for data collection or CPRI may be requested for the work of data collection and cost for the same would be borne by utilities.

7.12. Representative of UP told that DISCOMs are being pursued for submission of data. He emphasized that data shall be submitted by utilities by 30th March, 2019, otherwise data can be collected through third-party and cost for respective states would be borne by respective state utilities.

8. Phase nomenclature mismatch issue with BBMB and interconnected stations

8.1. 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 modify 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 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

BBMB was asked to rectify the phasenomenclature at their end accordingly.

8.2. 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.

8.3. 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.

8.4. 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.

8.5. Accordingly, the matter was taken up vide letter of even number dated 07.10.2018 for POWERGRID consent to the action plan. However, reply of the same is still awaited.

8.6. **152nd OCC meeting:** POWERGRID representative assured that the issue will be resolved with BBMB.

8.7. SE (O) requested POWERGRID to give their consent at the earliest so as that the BBMB could execute the work in the upcoming months of November & December as per the decision of NRPC.

8.8. **40th TCC & 43rd NRPC meeting:** In the meeting POWERGRID stated that they have reservation regarding the action plan submitted by BBMB, as for a single circuit line it may not be optimal plan to change the Jumper configuration in view of requirement for long shut down & material. He further stated that a similar issue was encountered in Rajasthan wherein same problem was mitigated for a Double circuit line.MS NRPC had requested POWERGRID to submit all their reservations in writing, highlighting the issues which may be encountered at the time of implementation of above. In the meeting it was stressed that the work should be completed in the lean period of November-December 2018

8.9. **153rd OCC meeting:** POWERGRID updated that the site visit is planned shortly to resolve the issue. As desired in the 43rdNRPC meeting POWERGRID submitted all their reservations in writing (Annexure 8 of MoM of 153rd OCC meeting). Further MS NRPC requested POWERGRID to resolve the matter immediately so that the work can be done by BBMB in the lean period. BBMB representative also requested for the same as once the clearance from POWERGRID is received thereafter the matter has to be approved by their Protection Committee.

8.10. **154th OCC meeting:** POWERGRID submitted the details (Annexure-8 of the minutes) of the issues/ difficulty which would be faced while completing the phase nomenclature mismatch work. POWERGRID intimated that the site visit had been done by their site officials.

MS, NRPC stated that the rectification of the phase nomenclature mismatch issue work is very important and it should be completed during the lean period.

8.11. After deliberations it was decided that a joint visit by POWERGRID, BBMB, NRLDC and NRPC would be conducted on 15/01/2019 so as to figure out the difficulties that would be faced in order to rectify the issue as listed out by POWERGRID.

8.12. **155th OCC meeting:** Due to the schedule of OCC meeting on 16th and 17th January, the visit could not be carried out. In the meeting, it was decided that the same may be tentatively done on 23rd and 24th January 2019.

8.13. **156th OCC meeting:** BBMB and POWERGRID were advised to mutually decide the date and conduct the visit at the earliest.

8.14. **157th OCC meeting:** BBMB and POWERGRID were again requested to decided the date for site visit at the earliest. It was agreed that site visit would be planned on 13th and 14th March, 2019. The schedule for site visit was decided as: 13th March, 2019 for Bhiwani & Rajpura S/s; 14th March, 2019 for Panchkula & Panipat S/s.

9. Follow up of issues from previous OCC Meetings – Status update The detail of the updated status of Agenda items as discussed in the 156th OCC meeting is enclosed at **Annexure-9**.

10. Status of FGD installation vis-à-vis installation plan at identified TPS.

10.1. The updated status of FGD installation is attached at **Annexure-10.**

11. LVRT compliance by wind generators.

11.1. The CEA (Technical Standards for Connectivity to the Grid) Amendment Regulations, 2013 stipulates that wind generating stations connected at voltage level of 66 kV and above shall remain connected to the grid when voltage at the interconnection point on any or all phases dips up to specific levels and for specific periods. LVRT is the capability of the generating unit to operate through the periods of lower grid voltage by boosting the terminal voltage of the point of connection of the wind machine when there is a fault at the remote location so that transient stability support is provided.

11.2. CERC has already directed all WTGs of capacity equal to or more than 500kW except Stall Type WTGs to implement LVRT, after the issue of necessary regulation/clarification by CEA. CERC has also desired that all WTGs of capacity equal to or more than 500 KW except 'Stall Type WTGs' to comply with LVRT, for which SERCs may consider to allow the cost of retrofitting WTGs with LVRT under the provision of 'Change in Law' in the respective PPAs. With regard to monitoring of the installation and performance of LVRT installed on existing WTGs, CERC has directed SLDCs to prepare quarterly reports and submit it to RPCs. RPCs are directed to validate the reports submitted by SLDCs in consultation with RLDCs and report any deficiency and non-compliance to the Commission in accordance with law.

11.3. Many wind generations operate without LVRT/FRT feature thereby adversely responding at low voltage either due to high load condition at wind pockets or any fault condition in different parts of the grid and becomes a source for grid incident. The installed capacity having LRVT, their setting is not uniformly matching with the provisions of the Central Electricity Authority (Technical standards for connectivity to the Grid) Regulation, 2007 as amended from time to time.

11.4. 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 and OCC so far without any result. In 38th TCC/41stNRPC meeting, 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. In 145thOCC meeting, RRVPNL intimated that MNRE had directed WTG manufacturers to apply for LVRT testing by 15.03.2018 along with the submission of an affidavit for CEA Technical standards compliance and submission of Bank Guarantee of Rs. 1 Crore per model (to be returned after the submission of certificate of compliance to CEA Technical standards).

11.5. In 148th OCC meeting, SLDCs were requested to issue notice to all Wind generators who have not done the needful compliance. Rajasthan SLDC representative confirmed that needful had been done. In the 149th OCC meeting, Rajasthan representative intimated that a meeting of wind turbine manufacturers was held on 05.07.2018 by RRVPNL to sort out the issue of LVRT. It was also informed that 638 generators are LVRT complaint & 106 do not require as per the regulation and 2641 generators need to be LVRT compliant. The capacity of generators that are non–compliant is 3019 MW. It was also informed that the cost of installing LVRT is about Rs. 25-40 lakh per generator for which the generators will have to make arrangements.

Subsequently, meetings with WTGs were held on 23.07.2018 and 09.10.2018 by RRVPNL. It was informed that M/S Suzlon and Inox have filed a petition for waiver of installation of LVRT on account of the additional cost involved. Further, in a meeting held on 23.10.2018 in NRPC Secretariat with the WTGs to explore GSS/PSS level solution like STATCOM and other alternatives. WTGs were requested to take up for "Pass-through tariff" under "change in law" with SERC. CEA representative proposed that SLDCs may file a petition with respective SERC indicating problem being faced by the WTGs in LVRT installation. In the 154thOCC meeting, Representative of Rajasthan SLDC informed that petition to be filled to SERC was put up for approval; but the management decided that matter may be taken up by the STU in view of the provision of B.3 of CEA (Technical Standards for Connectivity to the Grid) Amendment Regulations, 2013. SLDCs were requested in the 155thOCC meeting to comply with the CERC order on the LVRT issue by submitting quarterly report.

11.6. In the 156th OCC meeting, it was again requested to SLDCs to submit quarterly reports on installation & performance of LVRT on existing WTGs to NRPC, as per the order dt. 05.01.2016 of CERC.

11.7. **157th OCC meeting:** Rajasthan was again requested to file the petition in SERC and implement the decision of NRPC of not scheduling the LVRT non-compliant WTGs. Representative of Rajasthan informed that notice was given to WTGs; however, Rajasthan SLDC has been questioned about the basis of served notice. It was also informed that on the request of SLDC, Rajasthan, NIWE has furnished an estimate for performance test of one unit on dated 01.03.2019 but the cost of test is very high and it has to be decided that who will bear the cost. Rajasthan was requested to share the documents related to above. They were requested to submit the details of compliant/non-compliant WTGs to NRPC/NRLDC at the earliest.

Members were also apprised about the recent amendment in regulations i.e., Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019. It was informed that B.2 clause (vii) indicate towards implementation HVRT. All utilities were requested to study the new regulation.

12. System Protection Scheme (SPS) in NR

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

154th OCC meeting: POWERGRID representative informed that modifications related to CB ON/OFF status have been completed at both Agra and Gwalior end. He told that DTPC installation has been completed and the end to end testing has also been done for 20 links out of 21. He further stated that end to end testing is remaining only for Bhiwadi-Heerapura-Bhilwara-Chittorgarh link. He further requested the concerned states to terminate the links at the designated feeder on which the load shedding is required to be done. He told that end connections with Trip relay of the feeder to be done States. He assured that as targeted, the mock testing can be carried out in 01/2019. Representative of NRLDC requested POWERGRID to coordinate with states and keep NRPC/NRLDC in loop for early completion of the scheme. MS NRPC requested POWERGRID to coordinate with nodal officers of the concerned states for early termination of the links at their end.

155th OCC meeting: POWERGRID representative stated that the cable has already been laid down to the Protection panel in all substations and only the terminal connection needs to be done which has to be done by the utility concerned. Once the terminal connections are done, mock testing of the scheme can be done. Delhi, Haryana, Rajasthan, Punjab and

UP were advised to expedite. POWERGRID was requested to coordinate with nodal officers of the concerned states for early termination of the links at their end.

POWERGRID was advised to pursue with the concerned utilities and get the work done at the earliest so that mock testing of the scheme may be conducted in the first week of February 2019.

156th OCC meeting: POWERGRID representative informed that states were intimated via e-mail to arrange for terminating the tripping wire to respective feeders. He told that only Delhi has confirmed the termination of tripping wire. He further stated that it was coordinated with all nodal officers. Haryana, Rajasthan, Punjab and UP were requested to expedite the termination of the tripping wire to respective feeders.

POWERGRID was again requested to follow up with the concerned utilities for early completion of scheme so that mock testing of the scheme may be conducted in the February 2019.

157th OCC meeting: POWERGRID informed that list of substations was circulated. He told that necessary help and coordination would be done telephonically by POWERGRID but termination at Master trip relay has to be done by the respective state utility. Sh. R.N. Gupta and Sh. M.S.Handa, from POWERGRID side were appointed as coordinators for facilitating timely termination work. MS, NRPC advised that Whatsapp group may be created wherein continuous monitoring for early implementation and mock testing could be done. Rajasthan, Haryana, Punjab and UP were requested to complete the termination by 15th March, 2019 and mock testing would be planned on 25th March, 2019. States were also requested to share the names/ mobile nos. of coordinators at every location which is needed during the mock testing.

NRLDC requested POWERGRID to ensure logging of SPS signal in SCADA. He stated that time stamping of SPS signal when sent to particular group as well as time stamping of SPS signal when received by feeders in respective group needs to be ensured. He also told that possibility of logging of receiving signal in SCADA as in Mundra-Mahidragrh SPS might also be explored.

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

153rd OCC meeting: UPRVUNL updated that the work is under progress. BHEL they intimated has given a list of MAX-DNA Hardware to be procured by department. The offer stands received and procurement is under process. He further added that BHEL is developing the software logic of the SPS. As on date it is expected that the work would be completed by December 2018

154th OCC meeting: UPRVUNL updated that all the hardware required has been arranged at site. BHEL Engineer will be available at site from 22/12/2018 to finalize the design of logic in 15 days. Thereafter implementation will be done in next 7-8 days. The implementation of logic is expected to be completed by 1/2019.

155th OCC meeting: UPRVUNL in its letter dated 15.01.2019 has intimated that all the hardware required has been arranged at site. BHEL engineer will be available in the 3rd week of January. The design of SPS logic is under process with BHEL and the implementation of SPS is expected to be completed by January 2019.

156th OCC meeting: UPRVUNL in its letter dated 11.02.2019 has intimated that all hardware has been arranged at site. The BHEL engineer will be available w.e.f. 20th Feb 2019 to 24th Feb, 2019. The SPS implementation is expected to be completed by Feb, 2019.

157th OCC meeting: UPRVUNL informed that SPS work has been completed in DCS and input has been provided to UPPTCL as per requirement. Commissioning and testing of SPS at UPPTCL end were pending. Work was expected to be completed by UPPTCL up to 10.03.2019. Representative of UPSLDC informed that ICT-3 hasn't been included in the SPS to be implemented; hence, it needs to be reviewed. It was advised that UPSLDC, UPRVUNL and other concerned utilities to conduct a meeting wherein revision of SPS for ICTs at 765kV substation might be explored.

12.3. **SPS for Kawai – Kalisindh - Chhabra generation complex**:

In 152nd OCC meeting: RRVPNL representative submitted a letter from SE (Procurement-I), RVPN, Jaipur Annexure-XII of the MOM of the 152nd OCC meeting, vide which it has been intimated that the Technical specification for implementation of Automatic load shedding scheme under SPS for Kawai Kalisindh generation complex is under approval. Further, it was intimated that the contract will be awarded within 4-5 months and complete implementation of above scheme may take further 6-7 months. SLDC Rajasthan representative confirmed that Chabra STPS units have also been wired to the SPS.

155th OCC meeting: RRVPNL representative stated that the tender would be floated by the end of February 2019.

156th OCC meeting: Rajasthan vide letter dated 06.02.2019 has requested to review SPS scheme for Kawai – Kalisindh - Chhabra generation complex upon commissioning of 400kV CTPP-Anta feeder. The agenda has been deliberated in detail at point no. 1 Part-B NRLDC.

157th OCC meeting: Representative of Rajasthan informed that meeting is scheduled on 11.03.2019 to review the SPS for Kawai- Kalisindh-Chhabra generation complex. He stated that studies were being carried out by Planning Division which would deliberate the matter in the meeting. It was also advised that studies might be shared amongst NRLDC and Rajasthan, so that revised scheme might be formulated at the earliest. NRLDC requested to share the dynamic data for AVR, Governor, PSS for the generators so that detailed studies might be carried out.

13. Automatic Demand Management System

Clause 5.4.2 (d) of IEGC mandates for implementation of the state-of-the-art demand management schemes for automatic demand management to reduce overdrawal from the gird. The responsibility for the implementation of the same has been entrusted on SLDCs/ SEB/ DISCOMs.

CERC in its order in **petition No. 5/SM/2014** had granted time till **31.06.2016** to the concerned SLDCs/ SEB/ DISCOMs to implement ADMS, failing which action under Section 142 of the Act for non-compliance of the Regulation 5.4.2 (d) of the Grid Code and order of the Commission. **RLDCs were also directed to submit the report in this regard to the commission by 31.08.2016.**

The issue of implementation of ADMS in NR is being deliberated regularly in the OCC meetings. The status of implementation of ADMS in states of NR is:

State/ Utility	Status
Punjab	**Not fully implemented.** At SLDC level, remote tripping for 26locations is operational. At 11 kV feeder level, ADMS is to be implemented by Distribution Company.
TPDDL	**Fully implemented.**

State/ Utility	Status
Rajasthan	**Under implementation.** LoA placed on 12/12/2018 with an execution period of 18 months for ADMS at the level of 33 kV feeders at EHV Substation of RVPN under SCADA / EMS part of project. ADMS functionality at 11 kV feeders from 33/11 kV substation is under the jurisdiction of the Discoms and matter is being perused with discoms authorities
UP	**Not fully implemented.** Remote operation of 132 kV feeders under ADMS is operational. For the down below network, issue taken up with the DISCOMs.
Haryana	**Not implemented.**

All the utilities were requested to expedite the implementation of ADMS so as to avoid any action by the commission under Section 142 of the Electricity Act for non-compliance of IEGC.

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

The utilities are again requested to update the information as per the letter enclosed at Annexure 14 of agenda of 156th OCC meeting. In 155th OCC meeting, it was informed that in 8thNPC meeting held on 30th Nov, 2018 the non-submission of this information was highlighted and a serious concern was shown regarding the same. The status of information received is as followed:

Submitted		Not Submitted	
NTPC (NCR)	POSOSCO	Uttar Pradesh	Delhi
BBMB	NHPC	Himachal Pradesh	UT of Chandigarh
Punjab	HPGCL (Panipat TPS)	SJVNL	Jammu and Kashmir
Rajasthan	NPCIL	NTPC (NR-HQ)	
THDC	POWERGRID (NR-1 & NR-2)	POWERGRID (NR-3)	

156th OCC meeting: It was highlighted that it is a long pending issue and reminder letter has already been sent which is attached at annexure-14 of agenda of 156th OCC meeting. Utilities were again requested to share the updated status.

157th OCC meeting: Utilities were requested to submit the updated information at the earliest.

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

The updated status as per the 155th OCC meeting is enclosed as Annexure –15.

The guidelines have been issued vide which the Ministry of Power has directed that for 5000 ckt kms minimum 2 numbers of ERS are required (Annexure 16 of the MOM of the 150th OCC meeting).

In the **155th OCC meeting**, MS, NRPC advised BBMB to procure ERS for their system to which BBMB replied that the decision has already been taken in the full board that partner states will provide ERS to BBMB, whenever needed.MS, NRPC stated that if such a stance has been taken by the partner states, the partner states shall procure 1 additional set each, to be provided to BBMB whenever they require.

156th OCC meeting: Representative of BBMB stated that regarding the proposal for procuring one additional ERS set by each partner state of BBMB, the communication has already been done with the concerned and their reply on the same was waited for further action.

157th OCC meeting: BBMB was advised to take up the issue in the upcoming NRPC meeting wherein possibility of procuring one additional set by partner states would be explored.

16. Cleaning and Replacement of porcelain insulators

All transmission licensees in the Northern Region were requested since 148th OCC meeting to plan insulator replacement work from September 2018 onwards. The meeting for cleaning and replacement work of conventional insulator was held on 15.10.2018 and the minutes of the meeting was issued vide letter dated 12.11.2018. All utilities were requested to stick to the timeline as brought out in the meeting to mitigate fog related trippings during winter season and to ensure proper submission of data regarding progress of the cleaning/ replacement work in line with the discussions held in the meeting.

In the 156th OCC meeting, it was intimated that a web based online application (http://nrpc.gov.in/portal) has been made functional on NRPC website, wherein transmission licensees can regularly fill up their respective data pertaining to cleaning & replacement of porcelain insulators. This online application can facilitate generation of centralized and consolidated report. Demonstration of the application was given to the participants. It was intimated that requisite login ID and password may be furnished to the transmission licensees by NRPC; thereafter, online data may be furnished by respective transmission licensee.

All transmission licensees of Northern Region were requested to submit cleaning & replacement of porcelain insulators related data on the online application after the receipt of their respective login ID and password.

17. Cyber Security Preparedness Monitoring

A. In the 37th TCC and 40th NRPC meeting Chief Engineer (IT), CEA& CISO, MoP gave a detailed presentation on potential cyber threats for power sector along with cyber incidences and shared the desired action points to counter cyber threat. All utilities were also requested to monitor actions being taken in regard to the following points and report the status:

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.

In the 156th OCC meeting, all utilities were requested to furnished updated status of the aforementioned points to NRPC so the compiled information may be submitted to CISO, MoP.

POWERGRID intimated that draft Crisis Management Plan (CMP) for Transmission sector has been prepared and has been submitted for approval. **POWERGRID was requested to share the draft Crisis Management Plan (CMP) for Transmission sector with CISO, MoP, under intimation to NRPC.**

B. In the 156th OCC meeting, it was mentioned that inherent vulnerability in the ICT infrastructure or website or web applications may invite attackers to carry out malicious activities and exploit the targeted organization. In this regard, it is necessary for all utilities to conduct Vulnerability Assessment & Penetration Test (VAPT) of their respective ICT infrastructure, websites and web applications for proper assessment and remedial action thereafter.

NHPC vide e-mail dated 19.02.2019 has intimated that as a Pilot location, the auditing of IT infrastructure of IT&C Division and VAPT of Two Power Stations namely Chamera-II and Teesta-V Power Stations have already been done in NHPC. For the above works the work order was placed to M/s TCG Digital Solution Pvt. Ltd. Kolkata on 31.10.2018. The Audit/VAPT of IT&C Division, CO, Teesta-V and Chamera-2 Power Station completed on 15/12/2018. The final report has also been submitted by the firm on 31.12.2018. The compliance of the observations is under progress.

All utilities were requested were requested to intimate NRPC about the status of VAPT conducted in their respective organization and VAPT plan for the future.

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

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' considering ambient temp. of 45^{o}C for terminal equipment ratings of both ends of the lines.

As there is a scope for considering temperature adjusted thermal ratings for these lines in the PSSE studies, NRCE has decided to finalize the methodology for computation of TTC/ATC/TRM taking into a/c variation in thermal capability of lines wrt variation of ambient temp.

Therefore, POSOCO is in the process of populating the temp. adjusted thermal ratings in these lines in the PSSE study case.

All STUs and transmission licensees are requested to furnish terminal equipment ratings at all lines at 400kV and above for fully implementing the temp adjusted TTC to ensure that there is no gap in security assessment. The matter is under regular follow up since 152nd OCC meeting, only HVPNL has submitted the data (Annexure-19 of 156th OCC MOM) so far.

All other STUs and transmission licensees were requested for expeditious submission of information.

19. Expediting Construction of 132kV supply for railway traction substation for railway electrification projects in states in NR region.

Ministry of Railways has accorded high priority to railway electrification projects for reducing dependence on imported petroleum based fuel thereby enhancing energy security of nation. However, it is observed progress of ongoing transmission line and substation works being executed by SEBs is not matching with the targets for railway sections planned to be commissioned on electric traction. It is found that the work of transmission line for 31 traction sub stations (UP 19, Haryana 5, Punjab 1, and Rajasthan 5 & J&K 1) is yet to be completed. Further tender for transmission line work for 14 traction sub stations(UP 5,Haryana 2,Punjab 2, Rajasthan 5) is yet to be awarded and estimate for10 traction sub stations(UP 1,Punjab 2, Rajasthan 7) are yet to be received by Railways from respective SEBs. The details are enclosed at Annexure – Agenda item no 20 of the Agenda of the 154th OCC meeting.

154th OCC meeting: SE(O) stated that early commissioning of transmission line works and substation across the nation is required, so as to harness full potential of electrification.

Members were requested to take up the matter with concerned utilities to expeditious completion of the transmission line works and substation and regularly update the progress of the work in monthly OCC meeting.

157th OCC meeting: All utilities were again requested to update as per the Annexure-20 of the agenda 154th OCC meeting.

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 from CEA, CTU/ POWERGRID, NTPC,POSOCO were received and the first meeting of the committee **(**Minutes attached at Annexure -Agenda item no. 21**)** was held prior to the 152nd OCC meeting.

154th OCC: NTPC and POWERGRID was again requested to submit all the information as requested during 1st meeting of the committee at the earliest.

155th OCC Meeting:

NTPC informed that all the relevant information has been submitted on seo-nrpc@nic.in. POWERGRID was again requested to submit the information as desired in the first meeting of the committee.

157th OCC Meeting:

POWERGRID was again requested to submit the information as desired in the first meeting of the committee.

21. Mapping of UFR, df/dt relay details in SCADA

The UFR and df/dt mapping is mandatory as per Hon'ble CERC regulation. The issue has been discussed in various OCC, NRPC-TCC meetings.

In 136th OCC meeting it was discussed that in addition to the SCADA mapping, states should provide the following information regarding the UFR, df/dt relays installed at their respective substations:

Source of frequency measurement for UFR, df/dt relay viz. positive sequence, phase-to-neutral, phase-to-phase.

Computational time for measurement of frequency, rate of change of frequency in UFR, df/dt relays respectively.

In 137th OCC meeting, MS NRPC once again reiterated that mapping of UFR has to be done in the SCADA of SLDC & NRLDC for better visibility of relay status and feeder load relief and emphasized upon the importance of digital breaker status of feeders in such defense schemes. In 140th, 143th, 146th and 151stOCC meeting, all the state utilities were requested to correct the SCADA UFR, df/dt displays as per the comments. The defense schemes are extremely important schemes to avert any major contingency. Hence, State utilities should make all possible efforts to strengthen the same.

States	UFR	df/dt	Status as per the 151st OCC meeting	Remarks	Data Availability
J&K	No	No	-	-	-
UP	Yes	Yes	Following are provided since last status: • Feeder wise planned load relief in df/dt. • Alternate feeder details in UFR display. • Total planned relief in df/dt display.	Following yet to be provided: • Feeder-wise planned load relief of UFR. • Telemetry of feeders (Partial details available). • Alternate feeder details in df/dt display (Partial details available for UFR). • Total planned relief in UFR display. (Stage wise) • Total actual relief. (Stage Wise)	Very Poor
Haryana	Yes	Yes	Following are provided since last status: • Stage-2, 3 of df/dt included in display. • Feeder wise planned load relief.	Following yet to be provided: • Telemetry of feeders (Partial details available). • Telemetry of alternate feeders not available. • Calculation of total actual relief in	Poor

States	UFR	df/dt	Status as per the 151st OCC meeting	Remarks	Data Availability
			• Alternate feeder details. • Total actual relief in UFR.	df/dt seems incorrect.	
Delhi	Yes	Yes	-	Following yet to be provided: • Total of actual analog data of MW and alternate feeders. • Data suspected for most of the digital and Analog value at NRLDC display but available at SLDC display.	Poor
HP	Yes	Yes	Following are provided since last status: • Segregation of stage wise load. • Alternate feeder details include for most of the feeders. • Partial telemetry of feeders.	Following yet to be provided: • Telemetry of feeders (Partial data available). • Alternate feeder details in UFR (a few not available).	Poor
Uttarakhand	No	No	-	-	-
Punjab	Yes	Yes	-	Following yet to be provided: • Complete telemetry of feeders. • Alternate feeders' details. • Digital Status of all the feeders	Poor
Rajasthan	Yes	Yes	Following are provided since last status: • UFR display provided.	Following yet to be provided: • Analog value and digital data not available in UFR display (only alternate feeder details provided)	Very Poor

157th OCC: Utilities were again requested to submit the progress on details tabulated above at the earliest and correct/provide the SCADA UFR, df/dt displays as per the comments.

22. Technical Minimum loading of Steam Turbines of NTPC Gas Stations - Reg. (Agenda by NTPC)

NTPC gave a presentation in this regard and brought the issue in the notice of all OCC members for their view. The presentation is enclosed as Annexure-22. In this regard, all other entities were requested to offer comment, if any, related to similar situation. Delhi DISCOM commented on this matter by stating that whichever quantity is on bar they can schedule the Technical minimum of that quantity. If the Merit Oder is violated at the time of scheduling, their payment would not be approved by DERC. Further, MS, NRPC concluded that the matter is outside the jurisdiction of NRPC and solution lies with the CERC.

23. FY 19-20 Over haul of NTPC/NR Stations pending for approval: (Agenda by NTPC)

For the FY 19-20, over haul of NTPC/NR stations will start from 01.04.2019. Till date NRPC approved over-haul plan is not available. Over-haul plan may be approved by

10.03.2019, so that contracting agencies and material can be mobilized well before beginning of over-haul.

It was intimated that approval of the Ministry of Power is still awaited and the approval for shut down may be given accordingly. NTPC may apply for shut down in the outage meeting and the approval may be given, subject to approval of the Ministry.

24. Exemption from sign reversal for solar power stations for DSM calculation: (Agenda by NTPC)

As there is no way for controlling sign reversal in solar power station, exemption may be given to solar power station from sign reversal for DSM Calculation, similar to the practice in WRPC.

NTPC have asked for the exemption of sign reversal in case of Solar Power Station. In this regard MS, NRPC stated that exemption of sign reversal in case of Solar Power Station would be considered as conditional and same would be revised as per CERC clarification in future.

25. Replacement of existing HVPNL ABT Energy Meters with GPS synchronized & ether net port Energy Meters at JPL site (Agenda by CLP Jhajjar)

HVPNL are facing issue of time drift since 2012 in existing HVPNL ABT Energy Meters (Main & Check both) installed at all 400 KV outgoing feeders emanating from Jhajjar Power Ltd (CLP India). Many 400 KV line shutdowns have been taken by us for rectification of time drift of these Energy Meters. Time correction requires presence of 04 agencies and this is time consuming activity. Hence, we suggest replacing the existing ABT Energy Meter with GPS Synchronized Energy Meters and also Ethernet port for remote online metering & Energy accounting purpose.

CLP Jhajjar intimated that there are total 4 outgoing line of 400kv and total 8 meters are installed. It is observed that there is time drift; which is sometime extended upto 30 minutes and needs to be re-synchronized again. Line has been out due to problem in meter issue and requested Haryana to replace the meter.

HVPNL replied that issue could be discussed internally at state level. MS, NRPC concluded that the issue shall be discussed at state level, if there is any problem arises then it would be discussed at NRPC forum.

26. NRPC: A meeting was held in CEA on 05.03.2019 to discuss the feasibility of optimization of maintenance schedule of Pan India ISGS units by considering availability of surplus power in one region and deficit in other region.

MS, NRPC introduced the issue by stating that there is a diversity of Power in all over India. Somewhere the regions are having peak energy demand while somewhere are having off peak. At the place where energy demand is off peak, some shutdown can be considered; but after seeing the scenario of peak demand in the other region(s), shutdown can be deferred. This is an idea to streamline Pan India maintenance schedule for all generating stations. MS, NRPC asked the members to submit detailed activity chart for maintenance of generating stations. View and comments were also asked from all the generating entities.

28. The matter regarding validity of tentatively approved shut down in one OCC meeting was discussed in 154th OCC meeting in reference to restriction imposed by NLDC, for consideration of real time approvals for the shutdowns (s/d), limited only within the approved month. This was found against the well-established existing practice of the real time s/d approvals as tentatively approved s/d in one OCC are considered to be

valid for two months (the proposed month + next one month as well) i.e. say s/d approval of 154th OCC meeting hold good till conduction of 156th OCC meeting. (Agenda by POWERGRID)

On this matter, NRLDC mentioned that the proposed shutdowns are required to be restricted for that month only and if the time exceeds then the proposed shut down may be taken in the next OCC. This is an existing practice which is carried by all other RPCs. UP added that if shutdown is allowed and three days prior permission is also taken from NRLDC, then the shutdown must be given.

Further, PGCIL suggested that if the shutdown is proposed till the next month's OCC and the shutdown is not approved by NRLDC/NLDC due to some reason and is further shifted, then the shut down which was approved in the OCC shall be valid for next month.

MS, NRPC mentioned that matter would be taken up in the NPC meeting and added that shutdown must be given with the consent of NRLDC/NLDC with comfortable margin. It was concluded by MS, NRPC that shutdowns which are shifted can be applied for approval in NRPC and these will be considered for approval. PGCIL view will be taken up in the NPC meeting and all the entities are requested to give their comments.

Minutes for 157th OCC meeting

1. **Summer preparedness 2019**

NRLDC representative stated that with increase in temperature from March, demand of Northern region is expected to increase. Summer of Northern region are typically hot and demand is also high during this time, therefore we need to take advance actions for help in better real-time grid operation.

Following few points are important that would help in smooth Grid operation especially for coming summer:

a. Weather Monitoring: NRLDC representative stated that during summer, sudden rainfall, thunderstorm, high temperature, humidity etc. is a common phenomenon and all these factors impact the pattern of load or load behavior.

It was highlighted that Northern region has telemetry of temperature & humidity of various nodes in each state control area however, it needs improvement. Even before 2018-19 winter, in 40th TCC- 43rd NRPC meeting and in 150th and subsequent OCC meetings this issue of temperature and humidity telemetry has been highlighted, yet concrete actions are still to be taken in this direction. It was highlighted that at most of stations, temperature and humidity sensors are in working condition and it is just the telemetry and quality of data which needs to be improved. ***POWERGRID representative noted the stations from which telemetry is not available/ suspect and assured that it shall be attended at the earliest.***

MS, NRPC asked state utilities as well to make sure that telemetry of temperature and humidity is available at control centers as it would help in assessing weather conditions in real-time (Annexure-I).

b. **Demand Forecast:** NRLDC representative stated that as per action taken based on decision in previous TCC/OCC meetings, load forecast has been started by each state control area on daily basis. However, some of the states i.e. Punjab, HP are not sharing forecasted data from past 2-3 month and Jammu & Kashmir data is also intermittent.

Punjab SLDC representative stated that demand forecast was not being done for past 2-3 months, but they have started demand forecasting and sharing the same with NRLDC from past few days.

HP representative stated that they shall inform SLDC regarding the same.

MS, NRPC stated that utilities shall forecast load on daily basis based on weather, festival, peak, off-peak hours, public holidays, special days, events etc. They shall also make continuous effort to reduce the forecast error and develop the tools that incorporate weather related information, historical trend, growth factor, ramping of load etc.

c. Portfolio Management, load staggering: NRLDC representative stated that states such as Rajasthan and Haryana continue to connect/disconnect large quantum of load at hourly

boundaries resulting in frequency spikes and instantaneous over-voltages **(Annexure-II).** This has also resulted in tripping of lines on overvoltage in recent past.

It was highlighted that over-voltage trippings have taken place in Rajasthan near Bikaner and Jodhpur on 27th Feb 2019 and 1st Mar 2019 respectively during 03:30 to 04:400hrs which is similar to the time when demand is suddenly reducing.

Rajasthan representative stated that DISCOM is not switching on/ off feeders at 22:00hrs and 04:00hrs. The tendency of local consumers is to switch on agricultural water supply at 22:00hrs and switch off at 04:00hrs whereas power is available to them throughout the day. Thus, this sudden connection/disconnection of load is not in hands of SLDC/ DISCOM.

NRPC and NRLDC representative suggested that timing of switching on/off feeders be rechecked by Rajasthan SLDC. Rajasthan SLDC representative agreed to check the same and inform OCC.

Haryana representative stated that they are taking up this issue of sudden load reduction with DISCOM regularly in meetings and assured that this issue would be resolved in upcoming weeks.

d. **Maintenance of reserves:** NRLDC representative stated that they are monitoring ISGS reserves in real time using SCADA displays and have suggested same to SLDC also in various OCC/TCC meetings.

In addition, as per CERC mandate, ISGS generation shall reduce their generation upto 55% technical minimum under any load crash/ other events/as per Grid requirement. It has been observed that keeping units on bar at technical minimum also ensures unit on bar and serves as hot reserves as per requirement.

OCC appreciated that UP state generators are backing down upto 55% technical minimum as per UPSERC direction, which also ensures that sufficient reserves are available to cater any variation in demand. Other states were also requested to take actions to ensure backing down of generators to 55% of their capacity & keeping units on bar. This would ensure reserves in the system and also prepare us for extreme situations.

In view of high/increasing demand & transmission constraints if any in importing the power or in case of any contingency in the system, states were requested to maximize their internal generation to avoid low frequency/low voltage operation or other related issues.

e. Hydro Generation & Silt monitoring: During summer, sudden outage of hydro units on silt or other major generation outage impacts frequency/voltage, line loading, reliability and security of the corridor/control area/Generation complex etc. In such cases, apart from portfolio management based on proper forecast as discussed above, re-starting of units under reserve shutdown at state as well as Inter-state level through appropriate transactions is required. Hydro stations like Karcham, N. Jhakri, Rampur, Baspa, Dehar, Bairasuil, Salal, Parbati-3 are largely affected. More than 4500-5000 MW of generation in 2018 and 5000-

6000 MW in 2017 went under forced outage on several instances due to silt resulting in frequency drop, congestion of corridor, over drawl etc.

It was highlighted that HP has own generation installed capacity of ~1100 MW share in ISGS hydro generators of 954MW while only 121 MW share in ISGS thermal generators. During ISGS hydro outage on silt in the order of ~5000 MW, share of HP drops considerably and its own hydro generation gets reduced. Consequently, HP overdraws from the grid on continuous basis during this time. This is known issue for every year and same has been discussed in various OCC/TCC & other meeting. In spite of continuous request and suggestion, HP continue to overdraw from the grid (**Annexure-III**).

MS, NRPC suggested that states were requested to provide their feedback regarding signing of overarching agreement. However, response on the same is yet to be received.

In view of such situation likely to come in summer, OCC requested all states especially HP to make some banking arrangement & other resources arrangement during this period in order to avoid any overdrawl or violations. The penalty for overdrawl would be much higher this year due to new sign change rule. Thus, all shall pre-plan so that deviations during silt outages are minimized.

f. **Tower Strengthening and availability of ERS:** Tower collapses and complete outage of substations are known threats due to gusty winds, windstorm, bad weather etc.in summer months. Number of tower collapse incidents were reported during last summer also in May/Jun'18 in which many EHV lines were out on tower collapse along with important inter-regional line i.e. 765 kV Agra-Gwalior ckt-1, 765kV Gaya-Varanasi ckt-1, HVDC Agra-BNC Line-1. Apart from EHV line outage on tower collapse, nearly 30-40 lines used to be opened manually to control high voltage.

MS, NRPC asked utilities to carry out tower strengthening and ensure availability of Emergency Restoration System (ERS) [for early restoration of supply] for such scenario and said all utilities shall work on plan for tower repairing work before April.

Apart from this, utilities shall maintain their drawl as per schedule and ensure backing down of internal generation including technical minimum operation of units. ***Further, manual opening of feeders shall be restricted to only those having threat to life or materials. Thus, it is important to classify feeders in two lists:***

- ***one which do not require manual opening (in view of safety requirements)***
- ***other with safety concern***

Even after repeated requests in OCC/TCC meetings for compiling the information, the same is yet to be done. OCC agreed that SLDCs shall collect information from DISCOMs, compile and share as early as possible.

g. **Reactive Power Management:** NRLDC representative highlighted following actions for reactive power management:

- Switching ON Capacitor/Switching OFF reactor as per system requirement
- Tap Optimization at 400/220kV by NRLDC and 220/132kV by respective state control area based on scatter plots of ICTs, offline studies, NRPC RE account etc.
- Dynamic reactive support from Generator as per their capability curve.
- Synchronous condenser operation [in case water can be stored]
- SCADA Displays for better visualization

OCC agreed that these measures shall be followed by all utilities to ensure better reactive power management in the grid.

h. Defense Mechanism

NRLDC representative stated that majority of existing defense mechanism are to cover protection for under voltage, under frequency, rate of change of frequency, SPS for line/ICTs loading/generator complex evacuation etc.

OCC expressed concern regarding the fact that performance of SPS is considerably low (only 27% of planned relief in 2018). SPS is only for operational defense and should not be considered as long-term solution.

SPS	No. of Correct operation	No. of Mal-operation/Failed to operate
Agra-Gwalior	**0**	**1**
Rihand-Dadri	**5**	**0**
G.Noida (UP) ICT	**0**	**1**
Chabra TPS	**2**	**0**
Mehrauli Bus coupler	**1**	**0**
Agra(UP) ICT	**2**	**0**
Mundra-Mohindergarh	**0**	**1**
Balia-Bhiwadi	**1**	**1**
Total	**11**	**4**

Accurate operation of SPS is very essential and hence, mapping of SPS in SCADA is also being done. Moreover, islanding schemes have also been implemented in NR.

MS, NRPC stated that OCC had requested for information regarding average/normal loading of feeders identified for load relief for all approved SPS. However, information is

yet to be received from states. Further, utilities shall clearly identify and inform concerned person who can be contacted for sharing information.

OCC agreed that all state control area/Users shall ensure before start of summer that their protection and defense system are in working conditions and settings are as per the recommendations of NRPC. In addition, all states/user shall update for changes or modifications carried out if any.

2. Computation of TTC/ATC of respective control areas

NRLDC representative stated that they have done preliminary studies for assessing the TTC/ATC of large state control area for upcoming summer as per information available at NRLDC. Before summer season, each state shall assess and share its ATC/TTC as agreed earlier and as per CERC regulations.

TTC/ATC of summer 2019 and constraints expected this summer are given below:

State	TTC during Summer-19 (MW)	Constraints anticipated	Actions required
Punjab	State own generation = 5970 MW (High hydro) TTC= 6600 MW (on managing the load locally at Rajpura and Amritsar ICTs) ATC = 6000 MW (Considering reliability margin as 600 MW)	• N-1 compliance issues at Rajpura, Amritsar, Dhuri and MakhuICTs • Many 220kV lines near Amritsar(PG) and Ludhiana(PG) are also critically loaded ***Punjab SLDC representative informed that they are also assessing ATC/TTC limits at their end and shall share at the earliest. It was also mentioned that with three ICTs at Dhuri, N-1 non-compliance issue would not be there.***	• Increase in generation at 220kV level would help in meeting high demand & also improve voltage profile. • New 220kV lines may be planned and existing network reorganized to relieve the loading on ICTs and to meet loads through paths that are less loaded.
UP	State own generation = 10590 MW TTC = 12300 MW ATC = 11700 MW (Considering reliability margin as 600 MW)	• N-1 compliance issue at Lucknow (UP), Obra, Unnao, Sarnath ICTs • Many 220 kV lines like Bareilly-Dohna, Bareilly-CB Ganj and Meerut-Modipuram are critically loaded. ***UP SLDC representative informed that they have updated base case till Dec'18. Additional changes thereafter need to be modelled. NRLDC representative suggested that along with base case updation, SLDC shall also assess ATC/TTC limits at their end as well.***	• Monitor and ensure N-1 compliance at Lucknow (UP), Obra, Moradabad, Sarnath, Unnao, Gorakhpur (PG) etc. • Expedite commissioning of underlying n/w at recently commissioned 765kV & 400kV stations to reduce loading on other heavily loaded lines and ICTs

State	TTC during Summer-19 (MW)	Constraints anticipated	Actions required
Delhi	State own generation = 584 MW (No generation at BTPS) TTC = 6500 MW ATC = 6200 MW (Considering RM as 300 MW)	• N-1 compliance issue at Bamnoli ICTs and high loading at Harshvihar ICTS and 220 kV Ballabhgarh-BTPS lines ***Delhi representative stated that they have assessed ATC at their end as 6700MW, although report is yet to be finalized. It was confirmed that Delhi shall feed load radially through ICTs. MS NRPC asked Delhi to share their ATC/TTC assessment report with NRPC and NRLDC as early as possible.***	• Loading on 220 kV Harsh Vihar - PreetVihar - Patparganj to be monitored closely and new arrangements to feed the load to be worked on
Haryana	TTC = 7500 ATC = 6900	• N-1 non-compliance at Fatehabad, Abdullapur and Panipat • 220kV lines from Hisar, Lula ahir, Abdullapur etc. are heavily loaded ***Haryana SLDC representative stated that SLDC personnel have now started working on PSSe and would share their studies as soon as possible. It was also mentioned that new 220kV lines are expected to be commissioned shortly at 400/220kV Kurukshetra (PG) and this would reduce loading of nearby ICTs.***	• 220kV Hisar(PG)-Hisar(IA), 220kV lines from Lula ahir, 220kV Abdullapur-Jorian and other 132kV lines are heavily loaded and need to be strictly monitored. • Alternate arrangement for reducing loading on above lines needs to be expedited.
Rajas than	(Generation : 6390MW) TTC = 5000 ATC = 4400	• N-1 contingency of Phagi, Jodhpur & Merta ICTs • Constraint for evacuation of power from Rajwest • High loading of ICTs at Akal and need for reactive power support	• Expedite commissioning of 3rd ICT at Phagi • New ICT to be planned at Jodhpur and Akal • Expedite commissioning of 400kV Rajwest-Barmer # 2 bays at Barmer end by RRVPNL

OCC agreed that all states shall regularly compute TTC/ATC figures and manage loading to ensure N-1 compliance for elements under their jurisdiction.

3. Requirement of power flow and dynamics data for modeling renewable energy generation in Indian grid

NRLDC representative stated that guidelines for collection of data for wind and solar generation have been prepared by POSOCO including theory about them. Necessary data for modelling

need to be furnished prior to interconnection with the grid (during first time charging/registrations). Guidelines have been prepared based on various CEA standards / CERC regulations/ CTU reports/ Digsilent / other reports. ***Discussion was carried out in 155th OCC meeting regarding the same and utilities were requested to provide their feedback in this regard. However, feedback is yet to be received.***

Rajasthan SLDC had agreed in 154th OCC to provide load flow and dynamic modelling data of renewable generators within one month under its jurisdiction after collecting the same. However, still is yet to be received. Rajasthan SLDC representative stated that they are pursuing renewable generators for the same.

Upcoming Renew power Solar plant (50MW) to be connected at Bhadla (ISTS point) has been requested to provide pending modelling data before registration process. SLDC was also requested to ask for the same from upcoming generators.

Dynamic data of conventional generator are still pending from various agencies. Latest status of dynamic data submission is enclosed in Annexure-IV. MS NRPC asked utilities to furnish additional dynamic modelling details which have not been submitted till now.

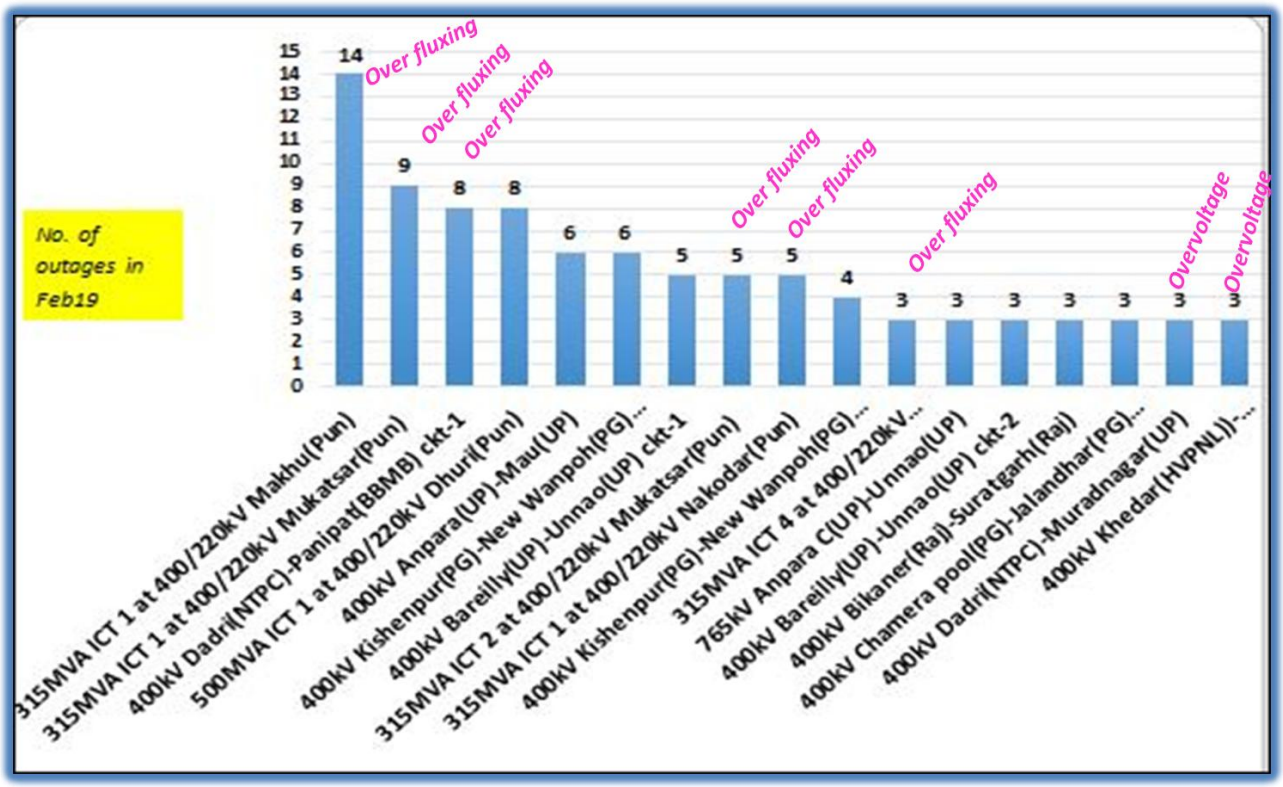
4. Frequent forced outages of transmission elements

The following transmission elements were frequently under forced outages during the month of **Feb'19**:

S. NO.	Element Name	No. of forced outages	Utility/SLDC
1	315MVA ICT 1 at 400/220kV Makhu(Pun)	14	Punjab
2	315MVA ICT 1 at 400/220kV Mukatsar(Pun)	9	Punjab
3	400kV Dadri(NTPC)-Panipat(BBMB) ckt-1	8	POWERGRID/NTPC/BBMB
4	500MVA ICT 1 at 400/220kV Dhuri(Pun)	8	Punjab
5	400kV Anpara(UP)-Mau(UP)	6	UP
6	400kV Kishenpur(PG)-New Wanpoh(PG) ckt-1	6	POWERGRID
7	400kV Bareilly(UP)-Unnao(UP) ckt-1	5	UP
8	315MVA ICT 2 at 400/220kV Mukatsar(Pun)	5	Punjab
9	315MVA ICT 1 at 400/220kV Nakodar(Pun)	5	Punjab
10	400kV Kishenpur(PG)-New Wanpoh(PG) ckt-4	4	POWERGRID
11	315MVA ICT 4 at 400/220kV Abdullapur(PG)	3	POWERGRID
12	765kV Anpara C(UP)-Unnao(UP)	3	UP
13	400kV Bareilly(UP)-Unnao(UP) ckt-2	3	UP
14	400kV Bikaner(Raj)-Suratgarh(Raj)	3	Rajasthan
15	400kV Chamera pool(PG)-Jalandhar(PG) ckt-1	3	POWERGRID
16	400kV Dadri(NTPC)-Muradnagar(UP)	3	POWERGRID/NTPC/UP
17	400kV Khedar(HVPNL))-Nuhiyawali(HVPNL) ckt-2	3	Haryana

The complete details are attached at **Annexure-II** of the Agenda**.** The frequent outages of such elements affect the reliability and security of the grid.

Utilities are requested to look into such frequent outages which also reduces reliability in the grid and share the remedial measures taken/being taken in this respect.



Following were the discussion on the trippings:

- UPPTCL representative informed that consolidated action plan will be submitted before next OCC meeting.
- Punjab representative informed that tripping was mainly of ICTs on account of over flux setting and remedial measures is being taken care.
- NTPC representative informed that CVT was fault at Dadri end of 400 kV Dadri-Panipat ckt-1 and same has been replaced in first week of March 2019. 400 kV Dadri-Panipat ckt-1 tripping may be reduced.
- NRLDC representative concerned about non-submission of information for multiple time single element tripping in last six months. Information is still pending from most of the NR utilities.
- UPPTCL representative informed that some of the action has been taken and some are pending, a consolidated report would be submitted within 15days.
- Rajasthan representative also informed that remedial measures report of every tripping would be submitted along with last six month tripping.

Although remedial measures report was requested to all the NR constituents but details are still awaited from all the involved utilities.

NRLDC representative once again requested all the constituents to share the report of last six month tripping and remedial measures taken by all the utilities for mitigation of such tripping incidents. Members agreed to the same. All the remedial measures report needs to be submitted within 7days.

5. Multiple element tripping events in Northern region in the month of Feb'19:

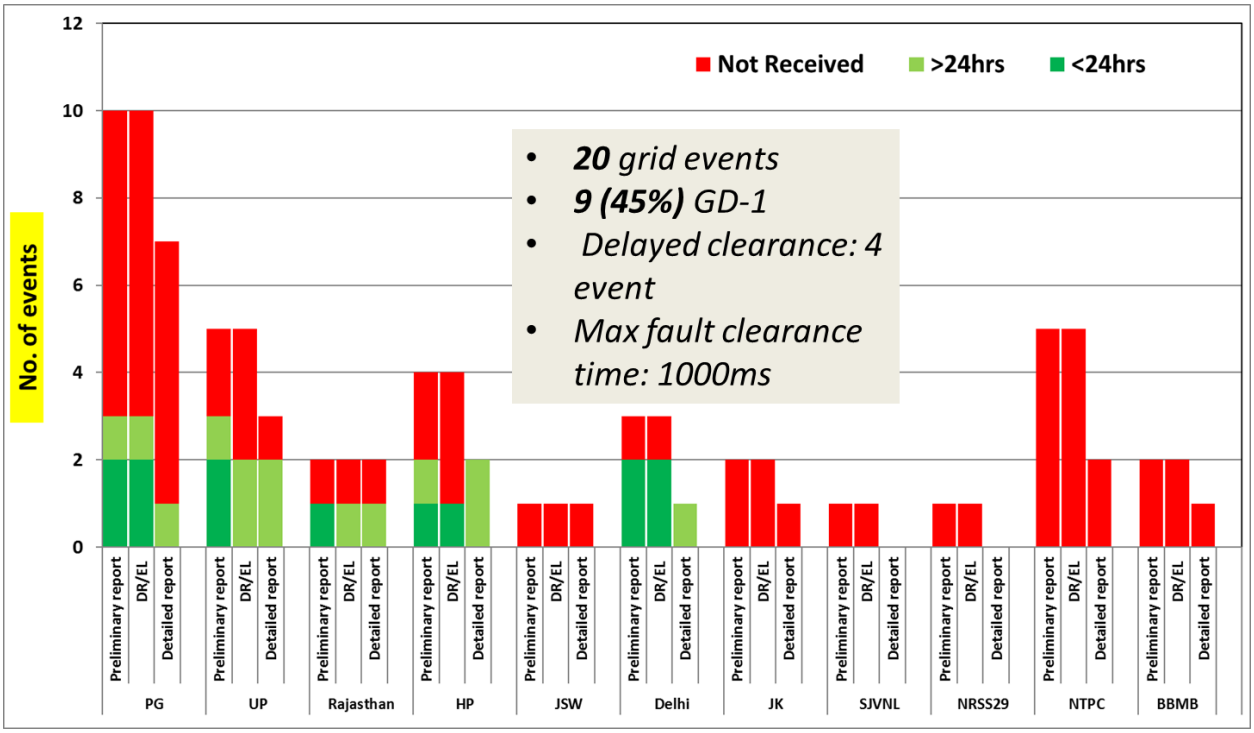
A total of **20** grid events occurred in the month of Feb'19 of which **9** are of GD-1 category. The preliminary report of all the events have been issued from NRLDC. A list of all these events along with the status of details received by 04-Mar-19 is attached at **Annexure-III.**

Further, despite persistent discussions/follow-up in various OCC/PCC meetings, the compliance of the regulations is still much below the desired level.

Maximum Fault Duration is **1000ms** in the event of tripping of 400kV Khedar-Kirori D/C on 24th Feb 2019 at 20:51hrs.

Delayed clearance of fault (more than 100ms for 400kV and 160ms for 220kV system) observed in total **4** events out of 20 events in the month.

NRLDC representative stated that the compliance of reporting details of events has improved but is still below the desired level. He showed the consolidated status of the reporting:



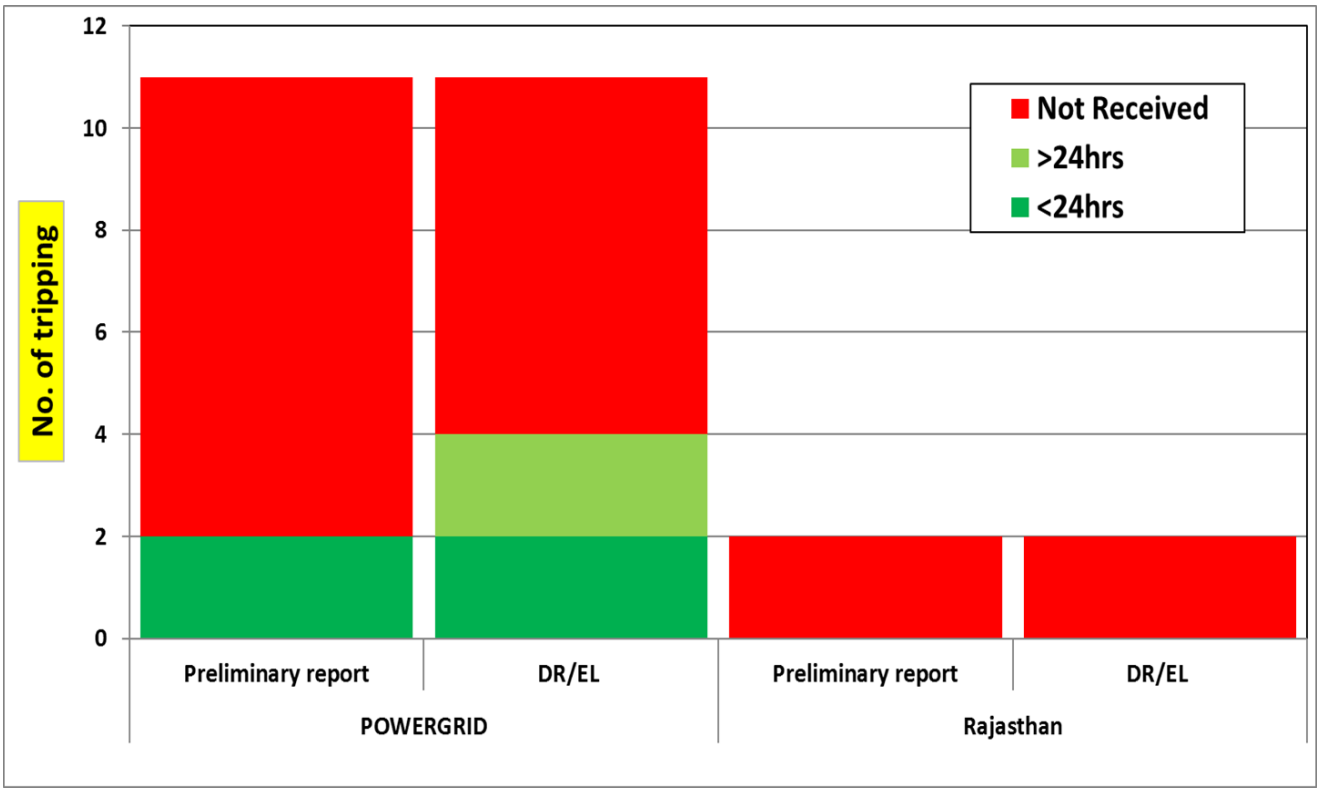
NRLDC representative once again requested to all the NR utilities to kindly calculate the energy loss in the incident and share the information to NRPC/ NRLDC in its report.

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.

6. Details of tripping of Inter-Regional lines from Northern Region for Feb'19:

A total of **13** inter-regional lines tripping occurred in the month of Feb'19. The list is attached at **Annexure-IV** of the Agenda. 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/RPC within 24hrs of the event. They shall also furnish the detailed investigation report within 7 days of the event if fault clearance time is higher than mandated by CEA (Grid Standard) Regulations.

Status of details received from the NR constituents is as below:



NRLDC representative once again requested all the concerned utilities to kindly submit the Preliminary Report, DR/EL within 24hrs and also share the remedial measures report for tripping in last one year. Utilities were asked to report DR/EL of both ends of line in case of inter-regional line. OCC agreed for the same.

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

NRPC agenda points:

10. LVRT compliance by wind generators

NRLDC representative stated that in RoP of hearing on 31st Jan 2019 in petition no. 237/MP/2017, Hon'ble Commission directed POSOCO for following actions by 8th March 2019:

i. To submit the states Wind Turbine Generator wise following data:
   - Population of wind turbines as per models, make and voltage levels
   - Details of LVRT enabled, LVRT design supported and fitted to be enabled, LVRT design supported but to be fitted and LVRT to be retrofitted

ii. To coordinate with RPCs for funding from PSDF/Green fund for retrofitting WTGs and LVRT as per order dated 5th Jan 2016 in petition no. 420/MP/2014

All the states utilities were requested to submit the data with respect to renewable generator as per the attached format **(Annexure-V)** for compliance to RoP of CERC**.** An e-mail was also sent in this regard on 6th March 2019 to all state utilities.

MS, NRPC asked state utilities to submit the required data as early as possible for compliance to RoP of CERC.

Agenda Point 11.1: Revised SPS of Agra-Gwalior Line

NRPC and NRLDC raised concern about delay in implementation of Revised Agra-Gwalior SPS. NRLDC also informed that mail has been sent for mock exercise of Agra-Gwalior SPS but no response received from any of the NR constituents.

POWERGRID representative informed that DTPC installation work has been completed at all the sites of Northern Region but further wiring for tripping of the feeder is still pending for most of the site location. Wiring for tripping of the feeder will not be done by POWERGRID.

Concern were discussed with Punjab, Haryana, Rajasthan and Uttar Pradesh. SPS wiring in Delhi has been completed from POWERGRID as well Delhi itself.

Rajasthan and Punjab representative asked for information of concerned person (co-coordinator) from POWERGRID.

Haryana representative informed that tripping wire at 220 kV Nuna Majra will be completed within two days. At other location (Dhanonda, Charkhi Dadri, Rewari etc), DTPC has not been installed as of now. POWERGRID representative stated that DTPC has been installed at Dhanonda, Charkhi Dadri & Rewari. Wiring shall be done at Fatehabad and Samaypur (BBMB)

One separate WhatsApp group was formed including coordinator from POWERGRID, NRLDC, NRPC and concerned state utility. It is requested to all the NR constituents that if any issue is pending than please drop the message in the WhatsApp group but try to close the pending work before 15th March 2019.

It was decided in OCC meeting that all the wiring for tripping of feeder shall be completed on or before 15th Mar 2019 and Mock testing of revised SPS of Agra-Gwalior line may be done on 25th March 2019.

NRLDC also stated that in earlier mock testing of SPS, usually letter has been issued from NRPC to all the concerned utilities and copy to WRPC/ WRLDC.

UP representative also informed that DTPC at Nara and Modipuram station in old SPS scheme is not healthy.

Apart from above NRLDC once again requested POWERGRID to kindly implement the following decision:

- Logging of SPS operation signal in station event logger and same shall be provided to NRLDC Scada event log.
- Receipt of signal at remote site/ tripping end similar to Mundra-Mahendergarh SPS scheme.

NRPC suggested all the utilities to expedite the progress and complete it before 15th march 2019 so that mock testing can be completed on 25th March 2019.

11.3 SPS for Kawai-Kalisindh-Chhabra generation complex:

NRLDC representative stated that they have conducted preliminary studies to revise SPS of Kawai-Kalisindh-Chhabra generation complex. Following assumptions were made while performing studies:

- 400kV Anta-Kota and and 400kV Chhabra-Anta lines have been considered in service. (not as 400kV Chhabra-Kota)
- Connection between Chhabra and Chhabra Supercritical not considered.
- All elements in service at present considered in service for studies.

It was requested that Rajasthan SLDC may confirm these assumptions i.e. the system would normally operate as assumed while performing studies. Further, Rajasthan was also asked to identify feeders for providing relief and furnish average loadings of these feeders. Further, it was mentioned that when SPS for Kawai-Kalisindh-Chhabra complex was finalised earlier, it was agreed that dynamic studies shall also be carried out to assess safe generation evacuation limits from the complex. It was highlighted that dynamic data is only available for Kawai generators. Rajasthan SLDC was asked to gather dynamic data of other nearby generators viz. Chhabra, Chhabra Supercritical, Kalisindh and perform dynamic studies to assess safe generation evacuation limits.

Results of preliminary studies by NRLDC based on above assumptions is as follows:

S. No.	Contingency	Existing Action	Suggested Action
1	N-1 of Chhabra-Hindaun or Chhabra-Bhilwara	Restricting generation within 750 MW would be safe. Thus, SPS shall trip one unit at Chhabra TPS	No backing down
2	N-1-1/N-2 of Chhabra-Hindaun and Chhabra-Bhilwara	Restricting generation within 600 MW would be safe. Thus, SPS should ideally trip one unit along with fast reduction in generation at Chhabra TPS.	No backing down
3	N-1-1/N-2 of Chhabra-Hindaun and Kawai-Chhabra	Restricting generation within 600 MW would be safe. Thus, SPS should ideally trip one unit along with fast reduction in generation at Chhabra TPS.	No backing down
5	N-1 of Kawai-Anta-1&2	Generation will be reduced to 65% of the Installed Capacity at Kawai and Chhabra TPS each	No backing down
6	N-1-1/N-2 of Kawai-Anta-1&2	Generation will be reduced to 65% of the Installed Capacity at Kawai and Chhabra TPS each	Kawai generation restricted to 70%
7	N-1-1/N-2 of Kalisindh-Anta-1&2	Not present	One unit of Kalisindh should be tripped and other unit should be restricted to 300 MW
8	N-1-1/N-2 of 765/400 kV Anta ICTs	One unit each at Kawai and Chhabra, two units at Kalisindh and unit at Chhabra SCTPS shall be tripped through SPS.	Total generation at Chhabra, Chhbara SCTPS, Kawai and Kalisindh should be restricted to 75% of installed capacity
9	N-1-1/N-2 of Anta-Phagi-1&2	One unit each at Kawai and Chhabra, two units at Kalisindh and unit at Chhabra SCTPS shall be tripped through SPS.	One unit at Kawai, Chhabra, Chhabra SCTPS and Kalisindh each should be tripped

Rajasthan representative stated that they are organizing a meeting on 11.03.2019 to discuss such issues. They shall subsequently share their studies and observations on NRLDC SPS study.

SE(O), NRPC stated that Rajasthan SLDC shall:

- **Submit observations on NRLDC SPS study report.**
- **Identify feeders for providing required load relief.**

- **Gather dynamic data of generators (Kawai, Kalisindh, Chhabra, Chhabra Supercritical) and perform dynamic studies to assess safe generation evacuation limits.**
- **Submit details of discussion carried on 11.03.2019 before next OCC, so that it could be discussed in next OCC.**

Other Points:

1. **Overflux tripping of ICTs in Northern Region:**

NRLDC representative stated that overflux trippings have taken place in Abdullapur, Bassi and Rajpura ICTs from 21 Feb'19 to 3 Mar'19. Voltages were not that high at Bassi and Rajpura (both 400kV and 220kV). PGCIL representative said they would look into the matter and check for relay settings at both Abdullapur and Bassi. Punjab SLDC representative informed that overflux trippings are now not taking place at Dhuri, Makhu, Muktsar etc. however, even after not so high voltages at Rajpura overflux trippings have taken place. They are also taking up this issue with their protection team and it shall be resolved at the earliest.

2. **Outage Procedure of NRPC**

POWERGRID representative stated that outages approved for particular month, when deferred due to system constraint or lack of preparedness by utilities shall also be valid for next month as well. NRLDC representative stated that OCC is forum consisting of all constituents and outages of elements are approved after concurrence from all utilities. Thus, rescheduling of outages to next month may not be in line with plans of constituents. Also, all RPCs have agreed that outages approved for particular month, when deferred due to system constraint or lack of preparedness by utilities are valid for present month only and hence deviating from this practice may create confusion amongst RPCs as approval of some (inter-regional) shutdown by one region requires consent from other RPC as well as NLDC. MS NRPC suggested POWERGRID to take up the issue in NPC forum so that harmony in practices at all RPCs is attained.

3. **Issues related to Dadri (NTPC):**

a. <u>Multiple times tripping of 400 kV Dadri-Panipat ckt-1</u>

S. No	Element Name	Voltage Level	Owner	Outage		Revival		Reason / Remarks
1	Dadri(NTPC)-Panipat(BBMB) 1	400 kV	PGCIL	22-Jan-19	2:02	22-Jan-19	2:34	Tripped from Dadri end only.
2	Dadri(NTPC)-Panipat(BBMB) 1	400 kV	PGCIL	22-Jan-19	3:42	22-Jan-19	7:41	Relay maloperation. No indication at both ends reported.
3	Dadri(NTPC)-Panipat(BBMB) 1	400 kV	PGCIL	8-Feb-19	4:03	8-Feb-19	5:37	Over voltage.
4	Dadri(NTPC)-Panipat(BBMB) 1	400 kV	PGCIL	11-Feb-19	3:25	11-Feb-19	6:28	Over voltage.
5	Dadri(NTPC)-Panipat(BBMB) 1	400 kV	PGCIL	15-Feb-19	2:44	15-Feb-19	8:56	Over voltage.
6	Dadri(NTPC)-Panipat(BBMB) 1	400 kV	PGCIL	18-Feb-19	12:30	18-Feb-19	13:40	Tripped due to bus bar protection operated due to CT blast in Tie-bay of Dadri-Panipat ckt 2 at Panipat end.
7	Dadri(NTPC)-Panipat(BBMB) 1	400 kV	PGCIL	25-Feb-19	4:03	25-Feb-19	5:39	Over voltage.
8	Dadri(NTPC)-Panipat(BBMB) 1	400 kV	PGCIL	25-Feb-19	23:46	26-Feb-19	6:04	Over voltage.
9	Dadri(NTPC)-Panipat(BBMB) 1	400 kV	PGCIL	26-Feb-19	22:01	26-Feb-19	22:06	Over voltage.
10	Dadri(NTPC)-Panipat(BBMB) 1	400 kV	PGCIL	28-Feb-19	1:25	28-Feb-19	1:30	Over voltage.

NRLDC raised concern about multiple time tripping of 400 kV Dadri-Panipat ckt-1. In this regard NRLDC representative asked about following points:

- *Condition Monitoring of CVT (In general 6 month, if parameter deteriorate than monitoring in 15days also)*
- *Replacement of CVT (if voltage variation is more than 2V in positive side and 4V in negative side)*
- *NRLDC already raised this issue in last two OCC meeting*

400 kV Dadri-Panipat ckt-1 tripped multiple times in the month of Feb-2019. Multiple time tripping of the same line also captured in the month of November, December and January. Although CVT error issue was already identified during OCC meeting of December month but issue was finally attended by NTPC in first week of March-2019.

NRPC raised concern about delayed action taken by NTPC and for non-submission of DR/EL and tripping report of the multiple time tripping of the line.

b. Long shutdown of the 400 kV bus section at Dadri (NTPC)*:* Any shutdown in Delhi ring or near to capital city is very critical for the system. Shutdown for 400 kV bus section at Dadri (NTPC) was awarded for 4 days starting from 24th Feb 2019. Shutdown was extended beyond 4days and 400 kV bus-2 at Dadri (NTPC) still under shutdown. Extension of shutdown further delay the approved shutdown in the near vicinity and squeeze the time duration for remaining shutdown.

400 kV Dadri-Muradnagar (New) ckt is in the same dia of 400 kV Dadri-Panipat ckt-1. As main breaker of 400 kV Dadri-Muradnagar (New) ckt connected to 400 kV bus-2 was already under outage. Over voltage tripping of 400 kV Dadri-Panipat ckt-1 due to CVT error resulted into main and tie CB in the bay and further resulted into tripping of 400 kV Dadri-Muradnagar New (Only connected through tie CB).

Revival of 400 kV Bus-2 of Dadri (NTPC) needs to be expedited as soon as possible.

c. New 125MVAr Bus Reactor (replacement of old damaged 63MVAr BR) in the same bay of 400 kV Dadri (end)-HarshVihar ckt-2: As discussed and approved, New 125MVAr bus reactor installed instead of 63MVAr damaged bus reactor at Dadri (NTPC). But it is connected in the same bay of 400 kV Dadri-Harsh Vihar ckt-2 although bay is already available in dia of 400 kV Dadri-Harsh Vihar ckt-1 and 400 kV Dadri-Panipat (BBMB) ckt-2. NRLDC stated that in present arrangement at Dadri (NTPC), 125MVAr Bus Reactor shall also be tripped in case of tripping of 400 kV Dadri (end)-HarshVihar ckt-2. NRPC also concerned about the present arrangement and suggested NTPC to look into the matter and explore the possibility for individual bay for 125MVAr bus reactor.

   NRLDC also requested to all other constituents to take care such type of things in planning stage itself so that operation issue shall be minimized.

d. Commensurate terminal equipment at the station associated with Quad Moose Delhi Ring: NRLDC has been raising the issue of commensurate terminal equipment/ switchgear at the station (G. Noida, Nawada, Dadri etc) in Delhi ring with Quad Moose conductor in Delhi Ring. This issue already raised through NRLDC letter, discussion in various OCC/ TCC meeting and operational feedback to planners (CEA/ CTU). However, NRLDC got information about replacement of switchgear at Dadri (NTPC) but with the same capacity of 2kA. NRLDC concerned about non-taking care of an issue after continuous follow up and requested all the concerned utilities to kindly take care during further replacement.

   NRPC also asked NTPC to kindly submit the reason of replacement of switchgear at Dadri (NTPC) with same capacity.

NTPC shall submit the reply for all the aforesaid concerned discussed during OCC meeting. (Action: **NTPC**; Time Frame: **7days**)

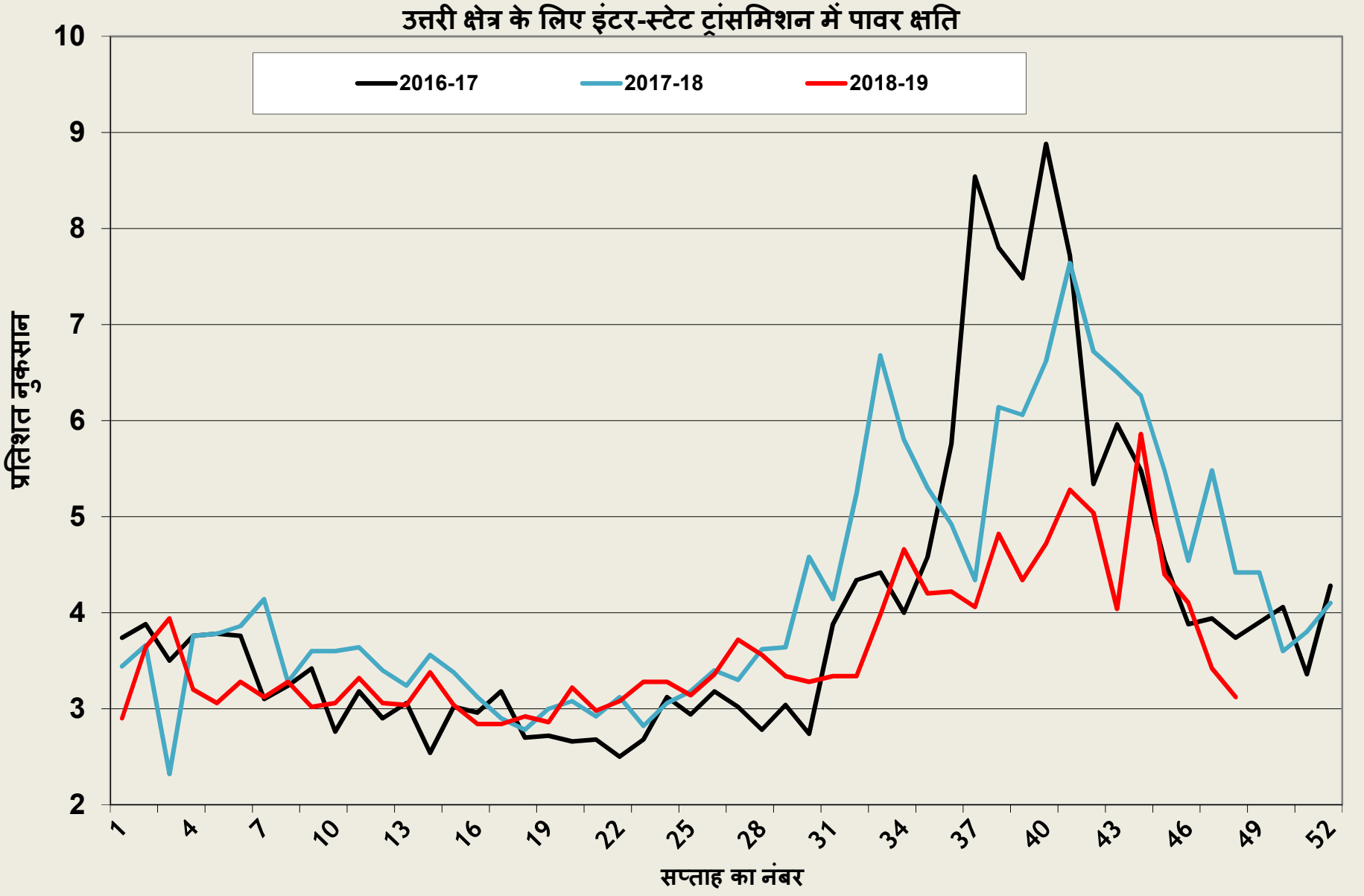
4. Issues related to 400 kV Bamnauli-Tughlaqabad:

a. Long outage of 400 kV Bamnauli-Tughlaqabad ckt-1 (since 12 Oct 2018) for replacement of damaged tower. 400 kV Bamnauli-Tughlaqabad ckt-2 was also on ERS: NRLDC representative raised concern about delay in revival of 400 kV Bamnauli-Tughlaqabad ckt-1. NRLDC representative further informed that Delhi is in plain area and this line is very important as it is part of Delhi ring. As per CEA standard work shall have completed within 30days but Tower maintenance work is still pending after five month of tower collapse.

   Delhi representative informed that restoration delay was due to underground cable found during excavation of tower foundation. Line will be charged through ERS in a month and further tower shifting will be expedited.

उत्तरी क्षेत्र की ऊर्जा खपत(MUs)

ट्रांसमिशन में पावर क्षति



Long Outage of Generating Units

SL. No	Station Name	Location	Owner	Unit No	Capacity	Reason	Outage		Remarks
							Date	Time	
1	Bairasiul HPS	HP	NHPC	3	60	For renovation and Modernization of the plant	15-10-2018	9:11	
2	Bairasiul HPS	HP	NHPC	2	60	For renovation and Modernisation of the plant	15-10-2018	10:02	
3	Bairasiul HPS	HP	NHPC	1	60	For renovation and Modernisation of the plant	15-10-2018	10:14	
4	Parbati III HEP	HP	NHPC	4	130	For repair & maintenance of HRT alongwith pressure shafts & drafts tubes	20-12-2018	0:00	
5	Parbati III HEP	HP	NHPC	3	130	For repair & maintenance of HRT alongwith pressure shafts & drafts tubes	20-12-2018	0:00	
6	Parbati III HEP	HP	NHPC	2	130	For repair & maintenance of HRT along with pressure shafts & drafts tubes	20-12-2018	0:00	
7	Parbati III HEP	HP	NHPC	1	130	For repair & maintenance of HRT along with pressure shafts & drafts tubes	20-12-2018	0:00	
8	Dulhasti HPS	JK	NHPC	3	130	For replacement of bypass valves(gate valves & isolation valves) of main intel valves of all 03 units.	2/1/2019	12:03	
9	Paricha TPS	UP	UPRVUNL	1	110	R & M Work	2/7/2016	17:30	
10	Obra TPS	UP	UPRVUNL	13	200	Reserve Shutdown R&M work.	23-02-2018	7:00	
11	Pong HPS	HP	BBMB	2	66	Repair and Replacement of draft tube gates.	28-03-2018	16:20	
12	Giral (IPP) LTPS	RAJASTHAN	RRVUNL	1	125	Bed materials leakage.	11/7/2014	8:20	
13	Giral (IPP) LTPS	RAJASTHAN	RRVUNL	2	125	Boiler tube leakage	27-01-2016	15:27	
14	Obra TPS	UP	UPRVUNL	12	200	Tripping details awaited.	24-09-2018	17:26	
15	Guru Gobind Singh TPS (Ropar)	PUNJAB	PSEB	5	210	Problem in GT.Details awaited.	14-12-2018	7:15	
16	RGTPP(Khedar)	HARYANA	HPGCL	1	600	Ash hopper problem.	18-12-2018	11:30	

SL. No	Element Name	Type	Voltage Level	Owner	Outage		Reason / Remarks
					Date	Time	
1	Akal (RVPNL)-Ramgarh 400 (RVPNL) 1	Line	400 kV	RRVPNL	10/12/2018	10:15	General maint work.
2	Lucknow Sarojininagar 315 MVA ICT 2	ICT	400/220 kV	UPPTCL	5/2/2019	10:10	For replacement of 315 MVA T/F With 500 MVA T/F. Load will be managed by UPPTCL authority without load shedding in Lucknow city (VIP area).
3	Sarnath 315 MVA ICT 1	ICT	400/220 kV	UPPTCL	6/2/2019	8:19	Replacement with 500 MVA new T/F under increasing capacity work.
4	400 kV 50 MVAR Line Reactor (Non-Switchable) of Bhadla(RVPNL) ckt 1 at Ramgarh 400 (RRVPNL)	Line Reactor	400 kV	RRVPNL	10/12/2018	12:00	General maint work.
5	50 MVAR (400kV) Bus Reactor at Moradabad (UP)	Bus Reactor	400 kV	UPPTCL	23-01-2019	10:29	For Dismantling, shifting, gasketreplacement, erection & commissioningof 50 MVAR Bus Reactor & Associatesworks in same station.
6	Dadri 400 kV Bus 2	BUS	400 kV	NTPC	24-02-2019	8:17	Cutting and Dismantling ofexisting 400KV Bus #2into BUS#2 & BUS#4 andBus-sectionalizer Bay-32equipment erection.
7	Saharanpur(PG) - Shamli	Line	220 kV	UPPTCL	23-02-2019	10:19	Replacement of bus of these section andreplacement of CTs and PTs
8	Unchahar 220 kV Bus 1	BUS	220 kV	NTPC	26-02-2019	13:00	for bus bar protection R&M by NTPC
9	Vindhyachal HVDC BtB Block 2	HVDV Station	500 kV HVDC	PGCIL	26-11-2017	14:55	Differential protection operated.
10	400kV Bamnauli(DTL)-Tughlakabad(PGCIL)-1	Line	400 kV	DTL	2/2/2019	18:40	Line is under planned SD For Tower replcement by DTL. S/D returned by PGCIL (24.01.2019 - 06.00Hrs to 25.01.2019 18.00 Hrs) and line under anti theft charge

SL. No	Element Name	Type	Voltage Level	Owner	Outage		Reason / Remarks
					Date	Time	
11	Kishenpur-New Wanpoh - 4	Line	400 kV	PGCIL	7/2/2019	14:21	R-N. Line under breakdown
12	Akal 500 MVA ICT 4	ICT	400/220 kV	RRVPNL	5/8/2018	16:00	ICT burnt
13	Akal 315 MVA ICT 2	ICT	400/220 kV	RRVPNL	22-08-2018	22:55	ICT burnt.
14	500MVA ICT -3	ICT	400/220 kV	RRVPNL	20-02-2019	13:43	Isolator hot Spot at Jaisalmer
15	FACT at BLB in Knp-BLB Line	FACTS	400 kV	PGCIL	2/7/2016	10:20	Y-Phase current imbalance
16	FSC (50%) of Koteshwar Pool -2 at Meerut (PG)	FSC	400 kV	PGCIL	14-07-2017	19:22	Fire in Y-ph unit
17	FSC of Balia-I at Lucknow	FSC	400 kV	PGCIL	29-11-2017	13:30	E/SD due to Hot Spot at Isolator
18	Chamera-1 (3*42) MVAR Bus Reactor	Bus Reactor	400 kV	NHPC	4/2/2019	15:14	For interconnection of 3x42 MVAr Bus Reactors.
19	Bairasuil(NHPC)-Pong(BBMB)	Line	220 kV	PGCIL	15-10-2018	10:50	for renovation & modernization. shutdown for 6 months
20	Bairasiul(NHPC)-Jassure(HPSEB)	Line	220 kV	PGCIL	15-10-2018	12:16	for renovation & modernization. shutdown for 6 months

Transmission Lines
(765kV- 605 ckt. Km, 400kV – 502 ckt. Km)

S. No.	Name of element	Voltage Level (in kV)	Line Length (In kM)	Conductor Type	Owner	Remarks	Actual date & time of charging (Synchronized)	
							Date	Time
1	765kV Chittorgarh-Banaskantha-1 bay 707(main),708(tie) along with 3x80 MVAR switchable line reactor(707R) and bay 713(main),714(tie) along with 3x110 MVAR switchable line reactor(713R) at Banaskantha end	765	302.406	Hexa Zebra	PGCIL		**28.02.2019**	**17:20**
2	765kV Chittorgarh-Banaskantha-2 bay 704(main),705(tie) along with 3x80 MVAR switchable line reactor(704R) and bay 710(main),711(tie) along with 3x110 MVAR switchable line reactor(710R) at Banaskantha end	765	302.406	Hexa Zebra	PGCIL		**28.02.2019**	**19:09**
3	400kV Kota-Jaipur(s) Kota bay 404-M, 405-T and Jaipur(s) bay 418-M, 417 T	400	180.118	ACSR Twin Moose	PGCIL	Charged from Kota end	15.02.2019	16:35
4	400kV Jaipur(s)-RAPP D, Jaipur(s) bay 415-M, 414-T along with 50 MVAR N-switchable line reactor at Jaipur(s) and 63 MVAR N-switchable line reactor at RAPP end.	400	228.18	ACSR Twin Moose	PGCIL	Charged from Jaipur(s) end	15.02.2019	18:40
5	400kV Dhanoda-Neemrana-DC-1 along with associated bay 413	400	46.66	Twin HTLS	GPTL		**24.02.2019**	**13:45**
6	400kV Dhanoda-Neemrana-DC-1 along with associated bay 413	400	46.66	Twin HTLS	GPTL		**24.02.2019**	**14:10**

LILO of Transmission Lines
(400kV – 65 ckt.-km and 220kV- 116 ckt.-km)

S.No.	Name of element	Voltage Level (in kV)	Line Length (In Km) before LILO	Line Length (In Km)	LILO Line Length (In Km)	Conductor Type	Agency/ Owner	Remarks	Actual date & time of charging (Synchronized)	
									Date	Time
1	400kV Rewa Rd-Musauli and associated bay no 410(Rewa Rd), 401(Musauli){ LILO of 400kV Rewa RD-Meja-2 at Musauli}	400	34.35	65.56	32.433	Quad Moose	UPPTCL		**05.02.2019**	**19:07**
2	400kV Meja-Musauli and associated bay no 416(Meja), 404(Musauli){ LILO of 400kV Rewa RD-Meja-2 at Musauli}	400	34.35	33.66	32.433	Quad Moose	UPPTCL		**05.02.2019**	**19:07**
3	220kV Agra(UP)-Agra(PG) { LILO of 220kV Agra(UP)-Bharatpur at Agra(PG)}	220	51	56.306	55.4	Single Zebra	PG(LILO portion only)		**05.02.2019**	**20:05**
4	220kV Agra(PG)-Bharatpur(RRVPNL) { LILO of 220kV Agra(UP)-Bharatpur at Agra(PG)}	220	51	56.306	55.4	Single Zebra	PG(LILO portion only)		**05.02.2019**	**0:32**
5	220kV Kota-Ranpura bay no 208 at Kota & 204 at Ranpura{LILO of 220kV Kota-Bhanpura at Ranpura}	220	83	20.8	2.7	Single Zebra	RRVPNL		**16.02.2019**	**21:19**
6	220kV Bhanpura-Ranpura bay no 205 at Bhanpura & 201 at Ranpura{LILO of 220kV Kota-Bhanpura at Ranpura}	220	83	67.58	2.7	Single Zebra	RRVPNL		**16.02.2019**	**21:19**

ICT

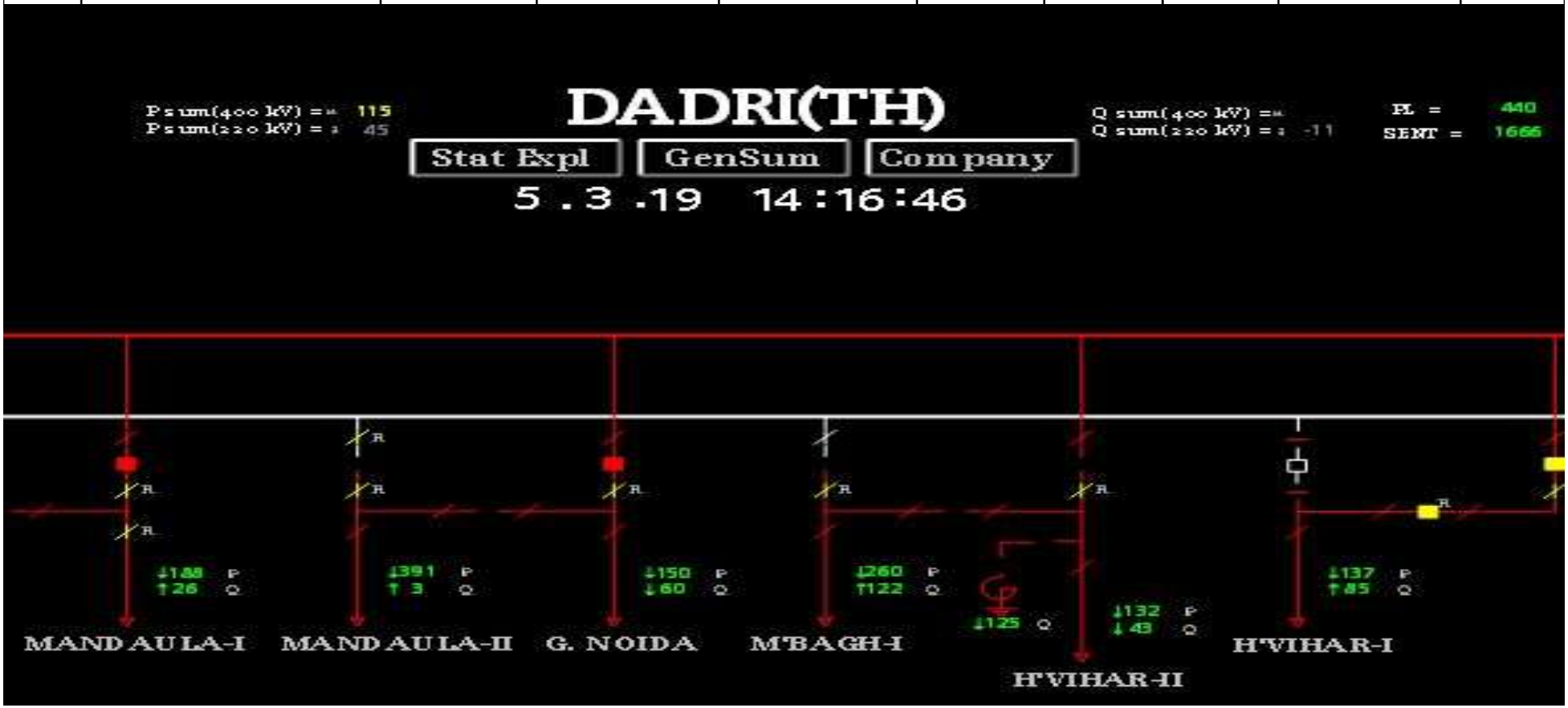
(Capacity Addition - 700 MVA)

S.No.	Name of element	Voltage Level	Transformation Capacity (in MVA)	New/replacement /augmentation	Agency/ Owner	Remarks	Actual date & time of charging (no load)		Actual date & time of charging (on load)	
							Date	Time	Remarks	Date
1	200 MVA ICT-1 along with associated bays 403,402(tie) & 102 at Musauli	400/132/33	200	New	UPPTCL		06.02.2019 & 25.02.2019	18:13	**27.02.2019**	**21:21**
2	500 MVA ICT-3 along with bay no 408B at Bhensara (Jaisalmer2)	400/220/33	500	New	RRVPNL	Charged at no load	05.02.2019	13:50		

Bus Reactor

(Capacity Addition –Bus Reactor 125 MVAR,)

S. No.	Name of element	Voltage Level (kV)	Transformation Capacity (in MVAr)	New/ replacement /augmentation	Make	Agency/ Owner	Remarks	Actual date & time of charging	
								Date	Time
1	125 MVAR Bus Reactor & bay no 24 R at Dadri(NTPC){ Replacment of 63 MVAR Bus Reactor}	400	125	New	CGL	NTPC		**19.02.2019**	**18:06**



Annexure-4

		MU	MW
State		Apr-19	Apr-19
Chandigarh	Availability	134	329
	Requirement	133	313
	Surplus/Shortfall (MU)	1	16
	Surplus/Shortfall (%)	0.5%	5.2%
Delhi	Availability	3054	5982
	Requirement	2770	5400
	Surplus/Shortfall (MU)	284	582
	Surplus/Shortfall (%)	10.3%	10.8%
Haryana	Availability	5964	9210
	Requirement	3545	7700
	Surplus/Shortfall (MU)	2419	1510
	Surplus/Shortfall (%)	68.2%	19.6%
Himachal Pradesh	Availability	796	1291
	Requirement	788	1326
	Surplus/Shortfall (MU)	8	-35
	Surplus/Shortfall (%)	1.0%	-2.6%
Jammu & Kashmir	Availability	1206	2213
	Requirement	1672	2752
	Surplus/Shortfall (MU)	-466	-539
	Surplus/Shortfall (%)	-27.9%	-19.6%
Punjab	Availability	4347	6966
	Requirement	3840	7039
	Surplus/Shortfall (MU)	507	-73
	Surplus/Shortfall (%)	13.2%	-1.0%
Rajasthan	Availability	9328	15713
	Requirement	6061	10620
	Surplus/Shortfall (MU)	3267	5093
	Surplus/Shortfall (%)	53.9%	48.0%
Uttar Pradesh	Availability	11759	17000
	Requirement	9960	17500
	Surplus/Shortfall (MU)	1799	-500
	Surplus/Shortfall (%)	18.1%	-2.9%

Uttarakhand	Availability	626	1454
	Requirement	1161	2012
	Surplus/Shortfall (MU)	-535	-558
	Surplus/Shortfall (%)	-46.1%	-27.7%
Total NR	Availability	37215	60158
	Requirement	29931	54662
	Surplus/Shortfall (MU)	7284	5496
	Surplus/Shortfall (%)	24.3%	10.1%

Follow up issues from previous OCCMs **ANNEXURE 9**

SNO	Description of Agenda point	Details	STATUS 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	**Punjab, DTL, Jammu and Kashmir & Rajasthan updated status. All other utilities were requested to update** **HVPNL- A committee has been constituted for submitting recommendations to procure/ install the Automatically Switched type or Conventional type of capacitor banks at existing as well as upcoming S/Stns. In future and the committed shall review the Techno-Economic analysis of both types (manual & automatic) of capacitor banks.**
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 updated details of the substations of Power Grid and their required downstream network were enclosed *as* Annexure 9/2 of the Agenda.** **All other concerned utilities were requested to update regularly and ensure that the work is completed expeditiously.**
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 10/3OF THE AGENDA OF THE 146TH OCC MEETING.***	**Information received in the 1/2019 from Uttarakhand, UP, Rajasthan & Haryana is enclosed at Annexure9/3. All other states were requested to update.** **HVPNL- For replacement of defective capacitor cells a PO has been placed upon M/s BHEL on Dt.31.10.2018 (HDP-2371) for supply of 530 no. 200KVAR capacitor cells and the supply is expected shortly.**
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*".**	**The information of period ending 9/2018 from Punjab, DTL stand submitted. Rajasthan was requested to update.** **The information ending 12/2018 was submitted by BBMB, UP and Rajasthan.** **All others were requested to submit.** **HVPNL- upto September'2018 the necessary confirmation has been supplied by the concerned field offices.**

5	**Strengthening of Intra-State transmission system**	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 **PTCUL, Punjab, Delhi & Rajasthan have submitted the information ending 6/2018 & that send submitted to concerned office.**	**UPPTCL has submitted the information ending 12/2018.** **ALL other SLDCs were requested to give half yearly feedback ending 12/2018 in the month of 1/2019 to STU regarding bottlenecks, constraints and overloading in the State transmission network for proper transmission planning**
6	**Mapping of Feeders in SCADA**	In the 141st OCC meeting members were informed about the "Compendium of SPS in NR" (*Annexure-_9 of the MOM_)* 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:** MS NRRPC 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. The matter under discussion in subsequent meetings but no further update	**All states except Punjab & Rajasthan were requested to update.** **HVPNL-SCADA wing has made provisions in the database as well as associated displays at control centre. The work at RTU locations is yet to be carried out to complete the SCADA mapping.**

Sr. No.	Developer	Name of Project	Sector	State	Region	NCR/Non-NCR	Unit No	Unit Capacity	DATE of COMMISSIONING (MM/DD/YYYY)	SPM Norms (mg/Nm3)	Current SPM (mg/Nm3)	ESP Plan	ESP Status	NOx Norms (mg/Nm3)	Current NOx (mg/Nm3)	Nox plan	NOx Status	Sox Norms (mg/N	Current Sox (mg/N	Old FGD Phasing Plan for	FGD Phasing Plan	Whether FGD Installed	FGD Commissioned	Remarks
1	CHINA LIGHT POWER	MAHATMA GANDHI TPS	Private Sector	Haryana	NR	NCR	1	660	**12-01-12**			SPM Compliant								1-31-2019	31/12/2019	N	Y	FGD POSSIBLE
2	CHINA LIGHT POWER	MAHATMA GANDHI TPS	Private Sector	Haryana	NR	NCR	2	660	**11-04-12**			SPM Compliant								1-31-2019	31/12/2019	N	Y	FGD POSSIBLE
3	HGPCorpn	PANIPAT TPS	State Sector	Haryana	NR	NCR	6	210	**31-03-01**											4-30-2021	31/12/2019	N	0	FGD POSSIBLE
4	HGPCorpn	PANIPAT TPS	State Sector	Haryana	NR	NCR	7	250	**28-09-04**			28-02-21								2-28-2021	31/12/2019	N	0	FGD POSSIBLE
5	HGPCorpn	PANIPAT TPS	State Sector	Haryana	NR	NCR	8	250	**28-01-05**			31-12-20								12-31-2020	31/12/2019	N	0	FGD POSSIBLE
6	HGPCorpn	RAJIV GANDHI TPS	State Sector	Haryana	NR	NCR	1	600	**31-03-10**			30-04-22								4-30-2022	31/12/2019	N	0	FGD POSSIBLE
7	HGPCorpn	RAJIV GANDHI TPS	State Sector	Haryana	NR	NCR	2	600	**01-10-10**			28-02-22								2-28-2022	31/12/2019	N	0	FGD POSSIBLE
8	HGPCorpn	YAMUNA NAGAR TPS	State Sector	Haryana	NR	NCR	1	300	**01-11-07**			31-12-21								12-31-2021	31/12/2019	N	0	FGD POSSIBLE
9	HGPCorpn	YAMUNA NAGAR TPS	State Sector	Haryana	NR	NCR	2	300	**29-03-08**			31-10-21								10-31-2021	31/12/2019	N	0	FGD POSSIBLE
10	NTPC	INDIRA GANDHI STPP	Central Sector	Haryana	NR	NCR	1	500	**31-10-10**			SPM Compliant	SPM Compliant				Award in September 18			10-31-2020	31/12/2019	N	0	FGD POSSIBLE
11	NTPC	INDIRA GANDHI STPP	Central Sector	Haryana	NR	NCR	2	500	**05-11-11**			SPM Compliant	SPM Compliant				Award in September 18			4-30-2020	31/12/2019	N	0	FGD POSSIBLE
12	NTPC	INDIRA GANDHI STPP	Central Sector	Haryana	NR	NCR	3	500	**07-11-12**			SPM Compliant	SPM Compliant				Award in September 18			2-29-2020	31/12/2019	N	0	FGD POSSIBLE
13	GVK Power Ltd.	GOINDWAL SAHIB	Private Sector	Punjab	NR	Non-NCR	1	270	**14-02-16**											4-30-2020	30/04/2020	N	0	FGD POSSIBLE
14	GVK Power Ltd.	GOINDWAL SAHIB	Private Sector	Punjab	NR	Non-NCR	2	270	**15-03-16**											2-29-2020	28/02/2020	N	0	FGD POSSIBLE
15	L&T Power Development LTD(Nabha)	Nabha TPP (Rajpura TPP)	Private Sector	Punjab	NR	NCR	1	700	**24-01-14**	50	<50	SPM Compliant	SPM Compliant	300	450	01-04-21	SNCR to	200	1610	4-30-2021	31/12/2019	N	0	FGD POSSIBLE
16	L&T Power Development LTD(Nabha)	Nabha TPP (Rajpura TPP)	Private Sector	Punjab	NR	NCR	2	700	**06-07-14**	50	<50	SPM Compliant	SPM Compliant	300	464	01-02-21	SNCR to	200	1620	2-28-2021	31/12/2019	N	0	FGD POSSIBLE
17	PSEB	GH TPS (LEH.MOH.)	State Sector	Punjab	NR	NCR	1	210	**29-12-97**			30-04-22								4-30-2022	31/12/2019	N	0	FGD POSSIBLE
18	PSEB	GH TPS (LEH.MOH.)	State Sector	Punjab	NR	NCR	2	210	**16-10-98**			30-04-22								4-30-2022	31/12/2019	N	0	FGD POSSIBLE
19	PSEB	GH TPS (LEH.MOH.)	State Sector	Punjab	NR	NCR	3	250	**03-01-08**			28-02-22								2-28-2022	31/12/2019	N	0	FGD POSSIBLE
20	PSEB	GH TPS (LEH.MOH.)	State Sector	Punjab	NR	NCR	4	250	**31-07-08**			28-02-22								2-28-2022	31/12/2019	N	0	FGD POSSIBLE
21	Talwandi Sabo Power Limited	TALWANDI SABO TPP	Private Sector	Punjab	NR	NCR	1	660	**17-06-14**			SPM Compliant								2-28-2021	31/12/2019	N	0	FGD POSSIBLE
22	Talwandi Sabo Power Limited	TALWANDI SABO TPP	Private Sector	Punjab	NR	NCR	2	660	**25-10-15**			SPM Compliant								12-31-2020	31/12/2019	N	0	FGD POSSIBLE
23	Talwandi Sabo Power Limited	TALWANDI SABO TPP	Private Sector	Punjab	NR	NCR	3	660	**29-03-16**			SPM Compliant								10-31-2020	31/12/2019	N	0	FGD POSSIBLE
24	Adani Power Ltd.	KAWAI TPS	Private Sector	Rajasthan	NR	Non-NCR	1	660	**28-05-13**			N								8-31-2020	31/08/2020	N	0	FGD POSSIBLE
25	Adani Power Ltd.	KAWAI TPS	Private Sector	Rajasthan	NR	Non-NCR	2	660	**24-12-13**			N								6-30-2020	30/06/2020	N	0	FGD POSSIBLE
26	RRVUNL	CHHABRA TPP	State Sector	Rajasthan	NR	Non-NCR	1	250	**30-10-09**	50	80	31-12-21	Tender Specifications under process	300	311	31-12-22	Tender S	600	779	12-31-2021	31/12/2021	N	0	FGD POSSIBLE
27	RRVUNL	CHHABRA TPP	State Sector	Rajasthan	NR	Non-NCR	2	250	**04-05-10**	50	94	31-10-21	Tender Specifications under process	300	590	31-12-22	Tender S	600	784	10-31-2021	31/10/2021	N	0	FGD POSSIBLE
28	RRVUNL	CHHABRA TPP	State Sector	Rajasthan	NR	Non-NCR	3	250	**14-09-13**	50	65	31-08-21	Tender Specifications under process	300	355	31-12-22	Tender S	600	975	8-31-2021	31/08/2021	N	0	FGD POSSIBLE
29	RRVUNL	CHHABRA TPP	State Sector	Rajasthan	NR	Non-NCR	4	250	**30-06-14**	50	55	31-08-21	Tender Specifications under process	300	415	31-12-22	Tender S	600	896	8-31-2021	31/08/2021	N	0	FGD POSSIBLE
30	RRVUNL	CHHABRA TPP	State Sector	Rajasthan	NR	Non-NCR	5	660	**04-04-17**	30	67	30-04-20	Tender Specifications under process	100	340	31-12-22	Tender S	100	1790	4-30-2020	30/04/2020	N	0	FGD POSSIBLE
31	RRVUNL	KALISINDH TPS	State Sector	Rajasthan	NR	Non-NCR	1	600	**02-05-14**	50	43		SPM Compliant	300	254	31-12-22	Tender S	200	1828	6-30-2021	30/06/2021	N	0	FGD POSSIBLE
32	RRVUNL	KALISINDH TPS	State Sector	Rajasthan	NR	Non-NCR	2	600	**06-06-15**	50	46		SPM Compliant	300	212	31-12-22	Tender S	200	1256	4-30-2021	30/04/2021	N	0	FGD POSSIBLE
33	RRVUNL	KOTA TPS	State Sector	Rajasthan	NR	Non-NCR	5	210	**26-03-94**	100	113	31-12-22	Tender Specifications under process	600	375	31-12-22	Tender S	600	576	12-31-2022	31/12/2022	N	0	FGD POSSIBLE
34	RRVUNL	KOTA TPS	State Sector	Rajasthan	NR	Non-NCR	6	195	**30-07-03**	100	102	31-12-22	Tender Specifications under process	600	375	31-12-22	Tender S	600	565	12-31-2022	31/12/2022	N	0	FGD POSSIBLE
35	RRVUNL	KOTA TPS	State Sector	Rajasthan	NR	Non-NCR	7	195	**30-08-09**	50	47		SPM Compliant	600	240	31-12-22	Tender S	600	780	10-31-2022	31/10/2022	N	0	FGD POSSIBLE
36	RRVUNL	SURATGARH TPS	State Sector	Rajasthan	NR	Non-NCR	1	250	**10-05-98**	100	96		SPM Compliant	600	325	31-12-22	Tender S	600	880	12-31-2022	31/12/2022	N	0	FGD POSSIBLE
37	RRVUNL	SURATGARH TPS	State Sector	Rajasthan	NR	Non-NCR	2	250	**28-03-00**	100	85		SPM Compliant	600	492	31-12-22	Tender S	600	948	10-31-2022	31/10/2022	N	0	FGD POSSIBLE
38	RRVUNL	SURATGARH TPS	State Sector	Rajasthan	NR	Non-NCR	3	250	**29-10-01**	100	92		SPM Compliant	600	322	31-12-22	Tender S	600	911	8-31-2022	31/08/2022	N	0	FGD POSSIBLE
39	RRVUNL	SURATGARH TPS	State Sector	Rajasthan	NR	Non-NCR	4	250	**25-03-02**	100	87		SPM Compliant	600	242	31-12-22	Tender S	600	925	6-30-2022	30/06/2022	N	0	FGD POSSIBLE
40	RRVUNL	SURATGARH TPS	State Sector	Rajasthan	NR	Non-NCR	5	250	**30-06-03**	100	90		SPM Compliant	600	298	31-12-22	Tender S	600	890	4-30-2022	30/04/2022	N	0	FGD POSSIBLE
41	RRVUNL	SURATGARH TPS	State Sector	Rajasthan	NR	Non-NCR	6	250	**29-08-09**	50	44	28-02-22	Tender Specifications under process	300	360	31-12-22	Tender S	600	919	2-28-2022	28/02/2022	N	0	FGD POSSIBLE
42	Lalitpur Power Gen. Co	LALITPUR TPS	Private Sector	Uttar Pardesh	NR	Non-NCR	2	660	**08-01-16**											2-28-2021	28/02/2021	N	0	FGD POSSIBLE
43	Lalitpur Power Gen. Co	LALITPUR TPS	Private Sector	Uttar Pardesh	NR	Non-NCR	3	660	**01-04-16**											10-31-2021	31/10/2021	N	0	FGD POSSIBLE
44	Lalitpur Power Gen. Co.	LALITPUR TPS	Private Sector	Uttar Pardesh	NR	Non-NCR	1	660	**26-03-16**											12-31-2020	31/12/2020	N	0	FGD POSSIBLE
45	Lanko Anpara Pow Ltd	ANPARA C TPS	Private Sector	Uttar Pardesh	NR	Non-NCR	1	600	**12-10-11**			SPM Compliant								8-31-2022	31/08/2022	N	0	FGD POSSIBLE
46	Lanko Anpara Pow Ltd	ANPARA C TPS	Private Sector	Uttar Pardesh	NR	Non-NCR	2	600	**18-01-12**			SPM Compliant								6-30-2022	30/06/2022	N	0	FGD POSSIBLE
47	NTPC	DADRI (NCTPP)	Central Sector	Uttar Pardesh	NR	NCR	1	210	**21-12-91**			SPM Compliant								12-31-2020	31/12/2019	N	N	FGD POSSIBLE
48	NTPC	DADRI (NCTPP)	Central Sector	Uttar Pardesh	NR	NCR	2	210	**18-12-92**			SPM Compliant								10-31-2020	31/12/2019	N	N	FGD POSSIBLE
49	NTPC	DADRI (NCTPP)	Central Sector	Uttar Pardesh	NR	NCR	3	210	**23-03-93**			SPM Compliant								8-31-2020	31/12/2019	N	N	FGD POSSIBLE
50	NTPC	DADRI (NCTPP)	Central Sector	Uttar Pardesh	NR	NCR	4	210	**24-03-94**			SPM Compliant								6-30-2020	31/12/2019	N	N	FGD POSSIBLE
51	NTPC	DADRI (NCTPP)	Central Sector	Uttar Pardesh	NR	NCR	5	490	**25-01-10**			SPM Compliant	SPM Compliant				Awarded on June 18			4-30-2020	31/12/2019	N	N	FGD POSSIBLE
52	NTPC	DADRI (NCTPP)	Central Sector	Uttar Pardesh	NR	NCR	6	490	**16-07-10**			SPM Compliant	SPM Compliant				Awarded on June 18			2-29-2020	31/12/2019	N	N	FGD POSSIBLE
53	NTPC	RIHAND STPS	Central Sector	Uttar Pardesh	NR	Non-NCR	1	500	**31-03-88**			SPM Compliant	SPM Compliant				Combustion tuning after			2-28-2022	28/02/2022	N	N	FGD POSSIBLE
54	NTPC	RIHAND STPS	Central Sector	Uttar Pardesh	NR	Non-NCR	2	500	**05-07-89**			SPM Compliant	SPM Compliant				Combustion tuning after			12-31-2021	31/12/2021	N	N	FGD POSSIBLE
55	NTPC	RIHAND STPS	Central Sector	Uttar Pardesh	NR	Non-NCR	3	500	**31-01-05**			SPM Compliant	SPM Compliant				NIT In Sep' 18			10-31-2021	30/10/2021	N	N	FGD POSSIBLE
56	NTPC	RIHAND STPS	Central Sector	Uttar Pardesh	NR	Non-NCR	4	500	**24-09-05**			SPM Compliant	SPM Compliant				NIT In Sep' 18			4-30-2021	30/04/2021	N	N	FGD POSSIBLE
57	NTPC	RIHAND STPS	Central Sector	Uttar Pardesh	NR	Non-NCR	5	500	**25-05-12**			SPM Compliant	SPM Compliant				NIT In Sep' 18			2-28-2021	28/02/2021	N	N	FGD POSSIBLE
58	NTPC	RIHAND STPS	Central Sector	Uttar Pardesh	NR	Non-NCR	6	500	**17-10-13**			SPM Compliant	SPM Compliant				NIT In Sep' 18			12-31-2020	31/12/2020	N	N	FGD POSSIBLE
59	NTPC	SINGRAULI STPS	Central Sector	Uttar Pardesh	NR	Non-NCR	1	200	**14-02-82**			31-12-21								12-31-2021	31/12/2021	N	N	FGD POSSIBLE
60	NTPC	SINGRAULI STPS	Central Sector	Uttar Pardesh	NR	Non-NCR	2	200	**25-11-82**			31-12-21								12-31-2021	31/12/2021	N	N	FGD POSSIBLE
61	NTPC	SINGRAULI STPS	Central Sector	Uttar Pardesh	NR	Non-NCR	3	200	**28-03-83**			31-08-21								8-31-2021	31/08/2021	N	N	FGD POSSIBLE
62	NTPC	SINGRAULI STPS	Central Sector	Uttar Pardesh	NR	Non-NCR	4	200	**02-11-83**			31-08-21								8-31-2021	31/08/2021	N	N	FGD POSSIBLE
63	NTPC	SINGRAULI STPS	Central Sector	Uttar Pardesh	NR	Non-NCR	5	200	**26-02-84**			30-04-21								4-30-2021	30/04/2021	N	N	FGD POSSIBLE
64	NTPC	SINGRAULI STPS	Central Sector	Uttar Pardesh	NR	Non-NCR	6	500	**23-12-86**			28-02-21	Under R&M				Combustion tuning after			2-28-2021	28/02/2021	N	N	FGD POSSIBLE
65	NTPC	SINGRAULI STPS	Central Sector	Uttar Pardesh	NR	Non-NCR	7	500	**24-11-87**			31-12-20	Under R&M				Combustion tuning after			12-31-2020	31/12/2020	N	N	FGD POSSIBLE
66	NTPC	UNCHAHAR TPS	Central Sector	Uttar Pardesh	NR	Non-NCR	1	210	**21-11-88**			31-12-22								12-31-2022	31/12/2022	N	N	FGD POSSIBLE
67	NTPC	UNCHAHAR TPS	Central Sector	Uttar Pardesh	NR	Non-NCR	2	210	**22-03-89**			31-12-22								12-31-2022	31/12/2022	N	N	FGD POSSIBLE
68	NTPC	UNCHAHAR TPS	Central Sector	Uttar Pardesh	NR	Non-NCR	3	210	**27-01-99**			31-10-22								10-31-2022	31/10/2022	N	N	FGD POSSIBLE
69	NTPC	UNCHAHAR TPS	Central Sector	Uttar Pardesh	NR	Non-NCR	4	210	**22-10-99**			31-10-22								10-31-2022	31/10/2022	N	N	FGD POSSIBLE
70	NTPC	UNCHAHAR TPS	Central Sector	Uttar Pardesh	NR	Non-NCR	5	210	**28-09-06**			30-04-22								4-30-2022	30/04/2022	N	N	FGD POSSIBLE
71	NTPC	UNCHAHAR TPS	Central Sector	Uttar Pardesh	NR	Non-NCR	6	500	**31-03-17**			31-08-20								8-31-2020	8-31-2020	N	N	FGD POSSIBLE
72	Prayagraj Power Generation Company LTD.	PRAYAGRAJ TPP	Private Sector	Uttar Pardesh	NR	Non-NCR	1	660	**25-12-16**			SPM Compliant								4-30-2020	30/04/2020	N	0	FGD POSSIBLE
73	Prayagraj Power Generation Company LTD.	PRAYAGRAJ TPP	Private Sector	Uttar Pardesh	NR	Non-NCR	2	660	**06-09-15**			SPM Compliant								6-30-2020	30/06/2020	N	0	FGD POSSIBLE

74	Prayagraj Power Generation Company LTD.	PRAYAGRAJ TPP	Private Sector	Uttar Pardesh	NR	Non-NCR	3	660	**22-05-17**			29-02-20									2-29-2020	29/02/2020	N	0	FGD POSSIBLE
75	Rosa Power Supply Co	ROSA TPP Ph-I	Private Sector	Uttar Pardesh	NR	Non-NCR	1	300	**10-02-10**			31-12-21									12-31-2021	31/12/2021	N	0	FGD POSSIBLE
76	Rosa Power Supply Co	ROSA TPP Ph-I	Private Sector	Uttar Pardesh	NR	Non-NCR	2	300	**26-06-10**			31-12-21									12-31-2021	31/12/2021	N	0	FGD POSSIBLE
77	Rosa Power Supply Co	ROSA TPP Ph-I	Private Sector	Uttar Pardesh	NR	Non-NCR	3	300	**28-12-11**												10-31-2021	31/10/2021	N	0	FGD POSSIBLE
78	Rosa Power Supply Co	ROSA TPP Ph-I	Private Sector	Uttar Pardesh	NR	Non-NCR	4	300	**28-03-12**												10-31-2021	31/10/2021	N	0	FGD POSSIBLE
79	UPRVUNL	ANPARA TPS	State Sector	Uttar Pardesh	NR	Non-NCR	1	210	**24-03-86**			31-10-22									10-31-2022	31/10/2022	N	0	FGD POSSIBLE
80	UPRVUNL	ANPARA TPS	State Sector	Uttar Pardesh	NR	Non-NCR	2	210	**28-02-87**			31-08-22									8-31-2022	31/08/2022	N	0	FGD POSSIBLE
81	UPRVUNL	ANPARA TPS	State Sector	Uttar Pardesh	NR	Non-NCR	3	210	**12-03-88**			30-06-22									6-30-2022	30/06/2022	N	0	FGD POSSIBLE
82	UPRVUNL	ANPARA TPS	State Sector	Uttar Pardesh	NR	Non-NCR	4	500	**19-07-93**	100	239	30-04-22	Engagement of agency for pre-award services is in process	600	411		Nox comp	200	675		4-30-2022	30/04/2022	N	0	FGD POSSIBLE
83	UPRVUNL	ANPARA TPS	State Sector	Uttar Pardesh	NR	Non-NCR	5	500	**04-07-94**	100	265	28-02-22	Engagement of agency for pre-award services is in process	600	431		Nox comp	200	687		2-28-2022	28/02/2022	N	0	FGD POSSIBLE
84	UPRVUNL	ANPARA TPS	State Sector	Uttar Pardesh	NR	Non-NCR	6	500	**08-06-15**	50	45	SPM Compliant	SPM Compliant	300	222		Nox comp	200	629		6-30-2021	30/06/2021	N	0	FGD POSSIBLE
85	UPRVUNL	ANPARA TPS	State Sector	Uttar Pardesh	NR	Non-NCR	7	500	**06-03-16**	50	47	SPM Compliant	SPM Compliant	300	228		Nox comp	200	649		4-30-2021	30/04/2021	N	0	FGD POSSIBLE
86	UPRVUNL	HARDUAGANJ TPS	State Sector	Uttar Pardesh	NR	NCR	8	250	**27-09-11**												12-31-2021	31/12/2019	N	0	FGD POSSIBLE
87	UPRVUNL	HARDUAGANJ TPS	State Sector	Uttar Pardesh	NR	NCR	9	250	**25-05-12**												10-31-2021	31/12/2019	N	0	FGD POSSIBLE
88	UPRVUNL	OBRA TPS	State Sector	Uttar Pardesh	NR	Non-NCR	9	200	**26-10-80**												8-31-2022	31/08/2022	N	0	FGD POSSIBLE
89	UPRVUNL	OBRA TPS	State Sector	Uttar Pardesh	NR	Non-NCR	10	200	**14-01-79**			31-10-22									10-31-2022	31/10/2022	N	0	FGD POSSIBLE
90	UPRVUNL	OBRA TPS	State Sector	Uttar Pardesh	NR	Non-NCR	11	200	**31-12-77**			31-12-22									12-31-2022	31/12/2022	N	0	FGD POSSIBLE
91	UPRVUNL	OBRA TPS	State Sector	Uttar Pardesh	NR	Non-NCR	12	200	**28-03-81**			30-06-22									6-30-2022	30/06/2022	N	0	FGD POSSIBLE
92	UPRVUNL	OBRA TPS	State Sector	Uttar Pardesh	NR	Non-NCR	13	200	**21-07-82**			30-04-22									4-30-2022	30/04/2022	N	0	FGD POSSIBLE
93	UPRVUNL	PARICHHA TPS	State Sector	Uttar Pardesh	NR	Non-NCR	3	210	**29-03-06**			30-04-22									4-30-2022	30/04/2022	N	0	FGD POSSIBLE
94	UPRVUNL	PARICHHA TPS	State Sector	Uttar Pardesh	NR	Non-NCR	4	210	**28-12-06**			30-04-22									4-30-2022	30/04/2022	N	0	FGD POSSIBLE
95	UPRVUNL	PARICHHA TPS	State Sector	Uttar Pardesh	NR	Non-NCR	5	250	**24-05-12**			28-02-22									2-28-2022	28/02/2022	N	0	FGD POSSIBLE
96	UPRVUNL	PARICHHA TPS	State Sector	Uttar Pardesh	NR	Non-NCR	6	250	**11-03-13**			31-12-21									12-31-2021	31/12/2021	N	0	FGD POSSIBLE
97	NTPC	Meja STPP	Central Sector	Uttar Pardesh	NR	Non-NCR	1	660	**30-03-18**														N	0	FGD POSSIBLE

FGD Status	Tar Date of FS Start	Tar Date of FS Complete	Tar Date of Tender Spec	Tar Date of NIT Issue	Tar Date of Bid Open	Tar Date of Bid Award	Tar Date of FGD Comm.
FGD Installed and is Under Renovation							
FGD Installed and is Under Renovation							
Developer wants exemption							
Feasibility Study Under Progress							
Feasbility Study Under Progress							
Feasbility Study Completed.							
Feasbility Study Completed.							
Feasbility Study Completed.							
Feasbility Study Completed.							
Bid awarded on 30 Jan 2018							
Bid awarded on 30 Jan 2018							
Bid awarded on 30 Jan 2018							
EOI was invited vide newspaper advrt. On 18.06.2018							
EOI was invited vide newspaper advrt. On 18.06.2018							
NIT expected in Oct' 18				Oct-18	Nov-18	Dec-18	
NIT expected in Oct' 18				Oct-18	Nov-18	Dec-18	
Administrative approval is under process.							
Administrative approval is under process.							
Administrative approval is under process.							
Administrative approval is under process.							
Feasiblity Study Carried Out. PPA issues pending with regulator							
Feasiblity Study Carried Out. PPA issues pending with regulator							
Feasiblity Study Carried Out. PPA issues pending with regulator							
NIT to be issued soon.				Oct-18	Dec-18	Jan-19	Aug-20
NIT to be issued soon.				Oct-18	Dec-18	Jan-19	Jun-20
Technical Specification and bid documents of FGD installationhas been finalised and case for approval for floating NIT has been processed			Sep-18				
Technical Specification and bid documents of FGD installationhas been finalised and case for approval for floating NIT has been processed			Sep-18				
Technical Specification and bid documents of FGD installationhas been finalised and case for approval for floating NIT has been processed			Sep-18				
Technical Specification and bid documents of FGD installationhas been finalised and case for approval for floating NIT has been processed			Sep-18				
Technical Specification and bid documents of FGD installationhas been finalised and case for approval for floating NIT has been processed				Nov-18			
NIT under process				Nov-18			
NIT under process				Nov-18			
Tender Specification under process			Sep-18	Sep-18			
Tender Specification under process			Sep-18	Sep-18			
Tender Specification under process			Sep-18	Sep-18			
Technical Specification and bid documents of FGD installationhas been finalised and case for approval for floating NIT has been processed			Sep-18				
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Technical Specification and bid documents of FGD installationhas been finalised and case for approval for floating NIT has been processed			Sep-18				
Petition was filed with UPERC for approval capital cost for installation of FGD and other associated systems. UPERC directed to approach CEA.							
Petition was filed with UPERC for approval capital cost for installation of FGD and other associated systems. UPERC directed to approach CEA.							
Petition was filed with UPERC for approval capital cost for installation of FGD and other associated systems. UPERC directed to approach CEA.							
Tender Specification made							
Tender Specification made							
Dry Sorbent Injection (DSI) SYSTEM TO BE INSTALLED							
Dry Sorbent Injection (DSI) SYSTEM TO BE INSTALLED							
Dry Sorbent Injection (DSI) SYSTEM TO BE INSTALLED							
Dry Sorbent Injection (DSI) SYSTEM TO BE INSTALLED							
Awarded on 01 Feb 18. Work in progress						Jan-18	
Awarded on 01 Feb 18. Work in progress						Jan-18	
NIT In Sep 18				Sep-18			
NIT In Sep 18				Sep-18			
Award in 31-08-2018						Aug-18	
Award in 31-08-2018						Aug-18	
Award in 31-08-2018						Aug-18	
Award in 31-08-2018						Aug-18	
NIT IN LOT-3 PLANNED IN OCT 2018							
NIT IN LOT-3 PLANNED IN OCT 2018							
NIT IN LOT-3 PLANNED IN OCT 2018							
NIT IN LOT-3 PLANNED IN OCT 2018							
NIT IN LOT-3 PLANNED IN OCT 2018							
NIT In Sep 18				Sep-18			
NIT In Sep 18				Sep-18			
NIT IN LOT-3 PLANNED IN SEP 2018							
NIT IN LOT-3 PLANNED IN SEP 2018							
NIT IN LOT-3 PLANNED IN SEP 2018							
NIT IN LOT-3 PLANNED IN SEP 2018							
NIT IN LOT-2 PLANNED IN JULY 2018							
Price bid submitted on 29.06.2018.							
Feasibility Study is under process. Requsted for FGD implementation date to be postponed by 5-6 years.							
Feasibility Study is under process. Requsted for FGD implementation date to be postponed by 5-6 years.							

Feasibility Study under progress							
Tendering Under Process							
Tendering Under Process							
Tendering Under Process							
Tendering Under Process							
Tender is floated on 14 February 2019 and Techno-Commercial (Part-I) is scheduled to open on 27 March 2019.							
Tender is floated on 14 February 2019 and Techno-Commercial (Part-I) is scheduled to open on 27 March 2019.							
Tender is floated on 14 February 2019 and Techno-Commercial (Part-I) is scheduled to open on 27 March 2019.							
Engagement of agency for pre-award services is in process							
Engagement of agency for pre-award services is in process							
Part -1 Techno Comm Bid opened on 27.11.2018					Sep-18		
Part -1 Techno Comm Bid opened on 27.11.2018					Sep-18		
Administrative approval is under process.							
Administrative approval is under process.							
Re-tender for Pre award consultancy services has been floated on 25.02.2019							
Re-tender for Pre award consultancy services has been floated on 25.02.2019							
Re-tender for Pre award consultancy services has been floated on 25.02.2019							
Re-tender for Pre award consultancy services has been floated on 25.02.2019							
Re-tender for Pre award consultancy services has been floated on 25.02.2019							
Part-I (Techno-comm. Bid) opened on 22.02.2019							
Part-I (Techno-comm. Bid) opened on 22.02.2019							
Part-I (Techno-comm. Bid) opened on 22.02.2019							
Part-I (Techno-comm. Bid) opened on 22.02.2019							
FGD will award in LOT-1A of NTPC							

State-wise Emergency Restoration system in NR #				
Transmission Licensee	Requirement of Total no of ERS in State	Number of ERS available in state	No of ERS to Be Procured	Remark if Any
POWERGRID		2 sets of 400 kV & 2 sets 765 kV	-	-
DTL		2 sets	-	-
PSTCL		2 sets	-	-
UPPTCL		2 sets	-	-
PTCUL			2 sets	DPR under finalization
HVPN			2 sets	Under tendering
RRVPN			2 sets	NIT floated
HPPTCL			2 sets	Matter under consideration regarding funds availability
PDD J&K		2 sets	-	-
BBMB		0	0	##
Sterlite*				

*Sterlite has an arrangement with M/s Supreme, Kolkata to provide the ERS services as and when required and are in the process of procurement of their own.

Data as available with NRPC Sectt.

In the 155th OCC meeting, MS, NRPC advised BBMB to procure ERS for their system to which BBMB replied that the decision has already been taken in the full board decision of BBMB that the partner states will provide ERS to BBMB whenever needed.

MS, NRPC stated that if such a stance has been taken by the partner states, the partner states shall procure 1 additional set each to be provided to BBMB whenever they require.

TEMPERATURE AND HUMIDITY DISPLAY

NR-2

STATION	TEMP °C	HUMD %	RATIO HUMID/TEMP
ABDULLAPUR	21	69	3
AMRITSAR	18	64	4
BAHADURGARH	28	0	0
FATEHABAD	20	746	37
HISSAR	26	31	1
JALLANDHAR	50	102	2
KAITHAL	17	65	4
KISHENPUR	16	63	4
MALERKOTLA	0	64	0
MOGA	17	63	4
NALAGARH	17	56	3
PATIALA_PG	17	72	4
WAGOORA	0	0	0
SONIPAT	20	35	

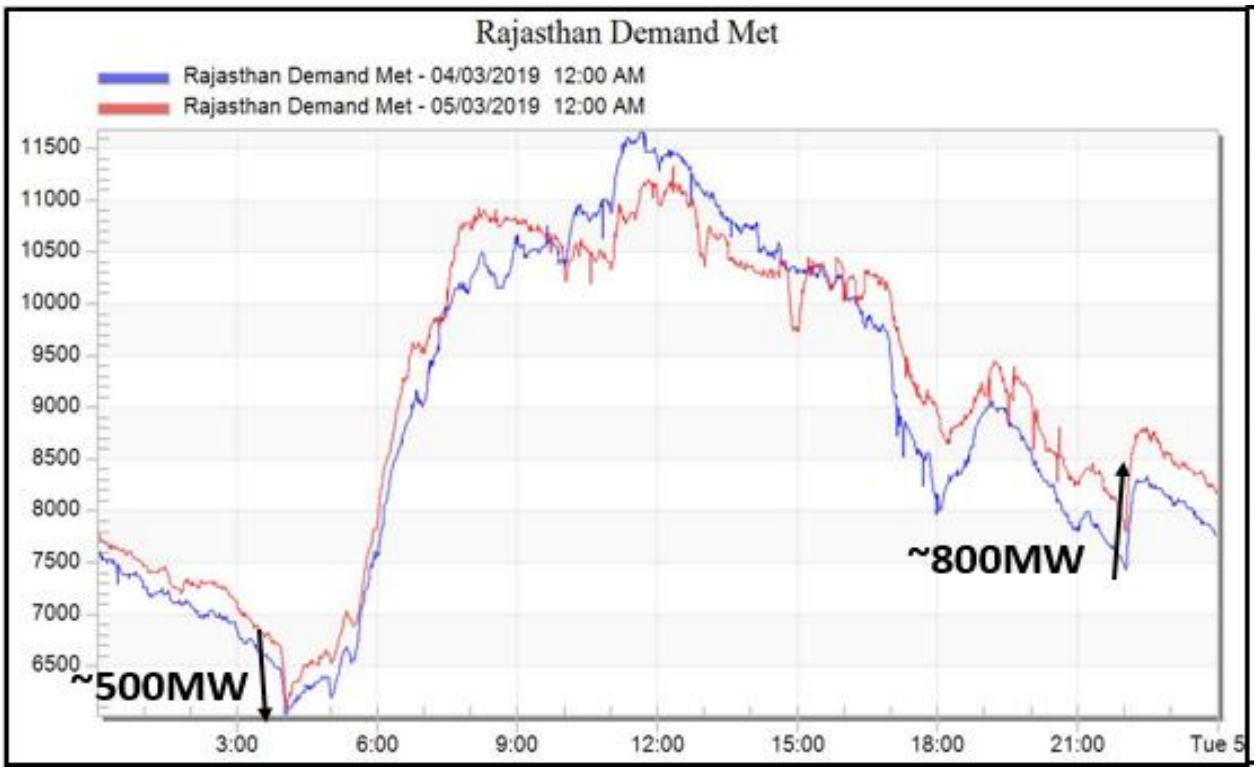
NR-1

STATION	TEMP °C	HUMD %	RATIO HUMID/TEMP
AGRA	18	40	2
ALLAHABAD	18	45	3
ANTA	18	41	2
AURIYA	8	0	0
BADARPUR	25	54	2
BALIA	11	15	1
BALLABGARH	25	102	4
BASSI	20	18	1
BHIWADI	21	46	2
DADRI HVDC	22	40	2
GORAKHPUR	21	41	2
KANPUR	21	46	2
LUCKNOW_PG	6	0	0
MAINPURI	25	51	2
MANDOLA	26	38	1
M'BAGH	25	51	2
MEERUT	19	43	2
RAIBAREILLY	36	0	0
RIHAND (HVDC)	22	94	4
RIHAND_NT	20	26	1
SINGRAULI	20	29	1
VINDHYACHAL	19	37	2

STATES

STATION	TEMP °C	HUMD %	RATIO HUMID/TEMP
ABLOWEL	18	36	
BADDI	33	0	
BHIWANI	5	10	
BWANA	30	63	2
DADRI	21	***	
GLADNI	0	0	
HEERAPURA	26	27	
JUTOGH	10	0	
LUCKNOW	0	7	0
MINTOROAD	22	32	
MORADABAD	0	70	
NARWANA	33	0	
PANIPAT	20	57	
RATANGARH	11	0	
PANIPAT - BB	25	99	

Annexure-II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Rajasthan Demand Met - 04/03/2019 12:00 AM
Rajasthan Demand Met - 05/03/2019 12:00 AM
11500
11000
10500
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9500
9000
8500
8000
7500
7000
6500
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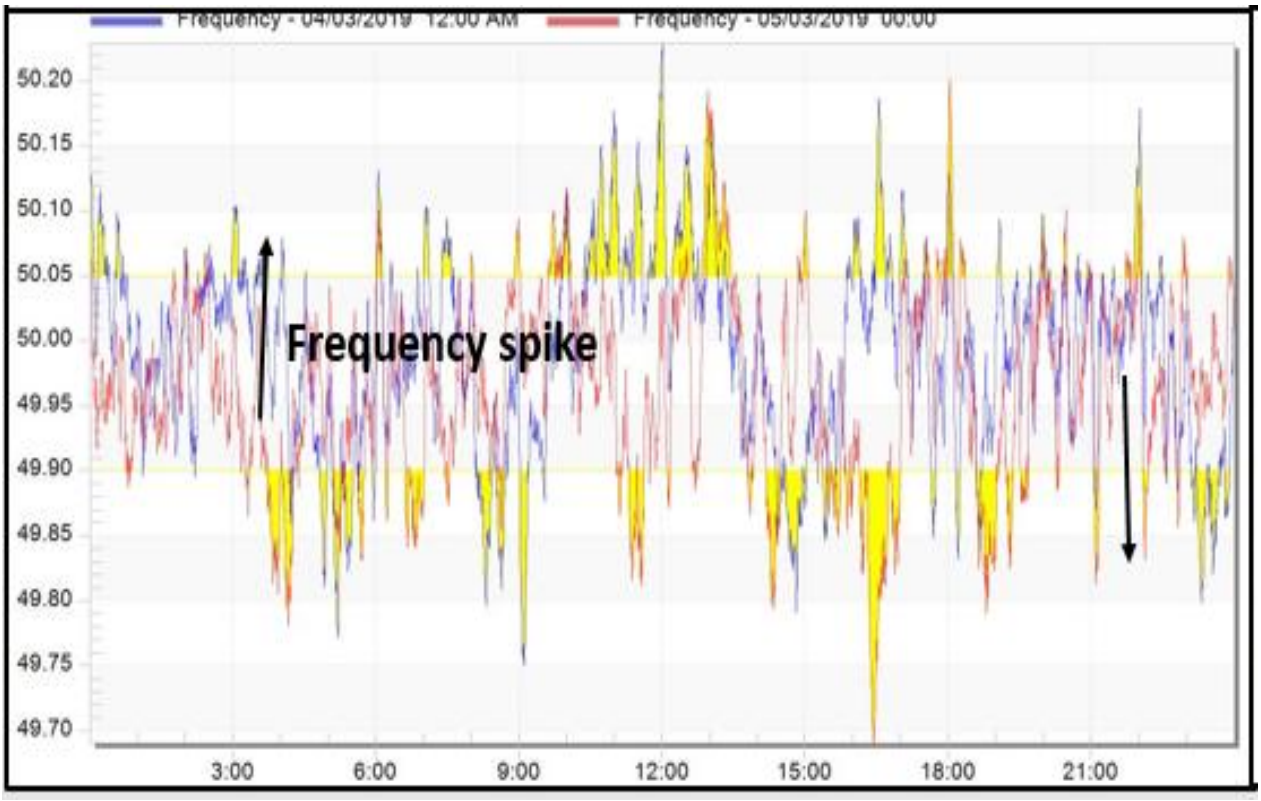
~800MW
3:00
6:00
9:00
12:00
15:00
18:00
21:00
Tue 5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50.15
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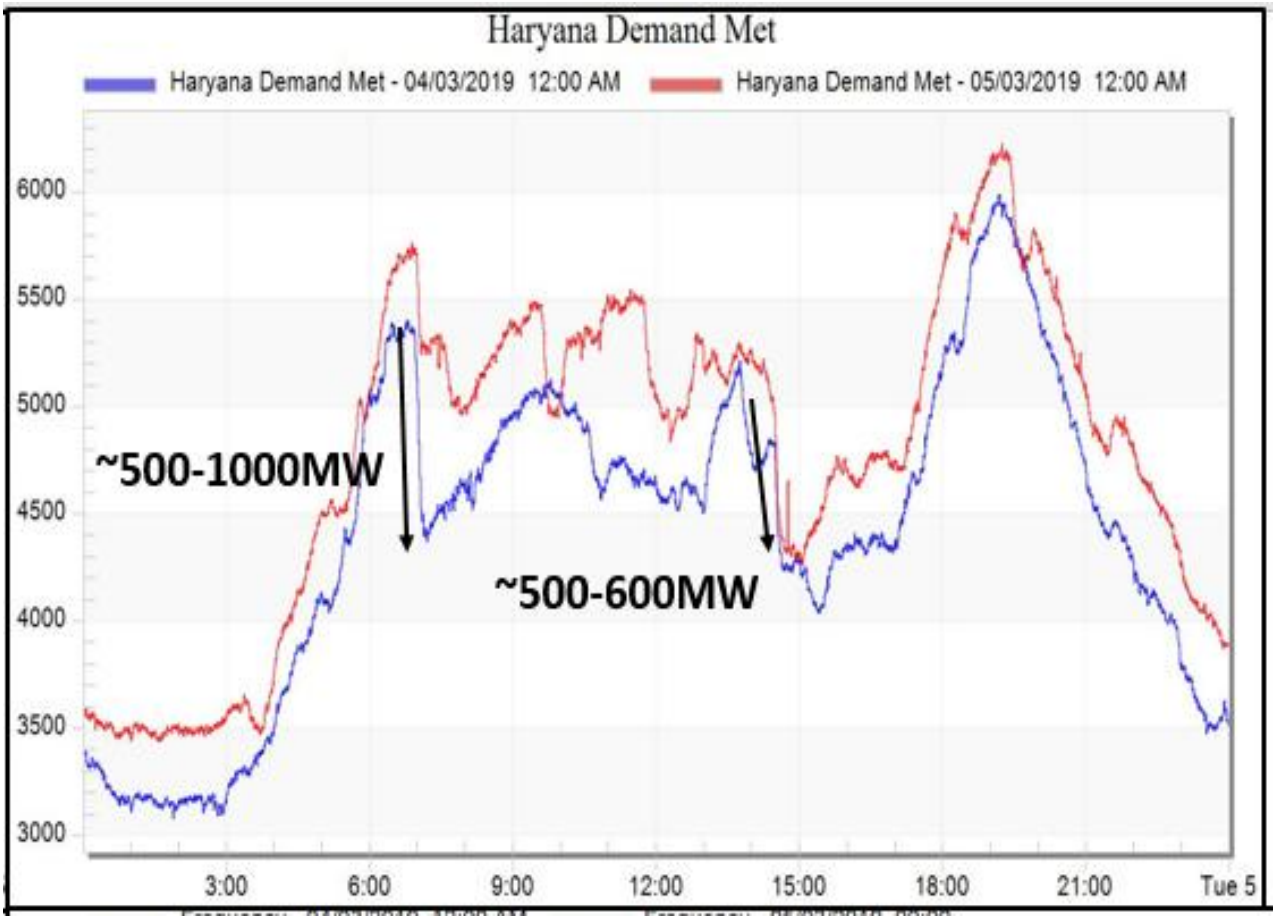
50.05
50.00
49.95
49.90
49.85
49.80
49.75
49.70
Frequency spike
3:00
6:00
9:00
12:00
15:00
18:00
21:00

Annexure-II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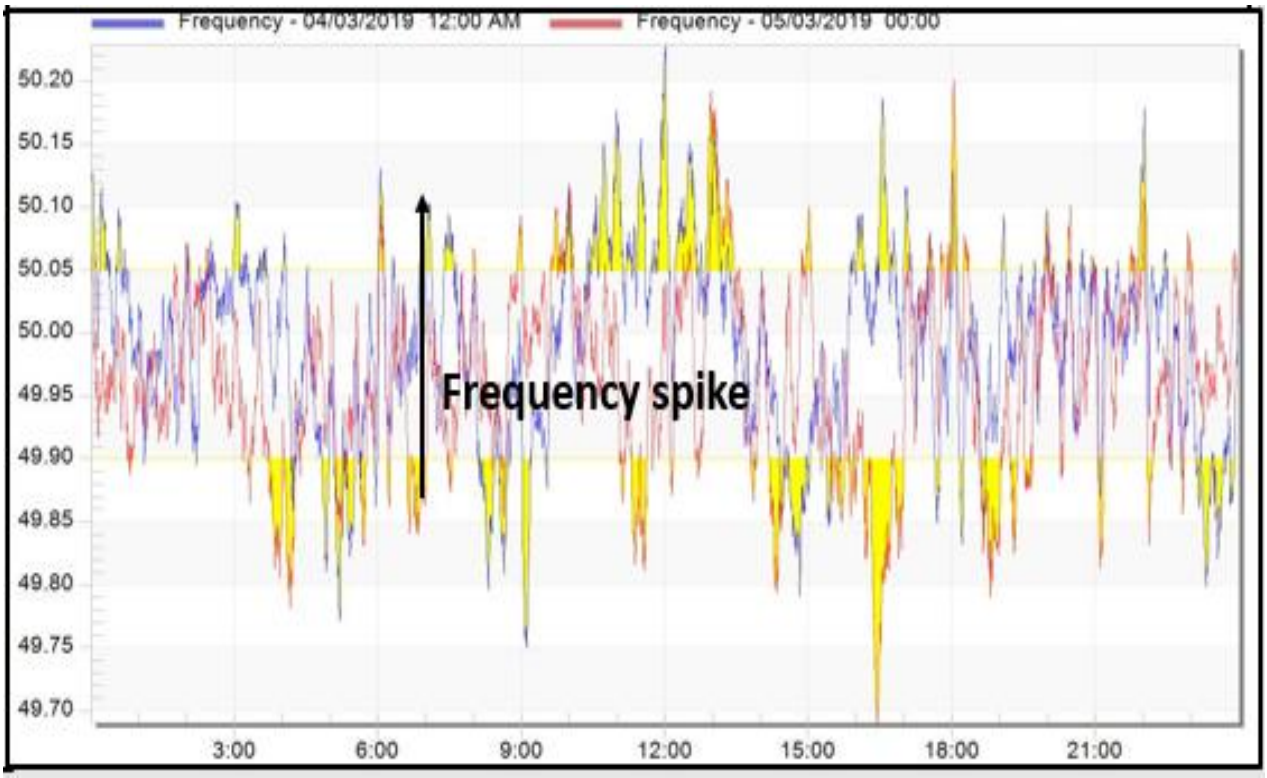
Haryana Demand Met - 04/03/2019 12:00 AM
Haryana Demand Met - 05/03/2019 12:00 AM
6000
5500
5000
4500
4000
3500
3000
~500-1000MW
~500-600MW
3:00
6:00
9:00
12:00
15:00
18:00
21:00
Tue 5


Frequency - 04/03/2019 12:00 AM
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50.05
50.00
49.95
49.90
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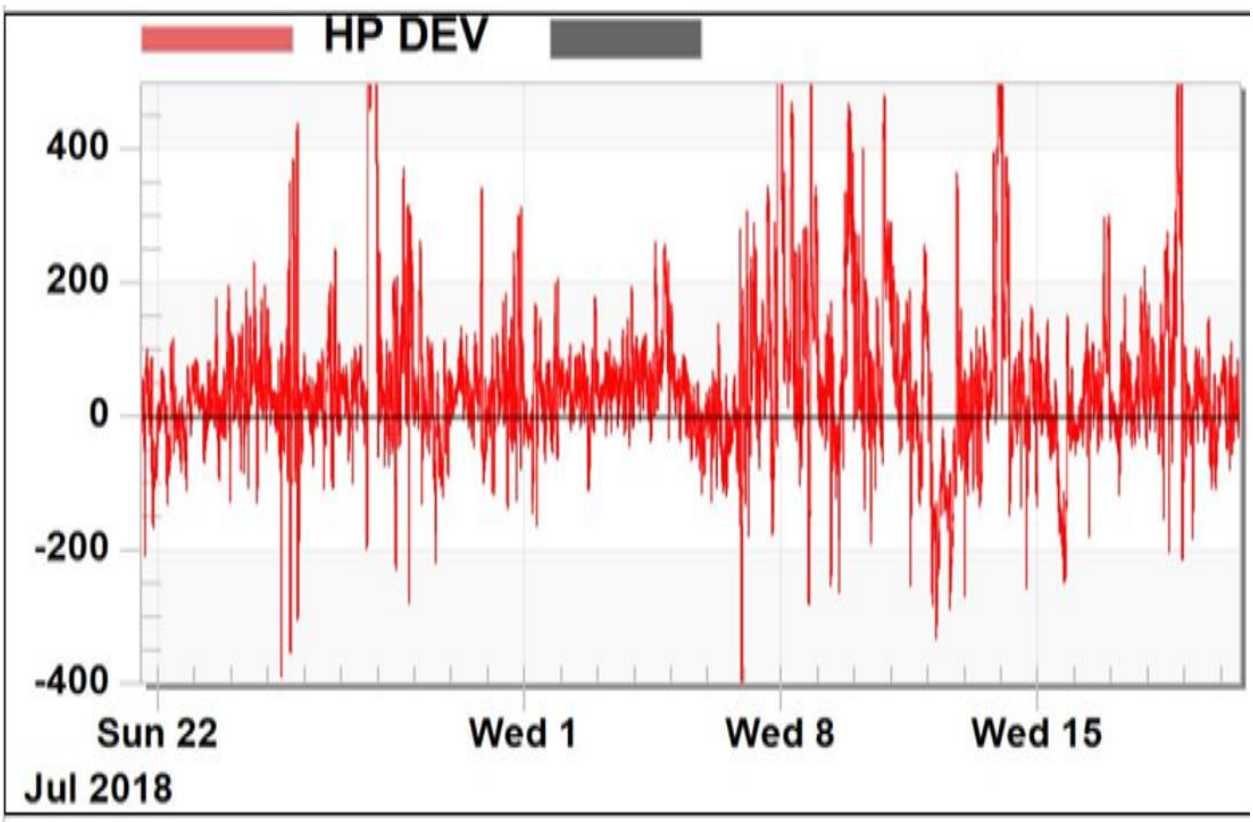
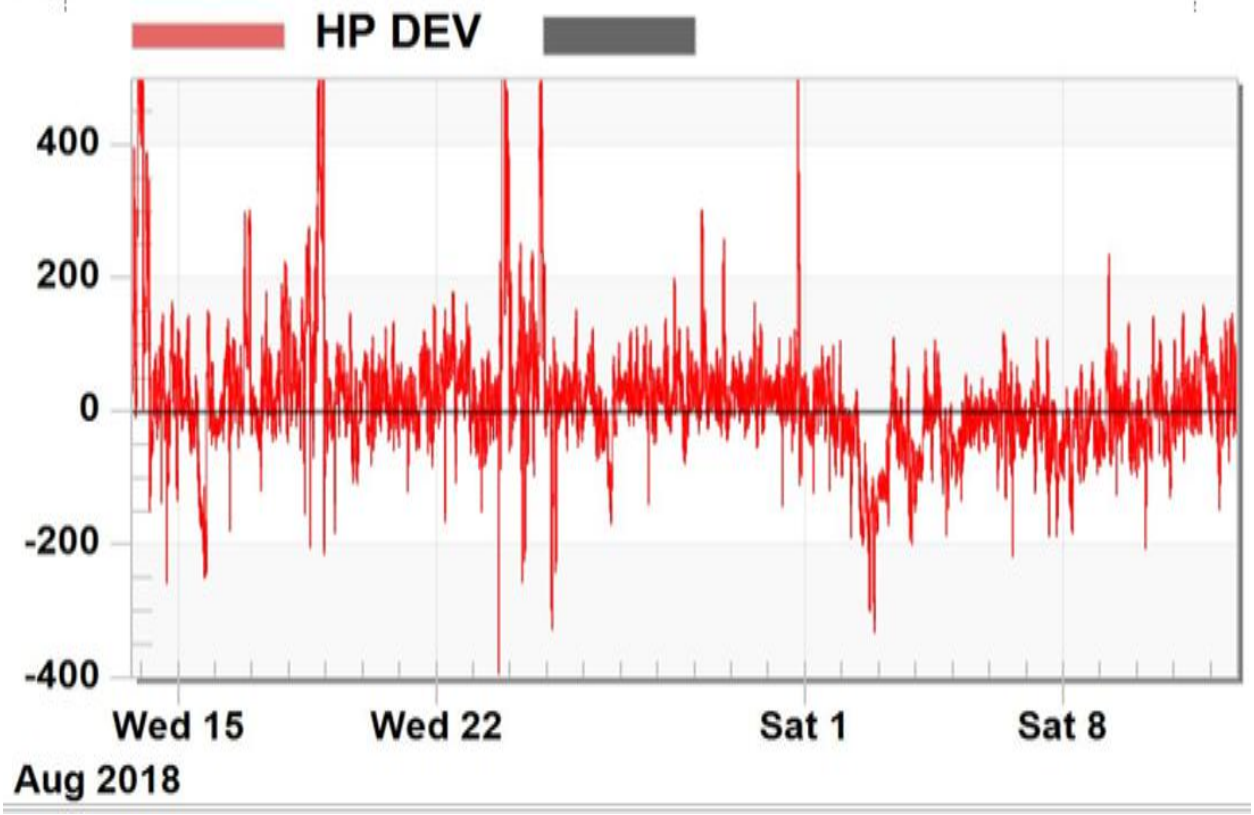
49.75
49.70
Frequency spike
3:00
6:00
9:00
12:00
15:00
18:00
21:00


HP DEV
400
200
0
-200
-400
Sun 22
Wed 1
Wed 8
Wed 15
Jul 2018

Aug 2018


HP DEV
400
200
0
-200
-400
Wed 15
Wed 22
Sat 1
Sat 8
Aug 2018

S.No.	Utility	Plant	Generator	Exciter	Governer	Stabilizer	Remarks (data not given)
1	**NHPC**	Chamera-1	Yes	Yes	Partial	Yes	Governor data is not in defined model/format, not able to process that data
		Chamera-2	Yes	Yes	Yes	No	T"q0,Xl & S(1.0)
		Chamera-3	Yes	Yes	Yes	Yes	S(1.0) & S(1.2)
		Dhauliganga	Yes	Yes	Yes	Yes	Exhaustive data for excitattion and stabilizer but not in defined model/format
		Bairasuil	Yes	Yes	Partial	Yes	Exciter & stabilizer coupled in excitation system
		Uri-1	Yes	Yes	Yes	Yes	
		Uri-2	Yes	Partial	Yes	Yes	Exhaustive data given for AVR , though not in defined model.
		Dulhasti	Partial	Partial	yes	No	Excitation data is not in defined model
		Parbati-III	Partial	No	Partial	No	Only block diagram given for excitation system, rest data is not in defined format
		Salal	Partial	Partial	No	Partial	Exciatation system block diagram with and without PSS is given. Some partial data for excitation system is given only. Data not in format
		Sewa-II	Partial	No	Yes	Yes	Governor and stabilizer block diagram has given and data is also shared. As the data is not defined for any standard model, we are checking the data
2	**NTPC**	Rihand	Yes	Yes	No	Yes	Stabilizer data only for Rihand -1 is given
		Dadri Thermal-2	Yes	Yes	No	No	
		Singrauli	Yes	Yes	No	No	
		Unchahar-1	Yes	Yes	No	No	
		Badarpur	Yes	Yes	No	No	Unit # 1,2,3 of 95 MW each
		Unchahar-4	Yes	Yes	Yes	No	
3	**SJVNAL**	NJPC	Yes	Yes	No	Yes	T"d0, T"q0 & S(1.2)
		Rampur	Yes	No	No	No	
4	**UPRVUNL**	Parichha	Partial	Yes	No	No	Time constants & Unit#7
		Harduaganj	Partial	No	No	No	Unit#2
		Anpara-1,2,3	Yes	Yes	No	Yes	
		Anpara- 4,5	Yes	Yes	No	Yes	
		Obra	Yes	No	No	No	
		Harduaganj Unit#7 (120 MW)	Yes	No	No	No	Model name has been given (Transfer function diagram of static excitation system also shared) [Governor model not defined]
5	**HPGCL**	Yamuna nagar	Yes	Yes	No	Yes	Inertia
		Panipat-1,2	Yes	Yes	No	Yes	
		Khedar	Yes	No	No	Yes	

6	**PSTCL**	Ropar	Yes	Yes	Yes	Yes	
		Rajpura	Yes	Yes	Yes	No	
		Talwandi Saboo	Yes	No	No	No	Model name has been given for excitation system, governor though data has not submiited
7	**Karcham**	Karcham Wangtoo	Yes	No	No	No	
8	**Everest**	Malana-2	Yes	No	No	No	
9	**AD Hydro**	AD Hydro	Yes	No	No	No	
10	**Shree Cement**	Shree Cement	Yes	No	No	No	
11	**Roza-IPP**	Roza	Yes	No	No	No	
12	**Lalitpur-IPP**	Lalitpur	Yes	Yes	No	Yes	
13	**RRVPNL**		Partial	yes	Partial	No	Xl, S(1.0),S(1.2)
14	**DTL**	Indra Prastha PPS-I	Partial	No	No	No	
		PPS-III	Partial	Partial	Partial	No	Not in any standard model, exhaustive data has given. Checking the data
15	**HPPCL**	Sainj HEP	Yes	Partial	Partial	Partial	Proposed settings are not given
16	**THDC**	Tehri	Yes	Yes	Yes	Yes	
		Koteshwar	Yes	Yes	Yes	Yes	

S.No.	Utility	Plant Name	Plant Capacity
1	NTPC	Dadri thermal-1	1820
		Unchahar-2,3	1050
		Dadri GPS	830
		Anta GPS	419
		Auraiya GPS	663
		Faridabad GPS (NTPC)	432
		Koldam	800
2	NHPC	Tanakpur-HPS	690
3	NPC	NAPS	440
		RAPS A (NPC)	300
		RAPS- B	440
		RAPS- C	440

4	BBMB	Bhakra HPS	1379
		Dehar HPS	990
		Pong HPS	396
5	IPP	Budhil HPS(IPP)	70
6	PSTCL	Guru Nanak Dev TPS(Bhatinda)	460
		Guru Hargobind Singh TPS(L.mbt)	920
			1320
7	Haryana	Jhajjar(CLP)	1320
8	J&K	Baglihar HPS (IPP)	1240
9	Uttarakhand	All hydro plants	1500
10	Rajasthan	kota TPS	1240
		Suratgarh TPS	1500
		Chabra TPS	1660
		Dholpur GPS	330
		Ramgarh GPS	271
		Barsingsar (NLC)	250
		Giral LTPS	250
		Rajwest LTPS (IPP)	1080
		Kalisindh	1200
11	UPPTCL	Panki TPS	210
		Tanda TPS (NTPC)	440
		Anpara-C (IPP)	1200
		Bajaj Energy Pvt.Ltd(IPP) TPS	450
		Anpara-D	1000
		Bara	1980
		Vishnuparyag HPS (IPP)	440
		Alaknanada	330
12	Delhi	Rajghat TPS	135
		Delhi Gas Turbine	282
		Rithala GPS	108
		Bawana GPS	1370
13	HPSEB	Baspa HPS (IPP)	300
		Malana HPS (IPP)	86

Rajasthan RE generators

1	PSS_132KV_DALOT_KANGARH
2	PSS_132KV_KOLAYAT_RAYS
3	PSS_132KV_NOKHADHAIYA_3No_33KV
4	PSS_132KV_PS2_GODAWARI_GREEN
5	PSS_132KV_PS2_PRECISION
6	PSS_132KV_PS3_8N0_33KV
7	PSS_132KV_PS3_ WELSPUN
8	P5S_132KV_RANI_RANI
9	PSS_132KV_SHEO_SUZLON
10	PSS_220KV_BADISID_EDEN
11	PSS_220KV_BADISID_TERRAFORM
12	PSS_220KV_BALOTRA _ BALOTRA
13	PSS_220KV_BAP _MAHI NDRA
14	PSS_220KV_BHAWAD_SNCA
15	PSS_220KV_GULABPURA_GULABPURA
16	PSS_220KV_KHINWSAR_KHI NWSAR
17	PSS_220KV_PRATAPGARH_DEVGARH
18	PSS_220KV_PRTAPGRH_ WELSPUN_TATA
19	PSS_220KV_TINWARI_3N0 _33KV
20	PSS_400KV_AKAL_AKAL
21	PSS_400KV_AKAL_DEVIKOT
22	PSS_400KV_AKAL_JAJIYA
23	PSS_400KV_AKAL_BHU
24	PSS_132KV_DALOT_33KV_DALOT
25	PSS_220KV_DECHU DSPPL
26	PSS_220KV_DECHU_RSTEPL
27	PSS_220KV_NEEMRANA_NEEM RANA
28	PSS_220KV_TINWARI_KETUKALAN
29	PSS_132KV_AAU_AAU
30	PSS_132KV_KOLAYAT_8N0_33KV
31	PSS_132KV_OSIAN_DUNDHARA
32	PSS_132KV_SHAHPURA_SHAHPURA_BHILWA
33	PSS_400KV_AKAL_DANGRI
34	PSS_400KV_AKAL_RAJGARH
35	PSS_400KV_AKAL_MULANA
36	PSS_220KV_AMARSAGAR_MOKALA
37	PSS_220KV_AMARSAGAR_LUDARWA
38	PSS_220KV_AMARSAGAR_KALADUNGAR
39	PSS_220KV_ BHOPALGARH_DEBARI
40	PSS_220KV_RAMGARH_TEJUWA_II
41	PSS_220KV_RAMGARH_RAMGARH
42	PSS_132KV_CHAMU_DERI A
43	PSS_132KV_PS8_SALODI
44	P5S_132KV_JAYAL_JAYAL

WTG details required in compliance to CERC ROP on Petition no. 237/MP/2017

																		Supplying to					
S.No.	State	Voltage	Interconnection Point voltage	#Date of Commissioning(dd/mm/yyyy)	Make	Model	WTG Capacity in MW	Number of turbines	Installed capacty in MW	LVRT settings as per CEA Regulations		stall/ pitch control	*V/ W/ X/Y /Z	WTGs with useful life beyond 04.01.2021		Working WTGs (HT Service alive)		DISCOM		Third Paty		Captive	
										Number	MW			Number	MW	Number	MW	Number	MW	Number	MW	Number	MW

*V= LVRT feature Enabled W= LVRT not possible, X = LVRT design supported and fitted to be enabled, Y = LVRT design supported but to be fitted, Z = LVRT feature to be retrofitted

in case of ambiguity, date of commissioning of last commissioned turbine of plant is to be considered

Adani PL.	(i) Sh. Nirmal Sharma, VP (O&M), Fax- 0141-2292065 (ii) Sh. Sameer Ganju, Head-Northern Region, Fax No. 011-24115560
APCPL	(i) AGM (O&M)-I, IGSTPP, Fax No. 01251-266326 (ii) AGM (EEMG), 01251-266326
BBMB	(i) Director (PR) Fax- 0172-2652820 (ii) Power Controller, Fax- 0172-2653297.
HVPNL	(i) Chief Engineer (Comm.); SE (SO & SLDC): 0181-2664440 Fax-0172-2560622
NHPC	(i) Sh. N.S.Parameshwaran, E.D., Faridabad – Fax-0129-2272413 (ii) Sh.V.K.Sinha,Chief Engineer (O&M), Faridabad – Fax-0129-2272413
POWERGRID	(i) Sh. Prabhakar singh, ED (NR-I), Fax No. 011-26853488 (ii) Sh. A.K. Arora, General Manager (O&M), NR-I, (iii) Sh. R.V.S Kushwaha, General Manager (O&M), Jammu; Fax- 0191-2471187 (iv) Sh.Rajeev Sudan Dy, General Manager (OS), Fax- 0191-2471187
RRVUNL	(i) Sh. A.K. Saxena, Addl. Chief Engineer (PPMC & IT),) Fax- 0141-2740989/44521
NTPC	(i) Head of OS/ Head of RCC, Fax No. 0120-2410082 (ii) Sh. Praveen Chaturvedi, GM (OS), NRHQ Lucknow; Fax-0522-2305849. (iii) DP Singh AGM –OS NRHQ NTPC LIMITED Lucknow
HPSEBL	(i) Chief Engineer (SLDC), HPSLDC (ii) SE (PR& ALDC), HPSLDC
NRLDC	General Manager - 26854861, 4051, 26569504 Fax- 26852747
NLDC	General Manager, NLDC, Fax: 011-26853488/26601079
Lanco APTL	Sh. Raj Kumar Roy, Director, Fax: 0124-2341627/4741024
SJVNL/NJHPS	General Manager (C&SO), Fax- 0177-2673283
PTCUL/UPCL	(i) Sh. Anupam Sharma, SE (SLDC), Fax- 0135-2451160, 0135-2763570
UPPTCL	(i) Director (Op), Fax- 0522-2286476 (ii) Chief Engineer (SLDC), Fax- 0522-2287880, 2288736
HPLDS	(i) Sh. N.P.sharma, SE, SLDC, Fax: 0177-2837649 (ii) Sh. Lokesh Thakur, Executive engineer, Fax: 0177-2837649
DTL	General Manager (SLDC)/ General Manager (Protection) Fax-23236462, 23221069
THDCIL	Sh. GM (EM - Design), Rishikesh
PSTCL	(i) Chief Engineer (SLDC) Fax – 0175-2365340 (ii) Dy.Chief Engineer (SLDC) Fax – 0175-2365340
CHANDIGARH	Sh. M.P.Singh, SE (Elect. Op.Circle) – Fax-0172-2740505
IPGCL/PPCL	(i) Sh. Y.P.Arora,GM (T), IPGCL, New Delhi, Fax- 23370884 (ii) Sh. R.K.Yadav, DGM (T), IPGCL, New Delhi, Fax- 23370884
BRPL	Sh. Satinder Sondhi, VP & Head System Operations, Fax No. 011-39996549
Everest PPL	Sh. Yogendra Kumar, Chief Operating Officer, Fax No. 011-45823862/ 43852507
RPSCL	Sh. Niranjan Jena, Addl.VP/ Sh. Suvendu Dey, Asst. VP-O&M, Fax: 05842-300003
HPGCL	Sh. S.K. Wadhwa SE/Technical(HQ), Fax: 0172-5022436
CEA	(i) Sh.Vikram Singh, Director; Fax-26170385,26108834 (ii) Chief Engineer, NPC, New Delhi
TPDDL	(i) Sh. Sanjay Banga, VP, Tata power-DDL, New Delhi (Fax: 011-27468042) (ii) Sh. Praveen Verma, Addl. GM, Tata Power-DDL, New Delhi (Fax: 011-27468042)
PTC India Ltd.	Sh. Ajit Kumar, Director (Commercial & Operations), PTC India Ltd., New Delhi (Fax- 011-41659144,41659145)
AD Hydro	Sh. Anil Kumar Garg, General Manager(BD), AD Hydro Power Ltd., Noida-201301, (Fax: 0120-4323271/4278772)
DISCOM UP	Sh. Rakesh Kumar, Director (T), Dakshinanchal VVNL, Agra-282007 (Fax- 0562-2605465)

NPL Mr. Rajesh Kumar, Head Operations- 08427183924, Email id: Kumar.Rajesh@larsentoubro.com
Address: Nabha Power Limited, PO box 28, Near Village Nalash, Rajpura, Punjab 140401.

Mr. Ravinder Singh Lall, Head O&M – 09815355411, Email : Ravindersingh.lall@larsentoubro.com
Mr. Pinaki Mukherjee, Sr. DGM, Commercial – 09871391388, Email id: Pinaki.mukhejee@larsentoubro.com

HPPTCL	Director (Planning & Contracts), Fax: 0177-2626284
J&K (PDD)	Chief Engineer (Survey & Commercial) Fax-0191-2476213
J&K SPDCL	GM, Fax: 0194-2500145
PSPCL	Engineer-in- Chief (PPRR), Fax- 0175-2308698.
RRVPNL	Chief Engineer (LD); SE (SO&LD) – Fax- 0141-2740920
UPRVUNL	DGM (TOM), 0522-2287861
UJVNL	General Manager Engineering: 0135-2761485, fax- 0135-2761549
NPCIL	(i) Station Director, NAPS; Fax. 05734-222177.(ii) Sr. Manager (Transmission), NPCILFax.-022-25563350
JPPVL	Sh. Suresh Chandra, Director, Fax- 0120-4516201/4609464/4609496
Jhajjar PL	Sh. Goutam Biswas, GM (Production), 01251-270155.
	Nabha Power Ltd (Rajpura)
LPGCL	Sh. A. N. Sar, Unit Head And Exec. Director, Fax- 91-22-22048681

Talwandi saboo Pvt ltd	Amit Mittal,GM- Power Sales, Strategy & Corporate Affairs,Talwandi Saboo