सत्यमेव जयते

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

संख्या: NRPC/OPR/106/01/2019/5489-5530 दिनांक:29.05.2019

विषय: उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 159वीं बैठक का कार्यवृत |

Subject: Minutes of 159th OCC meeting of NRPC.

उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 159वीं बैठक 15.05.2019 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 भेजें |

159th meeting of the Operation Co-ordination Sub-Committee of NRPC was held on 15.05.2019. The Minutes of this meeting has been uploaded on the NRPC website http://www.nrpc.gov.in. Any comments on the minutes may kindly be submitted within a week of issuance of the minutes.

संलग्नक: यथोपरि

-sd-
(सौमित्र मजूमदार)
अधीक्षण अभियंता (प्रचालन)

सेवा में,
प्रचालन समन्वय उप-समिति के सभी सदस्य

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Minutes of the 159th meeting of the Operation Coordination Sub-Committee (OCC) of NRPC

159th meeting of OCC of NRPC was held on 15.05.2019 at NRPC Secretariat, New Delhi. The list of participants of the meeting is attached at **Annexure-I**.

PART-A: NRPC

1. Confirmation of Minutes

The minutes of the 158th OCC meeting held on 15.04.2019 and 23.04.2019 at NRPC Secretariat, New Delhi were issued vide letter of even number dated 06.05.2019.

Sub-Committee confirmed the minutes of the 158th OCC meeting.

2. Review of Grid operations of April 2019:

2.1. Anticipated vis-à-vis Actual Power Supply Position (Provisional) March 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 April, 2019 in terms of Energy Requirement for Chandigarh, Haryana & Punjab and in terms of Peak Demand for Chandigarh, Haryana, & Uttar Pradesh. Reasons for variation and comments submitted by the concerned members are as under:

Delhi

4.9% variation observed in actual vis-a-vis anticipated demand was mainly because of temperature in last few days of April being higher than normal.

Uttar Pradesh

The variation in the peak demand was attributed to the abrupt increase in the temperature in the last few days of April.

Haryana

The weather conditions and the temperature during the last 2 days of April'19 remained comparatively higher than expected, so the demand of the last 2 days has spurred to 8127 MW.

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 April 2019 is placed on NRPC website (www.nrpc.gov.in/meetings/occ.html).

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

2.3.1. Frequency remained within the IEGC band for 73.11% of the time during April 2019, which is less than that of last year during same month (April 2018) when frequency (within IEGC band) remained 79.36% of the time. The maximum and minimum frequencies recorded were 50.32 Hz and 49.66 Hz 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 April 2019 were 53,985 MW (30.04.2019 at 23:00 hrs) and 28,433 MW (18.04.2019 at 04:00 hrs).

2.3.4. The average consumption, of the Northern Region, for April 2019, increased by 7.06% with respect to the corresponding month in previous year.

2.3.5. The average Thermal generation in April 2019 decreased by 5.67% (34 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 April 2019 increased by 98.47 MU/day with respect to the corresponding month in previous year.

2.3.7. The average Renewable generation in April 2019 increased by 7.27 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 April 2019 increased by 2.85 MU/day as compared to corresponding month in previous year.

2.3.9. The net average Inter-Regional import decreased by 13.37 MU/day during the month of April 2019, as compared to the corresponding month in previous year.

2.3.10. The net average Import from WR decreased by 4.44 MU/day during April 2019 as compared to corresponding month in previous year.

2.3.11. The net average Import from ER increased by approximately 8.31 MU/day during April 2019 as compared to corresponding month in previous year.

2.3.12. The net average Export to NER was approximately 15.30 MU/day during April 2019.

2.3.13. Long outages of generating Units were discussed in detail and the same is placed at **Annexure-II (B).**

2.3.14. Long outages of transmission lines were discussed in detail and the same is placed at **Annexure-II (C)** & all constituents were requested to revive the elements under long outages at the earliest.

2.3.15. The new elements charged were discussed and the list is attached at **Annexure-II (D).**

2.3.16. Total outages during April 2019 were 763 including Planned S/D (386) and Forced S/D (Trippings-246+Emergency S/D-131).

3. Maintenance Programme of Generating Units and Transmission Lines

3.1. Maintenance Programme for Generating Units.

The maintenance programme for Generating Units for the month of June, 2019 was discussed on 14.05.2019 at NRPC Secretariat, New Delhi.

3.2. Outage Programme for Transmission Elements.

The maintenance programme for Generating Units for the month of June, 2019 was discussed on 14.05.2019 at NRPC Secretariat, New Delhi.

4. Planning of Grid Operation

4.1. Anticipated Power Supply Position in Northern Region during June, 2019 as per LGBR for 2019-20:

4.1.1. Modified Anticipated Power Supply Position in Northern Region during June, 2019 is placed at **Annexure-III.**

4.1.2. UPSLDC representative informed that peak demand for June'19 would be **21,500 MW** instead of **21,000 MW**.

4.1.3. In view of the surplus/shortfall existing in the energy/peak demands, NLRDC is sharing 10 days' IMD data with state SLDCs for better forecasting and rationalization of energy/peaking. All the SLDCs were requested to get login ID and password from NRLDC for forecasting energy/peak.

4.1.4. SE (O), NRPC requested all SLDCs to ensure submission of anticipated and actual Power Supply Position from the ensuing months, mandatorily on the NRPC website portal. The Login ID and password has already been shared with the SLDCs. The same was again shared with the SLDCs vide e-mail dated 17.05.2019.

4.1.5. MS, NRPC further stated that the information sent through e-mail in this regard would not be accepted after 1st July 2019.

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 be furnished. No instance of variation was intimated by SLDCs.

6. Reactive compensation at 220 kV/400kV level

6.1. In the 38th TCC & 41st NRPC dt. 27th & 28th February 2018, 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.

6.2. **POWERGRID:** PGCIL representative informed that 11 no. of 400 kV Bus Reactor and 6 no. of 220 kV Bus Reactor, which were earlier informed to be executed through TBCB project has been allotted to PGCIL for execution. Further, NIT for the said reactors has already been floated and Bid Evaluation is under Process. LoA is likely to be placed by end of June 2019. Details placed at **Annexure-IV.**

6.3. **Delhi:** DTL intimated that for Peeragarhi, Mundka and Harsh Vihar, NIT is under approval. Further, for Bamnauli and Indraprastha, Board approval is not required and it may be approved by competent authority within 1- 2 weeks.

6.4. **Uttarakhand:** Informed that Financial Bid for 125 MVAr reactor at Kashipur has been opened and is being evaluated. Further it was informed that funding for the reactor will be done through PSDF.

6.5. **Rajasthan:** Informed that there was no change in the status as informed in the previous meeting. MS, NRPC stated that the issue has been pending since long, it would be taken up with the NPC at NRPC Secretariat level.

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

7.1. Punjab representative informed that the observations of CPRI (Annexure-II of agenda note) on the format submitted by Punjab have been forwarded to the concerned wing for incorporation of the same.

7.2. SE (O), NRPC requested other states to also consider the observations of CPRI on Punjab data and incorporate the same while submitting the same for their states.

8. Phase nomenclature mismatch issue with BBMB and interconnected stations

8.1. The issue of phase nomenclature mismatch with BBMB and interconnected stations was brought out in the 34th Protection Sub-Committee while discussing multiple elements tripping at 400/220/132kV Dehar HEP of BBMB. Thereafter, it was decided that BBMB should modify phase nomenclature to resolve the discrepancy.

8.2. In the 159th OCC meeting, it was decided that representatives of NRPC, NRLDC in coordination with BBMB and PGCIL will conduct site visit during last week of May 2019 to understand the issues. Tentative date for the visit was decided as 27th and 28th May 2019.

9. Follow up of issues from previous OCC Meetings – Status update

The detail of the updated status as discussed in the 159th OCC meeting is placed at the corresponding agenda point of **Annexure-V**.

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

10.1. The updated status of FGD installation was attached at Annexure-IV of the agenda note. All the utilities were requested to update the status on monthly basis and NTPC was specifically asked to provide the updated information regarding FGD installation.

11. LVRT compliance by wind generators.

11.1. The CEA (Technical Standards for Connectivity to the Grid) Amendment Regulations, 2013 stipulates for LVRT capability in the wind generating stations connected at voltage level of 66 kV and above. CERC vide order dt. 05.01.2016 had 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.

11.2. In the 158th OCC meeting, members were apprised of the amendment in regulation i.e., central Electricity Authority (technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019.

11.3. With regard to monitoring of the installation and performance of LVRT installed on existing WTGs, CERC had directed SLDCs to prepare quarterly reports and submit it to RPCs for validation. Any deficiency and non-compliance to the Commission needs to be reported by RPCs in consultation with RLDCs.

11.4. Rajasthan submitted WTG data with respect to LVRT compliance (Annexure-VI of minutes of 158th OCC).

11.5. Rajasthan representative was requested to ensure quarterly submission of the data as mandated by CERC.

12. System Protection Scheme (SPS) in NR

12.1. **Revised SPS for 765 kV Agra-Gwalior line**

As per decision taken in 158th OCC meeting, mock testing of revised SPS for 765 kV Agra - Gwalior line was carried out on 01.05.2019. Outcomes of the mock testing were shared by NRLDC in their presentation. To resolve certain observations as highlighted by NRLDC in its report, MS, NRPC advised to conduct a meeting through video conferencing on 23.05.2019 at 10:30 AM with coordinators of all the states.

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

In the 159th OCC meeting, it was decided that mock testing for the scheme will be carried out after elections, tentatively in the last week of **May 2019** and the revised SPS logic will be shared by UPSLDC with NRPC and NRLDC.

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

In the 152nd OCC meeting, Rajasthan SLDC representative confirmed that Chabra STPS units have also been wired to the SPS.

Further, in 156th OCC, request was made by Rajasthan to review SPS scheme for Kawai-Kalisindh-Chhabra generation complex upon commissioning of 400kV CTPP-Anta feeder.

Thereafter, in the 157th OCC meeting, Rajasthan was advised to share the studies carried out by their Planning Division, so that revised scheme might be formulated at the earliest. NRLDC also requested to share the dynamic data for AVR, Governor, PSS for the generators so that detailed studies might be carried out.

In the **159th OCC meeting**, NRLDC representative stated that the issue was also discussed with Rajasthan officials in last OCC meeting. In the study conducted by Rajasthan, they have considered Phagi-Bhiwani and Phagi-Gwalior transmission line to be out.

In view of the above, Rajasthan was advised to submit the following information to NRLDC/ NRPC Sectt.:

a) Expected network configuration for future scenario.
b) Revised SPS study.
c) Dynamic data of Kalisindh, Chhabra and Kawa.

13. Automatic Demand Management System

13.1. 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 as under:

State/ Utility	Status
Punjab	**Not fully implemented.** At SLDC level, 96 feeders of 66 kV are operational. At 11 kV feeder level, ADMS is to be implemented by Distribution Company. As per the information available with SLDC, for 50 feeders of 11 kV at Amritsar and Ludhiana, scheme was under finalization.
TPDDL	**Fully implemented.**
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 DISCOM authorities
UP	**Not fully implemented.**

State/ Utility	Status
	Remote operation of 50 feeders at 132 kV level being operated from SLDC. For the down below network, issue taken up with the DISCOMs.
Haryana	**Not implemented.**

13.2. 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 30th & 31st July 2012

14.1. The status of information received in this regard is as under:

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

15. Cleaning and Replacement of porcelain insulators

15.1. 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 all utilities were requested to stick to the timeline 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.

15.2. 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. The requisite login ID and password was subsequently furnished to the transmission licensees by NRPC.

15.3. In the 158th OCC meeting, members were requested to submit requisite data pertaining to cleaning & replacement of porcelain insulators on the online application of NRPC. Further, it was decided that list of elements along with following details (*not covered under first five approved stages for porcelain insulator replacement*) may be submitted by POWERGRID before next OCC meeting:

Element Name & Type; Maximum ESDD (Equivalent Salt Deposit Density) value; Pollution level (as per recommendation of the inquiry committee on grid incident in Northern Region on 27.01.2007); Number of fog related tripping of the element in last one year.

15.4. SE (O), NRPC, requested all the transmission utilities of NR to submit cleaning & replacement of porcelain insulators related data on the NRPC Data sharing portal, the login ID and Password for which has already been issued to the utilities.

16. Cyber Security Preparedness Monitoring

16.1. Based on the detailed presentation given by Chief Information Security Officer (CISO), MoP in the 37th TCC and 40th NRPC meeting, all utilities were requested to monitor actions being taken in regard to the following points and report the status:

a. Appointment of organization-wise CISO 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.

16.2. In the 156th OCC meeting, it was mentioned that inherent vulnerability in the ICT infrastructure or website or web applications shall be accessed and remedial action thereon shall be taken by all utilities by conducting Vulnerability Assessment & Penetration Test (VAPT) of their respective ICT infrastructure, websites and web applications.

16.3. In the 158th OCC meeting, all utilities were requested to intimate NRPC about the status of VAPT conducted in their respective organization and VAPT plan for the future. Further, POWERGRID was requested to submit draft CMP to CISO, MoP after incorporating the changes suggested by CERT-in.

16.4. In the 159th OCC meeting, POWERGRID representative informed that VAPT of IT equipment has been done. For SCADA system, only VA is being done.

16.5. Regarding the draft CMP to be prepared by POWERGRID, it was informed that the comments received from CERT-In are being incorporated and the same shall be finalised by next OCC.

16.6. Rajasthan representative informed that the award for complete cyber security layer under ICT infrastructure is already made and execution is being done. The third party checking/ assessment of the layer is also in the scope of the contractor.

16.7. Representative of BBMB informed that VAPT of ICT network related to BBMB Power System is being done on annual basis. Last VAPT was conducted on 8th January, 2019. Next VAPT is due in January, 2020.

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

17.1. 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 temperature of 45°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 account variation in thermal capability of lines w.r.t. variation of ambient temperature.

17.2. All STUs and transmission licensees were requested to furnish terminal equipment ratings at all lines at 400kV & above for fully implementing the temperature adjusted TTC to ensure that there is no gap in security assessment. The matter is under regular follow up since 152nd OCC meeting and only HVPNL has submitted the data so far.

17.3. In the 159th OCC meeting, all remaining STUs and transmission licensees were requested for expeditious submission of information.

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

18.1. Ministry of Railways has accorded high priority to railway electrification projects for reducing dependence on fuel based on crude oil and enhancing energy security of nation. However, 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. State-wise detail in respect of NR is as under:

Sl. No.	State	Tr. Line to be expedited		Contract to be awarded		Estimate awaited	
		(original target)	(updated status)	(original target)	(updated status)	(original target)	(updated status)
1	UP	19	-	5	-	1	-
2	Haryana	5	-	2	-	-	-
3	Punjab	1	-	2	-	2	-
4	Rajasthan	5	4* completed	5	1** completed	7	***
5	J&K	1	-	-	-	-	-

* 1 no. railway end pending due to demarcation in Army area.

** 2 nos. proposals withdrawn by Railways, 1 No. under progress, 1 No. route to be revised by Railways.

*** 3 Nos. proposals withdrawn by Railways, 2 Nos. A&FS pending and 2 Nos. works under progress.

18.2. In the 159th OCC meeting, HVPN submitted the status (Annexure-VI) of the ongoing works for railway traction substations. UP and Punjab were again requested to take up the matter with concerned utilities for expeditious completion of the identified transmission line & substation works and update the status.

19. 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

19.1. In the 142nd OCC meeting, it was reported by NTPC that after shifting of 2x500MW Rihand Stage-III units (Unit# 5&6) from NR Grid to WR Grid through Vindhyachal Pooling Station on 28.11.2017, 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.

19.2. In the 38th TCC & 41st NRPC meeting, it was decided to constitute a committee with members from CEA, NRPC, POSOCO, NTPC, POWERGRID and CTU to look into the issue of high vibrations during mono pole ground return operation for corrective actions. First meeting of the Committee was held on 16.10.2018 (*minutes attached in the 155th OCC MoM*).

19.3. In the 158th OCC meeting, it was decided that the constituted committee will hold its second meeting for reviewing the situation. In this regard, NTPC was requested to propose the meeting date.

19.4. In the 159th OCC meeting, NRLDC representative advised NTPC to observe the vibrations in the presence of OEM and to record the same in the above said machines on 19.05.2019 as one pole of HVDC Rihand-Dadri will be under shutdown. Based on the observations, NTPC was advised to convene the second meeting of the committee in June 2019.

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

20.1. As per Hon'ble CERC regulation, UFR and df/dt mapping is mandatory. In the 136th OCC meeting dt. 16.06.2017, it was decided 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.

20.2. In the 137th OCC meeting dt. 18.07.2017, NRPC 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. In the subsequent OCC meetings, all state utilities were requested to correct the SCADA UFR, df/dt displays as per the comments.

20.3. In the 158th OCC meeting, utilities were again requested to submit the progress on details tabulated in corresponding agenda point of Annexure-II at the earliest and correct/provide the SCADA UFR, df/dt displays as per the comments.

20.4. In the 159th OCC meeting, NRLDC intimated that the data submitted by the states

have depleted further. MS, NRPC advised to deliberate the issue in the video conferencing meeting, scheduled on 23.05.2019, and all SLDCs to ensure the presence of personal related with SCADA.

21. Frequent revisions in schedule (Agenda by APCPL-IGSTPS JHAJJAR)

21.1. APCPL representative mentioned that coal based thermal generating stations are designed for Base Load operation with minimal intervention in Scheduled Generation for better efficiency and stable operation for life span of 25 years. By quoting the example of 31.03.2019, it was mentioned that schedule of IGSTPS is frequently revised in opposite direction. The change in Schedule Generation is maintained by varying the amount of coal fired i.e. by changing the Heat Flux inside the boiler. Due to continuous variation of Heat Flux undue thermal stress on boiler tubes and other boiler components occur, which may lead to frequent tube/material failure. The electricity demand pattern is generally forecast a day ahead and the scheduling of Generating stations need to be spread out such that there is gradual change in schedule for consecutive blocks and single block revisions need to be avoided. Representative of APCPL requested to review the frequent revision of schedules, consequent schedule revisions in reverse direction and the scheduling pattern in respect of APCPL (IGSTPS)-Jhajjar.

21.2. NRLDC representative stated that all ramp up/down limits given by APCPL Jhajjar are being followed while scheduling at NRLDC. Since Jhajjar is having higher variable cost, requisition of power from beneficiaries changes frequently and accordingly schedule is being given to them. OCC suggested that if issues are coming up in machines within these ramp up/down limits, they shall take up matter with OEM and CERC.

21.3. It was decided that APCPL and CLP India will share requisite data in respect of schedule revisions for the months of March, April and May (upto 15th) 2019 in the next OCC meeting for deliberation.

21.4. In the 159th OCC meeting, APCPL and CLP India had share requisite data in respect of schedule revisions for the months of March, April and May (up to 15th) 2019. APCPL informed that the unit was shut down in the month of March so they have given the data from February. They have shown that in 8th May only one unit was running and scheduling was -47, +47, +50, -50, +39, and 39 in consecutive time blocks and similar instances happened on 5th May and more. As per the regulation, ramp up rate shall be 1% per minute and for Jhajhar 75 MW per time block (average 37.5 MW per time block). MS, NRPC requested NRLDC to look in to the matter so that frequent ramp up and down may be avoided.

22. Shifting of RLDC's declared peak hours (Agenda by UPSLDC)

22.1. UP representative stated that use of hydro generation for peaking is done by NRLDC based on peak hours declaration. The peak timing declared by NRLDC for Northern region as a whole is different from peak hours of UP. NRLDC representative stated that the issue has been previously deliberated in 156th OCC meeting and it was agreed that for better system operation ISGS hydro scheduling is to be done on regional peak hours requirement with consent of all beneficiaries.

In every OCC meeting, NRLDC is presenting demand curve of Northern region and states as well. Thus, if forum decides the change in peak hours, then same would definitely be incorporated.

22.2. MS, NRPC stated that NRLDC may look after Northern region as a whole and decide peak hours accordingly and the same could not be done state-wise. MS, NRPC stated that NRLDC shall make sure that request of states is taken into consideration upto best possible extent and peaking hours are rationalized to maximum extent. Further, it was decided that NRLDC will present the monthly load curves of states and region as a whole and same may be deliberated in the next OCC meeting so that all constituents, in consensus, may take a decision on the matter.

22.3. In the 159th OCC meeting, NRLDC presented the monthly load curves of states and region and informed that peak period is considered as 18.00 hrs to 21.00 hrs. Considering all the states in northern region, NRLDC is computing the peak and it is getting revised in every 15 days. UP SLDC informed that this revision was earlier done on 3 months' basis so they requested that the revision shall be done on 15 days. Now the peak timing declared by NRLDC of Northern region is getting revised in 15 days, so there is no problem. Further, June peak hour is declared at NRLDC website and agenda is resolved.

23. Scheduling issues with APCPL Jhajjar (Agenda by Delhi and Haryana)

A meeting was conducted on 14.05.2019 forenoon. The minutes of meeting is uploaded on NRPC website and also attached as **Annexure-VII.**

24. Agenda by NTPC-NRHQ

24.1 NTPC requested that RRAS UP, RRAS DOWN and NET DC parameter may be included in .csv file, available under tab scheduling summary (which can be downloaded in auto to run ABT software). In this regard, NRLDC replied that RRAS up and down information is already given in .xml file and purpose of .csv file is to operate in real time and not to be used for accounting purpose. In NRLDC site under schedule detail, .xml file is given and all the details are available in this file.

24.2 **Requirement of MRI's for Singrauli**

In the meeting, it was decided that the matter shall be deliberated in the Commercial Sub-Committee Meeting to be held on 21.05.2019.

1. Reliability issues in the grid: Summer 2019

NRLDC representatives shared the import capability (TTC) of each sates of Northern region for summer scenario 2019. The TTC/ATC assessment has been carried out as per the data available at NRLDC. TTC/ATC computation largely depend upon the network topology, load generation scenario, seasonal variation etc. All the factors are time dependent and therefore TTC/ATC computation vary with change in season/load generation scenarios etc. In view of above, NRLDC has been suggesting to all SLDC to compute their state control area TTC on regular basis and shared with NRLDC for further feedback. The same has been discussed in regular OCC / TCC meetings and still most of the states are not assessing their state control area TTC as per CERC procedure.

At present, states i.e. Punjab, Uttar Pradesh, Delhi are computing TTC/ATC based on requirement and other states of NR has not yet started. Large states like Rajasthan, Haryana has started coordinating in basecase exchanges however, study result yet to be received from these states.

As per network information available at NRLDC, TTC/ATC of following states are assessed as:

State	TTC/ATC by SLDC	TTC/ATC by NRLDC	Action decision in 159th OCC
Punjab	TTC: 7600 MW and ATC: 7000 MW	TTC:6800 ATC: 6200 MW. Major constraints observed at 400kV Amritsar, Rajpura, Muktsar ICTs	OCC advised SLDC, Punjab to make the action plan for load management at Amritsar, Rajpura, Muktsar ICTs during high demand period and ensure grid security and reliability during high import from the grid. In addition, it was advised to keep the 220kv generation in service/high to limit the various 220kv overloaded lines and voltages.
Haryana	Data base exchange only TTC: 7900 MW and ATC: 7300 MW	TTC: 7500 MW and ATC: 6900 MW. Major constraints observed at 400kV Deepalpur, Panipat ICTs and 220kV lines from Hisar, Lula ahir, Abdullapur etc. are heavily loaded	MS, NRPC advised to share the study report to SLDC, Haryana with likely constraints observed. NRLDC informed that basecase & study report has already been shared to Haryana and regularly in OCC and TCC meeting also. It was decided that TTC/ATC basecase & study would be shared to Haryana SLDC once again and SLDC would submit its feedback to NRLDC/NRPC. It was further discussed that SLDC, Haryana may also explore SPS for 400/220kV ICTs wherein N-1 non-compliance is being observed to avoid cascade tripping in case of overloading. Switchgear issue at 400kV Dhanoda, Nawada has also been raised for which a separate meeting has been decided on 23rd May 2019.
Rajasthan	Data base exchange only	TTC: 6500 MW and ATC: 5900 MW N-1 non-compliance at 765/400kV Phagi, 400/220kV Jodhpur, Akal and Bhadla ICTs. Constraint for	SLDC Rajasthan was also requested to co-ordinate the TTC assessment studies and share with NRLDC. In view of large renewable penetration in Rajasthan control area, it is very important to highlight the issues regarding N-1 compliances, reactive power support etc. for reliable evacuation of such large renewable energy. In addition, SPS for Kawai-Kalisindh-Chhanbra-Chhabra TPS is awaited for review in light of commissioning of Chhabra supercritical. NRLDC has

		evacuation of power from Rajwest.	shared their feedback to Rajasthan SPS study and final revised study is yet to be submitted by SLDC, Rajasthan for further feedback. SLDC Rajasthan informed that they are co-ordinating studies with planning & generators and would submit the final study as soon as possible.
Delhi	TTC: 6800 MW	TTC: 6800 MW & ATC: 6500 MW. Major constraints at Mundka & HarshVihar ICTs.	NRLDC showed the SCADA data plot of Mundka ICTs for Apr-May'19 which indicates that Mundka ICTs has already touched ~ 700 MW (N-1 limit) at import of ~ 5000 MW and therefore, SLDC delhi requested to monitor and manage the load nearby this node. Delhi SLDC representative also agreed with TTC/ATC fig and Constraints observed. SLDC, Delhi apprised that local load would be managed near Mundka ICTs. SLDC Delhi was requested to expedite the revival of 400kV Bamnauli-Tughlakabd D/C lines on normal towers which are in service through ERS. SLDC, Delhi shared that same would be normalized soon.
Uttar Pradesh	TTC > 12500 MW	TTC: 12700 & ATC: 12100 MW at UP gen of 10700 MW	Uttar-Pradesh shared the network changes at 132Kv,220Kv, 400Kv in April'19. NRLDC has incorporated major network change and preliminary study showed the import capability ~ 12700 MW at UP generation of 10700 MW. Uttar Pradesh import capability largely depends on generation mix at 220Kv & 400kv and load distribution across east, central and western UP. Major constraints observed at Agra, Mau, Sarnath, various 220kv lines etc. UP advised to keep internal generation high in view of higher demand anticipated in NR as whole and check the 220kV level generation to regulate the voltage and loading of 220kv lines. UP also assessed its TTC in same range and SLDC representatives asked to share their feedback on NRLDC study. SLDC, UP informed that TTC/ATC is in line with NRLDC fig and major constraints would be taken care by local load management. In addition, UP informed that Sarnath ICT (500 MVA ICT got burnt in April) would replace by 315 MVA and Aligarh 500 MVA augmentation by May'19 end.
Uttarakhand	NA	TTC: 1650 MW & ATC: 1500 MW	No feedback from SLDC, Uttarakhand
Himachal Pradesh	Co-ordinated once for data exchange only.	TTC: 1000 MW & ATC: 850 MW	No feedback from SLDC, HP

Recently, TTC/ATC study has been received from Punjab, Uttar Pradesh and Delhi state control area in which basecase & study report has been shared exclusively by planning/STU officers. It was requested to please co-ordinate with respective SLDCs and all the TTC/ATC assessment studies and basecase shall be communicated through SLDCs. As per CERC procedure, State Load Despatch Centre (SLDC) shall assess the Total Transfer Capability (TTC), Transmission Reliability Margin (TRM) and Available Transfer Capability (ATC) on its inter-State transmission corridor considering the meshed intra-State corridors for exchange (import/ export) of power with inter-State Transmission System (ISTS). These figures along with the data considered for assessment of TTC would be forwarded to the respective RLDC for assessment of TTC at the regional level. The details of

anticipated transmission constraints in the intra State system shall also be indicated separately.

OCC requested to all states to co-ordinate TTC/ATC studies with SLDC and SLDC shall communicate with RLDC. All user agreed for same.

2. Reactive power performance in the grid

a. Reactive power performance of generators

SCADA plot of MVAr Vs Voltage for major thermal/gas generating stations for April'19 (enclosed as Annex-I) was presented to check the reactive power response as per declared capability curve limit. These plots have been sharing in OCC on regular basis to share the dynamic response of generating units, telemetry discrepancies, other issues etc. It has been observed that after lots of discussion and persuasion, dynamic response & its monitoring for generating units still need lots of improvements.

Major issues reported/observed are as:

a. Voltage reference point (At what voltage the generating units should start absorbing/generating MVAr)
b. Telemetry of MVAr of generating units, Sign of MVAr, Voltage at bus, Data mismatch between local station and NRLDC SCADA, etc.
c. Poor response by generating units if compare with capability curves
d. Methodology for mapping dynamic response of generating station.

MS, NRPC suggested that to resolve these issues, one to one monitoring of each generating station is necessary. It was deliberated that issues at each station is different and therefore it should be monitored one to one in co-ordination with generating station personnel. it was decided that each month three major generating station would be chosen by OCC to monitored closely. All the issues related to these stations in respect of MVAr response & its monitoring would be coordinated by respective agencies, state control area & RLDC. The same would be shared in forthcoming OCC meeting for feedback. All the user agreed for this and three generating station for the May-Jun'19 chosen as **Bara TPS, Anpara-C and Anpara-D** in Uttar Pradesh control area. Generating agencies & Uttar Pradesh state control area are requested to co-ordinate with each other to resolve all the issues pertaining to monitoring & response of these generating stations. It is requested to kindly informed RLDC as well for action plan and for any further assistance in this direction.

b. Reactive Power injection at ISTS nodes:

NRLDC representative shared that in view of identifying locations where actually MVAR support is required, OCC decided to gather the information in a format shared in 144th

OCC and all the states were requested to provide that details. Such information & location would also help for planning new capacitor and reactor in the system.

As we all are aware that nodes wherein states are paying reactive energy charges as per NRPC publishes REA account every week indicating the nodes that are injecting/absorbing MVAr into the Grid under high/low voltages respectively. Based on this information, States has to ascertained these locations in given format which would help in better and more efficient utilization of resources. States were requested to provide progress on the same though the same is still awaited. MS, NRPC suggested to all states to revisit the format once and fill all the details and submit to NRLDC/NRPC. States were agreed to furnish the details and share it with NRPC/NRLDC as soon as possible.

c. Tap optimization exercise in Northern region

NRLDC shared that tap optimization study at 765/400 and 400/220kv is being done at NLDC/RLDC level. Such tap optimization study is based on simulation studies, historical data, NRPC Reactive energy account, SCADA data based scatter plots etc. It has been experienced that even after tap optimization at 400/220kv level, 220kV and below voltage nodes experiences voltage outside the specified limits. For this, it has been requesting in regular OCC/TCC meeting that such tap optimization shall be carried out at 220/132kv by state control area agencies/SLDCs. Though, SLDC has not yet reported any such studies and action plan for their state control area.

OCC requested that voltage regulation is very important for grid stability and every efforts and resources should be optimized for better utilization. It was again emphasized that states should alert and carry out such exercise to maintain the voltage at 220kv and below system. It is also important to monitor lower voltage level and action plan especially in view of large demand period in every state.

3. Demand and Generation projections of Q2 2019-20 for POC charges calculation

In line with CERC sharing of ISTS charges and losses regulation 2010 and subsequent amendments thereof, all the DICs have to submit the data for new transmission assets, Yearly transmission charges (YTC), forecast injection and withdrawal and node wise injection/withdrawal data to implementing agency for computation of PoC charges and losses for the application period. The format for data submission is available on NLDC website at https://posoco.in/transmission-pricing/formats-for-data-submission/.

NRLDC vide its letter dated 05.04.2019 had requested utilities to furnish Technical and commercial data for Jul'18-Sep'18 Q2 (2019-2020) by 15th April 2019. Details have been received only from HP, Delhi, NTPC, NHPC, BBMB, SJVN & NAPS. Other utilities are also requested to submit data as early as possible.

Further, generation and load projection done by NLDC/RLDCs based on monthly maximum injection/demand met in the last 3 years from actual metered data and accordingly projections were shown and discussed (enclosed in Annex-II).

MS, NRPC requested the users to kindly verify the load-generation figures as projected by NLDC. It was suggested that they may share their feedback through email also as early as possible. Feedback received during meeting is enclosed in Annex-II.

4. Long outage of hydro generating units

NRLDC informed that several hydro units of NHPC, BBMB such as Bairasuil, Kishanganga, Dehar, Pong, Bhakra (left), Kishenganga etc. are out since long duration. Details are attached as **Annexure-3.** Outage of units such as two units at Kishenganga is resulting in spillage of water. NHPC informed that Bairasiul two units would revive by Jun'19 end, Kishenganga units to revive as early as possible though the tentative dates are not available. BBMB informed that Bhakra-L one units would be in service by 31st May 2019 and Pong units by Jul'19. THDC shared that Tehri Unit#3 has some issues and it would revive by May'19 end.

It is well known that hydro generation in NR is high from April to Sep every year. In view of high hydro season and high demand expected in coming months, it is requested to kindly expedite revival of all central sector as well as state sector units (especially hydro) which are under outage. All agreed to revive the hydro units as early as possible.

5. Updation of documents in line with Indian Electricity Grid Code (IEGC):

NRLDC informed that NRLDC is updating the document, "Important grid element of Northern region", "Operating procedure of Northern region" and "Power Maps of Northern region and related information" and same has also been discussed in 158th OCC meeting also. Important Grid element and operating procedures are available at NRLDC website and power maps has been e-mailed to respective utilities. Feedback from POWERGRID and Delhi in respect of important grid elements and power maps of NR has been received.

NRLDC emphasized that Operating procedure of Northern region is an important document and comprises all the procedure, standards etc. in line with various regulation/order of CERC, CEA and decision in various fora. This operating procedure is applicable to all the user and therefore all are requested to go through the documents and share their feedback.

Based on feedback received, incorporating amended regulation/orders & decision in various OCC/TCC, draft operating procedure would be shared in forthcoming OCC meeting for further deliberation.
In addition, as per Indian Electricity Grid Code (IEGC), in respect of demand control, all efforts must be made to avoid situation of low frequency. The chapter on demand estimation and control may be referred for this purpose. Hon'ble CERC in its order in petition no 125/MP/2012 also directed to have the list of radial feeders which can be opened on the directions of NRLDC to regulate the demand. List of such radial feeders has been provided by respective utilities and is part of 'Operating Procedure of Northern Region' (attached as Annexure in 158th OCC and annex in operating procedure available at NRLDC website at https://nrldc.in/download/operating-procedures-of-northern-region-july-2018/?wpdmdl=5125).

As highlighted in previous meeting, in view of continuous network change and high demand period during summer, it is desirable to have updated list of feeders. Thus, each state control area was requested to update the information of feeders that can be used for demand regulation by NRLDC (in addition to action by SLDC). Following are the attributes for such feeders:

- Feeders shall be radial in nature
- Usually shall have substantial load flow so that effective change can be experienced on opening of such lines.

NRLDC representative further informed that Power Map also to be updated till the month of June-2019 and requested all the concerned utility to kindly share the feedback in desired format. SLDCs/STU were suggested to update the respective Power Map in each quarter and share the feedback on quarterly basis. Apart from above, NRLDC representative suggested to renewable rich state specially Rajasthan, Uttar Pradesh, Punjab and Haryana to prepare separate Power Map containing information regarding renewable generators and its connectivity (33kV and above).

Till date, data has been received from Haryana only. OCC requested other to expedite the update on same. Some states highlighted that as the transmission system has been expanded and overloading of EHV lines observed to be very less, list of such feeder has no significance. It was discussed that locating a radial feeder at 400kv level is also difficult. In view of such apprehension, MS, NRPC explained that these feeder list is as per recommendation of Grid disturbance enquiry committee and operation of such feeder would be very rare. Still, in case of emergency, we should have sorted such feeder which can be open to regulate the demand as system requires. All states agreed to update on same as soon as possible.

6. Frequent forced outages of transmission elements

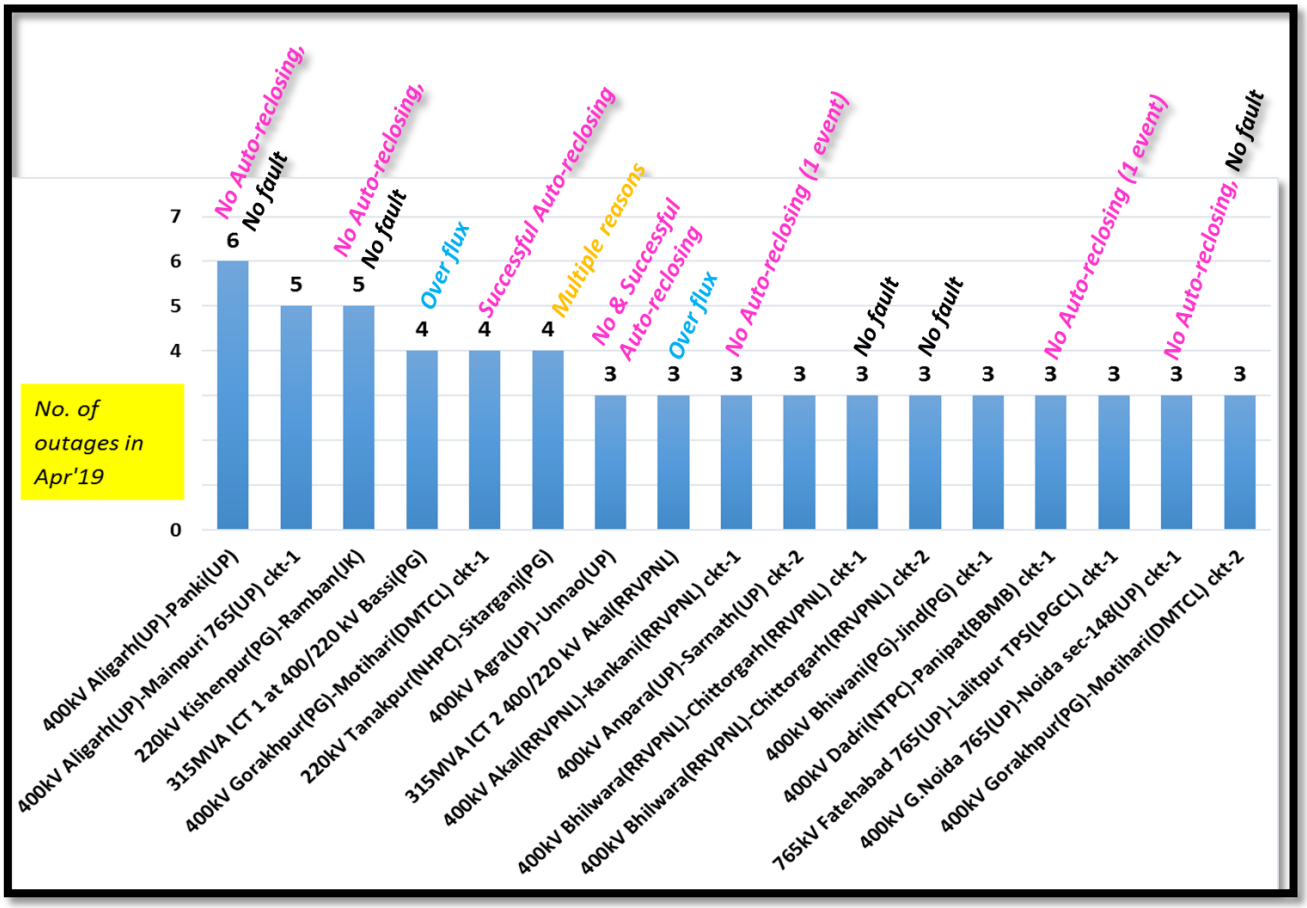
The following transmission elements were frequently under forced outages during the month of **Apr'19**:

S. NO.	Element Name	No. of forced outages	Utility/SLDC
1	400kV Aligarh(UP)-Panki(UP)	6	Uttar Pradesh
2	400kV Aligarh(UP)-Mainpuri 765(UP) ckt-1	5	Uttar Pradesh
3	220kV Kishenpur(PG)-Ramban(JK)	5	J&K/POWERGRID
4	315MVA ICT 1 at 400/220 kV Bassi(PG)	4	POWERGRID
5	400kV Gorakhpur(PG)-Motihari(DMTCL) ckt-1	4	POWERGRID
6	220kV Tanakpur(NHPC)-Sitarganj(PG)	4	NHPC/POWERGRID
7	400kV Agra(UP)-Unnao(UP)	3	Uttar Pradesh
8	315MVA ICT 2 400/220 kV Akal(RRVPNL)	3	Rajasthan
9	400kV Akal(RRVPNL)-Kankani(RRVPNL) ckt-1	3	Rajasthan
10	400kV Anpara(UP)-Sarnath(UP) ckt-2	3	Uttar Pradesh
11	400kV Bhilwara(RRVPNL)-Chittorgarh(RRVPNL) ckt-1	3	Rajasthan

12	400kV Bhilwara(RRVPNL)-Chittorgarh(RRVPNL) ckt-2	3	Rajasthan
13	400kV Bhiwani(PG)-Jind(PG) ckt-1	3	POWERGRID
14	400kV Dadri(NTPC)-Panipat(BBMB) ckt-1	3	POWERGRID/NTPC/BBMB
15	765kV Fatehabad 765(UP)-Lalitpur TPS(LPGCL) ckt-1	3	Uttar Pradesh
16	400kV G.Noida 765(UP)-Noida sec-148(UP) ckt-1	3	Uttar Pradesh
17	400kV Gorakhpur(PG)-Motihari(DMTCL) ckt-2	3	POWERGRID
18	132kV Mahendranagar(Nepal)-Tanakpur(NHPC)	3	NHPC/POWERGRID
19	315MVA ICT 1 at 400/220 kV Obra TPS(UP)	3	Uttar Pradesh
20	400kV Ratangarh(RRVPNL)-Suratgarh(RRVPNL) ckt-2	3	Rajasthan
21	500kV HVDC Vindhyachal(PG) BtB Block 1	3	POWERGRID

The complete details are attached at **Annexure-4** of the Agenda**.** Frequent outages of such elements affect the reliability and security of the grid. Hence, utilities are requested to look into such frequent outages and share the remedial measures taken/being taken in this respect.

Complete status and major cause of tripping is show below in bar graph:



The following were the discussion on the trippings:

- UPPTCL representative informed that STU representative didn't attend the meeting. This issue needs to be addressed at NRPC level.
- NRPC suggested SLDCs to take up the issue with STU internally also and submit the DR/EL, report along with remedial measures report in time bound manner.
- Rajasthan representative informed the following
    - 315MVA ICT-2 at Akal station tripped due to sensitive over flux setting of ICT. It has been revised.
    - 400 kV Akal-Kankani is new line and there are trees in the line. Complete patrolling is still pending from the company thatswhy line tripped multiple times. Auto reclosure issue will be addressed within 3 days.
    - 400 kV Bhilwara-Chittorgarh ckt-1 & 2 tripped due to tree touching. Tree has been trimmed. Time synchronization of DR/EL of both end of 400 kV Bhilwara-Chittorgarh ckts will be checked within 7days.
    - Remedial measures report of all the tripping discussed during last 9 OCC meeting will be shared within 7days.

- POWERGRID representative informed that, 400 kV Gorakhpur-Motihari ckts tripped due to frequent fault in Bihar section or at Motihari (GIS). NRPC further suggested POWERGRID to collect the information from its own end and counterpart, share the details to RPC/ RLDC.
- NRPC 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. NRPC also suggested NRLDC to prepare separate online portal for data submission and share the login, password to each utilities.
- NRPC representative further stated that writing of too much letter is not a feasible solution for real time operators and each entity shall proactively take action for system improvement.

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

NRPC raised serious concern for submission of details to NRPC and suggested all the SLDCs to compile the information and share the report of last ten month tripping and remedial measures taken by all the utilities for mitigation of such multiple times tripping incidents. Members agreed for the same. All the remedial measures report needs to be submitted within 7days. Each utility shall make presentation on remedial measures taken and pending. For pending measures, time frame also needs to be submitted by each utility.

7. Multiple element tripping events in Northern region in the month of Apr'19:

A total of **20** grid events occurred in the month of Apr'19 of which **11** 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 02-May-19 is attached at **Annexure-5** of the Agenda**.**

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

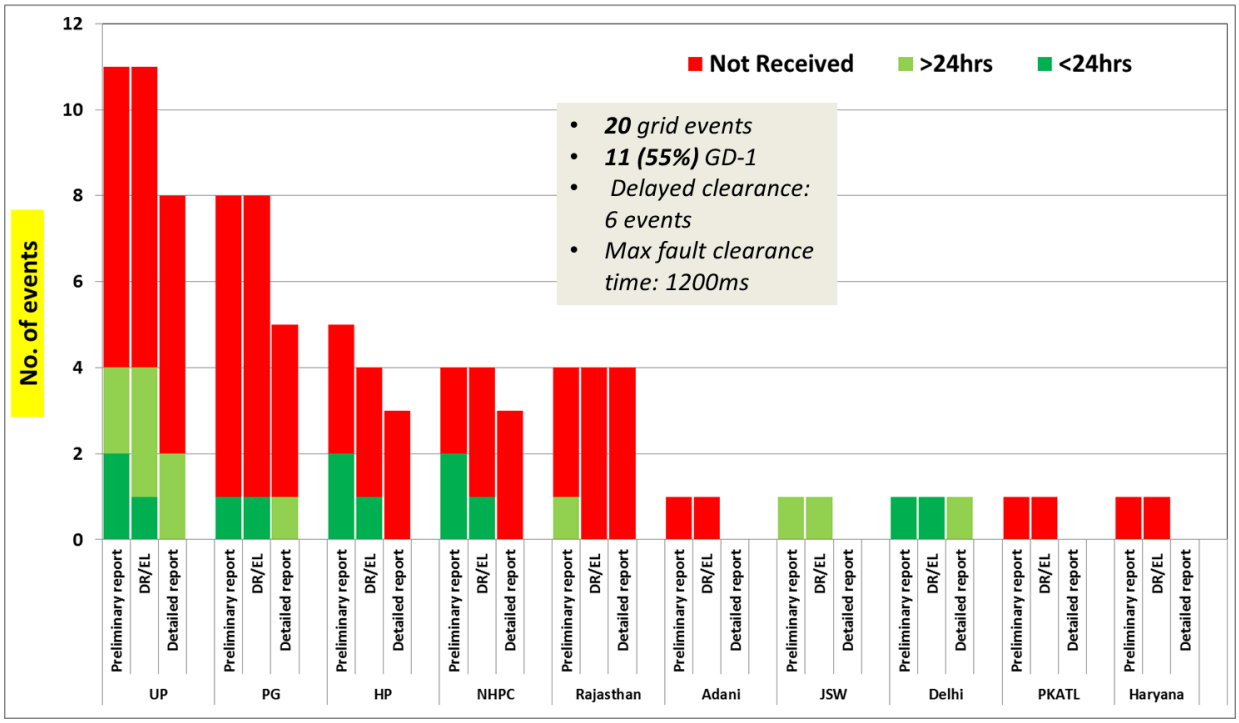
Maximum Fault Duration is **1200ms** in the event of tripping at Bawana (DTL) on 04-Apr-19 at 12:04hrs.

DTL representative informed that delayed clearance of fault was due to non-operation of breaker of 220 kV Bawana-Kanjhawala ckt-1 at Bawana end during operation of distance protection. LBB protection was also out of service due to retrofitment work of bus bar protection. Finally, fault cleared through back up over current earth fault protection of 400 kV side of 400/220 kV ICTs at Bawana (DTL).

Delayed clearance of fault (more than 100ms for 400kV and 160ms for 220kV system) observed in total **6** events out of 20 grid events occurred in the month.

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

Note: *Details received by 02-May-19 are considered*



NRLDC representative once again clarified that detailed report in approved format will be considered as a detailed report. Detailed report format once again attached as Annexure- for the kind perusal of the members.

NRLDC representative further stated that NRLDC IT team is working on development of online portal for all the constituents of NR, in the meantime Preliminary Report of each multiple element tripping is available at the link- https://nrldc.in/reports/preliminary-report/ on NRLDC website in public domain.

PMU plot based analysis is part of Preliminary Report. Each utility can go through this link regularly and send the details accordingly.

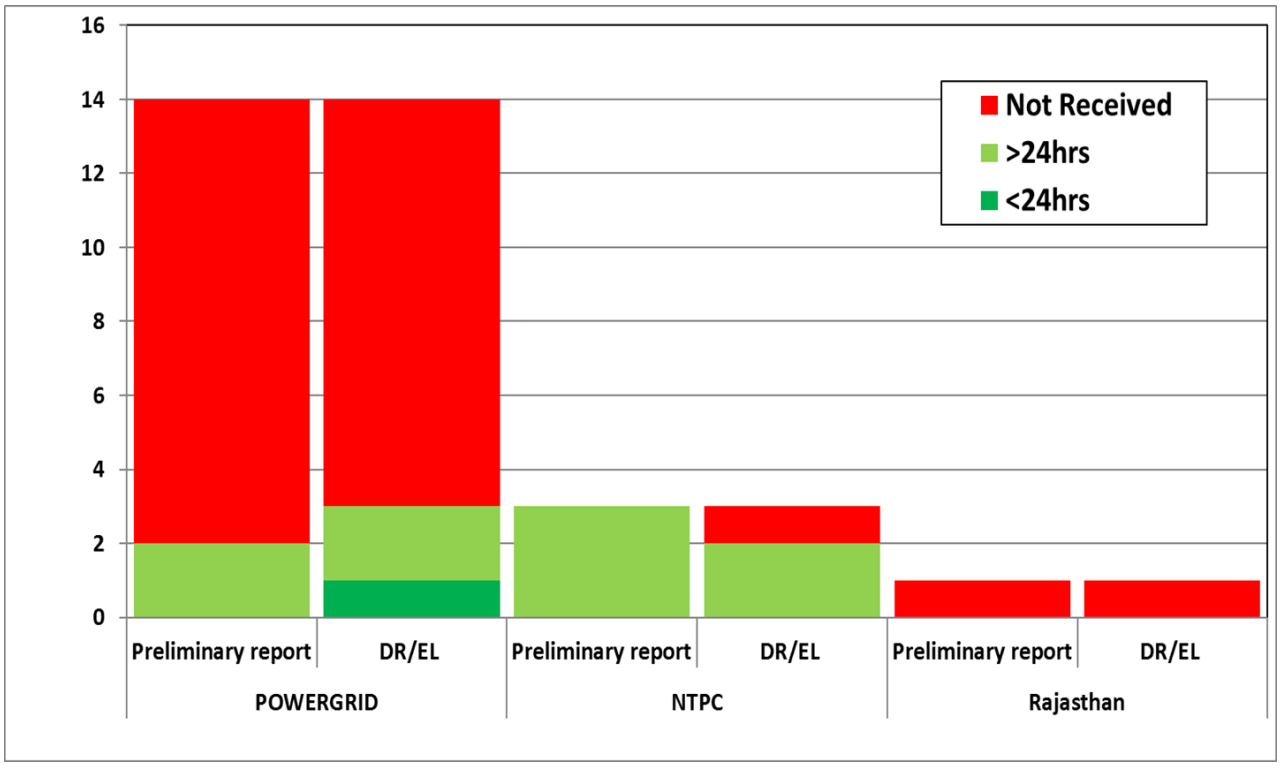
NRLDC representative once again requested to all the NR utilities to kindly calculate the energy loss in the incident and share the information to NRPC/ NRLDC in its detailed report.

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.

8. Details of tripping of Inter-Regional lines from Northern Region for Apr'19:

A total of **18** inter-regional lines tripping occurred in the month of Apr'19. The list is attached at **Annexure-6** 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.

POWERGRID representative agreed to share the DR/EL of all the Inter-Regional tripping within stipulated time period of 24hrs and also share the remedial measures report.

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

9. Frequency response characteristic:

Three FRC based event has occurred in the month of **Apr-2019**. Description of the events is as given below:

Table:

S. No.	Event Date	Time (in hrs)	Event Description	Starting Frequency (in Hz)	End Frequency (in Hz)	*Δf*
1	11-Apr-19	13:02hrs	HVDC Talcher-Kolar Pole-I got blocked due to emergency switch off signal from Kolar end triggering SPS. Load loss of 1123 MW took place in southern region and generation loss of 225 MW in eastern region as per SCADA data. The generation relief in aforesaid units was on account of ramp down which took place in span of minutes, so delta P considered in FRC calculation is of load relief quantum in southern region.	50.066	50.120	0.054
2	12-Apr-19	15:25hrs	Chandrapur-Bhadrawathi-4, Chandrapur-Chandrapur-1 & 2, Chandrapur U#8 & 9, Dhariwal CTU and STU Unit tripped resulting in 1500 MW generation loss.	49.907	49.812	-0.095
3	12-Apr-19	23:55hrs	400kV Teesta III-Kishanganj tripped on R-Y-N Fault. As a result around 1865 MW generation of the entire complex started to flow through 400 KV Rangpo-Kishanganj S/C which tripped on overload (Back –up overcurrent with each phase current of 4000 amps) and resulted in loss of generation of around 1900 MW.	50.017	49.928	-0.089

The Hon'ble CERC approved procedure has already been shared with all concerned during previous OCC meetings. FRC observed for each state control area for the events is tabulated below:

States	Talchar-Kolar Event	Chandrapur Event	Sikkhim Event	Remarks
PUNJAB	64%	4%	19%	
HARYANA	53%	13%	-60%	
RAJASTHAN	25%	8%	1%	
DELHI	-90%	4%	-60%	
UTTAR PRADESH	13%	5%	-8%	
UTTARAKHAND	8%	-40%	18%	
CHANDIGARH	-16%	79%	268%	Small Control area
HIMACHAL PRADESH	-49%	12%	-7%	
JAMMU & KASHMIR	-69%	-30%	47%	
NR	28%	9%	20%	

FRC calculation of ISGS stations based on NRLDC SCADA data is tabulated below:

Generator	Talchar-Kolar Event	Chandrapur Event	Sikkhim Event	Generator	Talchar-Kolar Event	Chandrapur Even	Sikkhim Event
Singrauli TPS	125%	17%	28%	Salal HEP	42%	11%	19%
Rihand-1 TPS	129%	-8%	41%	Tanakpur HEP	-2%	8%	9%
Rihand-2 TPS	57%	3%	38%	Uri-1 HEP	0%	2%	-3%
Rihand-3 TPS	25%	20%	18%	Uri-2 HEP	0%	0%	0%
Dadri-1 TPS	154%	4%	19%	Dhauliganga HEP	0%	39%	20%
Dadri -2 TPS	230%	14%	102%	Dulhasti HEP	167%	114%	50%
Unchahar TPS	0%	0%	0%	Sewa-II HEP	182%	0%	0%
Unchahar stg-4 TPS	-85%	30%	-7%	Parbati-3 HEP	193%	Suspected SCADA Data	Suspected SCADA Data
Jhajjar TPS	Increase in schedule	78%	114%	Jhakri HEP	171%	67%	Decrease in
Dadri GPS	-33%	0%	-11%	Rampur HEP	Decrease in schedule	243%	410%
Anta GPS	No generation	No generation	No generation	Tehri HEP	No generation	0%	-2%
Auraiya GPS	No generation	No generation	No generation	Koteswar HEP	141%	0%	0%
Narora APS	24%	-19%	16%	Karcham HEP	144%	34%	91%
RAPS-B	-17%	3%	13%	Malana-2 HEP	No generation	No generation	No generation
RAPS-C	13%	2%	16%	Budhil HEP	26%	No generation	No generation
Chamera-1 HEP	4%	3%	2%	Bhakra HEP	3%	1%	0%
Chamera-2 HEP	-5%	0%	52%	Dehar HEP	17%	3%	0%
Chamera-3 HEP	0%	0%	0%	Pong HEP	No generation	No generation	No generation
Bairasiul HEP	No generation	No generation	No generation	Koldam HEP	No generation	No generation	20%
				AD Hydro HEP	No generation	0%	241%

FRC calculation of major state generators based on NRLDC SCADA data is tabulated below:

Generator	Talchar-Kolar Event	Chandrapur Event	Sikkhim Event	Generator	Talchar-Kolar Event	Chandrapur Event	Sikkhim Event
PUNJAB				**UP**			
Ropar TPS	No generation	No generation	No generation	Obra TPS	39%	14%	14%
L.Mohabbat TPS	131%	-1%	36%	Harduaganj TPS	150%	4%	2%
Rajpura TPS	93%	-12%	47%	Paricha TPS	No generation	No generation	No generation
T.Sabo TPS	278%	16%	0%	Rosa TPS	Suspect SCADA data	-3%	-3%
Goindwal Sahib TPS	245%	25%	43%	Anpara TPS	-4%	-6%	-1%
Ranjit Sagar HEP	25%	18%	7%	Anpara C TPS	0%	-3%	22%
Anandpur Sahib HEP	No generation	No generation	No generation	Anpara D TPS	12%	8%	6%
HARYANA				Bara TPS	52%	6%	1%
Panipat TPS	-19%	10%	0%	Lalitpur TPS	0%	3%	0%
Khedar TPS	No generation	No generation	No generation	Meja TPS	No generation	No generation	No generation
Yamuna Nagar TPS	No generation	No generation	No generation	Vishnuprayag HEP	0%	0%	0%
CLP Jhajjar TPS	11%	7%	2%	Alaknanda HEP	87%	1%	19%
Faridabad GPS	No generation	No generation	No generation	Rihand HEP	No generation	No generation	1%
RAJASTHAN				Obra HEP	No generation	8%	-2%
Kota TPS	59%	-1%	10%	**UTTARAKHAND**			
Suratgarh TPS	153%	0%	-16%	Gamma Infra GPS	11%	13%	42%
Kalisindh TPS	64%	-9%	No generation	Shravanti GPS	-4%	-1%	14%
Chhabra TPS	No generation	No generation	No generation	Ramganga HEP	Suspect SCADA data	Suspected SCADA data	Suspected SCADA data
Chhabra stg-2 TPS	22%	-19%	49%	Chibra HEP	4%	Suspected SCADA	-1%
Kawai TPS	42%	27%	47%	Khodri HEP	No generation	No generation	No generation
Dholpur GPS	No generation	No generation	No generation	Chilla HEP	6%	Suspected SCADA	1%
Mahi-1 HEP	No generation	No generation	No generation	**HP**			
Mahi-2 HEP	No generation	No generation	No generation	Baspa HEP	-11%	-4%	-3%
RPS HEP	No generation	No generation	No generation	Malana HEP	-4%	2%	2%
JS HEP	No generation	No generation	No generation	Sainj HEP	Suspect SCADA data	No generation	No generation
DELHI				Larji HEP	Suspect SCADA data	Suspect SCADA data	Suspect SCADA
Badarpur TPS	No generation	No generation	No generation	Bhabha HEP	54%	21%	8%
Bawana GPS	-11%	0%	34%	Giri HEP	Suspect SCADA data	0%	32%
Pragati GPS	-11%	-8%	-4%	**J&K**			
				Baglihar-1&2 HEP	-5%	0%	3%
				Lower Jhelum HEP	No generation	No generation	No generation

In line with the decisions taken during various OCC meetings, the time and date of the FRC events were e-mailed to respective utilities. Constituents may submit the FRC of their control areas for both the events and reason of poor response, if observed.

Details received from Delhi:

11-Apr-19 Talcher-Kolar event

Delhi Control area response: -115%(SLDC), -90%(NRLDC)
CCGT Bawana: -7%(SLDC), -11%(NRLDC)
Pragati: -17%(SLDC), -11%(NRLDC)

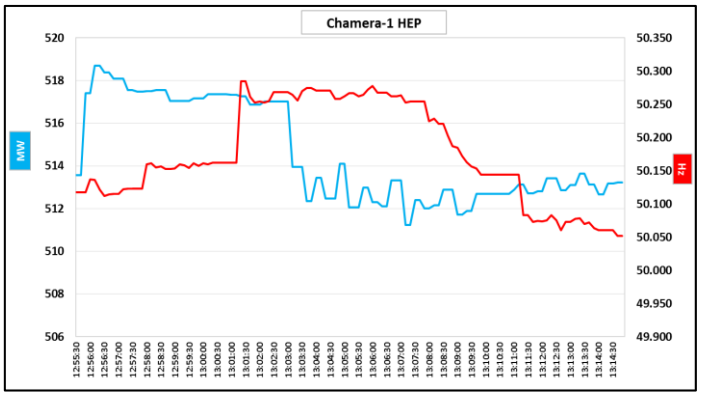
12-Apr-19 Sikkim event

Delhi Control area response: 48%(SLDC), -60%(NRLDC)
CCGT Bawana: -22%(SLDC), 34%(NRLDC)
Pragati: -11%(SLDC), -4%(NRLDC),

Details received from NHPC:

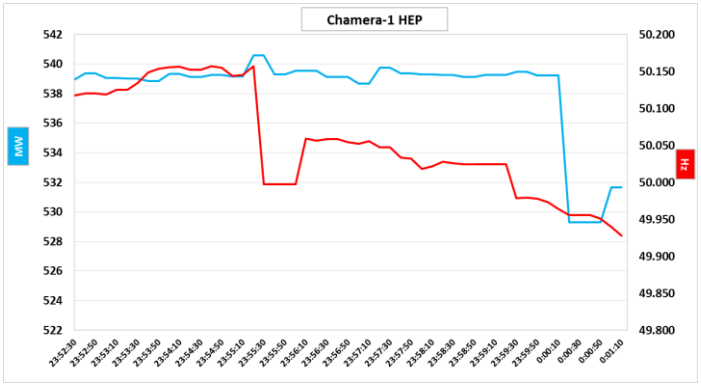
11-Apr-19 Talcher-Kolar event

Chamera-1: 80% (NHPC), 4%(NRLDC)
Chamera-3: 45% (NHPC), 0% (NRLDC)
No response from **Dhauliganga** observed



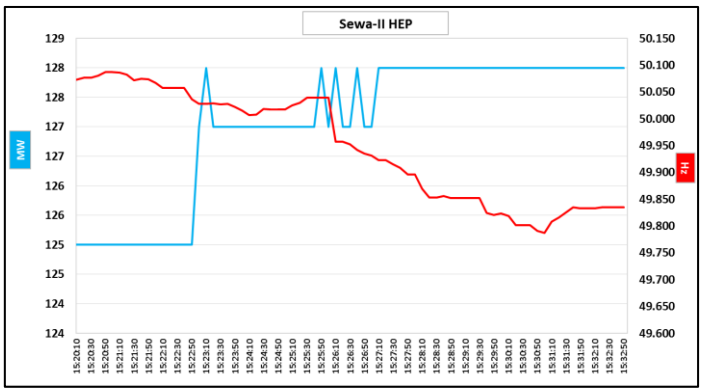
12-Apr-19 Sikkim event

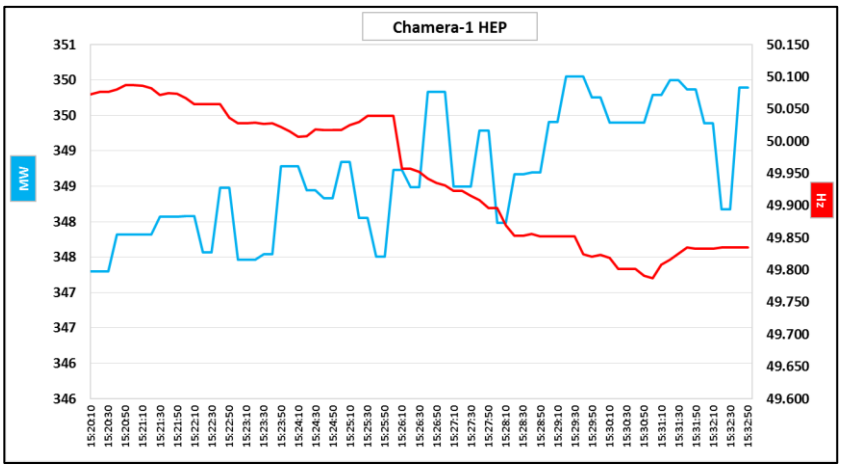
Chamera-1: 29% (NHPC), 2%(NRLDC)
Chamera-3: 13% (NHPC), 0% (NRLDC)
Sewa-2: 13% (NHPC), 0% (NRLDC)



12-Apr-19 Chandrapur event

Chamera-1: 43% (NHPC), 3%(NRLDC)
Chamera-3: 7% (NHPC), 0% (NRLDC)
Sewa-2: 7% (NHPC), 0% (NRLDC)





Details received from UPPTCL:

11 Apr 2019 (Talcher-Kolar event)

Sr No	Particulars	Dimension	ANPARA-A (3X210MW)	ANPARA-B (2X500MW)	ANPARA-D (2X500MW)	OBRA-B (5X200MW)	PARICHHA-B (2X210MW)	PARICHHA-C (2X250MW)	HARDUAGANJ(2X250MW)	LALITPUR (3X660MW)	BARA (3X660MW)
1	Actual net interchange immediately before the disturbance	MW	524.413	884.627	958.040	243.484	0.003	0.000	380.707	692.876	696.733
2	Actual net interchange immediately after the disturbance	MW	524.275	885.845	955.486	241.288	0.003	0.000	361.737	692.876	689.133
3	Change in Net Interchange (2 - 1)	MW	-0.138	1.218	-2.554	-2.195	0.000	0.000	-18.970	0.000	-7.600
4	Generation Loss (+) / Load Throw off (-) during the Event	MW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	Control Area Response (4-3) (ΔP)	MW	0.138	-1.218	2.554	2.195	0.000	0.000	18.970	0.000	7.600
6	*Frequency before the Event*	*HZ*	*50.032*	*50.032*	*50.032*	*50.032*	*50.032*	*50.032*	*50.032*	*50.032*	*50.032*
7	*Frequency after the Event*	*HZ*	*50.120*	*50.120*	*50.120*	*50.120*	*50.120*	*50.120*	*50.120*	*50.120*	*50.120*
8	*Change in Frequency (7-6)*	*HZ*	*0.088*	*0.088*	*0.088*	*0.088*	*0.088*	*0.088*	*0.088*	*0.088*	*0.088*
9	Frequency Response Characteristic (5 / 8)	MW/HZ	1.567	-13.841	29.022	24.944	0.000	0.000	215.569	0.000	86.362
10	Ideal generator response assuming 5% droop.....40% per Hz (40% of Row 1) (P ideal gen)	MW/Hz	209.765	353.851	383.216	97.393	0.001	0.000	152.283	277.150	278.693
11	Percentage ideal response	%	**0.747**	**-3.912**	**7.573**	**25.612**	**0.000**	**0.000**	**141.558**	**0.000**	**30.988**

Sr No	Particulars	VISHNUPRAYAG (4X110MW)	ALAKHNANDA (4X82MW)	ANPARA-C LANCO (2X600MW)	ROSA-I (2X300MW)	ROSA-II (2X300MW)	RIHAND-Hydro (6X50MW)	OBRA-H (3X33MW)	KHARA-H (3X24MW)	Tanda(4X110)	UP
1	Actual net interchange immediately before the disturbance	133.000	164.022	956.300	298.689	304.370	0.000	15.957	48.170	187.416	4616.381
2	Actual net interchange immediately after the disturbance	133.000	160.700	956.300	296.689	304.370	0.000	15.960	48.313	186.076	4618.163
3	Change in Net Interchange (2 - 1)	0.000	-3.322	0.000	0.000	0.000	0.000	0.002	0.143	-1.340	1.782
4	Generation Loss (+) / Load Throw off (-) during the Event	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	Control Area Response (4-3) (ΔP)	0.000	3.322	0.000	0.000	0.000	0.000	-0.002	-0.143	1.340	1.782
6	*Frequency before the Event*	*50.032*	*50.032*	*50.032*	*50.032*	*50.032*	*50.032*	*50.032*	*50.032*	*50.032*	*50.032*
7	*Frequency after the Event*	*50.120*	*50.120*	*50.120*	*50.120*	*50.120*	*50.120*	*50.120*	*50.120*	*50.120*	*50.120*
8	*Change in Frequency (7-6)*	*0.088*	*0.088*	*0.088*	*0.088*	*0.088*	*0.088*	*0.088*	*0.088*	*0.088*	*0.088*
9	Frequency Response Characteristic (5 / 8)	0.000	37.756	0.000	0.000	0.000	0.000	-0.027	-1.629	15.231	20.253
10	Ideal generator response assuming 5% droop.....40% per Hz (40% of Row 1) (P ideal gen)	53.200	65.609	382.520	119.475	121.748	0.000	6.383	19.268	74.967	1846.552
11	Percentage ideal response	**0.000**	**57.546**	**0.000**	**0.000**	**0.000**	**0.000**	**-0.422**	**-8.456**	**20.316**	**1.097**

12 Apr 2019 (Chandrapur event)

Sr No	Particulars	VISHNUPRAYAG (4X110MW)	ALAKHNANDA (4X82MW)	ANPARA-C LANCO (2X600MW)	ROSA-I (2X300MW)	ROSA-II (2X300MW)	RIHAND-Hydro (6X50MW)	OBRA-H (3X33MW)	KHARA-H (3X24MW)	Tanda(4X110)	UP
1	Actual net interchange immediately before the disturbance	138.000	167.255	1097.739	298.327	308.473	0.000	24.581	47.482	244.062	5468.326
2	Actual net interchange immediately after the disturbance	138.000	167.428	1096.574	295.432	310.652	0.000	24.590	47.480	243.392	5435.147
3	Change in Net Interchange (2 - 1)	0.000	0.173	-1.165	-2.895	2.178	0.000	0.009	-0.002	-0.670	-33.179
4	Generation Loss (+) / Load Throw off (-) during the Event	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	Control Area Response (4-3) (ΔP)	0.000	-0.173	1.165	2.895	-2.178	0.000	-0.009	0.002	0.670	-33.179
6	*Frequency before the Event*	***49.898***	***49.898***	***49.898***	***49.898***	***49.898***	***49.898***	***49.898***	***49.898***	***49.898***	***49.898***
7	*Frequency after the Event*	***49.824***	***49.824***	***49.824***	***49.824***	***49.824***	***49.824***	***49.824***	***49.824***	***49.824***	***49.824***
8	*Change in Frequency (7-6)*	*-0.074*	*-0.074*	*-0.074*	*-0.074*	*-0.074*	*-0.074*	*-0.074*	*-0.074*	*-0.074*	*-0.074*
9	Frequency Response Characteristic (5 / 8)	0.000	2.341	-15.737	-39.116	29.438	0.000	0.120	-0.034	-9.056	448.365
10	Ideal generator response assuming 5% droop.....40% per Hz (40% of Row 1) (P Ideal gen)	55.200	66.902	439.096	119.331	123.389	0.000	9.832	18.993	97.625	2187.330
11	Percentage ideal response	**0.000**	**3.499**	**-3.584**	**-32.780**	**23.858**	**0.000**	**1.216**	**-0.177**	**-9.276**	**20.498**

Sr No	Particulars	Dimension	ANPARA-A (3X210MW)	ANPARA-B (2X500MW)	ANPARA-D (2X500MW)	OBRA-B (5X200MW)	PARICHHA-B (2X210MW)	PARICHHA-C (2X250MW)	HARDUAGANJ(2X250MW)	LALITPUR (3X660MW)	BARA (3X660MW)
1	Actual net interchange immediately before the disturbance	MW	323.189	545.701	959.615	317.281	0.002	0.000	457.231	694.159	697.416
2	Actual net interchange immediately after the disturbance	MW	323.678	543.100	962.557	318.966	0.002	0.000	457.900	695.030	698.159
3	Change in Net Interchange (2 - 1)	MW	0.489	-2.601	2.942	1.685	0.000	0.000	0.669	0.871	0.744
4	Generation Loss (+) / Load Throw off (-) during the Event	MW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	Control Area Response (4-3) (ΔP)	MW	-0.489	2.601	-2.942	-1.685	0.000	0.000	-0.669	-0.871	-0.744
6	*Frequency before the Event*	*HZ*	***49.898***	***49.898***	***49.898***	***49.898***	***49.898***	***49.898***	***49.898***	***49.898***	***49.898***
7	*Frequency after the Event*	*HZ*	***49.824***	***49.824***	***49.824***	***49.824***	***49.824***	***49.824***	***49.824***	***49.824***	***49.824***
8	*Change in Frequency (7-6)*	*HZ*	*-0.074*	*-0.074*	*-0.074*	*-0.074*	*-0.074*	*-0.074*	*-0.074*	*-0.074*	*-0.074*
9	Frequency Response Characteristic (5 / 8)	MW/HZ	6.607	-35.150	39.759	22.768	0.007	0.000	9.041	11.771	10.049
10	Ideal generator response assuming 5% droop.....40% per Hz (40% of Row 1) (P Ideal gen)	MW/Hz	129.276	218.280	383.846	126.912	0.001	0.000	182.892	277.664	278.966
11	Percentage ideal response	%	**5.111**	**-16.103**	**10.358**	**17.940**	**1055.743**	**0.000**	**4.943**	**4.239**	**3.602**

12 Apr 2019 (Sikkim event)

Sr No	Particulars	Dimension	ANPARA-A (3X210MW)	ANPARA-B (2X500MW)	ANPARA-D (2X500MW)	OBRA-B (5X200MW)	PARICHHA-B (2X210MW)	PARICHHA-C (2X250MW)	HARDUAGANJ(2X250MW)	LALITPUR (3X660MW)	BARA (3X660MW)
1	Actual net interchange immediately before the disturbance	MW	532.201	883.281	967.703	307.009	0.000	0.000	459.809	1252.366	1047.114
2	Actual net interchange immediately after the disturbance	MW	532.465	884.090	969.883	309.947	-0.0009	0.000	460.734	1252.366	1047.865
3	Change in Net Interchange (2 - 1)	MW	0.264	0.809	2.180	2.939	-0.0011	0.000	0.925	0.000	0.751
4	Generation Loss (+) / Load Throw off (-) during the Event	MW	0.000	0.000	0.000	0.000	0.00000	0.000	0.000	0.000	0.000
5	Control Area Response (4-3) (ΔP)	MW	-0.264	-0.809	-2.180	-2.939	0.00110	0.000	-0.925	0.000	-0.751
6	*Frequency before the Event*	HZ	**50.010**	**50.010**	**50.010**	**50.010**	**50.010**	**50.010**	**50.010**	**50.010**	**50.010**
7	*Frequency after the Event*	HZ	**49.929**	**49.929**	**49.929**	**49.929**	**49.929**	**49.929**	**49.929**	**49.929**	**49.929**
8	*Change in Frequency (7-6)*	HZ	*-0.081*	*-0.081*	*-0.081*	*-0.081*	*-0.081*	*-0.081*	*-0.081*	*-0.081*	*-0.081*
9	Frequency Response Characteristic (5 / 8)	MW/HZ	3.260	9.988	26.915	36.279	-0.014	0.000	11.420	0.000	9.267
10	Ideal generator response assuming 5% droop.....40% per Hz (40% of Row 1) (P Ideal gen)	MW/Hz	212.880	353.312	387.081	122.803	0.000	0.000	183.924	500.946	418.846
11	Percentage ideal response	%	**1.531**	**2.827**	**6.953**	**29.542**	**-16975.309**	**0.000**	**6.209**	**0.000**	**2.212**

Sr No	Particulars	VISHNUPRAYAG (4X110MW)	ALAKHNANDA (4X82MW)	ANPARA-C LANCO (2X600MW)	ROSA-I (2X300MW)	ROSA-II (2X300MW)	RIHAND-Hydro (6X50MW)	OBRA-H (3X33MW)	KHARA-H (3X24MW)	Tanda(4X110)	UP
1	Actual net interchange immediately before the disturbance	140.000	153.200	1134.482	532.693	562.866	54.412	23.160	48.019	416.679	7558.420
2	Actual net interchange immediately after the disturbance	140.000	154.235	1143.449	530.745	563.727	54.457	23.146	47.984	416.232	7435.710
3	Change in Net Interchange (2 - 1)	0.000	1.035	8.967	-1.948	0.861	0.045	-0.014	-0.035	-0.447	-122.710
4	Generation Loss (+) / Load Throw off (-) during the Event	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	Control Area Response (4-3) (ΔP)	0.000	-1.035	-8.967	1.948	-0.861	-0.045	0.014	0.035	0.447	-122.710
6	*Frequency before the Event*	**50.010**	**50.010**	**50.010**	**50.010**	**50.010**	**50.010**	**50.010**	**50.010**	**50.010**	**50.010**
7	*Frequency after the Event*	**49.929**	**49.929**	**49.929**	**49.929**	**49.929**	**49.929**	**49.929**	**49.929**	**49.929**	**49.929**
8	*Change in Frequency (7-6)*	*-0.081*	*-0.081*	*-0.081*	*-0.081*	*-0.081*	*-0.081*	*-0.081*	*-0.081*	*-0.081*	*-0.081*
9	Frequency Response Characteristic (5 / 8)	0.000	12.777	110.709	-24.053	10.633	0.554	-0.174	-0.435	-5.515	1514.938
10	Ideal generator response assuming 5% droop.....40% per Hz (40% of Row 1) (P Ideal gen)	56.000	61.280	453.793	213.077	225.146	21.765	9.264	19.208	166.672	3023.368
11	Percentage ideal response	**0.000**	**20.851**	**24.396**	**-11.288**	**4.723**	**2.547**	**-1.880**	**-2.265**	**-3.309**	**50.108**

Action points decided during the meeting:

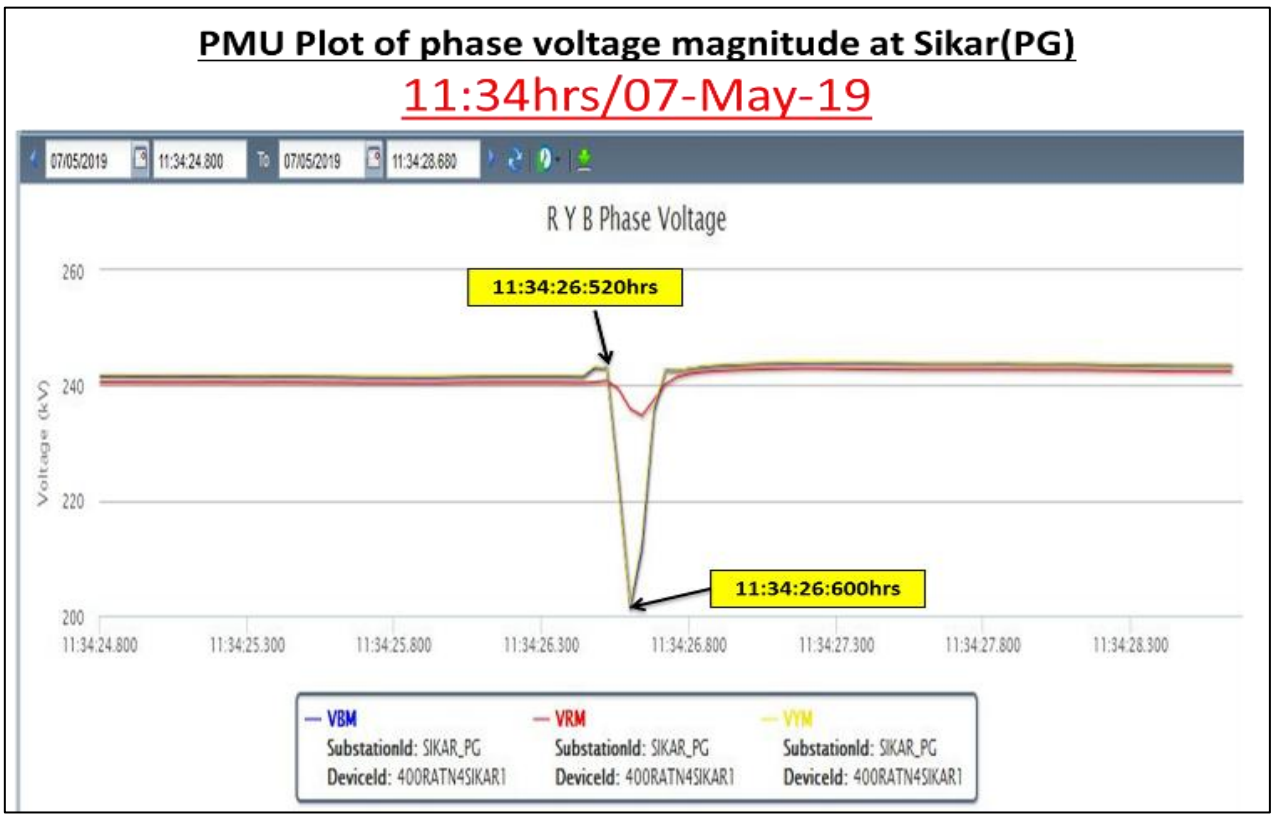
- FRC response of Bawana CCGT and Pragati station is very poor and it needs to be looked into by Delhi-SLDC.
- Report received from UP also shown poor FRC response from state generating stations and it needs to be reviewed.
- Most of the ISGS generating company is not sending the FRC response. Central sector generating companies shall check its own response and share the report.
- FRC response from Singrauli, Rihand and Dadri station is poor and it needs to be looked into.
- NRLDC shall prepare link at the website similar to Preliminary Report link in public domain.
- NHPC shall check the reason of poor response from Chamera-1, Chamera-3 and Sewa-2 plant.

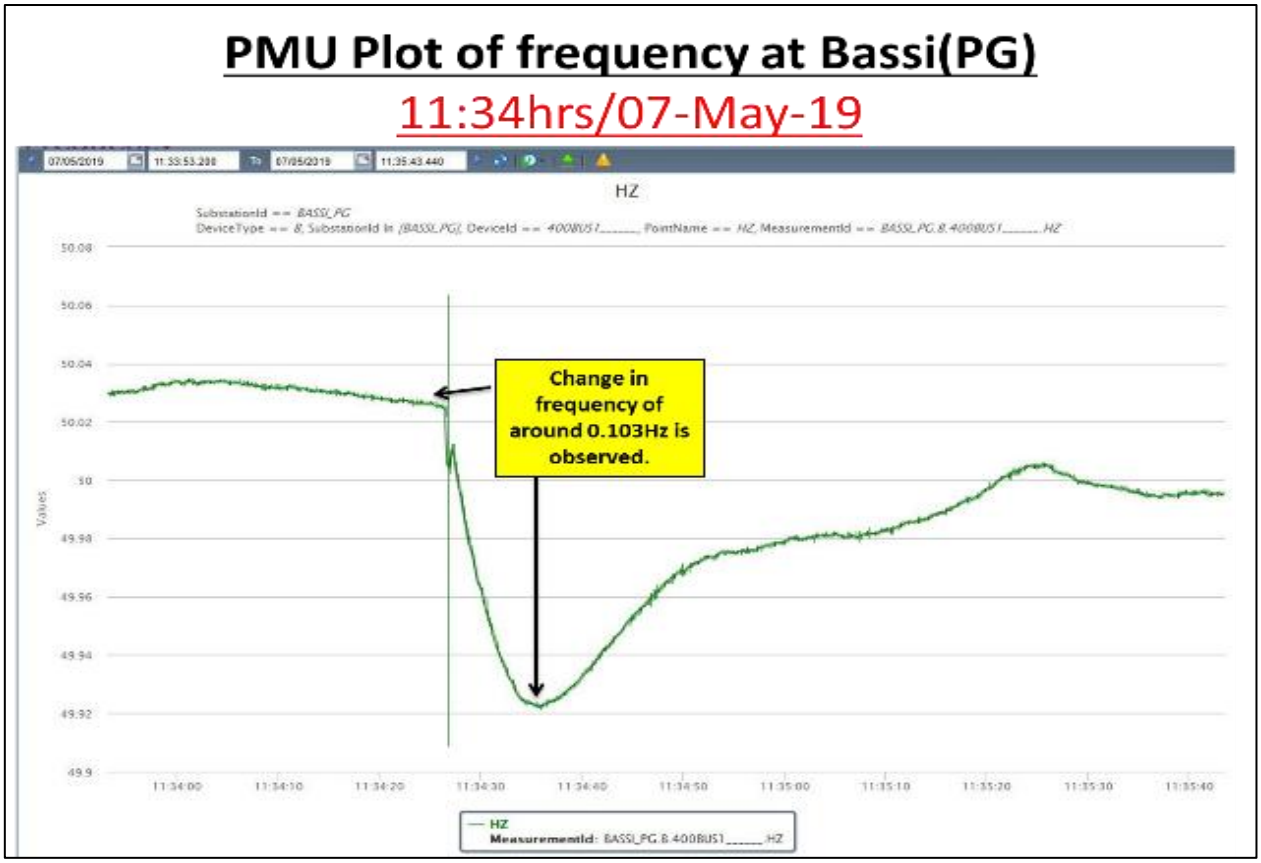
- FRC response is not received from most of the NR constituents and
- Other utilities shall also check the FRC response in case of these incident and share the details.
- As per Hon'ble commission order, All the ISGS hydro and thermal generators shall maintain the margin for FRC. All the generators shall ensure the proper margin during generation for compliance of the order.

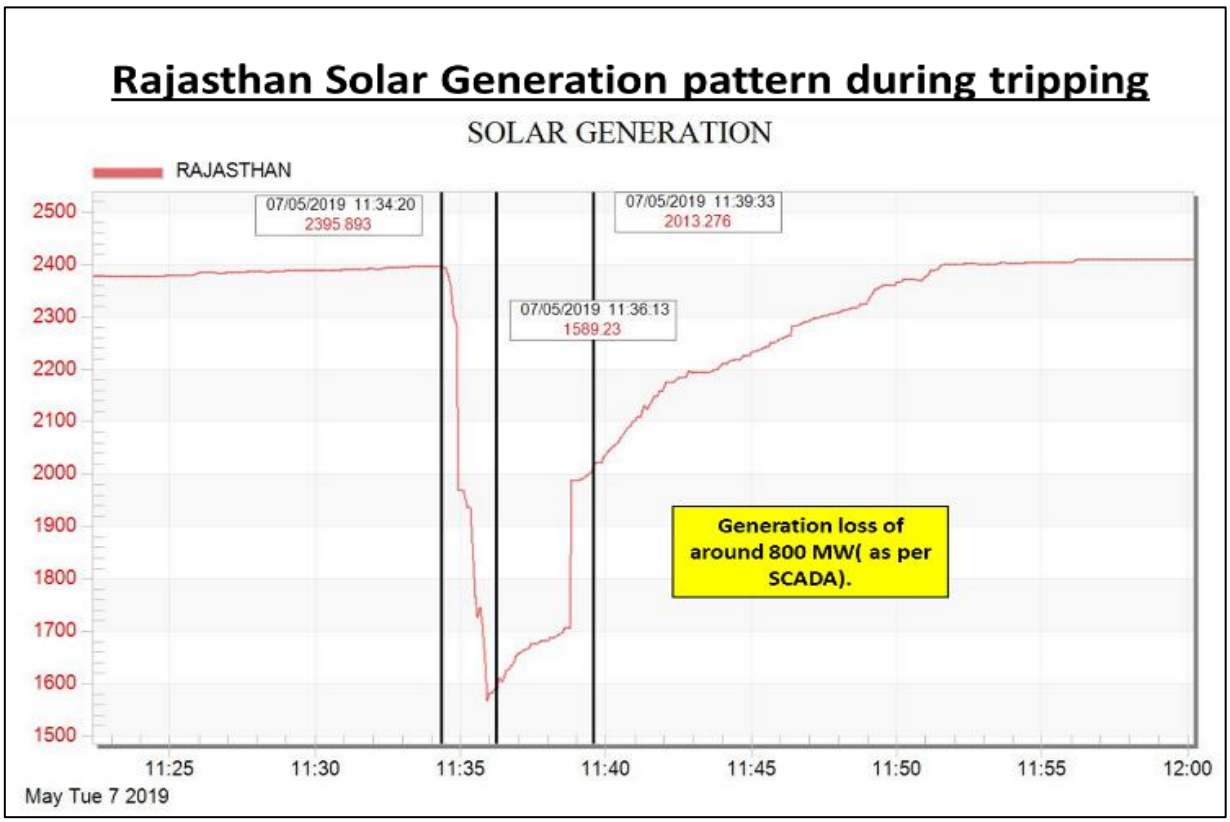
MS, NRPC raised serious concern about non reporting of FRC from most of the NR constituents and suggested all the NR constituents to share the FRC response along with action taken/ to be taken report (for mitigating poor FRC response) to NRPC/ NRLDC.

10. Loss of Rajasthan Solar power for short duration:

On 07.05.2019, at 11:34hrs, 400kV Bikaner-Bhadla ckt-2 tripped on R-Y phase to phase fault. PMU plot and SCADA solar (Rajasthan area) plot at time of tripping is shown below.







400kV Bikaner-Sikar D/C also tripped along with above. From PMU plot, it could be observed that fault cleared within 100ms but at the same time solar generation loss of around 800MW occurred in Rajasthan. It recovered partially after ~5 minutes whereas full recovery occurred after ~15minutes of tripping.

As per the following Rajasthan report, no loss of generation occurred.

Preliminary Report

Date & Time of event: - : 07.05.2019 /11.35
Introduction of Event: - : 400 KV Bikaner- Bhadla II
Total Loss of Generation : NA
Total Loss of Load: - : NA
Weather :

Triggering Incident:-

Sr. NO.	NAME OF ELEMENT	TRIPPING DATE	TRIPPING TIME	CLOSING DATE	CLOSING TIME	INDICATION	REMARKS
1	400 KV Bikaner-Bhadla II	07.05.2019	11.35	07.05.2019	14.50	Bikaner- R &Y Ph , Z1, 6.66Km	

Executive Engineer-II(SOLD)
RVPN, Jaipur

NRLDC representative shared the details of solar generation loss captured through SCADA data:

Generation loss at 400/220kV Bhadla (Raj) (Break UP)

	Generation Loss at Bhadla (Raj)				
		Time	11:33	11:37:00	11:45
		500 MVA 400/220kV ICT 1	415	192	301
		500 MVA 400/220kV ICT 2	414	192	301
		500 MVA 400/220kV ICT 3	410	191	300
		160 MVA 220/132kV ICT 1	51	49	52
		160 MVA 220/132kV ICT 2	40	39	41
S. No	From	To			
1	RSDCL1 Ckt-1	Bhadla(Raj)	137	51	132
2	RSDCL1 Ckt-2	Bhadla(Raj)	137	51	132
3	RSDCL2 Ckt-1	Bhadla(Raj)	142	97	123
4	RSDCL2 Ckt-2	Bhadla(Raj)	142	97	123
5	Adani ckt-1	Bhadla(Raj)	123	48	70
6	Adani ckt-2	Bhadla(Raj)	123	48	70
7	Kanasar	Bhadla(Raj)	80	80	80
8	BAP	Bhadla(Raj)	130	105	185
9	Badisid	Bhadla(Raj)	117	100	163
10	Saurya Urja ckt-1	Bhadla(Raj)	249	107	250
11	Saurya Urja ckt-2	Bhadla(Raj)	249	107	250
		Total	**1629**	891	1578
		Generation Loss at Bhadla(Raj) (in MW)	**738**		

Generation loss at 400/220kV Bhadla (PG) (Break UP)

	Generation Loss at Bhadla (PG)				
S.No	From	To	Time		
			11:33	11:34:40	11:36
1	Bhadla (Adani)	Bhadla(PG)	134	107	132
2	Saurya Urja	Bhadla(PG)	80	3	72
1A	Azure Plot-7 Ckt-1	Bhadla (Adani)	19	0	19
1B	Azure Plot-7 Ckt-2	Bhadla (Adani)	17	0	16
2A	SBE5 A	Saurya Urja	16	0	15
2B	SBE5 B	Saurya Urja	25	0	21
2C	SBE5 C	Saurya Urja	22	0	18
2D	SBE5 D	Saurya Urja	19	0	17
		Total	**118**	0	
		Generation Loss at Bhadla(PG)(in MW)	**118**		

NRLDC representative also raised serious concern on outage of around 900MW solar generation out of 3000MW telemetered solar generation. In case of large RE generation, such type of incident may pose security threat to the Synchronised Grid and this concern needs to be attended.

NRLDC representative informed about partial solar generation loss of Azure and complete solar generation loss of SB energy during the incident although company submitted the certificate for LVRT compliance.

Action points decided during the meeting:

- SLDC-Rajasthan shall check the details of solar generation loss and compliance of LVRT on those locations.
- If generator is LVRT compliant than reason of outage of generation during voltage dip and remedial measures taken thereafter.
- If RE generators are LVRT non-compliant, time frame to making those RE generators LVRT compliant.

Rajasthan shall compile the information for LVRT complaint/ non-compliant of RE generators and share the information to NRPC/ NRLDC. Rajasthan shall also share the remedial measures report particularly related to this event to NRPC/ NRLDC within 7days.

Part-A

Agenda 12.1: NRLDC representative informed that setting of Agra-Gwalior SPS has been revised as per approved SPS scheme. In 158th OCC meeting, a mock testing of SPS for 765 kV Agra-Gwalior was proposed on 30th Apr 2019. NRLDC representatives shared the presentation during OCC meeting. Following are the key highlights of the mock exercise:

- It was postponed to 01st May 2019 in view of requirement of shutdown of 765 kV Gwalior bays at Agra end by POWERGRID for affecting changes in the logic (CT input to PLC controller were required to be changed) as per revised scheme.
- Mock testing was successful with the collaborative effort of all the concerned utilities.
- During mock testing, all four condition tested and signal was sent to all the location except 220 kV Nara (UP). Communication issue at 220 kV Nara (UP).
- Mock testing report has been received from most of the utilities except from some location like Bhiwani (BBMB), Charkhi Dadri (BBMB) and Hisar (PG). Information from Bhiwani (BBMB) and Charkhi Dadri (BBMB) received after OCC Agenda.
- The testing of the scheme was by and large OK with few observations.

Point wise reply of POWERGRID:

- Communication issue resulting in major DTPC alarm at Nara. (However, communication issue was reportedly resolved in the evening of the same day at 1607hrs): ***POWERGRID representative agreed to rectify the communication issue.***
- Counter at 220 kV Nara (UP), Narwana (Haryana), Jamsher (Punjab) and Charkhi Dadri (BBMB) did not increase and therefore to be checked and corrected: ***At Nara there was communication issue, At Narwana counter was hanged and same has been reset. In Alstom scheme, counter is external display and hanging of counter will not be resulted into non-operation of SPS. Counter issue of Jamsher will be checked. Counter of Charkhi Dadri (BBMB) was witnessed by POWERGRID representative so it's not possible, there may be communication gap between HVPNL representative and BBMB representative. Counter issue will be checked and one to one testing will also be done jointly for those locations.***
- 66 kV Sarinh feeder is yet to be wired (Cable is yet to be laid for 66 kV feeder at 220 kV Laltokalan station): ***Information about cabling issue was received on the same day of mock exercise. Cabling work will be completed as soon as possible***.
- Two DTPC are installed at Beawar (Rajasthan) station but one DTPC did not receive the signal, therefore 132 kV GSS Ber Jaitaran and 132 kV GSS Asind

feeders connected to this DTPC would not trip. (DTPC is to be wired for input signal): ***Mis communication received from Beawar (Raj) station and Rajasthan also agreed for the same.***

- 220/132 kV Ratangarh (Sardar Sahar ckt): It's mapped for load Group-B but DTPC is not found at Ratangarh site. DTPC location to be checked and reported: ***POWERGRID agreed to install New DTPC at Ratangarh station or explore the possibility of extending the signal at different channel of existing DTPC.***

NRLDC representative suggested that concerned representative from state utilities shall be available at the site location during mock testing, irrespective to the jurisdiction of site location.

Issues related to Punjab, Haryana, Rajasthan, Uttar Pradesh and Delhi is the part of the mock testing report attached as **Annexure-VI** of the Agenda.

Delhi representative informed that 220 kV Bamnauli-Papankalan ckts was not radial at the time of testing however action will be taken accordingly to make these feeders radial nature.

NRLDC representative further suggested for separate meeting meeting to finalize the load group with the feedback of all the concerned utilities.

Representative from Punjab and Haryana didn't have any information available with them thatswhy It was decided during the meeting that this issue will be discussed separately through video conferencing on 23rd May 2019.

Agenda 22 Shifting of RLDC declared peak hours (evening) by UP (Agenda by UP, SLDC):

NRLDC shared the demand curve for all state and Northern region as whole for April'19. It emerged that peak hours declared by NRLDC is line with system operation requirement. All constituents including UP, SLDC agreed that regional peak hours' demand should be taken in place of state peak hours' requirement.

UP representative suggested for more frequent revision in declaration of peak hours, which is current practice of RLDC already addressed this issue.

MS, NRPC also appreciated that regional peak hours should be considered for better system operation

NRLDC representative informed that setting of Agra-Gwalior SPS has been revised as per approved SPS scheme. In 158th OCC meeting, a mock testing of SPS for 765 kV Agra-Gwalior was proposed on 30th Apr 2019.

Grid operation/ Weather forecast:

NRLDC gave a presentation on recent cyclone fani in Orissa. Forum appreciate the monitoring of such eventualities through radar data and help the system operator in advance. All states are also requested to use same portal as thunderstorm are likely in Summer/monsoon season for better forecasting and load management portfolio. MS, NRPC also appreciated the tools and emphasize that all the agencies should use it for better system operation.

Annexure-I

List of participants in the 159th OCC meeting held on 15th May 2019, New Delhi

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A/ A - Please send updated mail ID for timely information for NRLDC etc.

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उपलब्धता साराश - अप्रैल -2018 बनाम अप्रैल -2019

Annexure-II(A)

	अप्रैल -2018 (मि.यु. /दिन)	अप्रैल -2019 (मि.यु. /दिन)	अप्रैल माह में वृद्धि (मि.यु./दिन)
तापीय (Thermal) उत्पादन	589	555	-34
जलीय (Hydro) उत्पादन	126.12	224.59	98.47
नाभिकीय (Nuclear) उत्पादन	25.66	28.51	2.85
अंतर-क्षेत्रीय (Inter-Regional) कुल आयात	166.40	153.04	-13.37
अक्षय (Renewable) उत्पादन	35.43	42.70	7.27
कुल उपलब्धता	942.61	1003.84	61.23

Long Outage of Generating Units

Annexure-II(B)

SL. No	Station Name	Location	Owner	Unit No	Capacity	Reason	Outage		Outage duration (in days)
							Date	Time	
1	Giral (IPP) LTPS	RAJASTHAN	RRVUNL	1	125	Bed materials leakage.	11-07-2014	08:20	1768
2	Giral (IPP) LTPS	RAJASTHAN	RRVUNL	2	125	Boiler tube leakage	27-01-2016	15:27	1203
3	Paricha TPS	UP	UPRVUNL	1	110	R & M Work	02-07-2016	17:30	1046
4	Obra TPS	UP	UPRVUNL	12	200	Drum level high.	24-09-2018	17:26	232
5	Bairasiul HPS	HP	NHPC	3	60	For renovation and Modernisation of the plant	15-10-2018	09:11	211
6	Bairasiul HPS	HP	NHPC	2	60	For renovation and Modernisation of the plant	15-10-2018	10:02	211
7	Bairasiul HPS	HP	NHPC	1	60	For renovation and Modernisation of the plant	15-10-2018	10:14	211
8	Baglihar (IPP) HPS	JK	PDD JK	3	150	Capital Maintenance	19-12-2018	18:00	146
9	Dehar HPS	HP	BBMB	1	165	Capital Maintenance	28-01-2019	06:15	106
10	Pong HPS	HP	BBMB	2	66	Renovation and Modernization.	14-02-2019	08:00	89

Long Outage of Generating Units

SL. No	Station Name	Location	Owner	Unit No	Capacity	Reason	Outage		Outage duration (in days)
							Date	Time	
11	Bara PPGCL TPS	UP	Jaypee	2	660	Generator Transformer protection operated	22-02-2019	12:41	81
12	Bhakra-L HPS	HP	BBMB	3	108	Renovation and Modernisation of unit(capacity enhancement from 108 to 126 MW)	01-04-2019	09:20	43
13	Singrauli STPS	UP	NTPC	1	200	Annual maintenance	02-04-2019	22:31	42
14	Bhakra-L HPS	HP	BBMB	4	108	Runner modification and Annual Maintenance.	04-04-2019	00:00	40
15	Kalisindh TPS	RAJASTHAN	RRVUNL	2	600	Tripped due to oil leakage in Y phase buchholz relay of GT-1	04-04-2019	14:01	40
16	ISTPP (Jhajjar)	HARYANA	NTPC	3	500	Annual maintenance	08-04-2019	00:00	36
17	Koteshwar HPS	UTTRAKHAND	THDC	1	100	Annual maintenance .	09-04-2019	10:00	35
18	Barsingsar (IPP) LTPS	RAJASTHAN	NLC	2	125	Manually hand tripped due to major overhaul	12-04-2019	00:17	32
19	Obra TPS	UP	UPRVUNL	13	200	Boiler tube leakage Turbine governor system problem.	14-04-2019	13:01	30

Annexure-II(C)

Sl. No	Element Name	Type	Voltage Level	Owner	Outage		Outage duration (days)	Reason / Remarks
					Date	Time		
1	FACT at BLB in Knp-BLB Line	FACTS	400 kV	PGCIL	02-07-2016	10:20	1046	Y-Phase current imbalance
2	Vindhyachal HVDC BtB Block 2	HVDV Station	500 kV HVDC	PGCIL	26-11-2017	14:55	534	Differential protection operated.
3	FSC of Balia-I at Lucknow	FSC	400 kV	PGCIL	29-11-2017	13:30	531	E/SD due to Hot Spot at Isolator
4	Akal 500 MVA ICT 4	ICT	400/220 kV	RRVPNL	05-08-2018	16:00	282	ICT burnt
5	Bairasiul(NHPC)-Jassure(HPSEB)	Line	220 kV	PGCIL	15-10-2018	12:16	211	for renovation & modernization. shutdown for 6 months
6	Bairasuil(NHPC)-Pong(BBMB)	Line	220 kV	PGCIL	15-10-2018	10:50	211	for renovation & modernization. shutdown for 6 months
7	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	155	General maint work.
8	Akal (RVPNL)-Ramgarh 400 (RVPNL) 1	Line	400 kV	RRVPNL	10-12-2018	10:15	155	General maint work.
9	400 kV Bus coupler Main CB (424) of Bus 1& 2 at Anpara B UP	BAY/CB	400 kV	UPPTCL	21-01-2019	12:30	113	. For replacement of faulty CB at Anpara B. CB is faulty from 02.01.19

SL. No	Element Name	Type	Voltage Level	Owner	Outage		Outage duration (days)	Reason / Remarks
					Date	Time		
10	50 MVAR (400kV) Bus Reactor at Moradabad (UP)	Bus Reactor	400 kV	UPPTCL	23-01-2019	10:29	111	For Dismantling, shifting, gasketreplacement, erection & commissioningof 50 MVAR Bus Reactor & Associatesworks in same station.
11	Chamera-1 (3*42) MVAR Bus Reactor	Bus Reactor	400 kV	NHPC	04-02-2019	15:14	99	For interconnection of 3x42 MVAr Bus Reactors.
12	400 kV Tie CB (652T) of (Bassi ckt-2 & Hindaun ckt-2) at Heerapura	BAY/CB	400 kV	RRVPNL	11-03-2019	11:32	64	400 KV CB No. 652B is the Main Circuit Breaker of Future 400 KV Heerapura- Hindaun II , This CB is dismental from Location No. 652B &To be installed at Location No. 252T (Tie Circuit Breaker of 400 KV Heerapura- Merta & ILT-3).
13	FSC (40%) of Kanpur-II at Ballabgarh(PG)	FSC	400 kV	PGCIL	16-03-2019	14:39	59	Fire in B-Ph FSC at Ballabhgarh end.
14	765 kV Bara TPS-2 Main Bay (704) at Mainpuri 765 (UP)	BAY/CB	765 kV	UPPTCL	31-03-2019	16:27	44	E/S/D to attend SF6 gas leakage.
15	Gazipur(DTL)-Noida sec 20s(UP)	Line	220 kV	UPPTCL	12-04-2019	11:28	32	SD taken by UP for construction 2 nos. LILO bays at 220kV Noida Sec 20 to convert T-off into LILO at Noida Sec 20.
16	Sarnath 500 MVA ICT 1	ICT	400/220 kV	UPPTCL	19-04-2019	13:41	25	Tripped on differential and REF protection. Fire in ICT-1.
17	400 kV Main CB / Bay (417) of 400kV BLB ckt 1 at Kanpur(PG)	BAY/CB	400 kV	PGCIL	24-04-2019	10:22	20	for replacement of CB under CERC Add Cap at Kanpur PG.
18	Unnao 189.9 MVAR B/R	Bus Reactor	765 kV	UPPTCL	27-04-2019	18:54	17	Under voltage

Annexure-II(D)

Transmission Lines
(220kV – 27 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	220kV RAPP B-RAPP C bay 202 at RAPP B & 210 at RAPP C	220	1.1	ACSR single zebra	NPCIL		**20.04.2019**	**13:46**
2	220kV Bhadla(PG)-Bhadla(PSS Saurya)-Dc-2 bay no (208) & 207(PG) end	220	9.05	Al-59 single zebra	Suarya		**19.04.2019**	**20:00**
3	220kV Bhadla(PG)-AREPRL(PSS)-Dc-1 bay no (204) & 203(PG) end	220	17.287	ACSR single zebra	AREPRL		**27.04.2019**	**14:20**

ICT
(Capacity Addition - 4340 MVA)

S.No.	Name of element	Voltage Level	Transformation Capacity (in MVA)	New/replacement /augmentation	Agency/ Owner	Remarks	Actual date & time of charging (on load)	
							Remarks	Date
1	500 MVA ICT-1 at Sarnath(UP) **{ Augmentation of ICT capacity by replacing 315 with 500 MVA}**	400/220/33	500	Augmentation	UPPTCL		**07.04.2019**	**16:14**
2	500 MVA ICT-1 at Lucknow(UP) **{ Augmentation of ICT capacity by replacing 315 with 500 MVA}**	400/132/33	500	Augmentation	UPPTCL		**18.04.2019**	**13:55**
3	500 MVA ICT-1 at Noida Sec 148	400/132/33	500	New	UPPTCL		**06.04.2019**	**19:12**
4	315 ICT-3 at Navada	400/132/33	315	New	HVPNL	Charged at no load	12.04.2019	19:48
5	315 ICT-4 at Daultabad	400/132/33	315	New	HVPNL		**18.04.2019**	**19:22**
6	315 MVA ICT-3 at Unnao	400/220/33	315	New	UPPTCL		**15.04.2019**	**15:44**
7	240 MVA ICT-3 at Muradnagar(New)	400/220/33	240	New	UPPTCL	Charged at no load	15.04.2019	16:39
8	240 MVA ICT-3 at Obra(B)	400/220/33	240	New	UPPTCL	Charged at no load	30.04.2019	12:53
9	240 MVA ICT-3 at Gorakhpur(UP)	400/220/33	240	New	UPPTCL		**12.04.2019**	**16:19**
10	180 MVA Transformer-1 at Bhadla (AREPRL Adani PSS)	220/33	180	New	AREPRL(PSS)		**27.04.2019**	**14:20**
11	180 MVA Transformer-2 at Bhadla (AREPRL Adani PSS)	220/33	180	New	AREPRL(PSS)		**27.04.2019**	**14:20**
12	125 MVA Transformer-3 at Bhadla(Saurya PSS)	220/33	125	New	Saurya	Charged at no load	25.04.2019	18:58
13	125 MVA Transformer-5 at Bhadla(Saurya PSS)	220/33	125	New	Saurya	Charged at no load	24.04.2019 & 29.04.2019	17:36 & 17:11
14	10 MVA, 220/11 kV Transformer at Salal	220	10	New	NHPC		**26.04.2019**	**13:00**

Bus Reactor & Line Reactor

(Capacity Addition –Bus Reactor 80 MVAR & Line Reactor 63 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	80 MVAR Bus Reactor along with associated bays no at NJPC	400	80	New	BHEL	SJVNL		**22.04.2019**	**17:34**

Annexure III

State		June 2019 (MU)	June 2019 (MW)
Chandigarh	Availability	185	375
	Requirement	195	385
	Surplus/Shortfall (MU)	-10	-10
	Surplus/Shortfall (%)	-5.1%	-2.6%
Delhi	Availability	4110	7540
	Requirement	4100	7200
	Surplus/Shortfall (MU)	10	340
	Surplus/Shortfall (%)	0.2%	4.7%
Haryana	Availability	6150	10260
	Requirement	5620	9750
	Surplus/Shortfall (MU)	530	510
	Surplus/Shortfall (%)	9.4%	5.2%
Himachal Pradesh	Availability	840	1710
	Requirement	870	1490
	Surplus/Shortfall (MU)	-30	220
	Surplus/Shortfall (%)	-3.4%	14.8%
Jammu & Kashmir	Availability	1430	2410
	Requirement	1620	2880
	Surplus/Shortfall (MU)	-190	-470
	Surplus/Shortfall (%)	-11.7%	-16.3%
Punjab	Availability	7120	10670
	Requirement	5980	13110
	Surplus/Shortfall (MU)	1140	-2440
	Surplus/Shortfall (%)	19.1%	-18.6%
Rajasthan	Availability	8540	15340
	Requirement	7320	11700
	Surplus/Shortfall (MU)	1220	3640
	Surplus/Shortfall (%)	16.7%	31.1%
Uttar Pradesh	Availability	13700	20700
	Requirement	12650	21500
	Surplus/Shortfall (MU)	1050	-800
	Surplus/Shortfall (%)	8.3%	-3.7%
Uttarakhand	Availability	1300	2230
	Requirement	1340	2180
	Surplus/Shortfall (MU)	-40	50
	Surplus/Shortfall (%)	-3.0%	2.3%
Total NR	Availability	43375	69005
	Requirement	39695	63300
	Surplus/Shortfall (MU)	3680	5705
	Surplus/Shortfall (%)	9.3%	9.0%

Status of Reactors in NR (To be executed under RTM by POWERGRID as per MOM of Empowered Committee on Transmission)

Sl. No.	Package/ Project	Status / Remarks
1.0	**400 kV Reactor Package RT-06: NRSS-XL:** • 1X125 MVAr ,400 kV Bus Reactor at Kishenpur S/s • 1X125 MVAr ,400 kV Bus Reactor at Maharanibagh (GIS) S/s • 1X125 MVAr ,400 kV Bus Reactor at Mandola S/s • 1X125 MVAr ,400 kV Bus Reactor at Hissar S/s • 1X125 MVAr ,400 kV Bus Reactor at Chamera(GIS) Pooling S/s • 1X125 MVAr ,400 kV Bus Reactor at Moga S/s • 1X125 MVAr ,400 kV Bus Reactor at Sikar S/s • 1X125 MVAr ,400 kV Bus Reactor at Allahabad S/s • 1X125 MVAr ,400 kV Bus Reactor at Meerut S/s • 1X125 MVAr ,400 kV Bus Reactor at Jallandhar S/s • 1X125 MVAr ,400 kV Bus Reactor at Patiala S/s	1.0 NIT issued and Bids opened in March'19. Bid evaluation in progress. LOA expected by June'19 subject to discussion in NRPC for Patiala & Jallandhar reactors as per observations of PSTCL.
2.0	**220 kV Reactor Package RT-07:** **NRSS-XL:** • 1X25 MVAr ,220 kV Bus Reactor at Jind S/s • 1X25 MVAr ,220 kV Bus Reactor at Fatehabad S/s • 1X25 MVAr ,220 kV Bus Reactor at Kishenpur S/s • 2X25 MVAr ,220 kV Bus Reactor at Jallandhar S/s • 1X25 MVAr ,220 kV Bus Reactor at Amritsar S/s • 1X25 MVAr ,220 kV Bus Reactor at Mandola S/s	NIT issued and Bids opened in March'19. Bid evaluation in progress. LOA expected by June'19 .

ANNEXURE-V

Follow up issues from previous OCCMs

Sl. No.	Agenda point	Details	Status
1	Monitoring of schemes funded from PSDF (*Agenda by NPC*)	The latest status of the schemes for which grant has been sanctioned from PSDF for the schemes in Northern Region. Utilities are requested to expedite implementation of the schemes and submit information of physical as well as financial progress in the prescribed format by first week of every month on regular basis to Member Convener, PSDF Project Monitoring Group (AGM, NLDC and POSOCO) with a copy to NPC Division.	The available status is attached as Annexure-III/1 of the agenda note. All states are requested to update.
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 specially with 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 is placed at Annexure-III/2 of the agenda note. In 159th OCC Haryana submitted the updated status (**Annexure V(I)**)
3	Progress of installing new capacitors and repair of defective capacitors	Information regarding installation of new capacitors and repair of defective capacitors is to be submitted to NRPC Secretariat.	Information received from Uttarakhand (up to April 2019), UP, Rajasthan (up to February 2019) & Haryana (up to January 2019). All other states are requested to update.
4.	Healthiness of defence mechanism: Self-certification	Report of Mock exercise for healthiness of UFRs carried out by utilities themselves on quarterly basis is to be submitted to NRPC Secretariat and NRLDC. All utilities were advised to certify specifically, in the report that "*All the UFRs are checked and found functional*".	The information of period ending March 2019 received from UP, Haryana, Delhi and Rajasthan. All others are requested to submit information.

Sl. No.	Agenda point	Details	Status
5	Strengthening of Intra-State transmission system	All SLDCs were requested to give information regarding bottlenecks, constraints and overloading in the State transmission network for proper transmission planning	UPPTCL has submitted the information ending 12/2018. ALL other SLDCs are 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	All the utilities were requested to go through the “Compendium of SPS in NR” (available on NRLDC & NRPC website) and identify feeders concerning their state and map the same in SCADA	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. All states except Punjab & Rajasthan were requested to update.

Annexure-V(I)

Downstream network from ISTS Station/ Establishment of new 400/220 kV Sub-stations:

S. No.	Sub Stations (**on TBCB mode**)	Transmission lines (**by Haryana**)	Latest Status
1.	400/220 kV, 2X500 MVA Kurukshetra	LILO of one ckt of 220 kV D/C Kaul-Pehowa line.	**Commissioned on 07.03.2019.**
		LILO of one ckt of 220 kV D/C Kaul-Bastara line.	Work awarded on 12.03.2018. Contractual completion date is 11.10.2019.
		220 kV D/C to Salempur with HTLS conductor equivalent to twin Moose.	P.O issued on 15.10.18. Contract agreement signed on 30.11.2018. Likely date of completion 30.04.2020.
2.	400/220 kV, 1X315 MVA Kaithal	220 k/V D/C line Kaithal to Neemwala.	Work awarded on 08.06.2018. Contractual completion date is 06.01.2020.
		220 kV Neemwala.	Work awarded on dated 06.09.2018. Contractual completion date is 05.04.2020.
3.	400/220 kV, Bhiwani	220kV D/C line from 765kV S/stn. PGCIL Bhiwani to 220kV S/stn. HVPNL Bhiwani.	Price bid opened on 27.12.18. Case scrutinized and sent to DS&D for placing in the next HPPC meeting for decision regarding award. Likely date of award is 30.06.2019. Likely date of completion is 31.12.2020.
		220kV D/C line from 765kV S/stn. PGCIL Bhiwani to 220kV S/stn. Isherwal.	
4.	400/220 kV, Jind	LILO of both circuits of 220kV D/C Narwana –Mund line at 400kV S/stn. Khatkar (PGCIL Jind).	
5.	400/220kV **Sohna Road** Expected schedule : May'19	Creation of LILO of both circuits of 220 kV D/C Sector-69 Roj Ka Meo line at 400KV Sohna Road Gurugram with Single Moose ACSR Conductor - **1.3Km**. Approved vide R-1525 Dt. 15.12.17.	**NIT to be floated shortly**. Case processed for **permission of Election Commission of India**.
		Creation of LILO of both circuits of 220 kV D/C Badshahpur-Sec-77 line at 400KV Sohna Road, Gurugram with 0.4 Sq. Inch AL-59 Conductor – **0.5Km**. Approved vide R-1525 Dt. 15.12.17.	**NIT to be floated shortly**. Case processed for **permission of Election Commission of India. Alternatively, to expedite the evacuation of power, the proposal for execution of work through EPC contractor M/s R S Infra at the rates defined in another contract is under process and deliberated in the HVPNL's internal review meeting dt. 24.04.19.**
		To augment the balance conductor of 220 kV D/C Badshahpur-Sohna Road Line after the LILO work, from 0.4 Sq. ich ACSR Conductor to 0.4 Sq. inch AL-59 conductor – **5Km**. Approved vide R-1525 Dt. 15.12.17.	**NIT to be floated shortly**. Case processed for **permission of Election Commission of India.**
6.	400/220kV **Prithla** Expected schedule : May'19	LILO of both ckt of 220 kV D/C Ranga Rajpur-Palwal line – **5.27Km** Approved vide R-1415 Dt. 14.07.16.	**Work awarded** on 22.10.2018. Contractual completion date is 08.02.2020.
		220 kV D/C for Prithla(400KV) - Sector-78, Faridabad – **32.247Km**. Approved vide R-1435 Dt. 22.08.16.	**Dropped in the HPPC** (High Powered Purchase Committee) in meeting dt. 22.01.2019. **Work refloated vide NIT dated 25.02.2019. 1st part opened on 27.03.2019 and under evaluation.**

7.	400/220kV **Kadarpur** Expected schedule : May'19	Creation of LILO of both circuits of 220 KV Pali-Sector 56 D/C line on M/C & D/C towers with 0.4 sq. inch AL-59 conductor at 400KV substation Kadarpur (Approx. length **13Km**) along with augmentation of existing conductor from 220 KV sector-56 to LILO point with 0.4 sq. inch AL-59 conductor (Approx. length **5.5 Km**). Approved vide R-1612 Dt. 05.11.18.	NIT floated on 05.03.2019 with due date of submission on 22.04.2019 (**opened on 23.04.2019 and under evaluation**).
		Creation of LILO of both circuits of 220 KV Sector 65- Pali D/C line on M/C & D/C towers with 0.4 sq. inch AL-59 conductor at 400KV substation Kadarpur (Approx. length **6Km**) along with augmentation of balance 0.4 sq. inch ACSR conductor of 220 KV Kadarpur-Sector 65 D/C line with 0.4 sq. inch AL-59 conductor (Approx. length **8.5 Km**). Approved vide R-1612 Dt. 05.11.18.	

Status of on-going transmission works for railway traction substations:

CE/ TS, HVPNL, Panchkula:

Sr. No.	Description/ Status supplied with the PUC	Name of Transmission line	Latest status
1.	**132/25 kV Kharainti : (TS Rohtak).**	i. Creation of 1 No. 132 KV bay at 132 KV S/Stn. Chandi for 132 KV TSS Kharanti.	**SE/TS-Rohtak:-** **The work of bay for TSS Kharanti is being executed along with construction of 132 KV Chandi.** **The progress of 132 KV Chandi is as under:** **Latest Progress:** • T/F Plinth (02 Nos.) • Tower material received at site and erection work completed. • Stinging and stringing of bus and jumpering work completed. • Erection of ODSG completed**.** • Erection of Power T/F completed. • Tower foundation work completed. • Foundation of Station transformer completed. • Equipment Foundation completed • Control Cable laying completed. **Pending Material: Nil** **Pending Activity:** • Cable trench 5 % is balance. • Switch house building 5% is balance. • Roads, site surfacing -50% is balance. • Boundary wall, earth filling -15% is balance. • Misc. Civic Activity: 30 % is balance. **Electrical** • Earth mat work in progress. • Equipment earthing under progress. • Control cable termination under progress. • Witness of Testing by M&P team in progress. **Tentative date of completion:- 31.05.2019**
		ii. Const. of 132 KV S/C line from 132 KV S/Stn.Chandi to 132 KV TSS Kharanti (1.886 KM app.)	**Civil activities completed= 71.42 %** **Total material received= 60 %** **Total erection completed = 71.42 %** **Stub setting: 5/7 No.** **Tower erection: 5/7 No.** **Stringing: 0/ 1.566 KM** Route of the work approved by the competent authority Stub setting of TL No 3, 4, 5, 6 and 7 Completed. Erection work of TL No 3, 4, 5, 6 and 7 Completed. Meeting regarding resolving ROW was done with DC Rohtak on 25.02.2019. DC Rohtak endorsed the case of higher crop Compensation to SDM Meham. SDM Meham was approached on dated 08.03.2019 and all the relevant documents submitted to his office. DC Rohtak during meeting on 25.03. 2019 directed SDM Meham to resolve the matter on priority basis. The detailed file as desired by SDM Meham has been submitted during meeting on dated 27.03.2019 and 28.03.2019. The matter is again taken up with DC Rohtak on dated 02.04.2019, 16.04.2019, 18.04.2019 & 26.04.2019 and with SDM Meham on 22.04.2019 so that ROW can be resolved. **Tentative date of completion:- 31.05.2019**

2.	**132/25 kV TSS Kalanaur : (TS - Rohtak)** • Power supply from HVPNL GSS Kalanaur to Railway TSS Kalanaur by 4 Km Tr. Line Rs. 461 Lakh deposited with Tr. Line work on 04.001.2017. • Tr. Line 4.6 km, No. of foundations 18 Tower erection 18	i) Creation of 1 no. 132 kV bay at 132 kV S./Stn. Kalanaur.	**SE/TS Rohtak-** Work of bay completed and energized on 22.12.2018.
		ii) 132 kV line from 132 kV Substation Kalanaur to TSS Kalanaur.	**SE/TS Rohtak-** Work of line completed and energized on 22.12.2018.
3.	**132/25 kV TSS Manaharu : (TS - Rohtak)**	i) Creation of 1 no. 132 kV bay at 132 kV S./Stn. Kalanaur.	**SE/TS Rohtak-** Work of bay completed and ready for energization.

CE/ TS, HVPNL, Hisar:

Sr. No	Name of Transmission Line	Date of award / Contractual completion date	Likely date of completion	Status
1.	Construction of 2 phase 132 kV S/C line on D/C towers with 0.4 Sq ACSR conductor from 132 kV S/Stn., Kalanaur to 132 kV TSS Manheru. Funding : REC-159 District: Bhiwani Contractor: M/S Fedders Lloyd Ltd. Line length – 30 Km Total Location – 126 Cost (In Rs. Lacs): 1090 Planning Code 1D2832*	07.09.16/ 06.06.17	-	**Stub setting:-** **90/118** **Tower erection:-** **53/118** **Stringing:** **Nil/30 Km.** Work allotted to M/s Fedders Lloyd Ltd. vide contract No – HDP-2145 & 2146/ REC-159 / XEN / Project (TL) dated 26.08.2016. Presently the work is totally held up from last 6 months. **Pending Material:** 18 Nos. Towers, partial 70kN/120kN insulator strings, 8 Nos. post insulators and tower accessories are pending. **Pending Activities:** Stub setting: - 28 Nos. Tower erection: - 65 Nos. Stringing: 30 Km. **Bottlenecks:** Work progress remained intermittent and remained stopped for 3 to 4 months and work was restarted by the firm on dated 24.04.2018. Work is slow on part of M/s Fedders for want of construction material and labour issues. Presently the work is totally held

				up from last 4-5 months. **Likely date of completion i.e. 31.03.2019 was given as assured by M/s Fedder Electric & Engineers Limited in meeting dated 17.12.2018 at Shakti Bhawan and firm has assured to restart the work in 1st week of Jan 2019 but firm yet not start the work, case sent for termination of contract to Nigam authorities.**
2.	LILO of 132kV line from 220kV BBMB Hisar – 132kV Hansi Ckt - 1 at 132kV TSS Satrod and raising and shifting of 132kV BBMB Hisar – Hansi Ckt – 2. Funding : Deposit work of RVNL (REC-204) District : Hisar Contractor : M/s Aquarian Enterprises Line length –1.2 KM (Conductor) 1.8 KM (Cable) Cost(In Rs. Lacs) : 503.00	04.05.18/ 03.02.19	30.06.2019	**Stub setting:-** **07 / 07 No** **Tower erection:-** **02 / 07 No** **Stringing:** **0 / 1.2 KM (conductor)** **0/ 1.8 KM (Cable)** **HDPE pipe laid.** Work is very slow on part of the Contractor. Being perused regularly for timely completion as per schedule. Construction of cable trench is in progress. 132 KV XLPE Cable received at site. **Pending Material:** 1 No. DD+3 & 1 No. DD+6 Type extensions only, accessories for tower, cable & earthing etc. are pending. **Pending Activities:** Tower erection:- 5 No Stringing: 1.2 KM (conductor) 1.8 KM (Cable) **Bottlenecks:** RoW on TL No. 12 has arisen, as Nagar Nigam, Hisar has stopped the work of tower erection giving reason to get approval on their land due to under construction sewerage treatment plant (STP) adjacent to TSS Satrod. Matter being pursued. However, the matter with RVNL has been taken up to complete the following works required for completion of work: • The work of gantry which was supposed to be provided by RVNL has not been started till today. • Control room has not been constructed as per design of HVPNL to accommodate 3 No. 132kV C&R panels for LILO arrangement. • 132kV C&R panels and other accessories which were in the scope of RVNL has not been purchased till date. • No work is going on at site since 3 to 4 months and site is lying abandoned.

				The likely completion date i.e. 15.02.2019 could not be achieved due to slow progress of work by contractor as well as issues related to RVNL as stated above.
3.	LILO of 132kV Bhuna – Ukala line at 132kV TSS Uklana. Funding : Deposit work of Railway (REC-201) District : Fatehabad Contractor : M/s Raychem RPG Line length – 0.465 + 0.496 KM Cost(In Rs. Lacs) : 161.00	15.05.18/ 14.02.19	30.06.2019	**Stub setting for Gantry:-** **04/05 No** **Gantry erection:-** **0/ 05 No** **Stringing:-** **0/0.465 KM (conductor)** **0/ 0.496 KM (Cable)** Work of stubbing is in progress. However, supply through solid T-OFF has been given to Railways on dated 29.08.2018. **Pending Material:** Some of the hardware fittings & accessories are pending. **Pending Activities:** Stub setting for Gantry:- 01 Nos Gantry erection:- 05 Nos Stringing: 0.465 KM (conductor) 0.496 KM (Cable) **Bottlenecks:** Matter taken up with RVNL to resolve the following issues for early completion of work: • Excavation of casting of foundation of Gantry G-1 (Opposite side of TSS Uklana) is in progress, during excavation some cables of Railway found at the site of foundation of gantry and some cables found in the route of HDPE pipe for 132kV Power Cables. Both the cables of Railway required to be shifted. • 132kV loop in and loop out bays are required at TSS Uklana to provide the supply to TSS Uklana and to maintain continuity of supply of 132kV Bhuna- Uklana line. Even after the repeated communication by XEN/TS, HVPNL, Hisar, 132kV Loop in & Loop out bays are not constructed by RVNL at TSS Uklana till date. Without the availability of loop in loop out bays, LILO of said line at TSS Uklana could not be feasible. • To start the erection work of gantries, temporary gantry structure constructed by RVNL at TSS Uklana is required to be dismantled. The likely completion date i.e. 31.03.2019 could not be achieved due to slow progress of work by contractor as well as issues related to RVNL as stated above.

ANNEXURE VII

सत्यमेव जयते

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

संख्या: NRPC/OPR/106/02/5178-81 दिनांक: 21.05.2019

To,

1) GM, NRLDC, New Delhi
2) DGM (SO), Delhi SLDC, New Delhi
3) SE (SLDC), Haryana SLDC, Panipat
4) AGM, APCPL, Jhajjar

विषय: Minutes of meeting held on 14.05.2019 to discuss modalities regarding procedure when only one beneficiary is requesting for Unit to be on BAR.

उपरोक्त विषय पर दिनांक 14.05.2019 को उ.क्षे.वि.स. सचिवालय में आयोजित बैठक का कार्यवृत्त संलग्न है।

संलग्नक: यथोपरि

-sd-
(सौमित्र मज़ूमदार)
अधीक्षण अभियंता (प्रचालन)

Minutes of the meeting held on 14.05.2019 at NRPC Sectt. to discuss modalities regarding procedure when only one beneficiary is requesting for Unit to be on BAR

In pursuance of the decision taken in the 158th OCC meeting dated 23.04.2019, a meeting was held on 14.05.2019 at NRPC Sect., New Delhi to discuss modalities when only one beneficiary agrees to keep the machine on bar during off peak hours and subsequently its requested share of power during peak hours gets reduced when the second state punches requisition from the same machine on bar as per its entitlement. The list of participants for the meeting is enclosed as **Annexure-I**.

2. Member Secretary, NRPC welcomed all participants and mentioned that both Delhi and Haryana raised concern in the past when their requested schedule was not fulfilled from APCPL Jhajjar. MS, NRPC requested the representatives of NRLDC, Delhi, Haryana and APCPL Jhajjar to explain the matter.

3. GM, NRLDC explained that issue arises when only one beneficiary agrees to run the machine at Technical Minimum during off-peak in order to meet its requirement during peak period. The other beneficiary does not request for power initially; but later during exigency, punches requisition from the same running machine as per its entitlement, due to which requested schedule of the first beneficiary is not fulfilled. It was mentioned that such problems have been faced by both Delhi and Haryana at different points of time. Further, it was stated that beneficiaries are entitled to get proportional schedule on running units as per IEGC. However, it would be ethical that the entity agreeing to run the unit by ensuring technical minimum during low demand hours should get requested power during high demand period.

4. Representative of APCPL explained that there are 3 machines in APCL Jhajjar each having 500MW installed capacity and ex-bar capacity of 471.25 MW. Haryana and Delhi both have share of 46.2% in Jhajjar (i.e., 217.7 MW in each machine). Technical Minimum of each machine is 259.18 MW.

5. Representative from TPDDL suggested to establish documented procedure that can be followed by both beneficiaries so that scheduling can be done transparently.

6. Decisions taken in the meeting are as under:

i. In case only one beneficiary wants to keep the machine(s) on bar and agrees to provide technical minimum schedule for the same during off peak hours, he would have the first right to schedule power up to the DC on bar of the machine or Entitlement of the beneficiary from that machine, whichever is lower.

ii. In case the other beneficiary wishes to schedule power from the machine in which it had surrendered power, consent of the beneficiary on whose request the machine has been kept on bar would be required. For this purpose, SLDCs shall adopt a uniform SOP. The SLDC (A) which wishes to schedule power shall send the mail, stating the quantum and duration of power required, to the SLDC (B) which was providing technical minimum schedule. After obtaining consent from its DISCOMs, SLDC (B) shall give its consent to SLDC (A) to punch the agreed schedule in WBES of NRLDC. SLDC (A) shall punch the schedule in

WBES only after obtaining this consent through mail and forwarding it to NRLDC. Consent of SLDC (B) would also be required in case URS is available in the machine on bar.

iii. In case SLDC (B) does not give consent, SLDC (A) may request NRLDC to bring the other unit(s) of APCPL Jhajjar on bar. In this scenario, SLDC (A) shall wait till the start-up time of other unit before it can punch its requisition in WBES.

iv. No changes would be made in the WBES software of NRLDC to prevent SLDC (A) from punching requisition up to its entitlement from the machine on bar.

v. All stakeholders are expected to behave ethically and follow this mutually agreed procedure to avoid scheduling related issues.

***

List of participants for the meeting to discuss regarding procedure when only one beneficiary is requesting for Unit to be on BAR.

Date: 14.05.2019

Sl No	Name	Designation	Organization	Tel. No. / Mobile No.	E-mail
1	Rajesh Kumar	Manager	NRLDC	9560032972	r.kumar@posoco.in
2	Ashutosh Kumar Pandey	Asst. Manager	NRLDC	9599111272	ashutosh.pandey@posoco.in
3	ABHISHEK JAIN	DGM	APCPL JHAJJAR	9729042596	abhishekjain@ntpc.co.in
4	P. MEDIRATTA	AGM	APCPL JHAJJAR	9416212411	pmedivatta@ntpc.co.in
5	SHREYANS NAVAL	Sr. Manager	BRPL	9312518646	shreyans.naval@relianceada.com
6	ARVIND CHAUDHRY	Xen/SO	HPPC, Hamirpur	9357189063	UCRPANCHKULA18@gmail.c
7	Mukesh Dadhich	As VP	BYPL	9350261451.	mukesh.dadhich@relianceada.com.
8	NAVEEN GOEL	Manager	Delhi SLDC	9999533950	naveengoel06@gmail.com
9	SANDEEP KUMAR	Sr. Manager	TPDDL	9971194097	Sandeep.K@Tatapower-DDL.com
10	SUJATA GURUJI	Sr. Manager	TP-DDL	9971395315	sujata.guruji@tatapower-ddl.com
11.	N.K. MAKKAR	PC(SLDC	HVPNL SLDC	9466219042	sldchayana@gmail.com

Sl No	Name	Designation	Organization	Tel. No. / Mobile No.	E-mail
11	P. Devanand	Addl. GM	TPDDL	9971800506	P.devanand@tatapower-ddl.com
12	राजीव पोरवाल	महाप्रबंधक	NRLDC,	9871581133	rk.porwal@posoco.in
13	M. M. Hassan	GM	NRLDC	9810952965	mm.hassan@posoco.in
14	H K Chawla	Sr GM	NRLDC	9650086711	hk.chawla@posoco.in
15					
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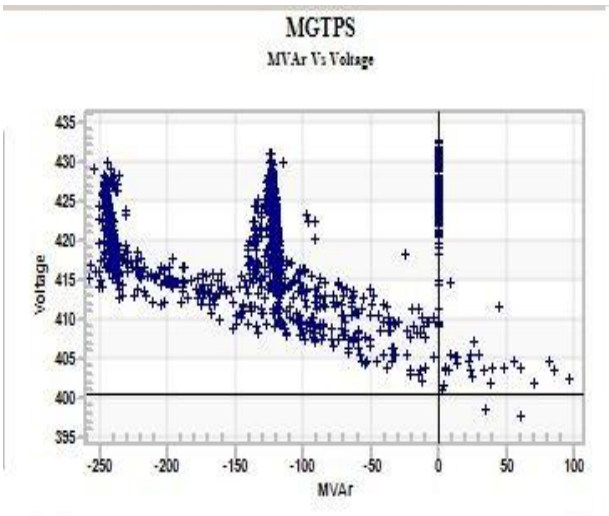
Annexure-1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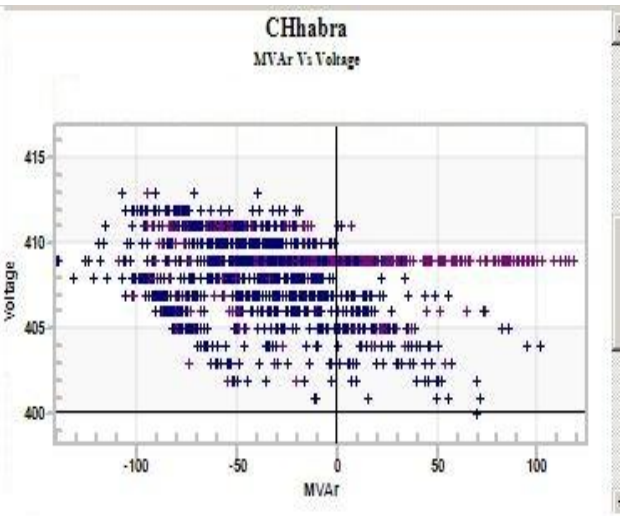
MVAr Vs Voltage
Voltage
MVAr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MVAr Vs Voltage
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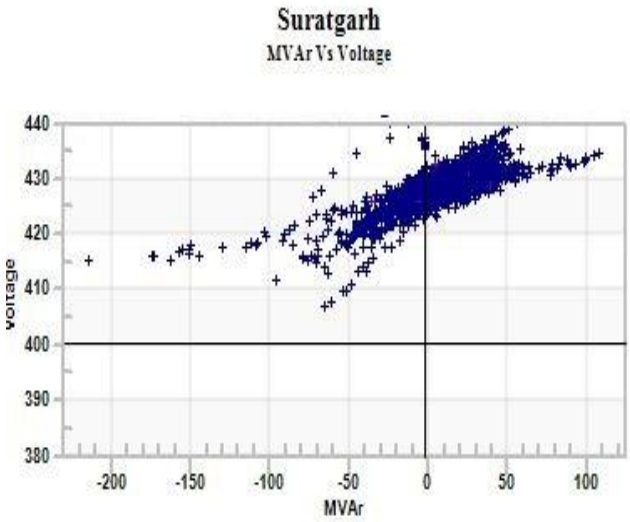
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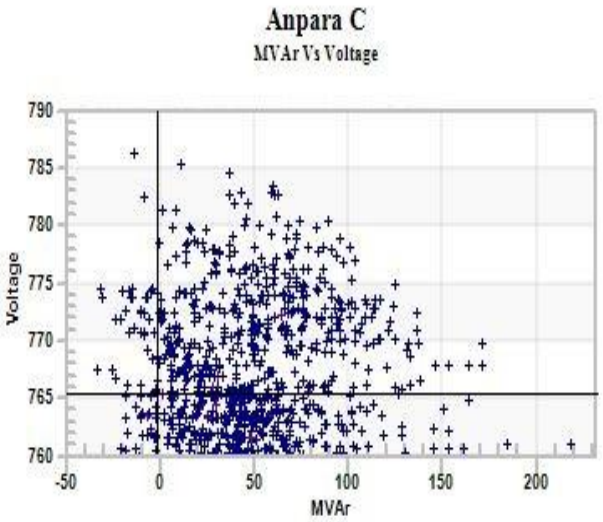
MVAr Vs Voltage
voltage
MVAr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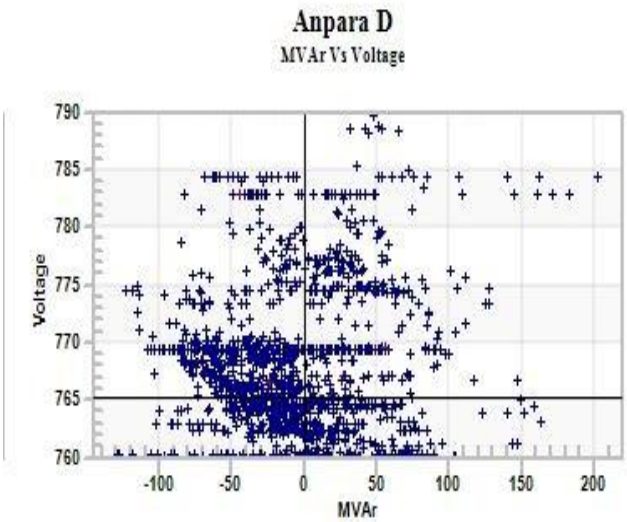
MVAr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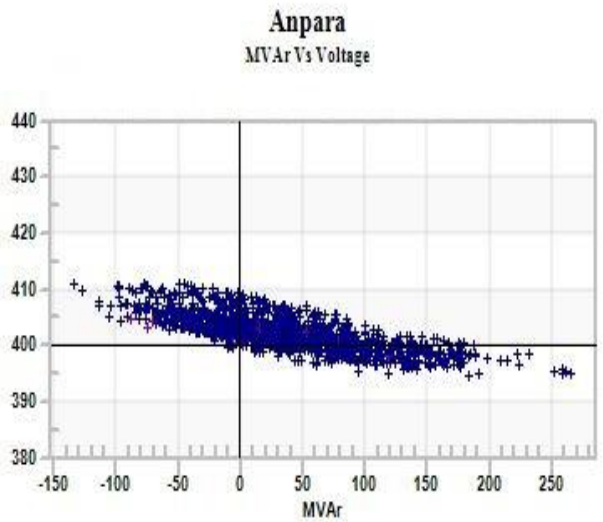
MVAr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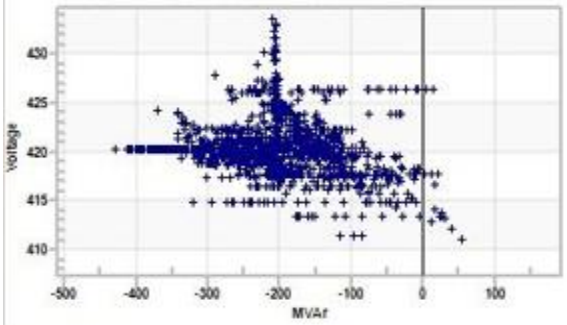
MVAr Vs Voltage
MVAr

Rajpura

MVAr Vs Voltage



Tahwandi Saboo

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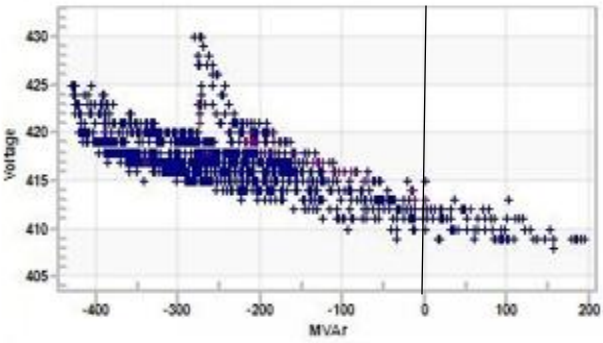

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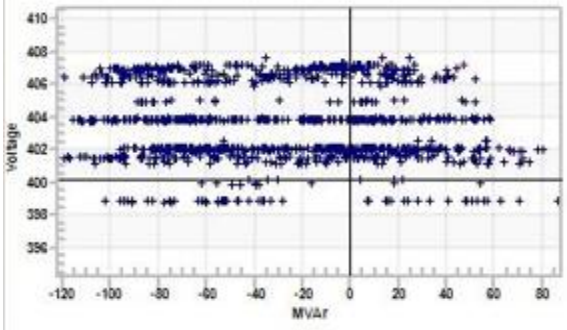

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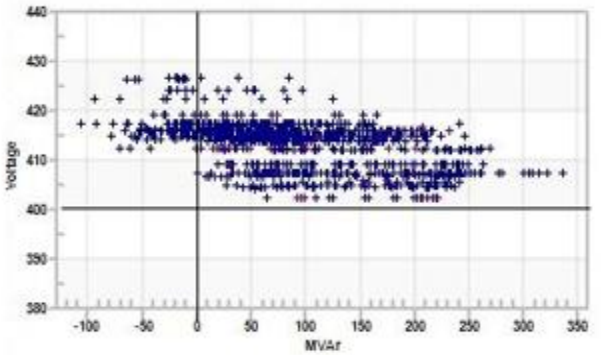

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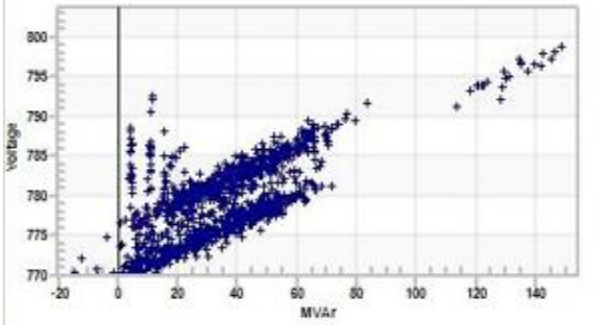

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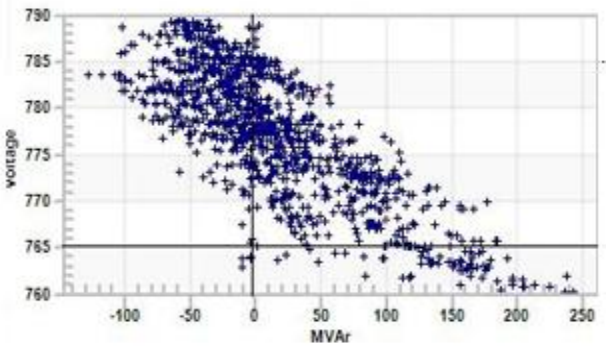

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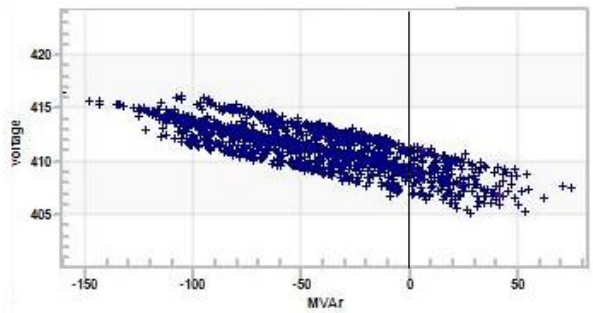

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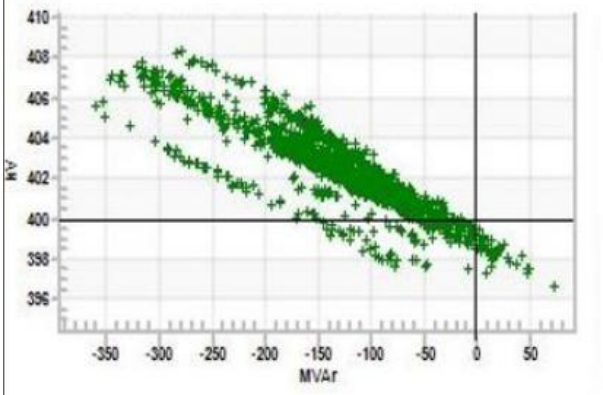

Singrauli

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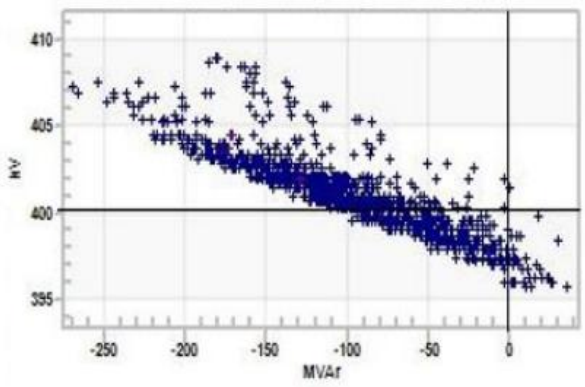

Jhajjar

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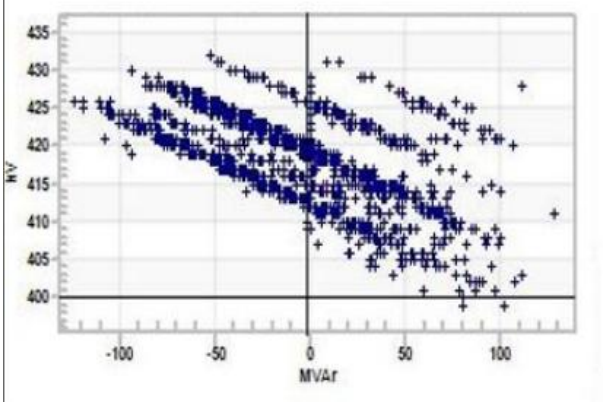

Dadri (4*210)

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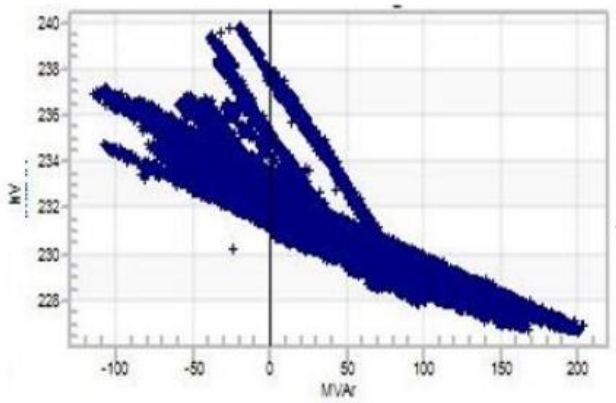

Dadri (2*490)

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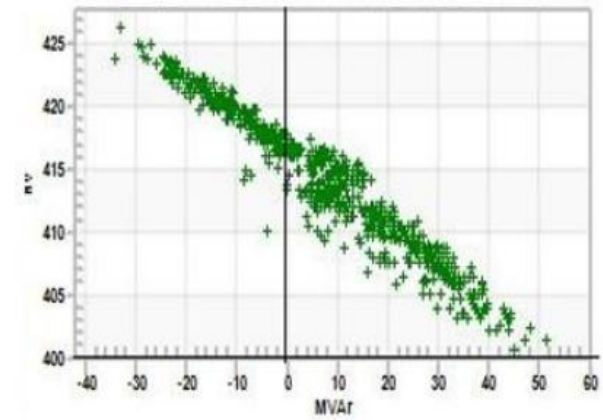

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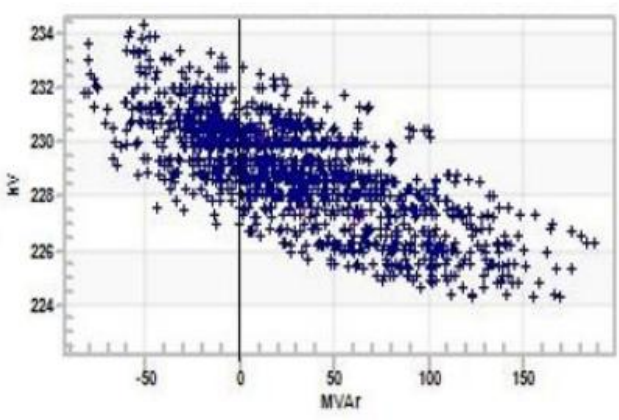

ANNEXURE - 2

Generation Projection (July2019 - Sep 2019)

				Generation declared Commercial from 1st Oct'18 to 31st Mar'19					Generation declared/expected to be declared Commercial from 1st Apr'19 to 30th June'19								
Sl. No.	Entities	Region	Projections based on 3 Years Data	Bus Name	Unit No.	Installed Capacity	Gen. considered	Sub Total	Bus Name	Unit No.	Installed Capacity	Gen. considered	Sub Total	TOTAL	Comments From DICs /Others (if any)	Figure as per Comments/ PoC Data	Projected Generation before normalization w.r.t projected All India Peak Demand
			(MW)			(MW)	(MW)	(MW)			(MW)	(MW)	(MW)	(MW)			(MW)
1	Uttar Pradesh	NR	9508						Meja	1	660	432	432	9940			9940
2	Delhi	NR	1401											1401	As data given by Delhi	1092	1092
3	Haryana	NR	2750											2750			2750
4	Uttarakhand	NR	1004											1004			1004
5	Punjab	NR	6139											6139			6139
6	Rajasthan	NR	7968						Chhabra SCTPP	6	660	432	432	8400			8400
7	Himachal Pradesh	NR	1051											1051	As data given by H.P.	909	909
8	Jammu & Kashmir	NR	1063											1063			1063
9	BBMB	NR	2457											2457	As per data given by BBMB	2469	2469
10	Chandigarh	NR	0											0			0
11	Railways	NR	0											0			0
12	Dadri Thermal	NR	1717											1717	As per data given by NTPC	500	500
13	Rihand	NR	2919											2919		2807	2807
14	Singrauli	NR	1777											1777		1863	1863
15	Unchahar	NR	969											969		1400	1400
16	Auraiya	NR	313											313		150	150
17	Dadri CCPP	NR	662											662		300	300
18	NAPS	NR	368											368	As per data given by NAPS	440	440
19	Jhajjar	NR	1434											1434	As per data given by Jhajjar	1414	1414
20	DHAULIGANGA	NR	292											292	As per NHPC	280	280
21	Tanakpur	NR	99											99		97	97
22	Koteshwar	NR	407											407			407
23	Tehri	NR	1024											1024			1024
24	Anta	NR	257											257	As per data given by NTPC	150	150
25	RAAP B	NR	379											379			379
26	RAPP C	NR	440											440			440
27	AD Hydro	NR	242											242			242
28	Everest	NR	105											105			105

Generation Projection (July2019 - Sep 2019)

				Generation declared Commercial from 1st Oct'18 to 31st Mar'19					Generation declared/expected to be declared Commercial from 1st Apr'19 to 30th June'19								
Sl. No.	Entities	Region	Projections based on 3 Years Data	Bus Name	Unit No.	Installed Capacity	Gen. considered	Sub Total	Bus Name	Unit No.	Installed Capacity	Gen. considered	Sub Total	TOTAL	Comments From DICs /Others (if any)	Figure as per Comments/ PoC Data	Projected Generation before normalization w.r.t projected All India Peak Demand
			(MW)			(MW)	(MW)	(MW)			(MW)	(MW)	(MW)	(MW)			(MW)
29	Karcham Wangtoo	NR	1172											1172			1172
30	Bairasul	NR	180											180		120	120
31	Chamera 1	NR	554											554	As per NHPC	540	540
32	Chamera 2	NR	309											309		304	304
33	Chamera 3	NR	251											251		231	231
34	Naptha Jhakri	NR	1635											1635	As per data given by SJVN	1605	1605
35	Lanco Budhil	NR	75											75			75
36	DULHASTI	NR	414											414		390	390
37	Salal	NR	713											713		690	690
38	Sewa-II	NR	133											133	As per NHPC	129	129
39	URI 1 HPS	NR	512											512		480	480
40	URI II HPS	NR	243											243		240	240
41	Sree Cement	NR	251											251			251
42	Parbati III	NR	528											528	As per NHPC	520	520
43	Rampur HEP	NR	459											459	As per data given by SJVN	442	442
44	KOLDAM	NR	876											876		792	792
	Rosa Power	NR															0
	Kishanganga	NR	224											224	As per NHPC	330	330
	Sainj HEP	NR	134											134			134
	TOTAL		55408										864	56272			54211

Note:

1. Projections are based on monthly maximum injection in the last 3 years from actual metered data.
2. Generation forecast has been done based on the following criteria
(i) If there is an increasing trend then last year average generation has been considered
(ii) Otherwise average of past three year average generation has been considered
3. In case of new generators where past data was not available following has been assumed
(i) 1.0 plf for hydro generators
(ii) 0.7 plf for thermal generators.
(iii) 0.3 plf for gas stations

DEMAND FORECAST USING PAST 3 YEARS DATA (July2019 - Sep 2019)

										1	2	3	4		
	2016-17			2017-18			2018-19								
	Jul-16	Aug-16	Sep-16	Jul-17	Aug-17	Sep-17	Jul-18	Aug-18	Sep-18	2015-16 Average	2016-17Average	2017-18 Average	Projected Demand for (July2019 - Sep 2019) before normalization	Data given by DICs	Comments
Chandigarh	358	350	313	363	335	287	368	338	293	340	328	333	327		
Delhi	6,261	5,707	5,301	6,121	6,129	5,661	7,016	5,937	5,358	5,756	5,970	6,104	6,291	6295	As data given by Delhi
Haryana	9,262	8,984	9,109	9,539	9,501	8,932	10,270	9,415	9,008	9,118	9,324	9,564	9,782		
Himachal Pradesh	1,297	1,293	1,329	1,346	1,369	1,413	1,471	1,479	1,466	1,306	1,376	1,472	1,550	1478	As data given by HP
Jammu & Kashmir	1,950	2,008	1,975	2,114	2,137	2,163	2,113	2,276	2,361	1,978	2,138	2,250	2,394		
Punjab	11,408	11,204	10,543	11,705	11,074	9,939	12,638	12,012	11,405	11,052	10,906	12,018	12,292		
Rajasthan	9,168	7,807	9,816	9,795	10,293	9,900	11,057	11,354	10,612	8,930	9,996	11,008	12,055		
Uttar Pradesh	15,154	14,690	15,457	17,394	17,719	17,902	19,353	19,086	18,121	15,100	17,672	18,853	20,961		
Uttarakhand	1,907	1,888	1,942	1,971	1,987	2,033	2,143	2,096	1,996	1,912	1,997	2,078	2,162		

Notes

1. Projections are based on the past 3 years' monthly Peak Demand Met data available on the website of CEA
2. The above projections are being done for financial year 2019-2020 (Q2) i.e July 2019- Sep 2019
3. Projections are being done based on the forecast function available in MS Office Excel
4. CEA Reports can be accessed from the following links:

http://www.cea.nic.in/reports/monthly/powersupply/2018/psp_peak-07.pdf
http://www.cea.nic.in/reports/monthly/powersupply/2018/psp_peak-08.pdf
http://www.cea.nic.in/reports/monthly/powersupply/2018/psp_peak-09.pdf
http://www.cea.nic.in/reports/monthly/powersupply/2017/psp_peak-07.pdf
http://www.cea.nic.in/reports/monthly/powersupply/2017/psp_peak-08.pdf
http://www.cea.nic.in/reports/monthly/powersupply/2017/psp_peak-09.pdf
http://www.cea.nic.in/reports/monthly/powersupply/2016/psp_peak-07.pdf
http://www.cea.nic.in/reports/monthly/powersupply/2016/psp_peak-08.pdf
http://www.cea.nic.in/reports/monthly/powersupply/2016/psp_peak-09.pdf

ANNEXURE - 3

S.No	Station	Location	Owner	Unit No	Capacity (MW)	Reason(s)	Outage Date	Expected Revival Date
1	Bairasiul HPS	HP	NHPC	3	60	For renovation and Modernisation of the plant	15/10/2018	06-05-19
2	Bairasiul HPS	HP	NHPC	2	60	For renovation and Modernisation of the plant	15/10/2018	31/08/2019
3	Bairasiul HPS	HP	NHPC	1	60	For renovation and Modernisation of the plant	15/10/2018	06-05-19
4	Dehar HPS	HP	BBMB	2	165	Capital Maintenance	28/01/2019	05-09-19
5	Dehar HPS	HP	BBMB	1	165	Capital Maintenance	28/01/2019	05-09-19
6	Pong HPS	HP	BBMB	2	66	Renovation and Modernization.	14/02/2019	31/05/2019
7	Bhakra-L HPS	HP	BBMB	3	108	Renovation and Modernisation of unit(capacity enhancement from 108 to 126 MW)	04-01-19	12-09-19
8	Bhakra-L HPS	HP	BBMB	4	108	Runner modification and Annual Maintenance.	04-04-19	31/05/2019
9	Koteshwar HPS	UTTRAKHAND	THDC	1	100	Annual maintenance. .	04-09-19	05-09-19
10	Pong HPS	HP	BBMB	3	66	Annual maintenance.	04-09-19	05-09-19
11	Kishanganga HEP	JK	NHPC	3	110	Problem in cooling water system	23/04/2019	*
12	Kishanganga HEP	JK	NHPC	2	110	Problem in cooling water system	26/04/2019	*
					1178			

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
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Mr. Pinaki Mukherjee, Sr. DGM, Commercial – 09871391388, Email id: Pinaki.mukhejee@larsentoubro.com

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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