सत्यमेव जयते

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

सं: उ.क्षे.वि.स./प्रचालन/106/01/2019/6174-6215 दिनांक: 14/06/2019

**विषय:** प्रचालन समन्वय उप-समिति की 160वीं बैठक का कार्यसूची ।
**Subject:** Agenda of 160th OCC meeting.

प्रचालन समन्वय उप-समिति की **160**वीं बैठक दिनांक **18-06-2019** को **10:00** बजे से उ.क्षे.वि.स. सचिवालय, नई दिल्ली में आयोजित की जाएगी। उक्त बैठक की कार्यसूची उत्तर क्षेत्रीय विद्युत समिति की वेबसाइट http://www.nrpc.gov.in पर उपलब्ध है।

160th meeting of the Operation Co-ordination sub-committee will be held on **18-06-2019** at **10:00am** at NRPC Secretariat, New Delhi. The agenda of this meeting has been uploaded on the NRPC web-site http://www.nrpc.gov.in.

It is requested that the updated status of various points under follow-up action points of previous OCC meeting may kindly be furnished prior to the meeting.

Kindly make it convenient to attend the meeting.

(सौमित्र मजूमदार)
अधीक्षण अभियंता ( प्रचालन)

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

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**Part-A NRPC**

## 1. Confirmation of Minutes

The minutes of the 159th OCC meeting held on 14.05.2019 and 15.05.2019 at NRPC Secretariat, New Delhi were issued vide letter of even number dated 29.05.2019.

No comment on the minutes has been received from any of the members till date.

**The sub-committee may kindly confirm the Minutes.**

## 2. Review of Grid operations of May, 2019

### 2.1 Supply Position (Provisional) for May, 2019

Anticipated Power Supply Position v/s Actual Power Supply Position (Provisional) of Northern Region during the month of May, 2019 is as given below:

| State | Req. / Avl. | Anticipated (MU) | Actual (MU) | Variation | Anticipated (MW) | Actual (MW) | Variation |
|---|---|---|---|---|---|---|---|
| Chandigarh | Avl. | 185 | 154 | -16.76% | 370 | 356 | -3.78% |
| | Req. | 175 | 154 | -12.00% | 370 | 356 | -3.78% |
| Delhi | Avl. | 3320 | 3366 | 1.39% | 6980 | 6461 | -7.44% |
| | Req. | 3600 | 3366 | -6.50% | 6750 | 6461 | -4.28% |
| Haryana | Avl. | 5600 | 4907 | -12.38% | 9880 | 8874 | -10.18% |
| | Req. | 4510 | 4907 | 8.80% | 8420 | 8874 | 5.39% |
| Himachal Pradesh | Avl. | 830 | 863 | 3.98% | 1460 | 1480 | 1.37% |
| | Req. | 860 | 872 | 1.40% | 1510 | 1480 | -1.99% |
| Jammu & Kashmir | Avl. | 1470 | 1424 | -3.13% | 2440 | 2426 | -0.57% |
| | Req. | 1700 | 1760 | 3.53% | 3090 | 2426 | -21.49% |
| Punjab | Avl. | 6570 | 4769 | -27.41% | 9670 | 8802 | -8.98% |
| | Req. | 5290 | 4769 | -9.85% | 10510 | 8802 | -16.25% |
| Rajasthan | Avl. | 8740 | 7110 | -18.65% | 16440 | 11791 | -28.28% |
| | Req. | 7580 | 7120 | -6.07% | 12120 | 11791 | -2.71% |
| Uttar Pradesh | Avl. | 13350 | 12695 | -4.91% | 18950 | 21493 | 13.42% |
| | Req. | 12050 | 12695 | 5.35% | 20800 | 21493 | 3.33% |
| Uttarakhand | Avl. | 1300 | 1329 | 2.23% | 2140 | 2155 | 0.70% |
| | Req. | 1290 | 1329 | 3.02% | 2140 | 2155 | 0.70% |
| NR | Avl. | 41365 | 36017 | -12.93% | 68330 | 60078 | -12.08% |
| | Req. | 37055 | 36374 | -1.84% | 65710 | 60987 | -7.19% |

As per above, it has been observed that there are higher variations (i.e. > 5.0%) in the Anticipated vis-à-vis Actual Power Supply Position (Provisional) for the month of May 2019 in terms of Energy Requirement for Chandigarh, Delhi, Haryana, Punjab, Rajasthan & Uttar Pradesh and in terms of Peak Demand for Haryana, J&K and Punjab. **These states are requested to submit reason for such variations so that the same can be deliberated in the meeting**.

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

### 2.2 Power Supply Position of NCR

NCR Planning Board (NCRPB) is closely monitoring the power supply position of National Capital Region. Monthly power supply position for NCR till the month of May 2019 is placed on NRPC website. (http://nrpc.gov.in/operation-category/power-supply-position/).

## 3. Maintenance Programme of Generating Units and Transmission Lines

### 3.1. Maintenance Programme for Generating Units.

The meeting on proposed maintenance programme for Generating Units for the month of July 2019 is scheduled on 17.06.2019 at NRPC Secretariat, New Delhi.

### 3.2. Outage Programme for Transmission Elements.

The meeting on proposed outage programme of Transmission lines for the month of July 2019 is scheduled on 17.06.2019 at NRPC Secretariat, New Delhi.

## 4. Planning of Grid Operation

### 4.1. Anticipated Power Supply Position in Northern Region for July 2019

The Anticipated Power Supply Position in Northern Region for July 2019 is enclosed at **Annexure-I.**

SLDCs are requested to update their estimated power supply position for July 2019 and measures proposed to be taken to bridge the gap between demand & availability, as well to dispose of the surplus, if any, in the prescribed format.

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

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

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

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

6.1 **In the 38th TCC & 41st NRPC 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 nos. of 220 kV bus reactors and 18 nos. of 400 kV bus reactors, subject to availability of space.

6.2 **POWERGRID:**

500 MVAr TCR at Kurukshetra: Award placed in January 2019 with completion schedule of 22 months.

11 nos. of 400 kV Bus Reactor and 6 nos. 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 been floated and Bid Evaluation is under Process. LoA is likely to be placed by end of June 2019.

**POWERGRID may update on any further progress made.**

6.3 **DTL:**

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

| S.No. | Sub Station | Voltage level (kV) | Reactor (MVAr) | Status (as per 42nd TCC & 45th NRPC meeting) |
|---|---|---|---|---|
| 1 | Peeragarhi | 220 | 1x50 | NIT to be floated by end of June 2019. |
| 2 | Mundka | 400 | 1x125 | |
| | | 220 | 1x25 | |
| 3 | Harsh Vihar | 220 | 2x50 | |
| 4 | Electric Lane | 220 | 1x50 | Approval from the competent authority expected to be obtained by July 2019. |
| 5 | Bamnauli | 220 | 2x25 | |
| 6 | Indraprastha | 220 | 2x25 | |
| **TOTAL** | | | **450** | |

**DTL may kindly update on any further progress made.**

**6.4 PSTCL:**

In the 42nd TCC and 45th NRPC meeting, it was informed that sanction order for PSDF funding has been issued to PSTCL and re-tendering has already been done with bid opening date as 08.07.2019.

**PSTCL may kindly update on any further progress made.**

**6.5 Uttarakhand:**

**125 MVAr reactors at Kashipur**: 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 and the proposal is under DPR formation stage.

**PTCUL may kindly update.**

**6.6 Rajasthan:**

The status as updated in the 158th OCC dt. 23.04.2019 meeting is placed below:

| Item | Background | Status (As per 42nd TCC & 45th NRPC meeting) |
|---|---|---|
| **3 Nos. each of 25 MVAr (220 kV) reactors for Akal, Bikaner & Suratgarh.** | - | PSDF funding sanctioned.<br>Tendering under process. |
| **1 No. of 25 MVAr (220 kV) reactor for Barmer& 125 MVAr (400 kV) reactor for Jodhpur, included in 450 MVAr (13x25 + 1x125 MVAr) proposal** | Revised DPR for 450 MVAr approved Reactor after separating STATCOM was submitted vide letter dt. 12.10.2018 to POSOCO for approval. | RVPN submitted reply to the sought clarifications.<br>TESG has examined the same and put up for approval of Appraisal Committee. |

**Rajasthan may kindly update.**

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

7.1 In the 38th TCC & 41st NRPC meeting dt. 27th & 28th February 2018, it was decided to conduct capacitor requirement study of NR at 11/33 kV level from CPRI so as to obtain the true requirement of capacitor for FY 2019-20. In the subsequent NRPC meeting, approval was given to the Techno-Commercial offer of CPRI of Rs. 32 Lakh (excluding taxes) for conducting the capacitor study and the format for data submission was shared amongst the members.

7.2 In the 150th OCC meeting dt. 21.08.2018, members expressed concerns on the nature of the format. Accordingly, CPRI made a detailed presentation in the 151st OCC meeting and format was revised based on the received inputs & sent to respective SLDCs on 24.09.2018.

7.3 Utilities had been regularly pursued for the submission of data; however, data received from the utilities were mostly not in line with the requirement of CPRI.

7.4 Even after regular persuasion in the OCC meetings, sample data has been received only from **Delhi, Haryana, Punjab and HP**.

7.5 In the 42nd TCC and 45th NRPC, members expressed concerns over non-submission of even sample data by the states. In the meeting all member states were requested to submit the data in a time bound manner latest by **30.06.2019**.

7.6 States which would not be able to submit the data by 30.06.2019, CPRI would be approached for collection of data of their states (based on the acceptance of CPRI) and the expenditure would be booked to the respective states.

7.7 MS, NRPC in the meeting stated that efforts being put by individual states would not be allowed to go in vain because of non-submission of data by some other state and CPRI would be requested to explore for the separate study of each state (whosoever submits the data in time).

**All utilities may kindly update.**

## 8. Phase nomenclature mismatch issue with BBMB and interconnected stations

8.1. The issue of phase nomenclature mismatch of BBMB and interconnected stations was highlighted while discussing multiple elements tripping at 400/220/132kV Dehar HEP of BBMB in its 34th meeting held on 21.04.2017. Thereafter, it was decided that BBMB should modify phase sequencing at Dehar as Y-B-R instead of R-Y-B.

8.2. On the request of BBMB, a committee comprising of BBMB and its partner states, utilities with which BBMB has interconnection, NRPC Secretariat and POWERGRID was formed.

8.3. The committee had deliberated the draft action plan submitted by BBMB for the rectification of the phase nomenclature issue. POWERGRID had certain reservations on the action plan and stated that there might be some issues in the work such as **design constraint of tower, de-stringing and re-stringing of conductors etc.** for which it was proposed to conduct a site visit of the committee.

8.4. Accordingly, a site visit was held on 27.05.2019 and 28.05.2019 to resolve the issues at Bhiwani, Rajpura, Panchkula & Panipat S/s. The Minutes of the site visit is enclosed as **Annexure-II**.

8.5. However, in the **42nd TCC and 45th NRPC meeting**, POWERGRID representative informed that they were of the view that rather than going for the work as proposed by the committee in the Minutes of the site visit, the issue could be resolved by rewiring CT/PT at the secondary side. NRPC was of the view that if the quantum of work could be reduced by the action being proposed by POWERGRID, it could be thought of and advised POWERGRID to formulate the action plan involving all the concerned parties and submit the same by 30.06.2019 to NRPC Sectt. so that the same could be implemented in a time bound manner.

**POWERGRID may kindly update.**

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

The updated status of Agenda items is enclosed at **Annexure-III. All utilities are requested to update the status.**

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

The updated status of FGD installation is attached at **Annexure-IV. All utilities are requested to regularly update the status.**

## 11. System Protection Scheme (SPS) in NR

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

11.1.1. The Mock test of 765kV Agra-Gwalior SPS has been conducted on 01.05.2019. In a separate meeting held on 23.05.2019 at NRPC Sectt. through video conferencing, the deficiencies observed during the mock test was brought out and the utilities concerned were asked to resolve the same at the earliest. Also, in the meeting it was decided that in the 160th OCC meeting, all the concerned states shall give presentation on the deficiencies which were observed at the time of mock test and their present status.

**Punjab, Haryana, Rajasthan, UP and Delhi may give presentation.**

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

11.2.1. In the 159th OCC meeting, it was decided that mock test 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.

**UPSLDC / UPRVUNL may kindly update the status.**

11.3 **SPS for Kawai – Kalisindh - Chhabra generation complex**:

11.3.1. In the 156th OCC meeting, it was intimated that Rajasthan has requested to review the SPS scheme for Kawai-Kalisindh-Chhabra generation complex upon commissioning of 400kV CTPP-Anta feeder.

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

11.3.3. In the 159th OCC meeting, NRLDC representative stated that the issue was discussed with Rajasthan officials. 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 Kawai.

11.3.4. Rajasthan vide e-mail dated 23.05.2019 has submitted the dynamic data of CTPP Chhabra, CSCTPS Chhabra and Kalisindh. However, NRLDC has informed that the dynamic data as submitted by Rajasthan could not be utilised for modelling. Also, revised SPS study and the expected network configuration for future scenario has not been submitted by Rajasthan.

**Rajasthan may kindly update.**

## 12. Automatic Demand Management System

12.1. 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 over-drawal 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.**<br>At SLDC level, 96 feeders of 66 kV are operational.<br>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.**<br>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.<br>ADMS functionality at 11 kV feeders from 33/11 kV substation is under the jurisdiction of the DISCOMs and matter is being perused with DISCOMs authorities |
| **UP** | **Not fully implemented.**<br>Remote operation of 50 feeders at 132 kV level being operated from SLDC.<br>For the down below network, issue taken up with the DISCOMs. |
| **Haryana** | **Not implemented.** |

**SLDCs/SEBs/DISCOMs are requested update the status**.

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

13.1 Based on the recommendations of the Enquiry Committee on grid disturbances on 30th & 31st July 2012, utilities of NR were requested to take necessary action and submit compliance/status report to NRPC. In the 8th NPC meeting held on 30.11.2018, the non-submission of implementation status related information was highlighted and serious concern was shown. In the subsequent OCC meetings,

utilities were requested to submit the requisite information regarding implementation of recommendations of Enquiry Committee. 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 | | |

**UP, HP and NTPC (NR-HQ), HVPNL, Chandigarh and J&K are requested to kindly update the status.**

## 14. Cyber Security Preparedness Monitoring

14.1 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.

The updated status on aforementioned cyber security action points is enclosed as **Annexure-V(A)**. **All utilities are requested to update the status**.

14.2 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. The updated status of VAPT and cyber security audit is enclosed as **Annexure-V(B)**.

**All utilities are requested to update the status of VAPT conducted in their respective organization and VAPT plan for the future.**

14.3 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.

**POWERGRID is requested to update the status of draft CMP**.

14.4 In the 42nd TCC and 45th NRPC meeting, in response to the request by TCC for sharing some guidelines to be followed by all the STUs for ensuring compliance, PGCIL informed that the guidelines had already been issued by CERT-In and they were also following the same. Further, PGCIL advised all the STUs to comply with ISO 27001, which covers to a large extent the requirements mandated.

**Members may kindly note.**

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

15.1 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$^{o}$C for terminal equipment ratings of both ends of the lines. As there is a scope for considering temperature adjusted thermal ratings for these lines in the PSSE studies, NRCE has decided to finalize the methodology for computation of TTC/ATC/TRM taking into account variation in thermal capability of lines w.r.t. variation of ambient temperature.

15.2 All STUs and transmission licensees had been 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.

**All STUs and transmission licensees, except HVPNL, are requested for expeditious submission of information.**

## 16. Expediting construction of 132kV supply for railway traction substation for railway electrification projects in states in NR region

16.1 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.

16.2 In the 159th OCC meeting, HVPN has submitted the status (Annexure VI of minutes) of the ongoing works for railway traction substations.

**UP, Punjab and J&K 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.**

## 17. 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

17.1 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 Rihand-Dadri HVDC is run on single pole in ground return mode.

17.2 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*).

17.3 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.

17.4 Accordingly, 2nd meeting of the committee was held on 30.05.2019 at NRPC Sectt, New Delhi. Following was concluded in the meeting:

i. POWERGRID is requested to explore/accommodate the possibility of conducting

study on the subject issue in the existing contract of Refurbishment of Rhand-Dadari HVDC System. POWERGRID to intimate the status within 2 weeks.

ii. In case of non-feasibility of (i), NTPC may approach any academic institution like IIT or similar professional institution for conducting the study. NTPC expressed concerned over the limitation of data for study input. Representative of CEA, NRLDC and POWERGRID confirmed to cooperate and share available data.

iii. POWERGRID is requested to compare the present earth electrode data (by collecting the same during outage of one pole) with respect to design data under mono pole operation. POWERGRID agreed for the same subject to availability of old design data.

iv. Regarding contingency measures, NTPC requested for making effort to limit the power flow to 300MW in case of mono polar operation of HVDC Rihand-Dadari line so that neutral current of GT is limited. NRLDC highlighted the limitation of reduced power flow during mono pole operation in view of system requirement; however, agreed to limit the power flow to extent possible, keeping the network security aspect. As regards the planned shutdown, it is decided that outage of one pole of Rihand-Dadri may be given when both units of stage-Ill of Rihand or both units of stage-IV of Vindhyachal are not planned for outage, so that neutral current is shared among the GTs of these units.

**This is for kind information of the members.**

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

18.1 As per 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.

18.2 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.

18.3 In the 159th OCC meeting, NRLDC has intimated that the data submitted by the states have been depleted further. Thereafter, a separate meeting was conducted on 23.05.2019 at NRPC Sectt., wherein all the SLDCs were advised to get their SCADA data thoroughly checked and bring out the deficiencies along with the remedial measures so as to improve the data availability. It was also decided that all the SLDCs shall make a presentation in the next OCC (160th OCC) meeting.

**SLDCs to make a presentation.**

18.4 Utilities had been requested to update the progress as per following details in the past OCC meetings:

| States | UFR | df/dt | Status as per the 151st OCC meeting | Remarks | Data Availability |
|---|---|---|---|---|---|
| **J&K** | No | No | | | |
| **UP** | Yes | Yes | Following are provided since last status:<br>• Feeder wise planned load relief in df/dt.<br>• Alternate feeder details in UFR display.<br>• Total planned relief in df/dt display. | Following yet to be provided:<br>• Feeder-wise planned load relief of UFR.<br>• Telemetry of feeders (Partial details available).<br>• Alternate feeder details in df/dt display (Partial details available for UFR).<br>• Total planned relief in UFR display. (Stage wise)<br>• Total actual relief. (Stage Wise) | Very Poor |
| **Haryana** | Yes | Yes | Following are provided since last status:<br>• Stage-2, 3 of df/dtincluded in display.<br>• Feeder wise planned load relief.<br>• Alternate feeder details.<br>• Total actual relief in UFR. | Following yet to be provided:<br>• Telemetry of feeders (Partial details available).<br>• Telemetry of alternate feeders not available.<br>• Calculation of total actual relief in df/dt seems incorrect. | Poor |
| **Delhi** | Yes | Yes | | Following yet to be provided:<br>• Total of actual analog data of MW and alternate feeders.<br>• Data suspected for most of the digital and Analog value at NRLDC display but available at SLDC display. | Poor |
| **HP** | Yes | Yes | Following are provided since last status:<br>• Segregation of stage wise load.<br>• Alternate feeder details include for most of the feeders.<br>• Partial telemetry of feeders. | Following yet to be provided:<br>• Telemetry of feeders (Partial data available).<br>• Alternate feeder details in UFR (a few not available). | Poor |
| **Uttarakhand** | No | No | | | |
| **Punjab** | Yes | Yes | | Following yet to be provided:<br>• Complete telemetry of feeders.<br>• Alternate feeders' details.<br>• Digital Status of all the feeders | Poor |
| **Rajasthan** | Yes | Yes | Following are provided since last status: | Following yet to be provided: | Very Poor |

| | | | | | |
|---|---|---|---|---|---|
| | | | • UFR display provided. | • Analog value and digital data not available in UFR display (only alternate feeder details provided) | |

**Utilities are requested to submit the progress on details tabulated above at the earliest and provide the SCADA UFR, df/dt displays as per the comments.**

**19. Submission on draft NRLDC Operating Procedure July-2018 (agenda by PGCIL)**

**A. <u>Switching of Bus Reactors/ Switchable line Reactors for Voltage Control</u>**

The voltage (kV rms) range for smooth Grid operation, as per IEGC-2010 clause 5.2(S) has been fixed as following:

| Nominal | Maximum | Minimum |
|---|---|---|
| 765KV | 800 | 728 |
| 400KV | 420 | 380 |
| 220KV | 245 | 198 |

As per existing practice, the Bus Reactors are normally being taken out of service at the station voltage ≤ 395kV. These reactors are taken back in service after getting consent/direction from NRLDC depending upon real time grid parameters / voltage going up above 410kV.

Chapter-6, clause 6.5 of the operating procedure, developed by NRLDC, read as under:

*"Bus reactors at 400kV shall be taken in to service whenever bus voltage exceeds 405kV and they shall be taken out of service when voltage is below 395kV. Standing instruction may be issued to the operating personnel at the sub-station. There may be exception with permission of NRLDC. NRLDC shall issue operating code for switching of switchable line reactors."*

As per the discussion of 151st OCC meeting, RLDC was required to formulate new procedure / change voltage range for operating Bus Reactors. POWERGRID vide its letter dated 18.09.2018 and 14.11.2018 from CGM-AM, CC had approached ED-NRLDC, POSOCO for revision of the said voltage range / procedure for smooth switching of Bus Reactors. It is proposed that following procedure may be incorporated for smooth switching of Bus and Switchable line reactors:

Bus reactors at 400 kV shall be taken into service whenever bus voltage exceeds 415 kV and they shall be taken out of service when voltage is below 385 kV. Standing instruction may be issued to the operating personnel at the substation. There may be exception with permission of NRLDC for which NRLDC shall issue operating code. If there are more than one Bus/ switchable line reactor at a station, then it may be taken out on rotational basis to avoid frequent switching operation of the same element.

**B. <u>Switching coordination</u>**

Under section 4.4, Other Precautions to be taken during Switching: additional point (xi) to be added as below:

*"Charging code for an element (Under Outage) shall be issued by NRLDC within 5-10 minutes of request/ charging clearance from the transmission licensee. NRLDC shall also issue an operating code for keeping the element out of service, if there is any expected delay due to system constraint/ persisting high voltage/ load dispatch requirement etc."*

**Members may kindly deliberate.**

## 20. Inclusion of RRAS UP/DOWN, NET DC, SCED Increment, SCED Decrement in CSV File (agenda by NTPC)

20.1 Following parameter are to be included in csv file, available under tab scheduling summary (which can be downloaded in auto to run ABT software):

i. RRAS UP
ii. RRAS DOWN
iii. NET DC
iv. SCED Increment
v. SCED Decrement

20.2 In absence of these data in csv file, manual intervention required for data updation during daily report preparation. In addition, SCE have to post data (RRAS UP/ DOWN, DC, SG etc) in SAP, which is manually fetched from different location in NRLDC site, which is time consuming & probability of error is more in manual mode. Adding requested parameter in csv file (for auto download by ABT software) will be convenient for station and purpose of system improvement will fulfilled.

**Members may deliberate.**

## 21. Requirement of MRIs for Singrauli (agenda by NTPC)

21.1 Energy data is being regular collected by MRI from SEMs on weekly basis. This data is most vital for commercial and billing purpose, all energy account is being done by NRPC with SEM data.

21.2 Data for Solar, Hydro and thermal plant is to be collected on every Monday with fix time frame (Monday up to 1200 hrs) positively, no delay is acceptable as advised in OCC meetings. Presently in SSTPS station there are only 02 nos. of functional MRIs; and these are also old causing frequent battery discharge or MRI got hang (no responsive). Many times, it become very critical to download meter data and provide to NRLDC on time. Moreover, only with 02 MRIs it is very difficult to collect data from 03 different locations (Solar, Hydro & thermal) total more than 32 meters.

21.3 It is kindly requested to provide 03 nos. MRI (02 nos. MRI of SANDS make and 01 no. MRI compatible with Secure Meter[##]) or equivalent compatible with installed meters at Singrauli injection point.

## Secure meter installed in Allahabad # II line for capturing 0.01 Hz frequency step.

**Members may deliberate.**

**Part-B NRLDC**

### 1. Monsoon preparedness

Northern region meets its maximum demand and energy consumption during Jul-Sept i.e. in monsoon months. As on date, NR maximum demand during this summer has already touched ~ 62.1 GW on 10th Jun 2019. During monsoon period, sudden thunderstorm, rainfall, large hydro outages on silt causes load-generation mismatch leading to variations in voltage, frequency, MW loadings and pose challenge for grid operation. All above are known phenomena and practices to be followed to combat such situation have been deliberated and agreed in previous various OCC/TCC and other meetings. Following agreed actions are presented below for Monsoon preparedness:

| S. No. | Action Area | Description |
|---|---|---|
| **1** | Temperature & Humidity transducer at various location in NR | Location and present telemetry status of temperature & humidity transducer of NR is enclosed in **Annex-1**. Intermittency and non-availability of data from these transducers have been highlighted regularly in OCC meeting. Real time weather data has been helpful for weather prediction and further analysis. All the agencies are requested to co-ordinate and rectify the telemetry issues of respective station highlighted in Annex-I. |
| **2** | Load forecasting by SLDCs on daily basis and mapping in SCADA | In line with CERC direction and various decisions in OCC/TCC meetings, load forecasting on daily basis has been started by states/SLDCs of NR. All states are requested to further workout to reduce forecast error and start the forecast of ramping of load also. States may also share their experiences/tools for other states to follow in case such tools/procedure help in reducing the forecast error. Latest status of load forecast data by states is enclosed in **Annex-2**. |
| **3** | Maintenance of reserves (keep thermal units on bar) | Large state i.e. Punjab, Haryana, Rajasthan, Uttar Pradesh should maintain adequate reserves to combat the real time imbalances in the system. All these states also have big generating stations and outage of one unit may cause mismatch in LGB. Small states i.e. Himachal Pradesh, Uttarakhand, Jammu & Kashmir etc. whose major load caters through hydro station shall make banking arrangement with other states which could be utilized in case of outage of Hydro stations on silt. Moreover, coordination amongst internal agencies of state is also required so that outage of hydro units is taken care of. |

| | | |
|---|---|---|
| **4** | Maximize internal generation | Some of the states e.g. Punjab, Uttar Pradesh, Haryana, Delhi etc. meet their peak demand during Jul-Sept. During such scenarios, their import capability also gets restricted due to transmission constraints at 400/220kV level, 220kv line loading and voltages at 220kv level. In order to meet the load with reliability during such scenarios, it has been suggested that all states shall maintain their own generation at both 220kv & 400kv under high demand conditions. |
| **5** | Better forecasting of Silt and Planned action for hydro outages | Large hydro outage in short duration during monsoon on silt is a common phenomenon and the associated challenges have been highlighted in regular OCC/TCC meeting. The agreed action based on deliberation in various meetings are given below: |
| | | • Action for Generator |
| | | – Silt monitoring/Silt forecasting for planned hydro outage [Advance information] |
| | | – Reduction of Generation/Tripping of Units as per protocol (Staggering of units) |
| | | – Slow ramping down of generation on the units to be closed as per protocol. |
| | | • Action by SLDC/Constituents |
| | | – Generation reserve to be maintained |
| | | • Own Generation |
| | | • Contracted Generation from Other State/Traders |
| | | – Load management to be planned |
| | | – Optimization of Hydro generation as per demand requirement |
| | | It has been experienced that states those have major share in hydro e.g. Himachal Pradesh over draw from the grid during such condition. As deviation mechanism is also strict, it is gentle reminder for each state to plan in advance for such eventualities. |
| **6** | Ensuring defense mechanism | Ensure defense mechanism i.e. Protection system, UFR, UVLS, df/dt, SPS, islanding schemes, Black start etc. are intact and reliable in operation during hours of need.<br>SPS is useful tool which helps in protecting in real time based on some logic. There are around 33 SPS in Northern Region and monitoring/ mock testing of SPS is also important to assess its reliability.<br>Although mock testing of Agra-Gwalior SPS has been successfully conducted, testing of other SPS is also required. Utilities may share plan for conducting mock exercises of SPS in its control area. |

**Members may kindly discuss.**

## 2. Reliability issues in the grid: Summer 2019

In 157th and 158th OCC meeting, NRLDC had shared results of studies carried out for assessing the TTC/ATC of large state control area of Northern region for upcoming summer (as per network information available at NRLDC). TTC/ATC of states and other reliability issues are highlighted below:

- **Delhi:** As per studies carried out by Delhi SLDC and NRLDC, TTC limit was assessed as 6800MW. Considering reliability margin of 300MW, ATC limit comes out 6500MW. Simulation studies suggest N-1 non-compliance at 400/220kV Mundka and Harsh vihar ICTs. In real-time, under import of 5800MW, loading of Mundka ICTs is close to its N-1 contingency limit. Revival of 400kV Bamnauli-Tughlaqabad D/C lines on normal towers which are in service through ERS may be expedited. Delhi may kindly update the status.
- **Uttar Pradesh**: In simulation studies performed in May 2019 after incorporating network changes given by UP, NRLDC has assessed TTC as 13400MW under state generation scenario of 10000MW. Considering reliability margin of 600 MW ATC comes out as 12800 MW. UP has assessed TTC limit of more than 13200MW under generation scenario of ~10000MW which is quite similar to limits assessed by NRLDC. Simulation studies based on data provided suggest N-1 non compliances at 400/220kV Agra(PG) and 400/132kV Mau ICTs. TTC/ATC of UP state control area depends on its own generation scenario and would increase/decrease depending upon internal generation. In real time, loadings close to N-1 contingency limits are observed at Agra (PG). Loading is on the higher side since one ICT at Agra(UP) is also under outage.
- **Haryana:** TTC/ ATC limits assessed by NRLDC are 7500MW/ 6900MW respectively with N-1 non-compliance at 400/220kV Dipalpur and Panipat ICTs. 220kV lines from Hisar, Lula ahir, Abdullapur etc. are heavily loaded. In real-time also under import of 6000-7000MW, loading of Dipalpur and Panipat ICTs are high (close to N-1 limits). As discussed in last OCC, Haryana SLDC have assessed their TTC/ATC limit as 7900MW/ 7300MW. Many new elements are also being commissioned in Haryana, details of which are still awaited. ***In 158th, 159th OCC meeting and subsequently through email, Haryana was asked to share modelling data along with latest base case to NRLDC. Haryana may kindly update.***
- **Rajasthan:** Simulation studies suggest N-1 non-compliance at 765/400kV Phagi, 400/220kV Jodhpur, Akal and Bhadla ICTs. Constraint for evacuation of power from Rajwest. In real time, high loading of ICTs at Akal (one 500MVA ICT is still out) and Bhadla are being observed with constraints in evacuation of renewables. As highlighted by NRLDC on previous many occasions, there is need for additional reactive power support at Akal.

  Rajasthan vide email dated 16.04.2019 shared study for revised SPS conditions for Kawai-Chhabra-Kalisindh complex carried out by their planning department. However, there are some assumptions in base case, which needed clarification which were informed to Rajasthan SLDC in 158th and 159th OCC and also emailed to them on 30.04.2019. For example, 765kV Phagi-Bhiwani and 765kV Phagi-

Gwalior are considered open which indicate already degraded network. Status of 400kV Chhabra-Chhabra Supercritical is not known (in service or not).

In 159th OCC, Rajasthan had agreed to share following with NRPC/ NRLDC:

a) Expected network configuration for future scenario.

b) Revised SPS study.

c) Dynamic data of Kalisindh, Chhabra and Kawai

Rajasthan SLDC representative may inform OCC about progress of revised study with expected dates of finalized study report. Quantum of generation to be backed down is being studied, but Rajasthan shall also expedite identification of loads which could be shed under operation of SPS.

***Rajasthan may provide update on the same.***

## 3. Update of documents in line with Indian Electricity Grid Code (IEGC)

As discussed in 158th, 159th OCC meetings, NRLDC is updating the document "Operating procedure of Northern region" and "Power Maps of Northern region and related information".

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 previous OCCs).

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 is again 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.

***Thus, it is once again requested that the respective information may be provided till 30th June 2019.***

*As per approval in 159th OCC meeting, all the renewable rich state shall kindly prepare separate power map for renewable generators and its connectivity (33 kV and above). Rajasthan, Uttar Pradesh, Punjab & Haryana may kindly update the present status and timeline for the completion.*

"Important Grid element of NR" document was updated in May 2019, and mailed to all utilities. Document is also available at NRLDC website. It is once again requested to go through the document and provide the updated information and feedback to modify the above documents.

**Member may kindly update**.

## 4. Frequent forced outages of transmission elements

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

| *Sl. No.* | Element Name | No. of forced outages | Utility/SLDC |
|---|---|---|---|
| *1* | 400kV Ajmer II(RRVPNL)-Bhilwara(RRVPNL) ckt-2 | 5 | Rajasthan |
| *2* | 400kV Akal(RRVPNL)-Kankani(RRVPNL) ckt-2 | 5 | Rajasthan |
| *3* | 220kV Kishenpur(PG)-Ramban(JK) | 5 | J&K/POWERGRID |
| *4* | 400kV Alwar(RRVPNL)-Hindaun(RRVPNL) | 3 | Rajasthan |
| *5* | 400kV Anpara(UP)-Mau(UP) | 3 | UP |
| *6* | 400kV Bhadla(RRVPNL)-Bikaner(RRVPNL) ckt-1 | 3 | Rajasthan |
| *7* | 400kV Bhadla(RRVPNL)-Merta (RRVPNL) | 3 | Rajasthan |
| *8* | 400kV Bikaner(RRVPNL)-Merta(RRVPNL) | 3 | Rajasthan |
| *9* | 800kV HVDC Agra(NR)-Alipurduar(ER) Pole-4 at Agra HVDC | 3 | POWERGRID |
| *10* | 400kV Mainpuri765(UP)-Orai(UP) ckt-1 | 3 | UP |
| *11* | 500kV HVDC Vindhyachal BtB Block 2 | 3 | POWERGRID |

The complete details are attached at **Annex-3.** 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.

*In 159th OCC meeting, NRPC raised concern on non-submission of details to NRPC/ NRLDC and suggested to all the SLDCs to compile the information and share the remedial measures report for last ten months tripping presented in various OCC meeting. All the concerned utility shall prepare the presentation on remedial measures taken and present during 160th OCC meeting.*

Members may like to discuss.

## 5. Multiple element tripping events in Northern region in the month of May'19

A total of **31** grid events occurred in the month of May'19 of which **14** 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 06-June-19 is attached at **Annex-4.**

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 **1440ms** in the event of tripping at Barmer(Raj) on 12-May-19 at 08:08hrs.

Delayed clearance of fault (more than 100ms for 400kV and 160ms for 220kV system) observed in total **8** events out of 31 grid events occurred in the month.

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

Members may like to discuss.

## 6. Details of tripping of Inter-Regional lines from Northern Region for May'19

A total of **23** inter-regional lines tripping occurred in the month of May'19. The list is attached at **Annex-5.** Out of 23, 14 tripping incidents are related to HVDC system. 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.

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

## 7. Discussion on shortcoming during mock testing of Agra-Gwalior SPS and finalization of load groups

The 765kV Agra-Gwalior D/C is an important link between WR-NR. An SPS is in place to take care of the contingencies associated with the aforesaid link.

After discussion in various OCC meeting, revised logic of Agra-Gwalior SPS scheme was implemented in the month of Apr-19. As per approval in 158th OCC meeting, mock testing of 765 kV Agra-Gwalior SPS was conducted on 01st May 2019. Detailed report based on input from different utilities is prepared by NRLDC and shared with all the concerned utilities. This report was attached and discussed in 159th OCC meeting and thereafter a separate meeting was also called on 23rd May 2019 through video conferencing. In this meeting concerned utilities shared its input on

shortcoming highlighted in the NRLDC report. Details of the shortcoming in mock testing and reply of concerned utility is attached as **Annex-6**. Following are the key highlights of the discussion during the meeting:

- *NRLDC representative raised concern about submission of load relief information by most of the utilities on the basis of average load on the feeders however it has already been discussed and approved in NRPC meeting that load relief quantum shall be calculated on minimum load on these feeders.*
- *For calculation of minimum load, it was suggested that utilities shall take the yearly data and calculate the average of 30days of minimum load period on that particular feeder and share the details in next OCC meeting.*
- *If there is any shortfall in load relief than utilities shall submit the additional load feeders on the same locations where DTPC is already available/ installed.*
- *Load groups shall be finalized in next OCC meeting after input from all the concerned utilities (Punjab, Haryana, Rajasthan, Uttar Pradesh and Delhi).*

It is requested to all the concerned utilities to kindly prepare the presentation on the remedial measures and share the input for finalization of load group along with feeder wise details of MW relief on the basis of suggested procedure.

Members may like to discuss.

**8. Mapping of analog data and digital status of SPS operation related information in SCADA data and SoE:**

System Protection Scheme (SPS) is very important defensive mechanism for healthy and reliable system operation. Further, SPS is an important tool which helps in protecting in real time based on some logic. Therefore, monitoring of SPS is also important to assess its reliability.

Mapping of SPS signal in SCADA, SPS feeders CB status, analog data in SCADA or Station Event log is discussed in various OCC meetings and TCC meeting however it seems utilities are not considering it during implementation of new SPS scheme like Agra-Gwalior SPS (extension), Tehri-Koteshwar SPS, Dhauliganga SPS and Anpara-Unnao SPS scheme.

NRPC/ TCC has already approved the following:

- Mapping of SPS signal in SCADA, SPS feeders CB status, analog data in SCADA or Station Event log for new SPS scheme to be taken care at the time of implementation of new scheme
- Utilities shall expedite the Mapping of feeders and digital data, also in existing SPS scheme.

POWERGRID, THDC, NHPC and UPPTCL shall kindly update the reason of non-compliance of TCC decision and also update the timeline for completion of the signal & CB status mapping in SCADA.

*Adani is requested to kindly give the presentation on the signal mapping in its SCADA system for Mundra-Mahendergarh SPS. Adani shall also provide the details of mapping to NRLDC so that it may be implemented in NRLDC SCADA system for monitoring. Mock testing of Mundra-Mahendergarh SPS is also long pending, date of mock testing needs to be discussed and finalized*.

As per approved "Roles and Responsibility regarding SPS", each utility shall complete the periodic mock testing of SPS schemes (at least once in half year) and share the report along with certification of healthiness of the SPS. Half yearly certification of healthiness of the SPS is yet to be received from all the utilities. Details of mock testing is also awaited from all the utilities.

It has been observed that the utilities are yet to assume the roles and responsibilities as per the approved procedure "Roles and Responsibility regarding SPS".

**Members may like to discuss.**

## 9. Frequency response characteristic:

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

| S. No. | Event Date | Time (in hrs) | Event Description | Starting Frequency (in Hz) | End Frequency (in Hz) | *Δf* |
|---|---|---|---|---|---|---|
| 1 | 16-May-19 | 19:10hrs | Smelter load of Vedanta plant that is coming through Sterlite sub-station became nil as reported. The reason of the incident is still not being intimated by SLDC. Also in the incident, SCADA data of Sterlite station was suspected. The net change in power is calculated from remote end data of 400 kV lines connected to Sterlite station and that change is 1337 MW. | 49.978 | 50.040 | 0.062 |
| 2 | 19-May-19 | 10:35hrs | All units in operation i.e. unit 1- 4 & 6 of 210 MW each (Unit -5 was already under planned shutdown for annual Maintenance) and Unit 7-10 of 500MW each at Vindhyachal STPS Stage-1, Stage-2 and Stage-3 tripped along with all 400kV Buses and emanating lines | 50.020 | 49.803 | -0.217 |

| S. No. | Event Date | Time (in hrs) | Event Description | Starting Frequency (in Hz) | End Frequency (in Hz) | *Δf* |
|---|---|---|---|---|---|---|
| | | | connected to VSTPS Stage-1, Stage-2 and Stage-3. As reported by NTPC, incident started due to R-phase bushing failure of generator transformer of Unit-7 and subsequent tripping of other units on impedance protection and turbine over speed. Around 2975 MW of generation loss occurred as per SCADA Data. | | | |

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 | 16-May-19 event | 19-May-19 event | Remarks |
|---|---|---|---|
| **PUNJAB** | 64% | 16% | |
| **HARYANA** | -22% | 23% | |
| **RAJASTHAN** | 23% | 21% | |
| **DELHI** | 132% | 36% | |
| **UTTAR PRADESH** | 63% | 33% | |
| **UTTARAKHAND** | -5% | -1% | |
| **CHANDIGARH** | 311% | 56% | Small Control area |
| **HIMACHAL PRADESH** | 5% | 6% | |
| **JAMMU & KASHMIR** | -53% | -12% | |
| **NR** | 30% | 28% | |

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

| Generator | 16-May-19 event | 19-May-19 event | Generator | 16-May-19 event | 19-May-19 event |
|---|---|---|---|---|---|
| Singrauli TPS | 0% | Suspect SCADA data | Salal HEP | 37% | 8% |
| Rihand-1 TPS | -18% | Suspect SCADA data | Tanakpur HEP | -7% | 0% |
| Rihand-2 TPS | -2% | Suspect SCADA data | Uri-1 HEP | 3% | -5% |
| Rihand-3 TPS | -5% | 8% | Uri-2 HEP | 33% | 5% |
| Dadri-1 TPS | 96% | 25% | Dhauliganga HEP | -43% | 48% |
| Dadri -2 TPS | 177% | 46% | Dulhasti HEP | 12% | 28% |
| Unchahar TPS | 0% | -8% | Sewa-II HEP | 139% | Suspected SCADA data |

| | | | | | |
|---|---|---|---|---|---|
| Unchahar stg-4 TPS | 143% | 6% | Parbati-3 HEP | 44% | No generation |
| Jhajjar TPS | 7% | 26% | Jhakri HEP | 16% | 29% |
| Dadri GPS | 18% | -1% | Rampur HEP | 37% | 0% |
| Anta GPS | -37% | -4% | Tehri HEP | 0% | 129% |
| Auraiya GPS | No generation | No generation | Koteswar HEP | Suspect SCADA data | 13% |
| Narora APS | 0% | -2% | Karcham HEP | 94% | 96% |
| RAPS-B | 13% | 7% | Malana-2 HEP | 0% | 0% |
| RAPS-C | -17% | 4% | Budhil HEP | 6% | 2% |
| Chamera-1 HEP | Suspect SCADA data | 3% | Bhakra HEP | -4% | 0% |
| Chamera-2 HEP | 0% | 1% | Dehar HEP | 10% | 8% |
| Chamera-3 HEP | 61% | 61% | Pong HEP | -11% | 4% |
| Bairasiul HEP | No generation | No generation | Koldam HEP | 164% | No generation |
| | | | AD Hydro HEP | 0% | Suspected SCADA data |

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

| Generator | 16-May-19 event | 19-May-19 event | Generator | 16-May-19 event | 19-May-19 event |
|---|---|---|---|---|---|
| PUNJAB | | | UP | | |
| Ropar TPS | No generation | 1.1% | Obra TPS | -8% | 0% |
| L.Mohabbat TPS | No generation | No generation | Harduaganj TPS | -6% | 40% |
| Rajpura TPS | 81% | 22% | Paricha TPS | 6% | 2% |
| T.Sabo TPS | 113% | 49% | Rosa TPS | 18% | 17% |
| Goindwal Sahib TPS | No generation | No generation | Anpara TPS | -9% | -2% |
| Ranjit Sagar HEP | -17% | 8% | Anpara C TPS | 0% | 8% |
| Anandpur Sahib HEP | -7% | -3% | Anpara D TPS | -5% | -1% |
| HARYANA | | | Bara TPS | 52% | 1% |
| Panipat TPS | 8% | -1% | Lalitpur TPS | 0% | 0% |
| Khedar TPS | No generation | No generation | Meja TPS | -33% | No generation |
| Yamuna Nagar TPS | No generation | No generation | Vishnuprayag HEP | 0% | 70.0% |
| CLP Jhajjar TPS | 3% | 14% | Alaknanda HEP | -58% | -1.1% |
| Faridabad GPS | No generation | No generation | Rihand HEP | No generation | No generation |
| RAJASTHAN | | | Obra HEP | No generation | No generation |
| Kota TPS | -6% | 13% | UTTARAKHAND | | |
| Suratgarh TPS | 0% | 21% | Gamma Infra GPS | Suspect SCADA data | Suspect SCADA data |
| Kalisindh TPS | 0% | 1% | Shravanti GPS | -15% | 1.5% |
| Chhabra TPS | No generation | No generation | Ramganga HEP | Suspect SCADA data | Suspect SCADA data |
| Chhabra stg-2 TPS | 26% | -1% | Chibra HEP | Suspect SCADA data | Suspect SCADA data |
| Kawai TPS | 7% | 45% | Khodri HEP | No generation | No generation |
| Dholpur GPS | No generation | No generation | Chilla HEP | 29% | 3% |
| Mahi-1 HEP | No generation | No generation | HP | | |
| Mahi-2 HEP | No generation | No generation | Baspa HEP | 2% | 2% |
| RPS HEP | No generation | No generation | Malana HEP | -3% | -5% |
| JS HEP | No generation | No generation | Sainj HEP | No generation | No generation |
| DELHI | | | Larji HEP | Suspect SCADA data | Suspect SCADA data |
| Badarpur TPS | No generation | No generation | Bhabha HEP | 21% | -3% |
| Bawana GPS | 0% | 55% | Giri HEP | No generation | No generation |
| Pragati GPS | 0% | No generation | J&K | | |
| | | | Baglihar-1&2 HEP | -5% | -2% |
| | | | Lower Jhelum HEP | 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.

**Annexure-I**

| State | | Jul-19 (MU) | Jul-19 (MW) |
|---|---|---|---|
| Chandigarh | Availability | 195 | 385 |
| | Requirement | 190 | 385 |
| | Surplus/Shortfall (MU) | 5 | 0 |
| | Surplus/Shortfall (%) | 2.6% | 0.0% |
| Delhi | Availability | 4200 | 7490 |
| | Requirement | 3880 | 7400 |
| | Surplus/Shortfall (MU) | 320 | 90 |
| | Surplus/Shortfall (%) | 8.2% | 1.2% |
| Haryana | Availability | 6410 | 11490 |
| | Requirement | 6060 | 10700 |
| | Surplus/Shortfall (MU) | 350 | 790 |
| | Surplus/Shortfall (%) | 5.8% | 7.4% |
| Himachal Pradesh | Availability | 970 | 1910 |
| | Requirement | 900 | 1500 |
| | Surplus/Shortfall (MU) | 70 | 410 |
| | Surplus/Shortfall (%) | 7.8% | 27.3% |
| Jammu & Kashmir | Availability | 1480 | 2430 |
| | Requirement | 1570 | 2770 |
| | Surplus/Shortfall (MU) | -90 | -340 |
| | Surplus/Shortfall (%) | -5.7% | -12.3% |
| Punjab | Availability | 7620 | 11040 |
| | Requirement | 7300 | 13640 |
| | Surplus/Shortfall (MU) | 320 | -2600 |
| | Surplus/Shortfall (%) | 4.4% | -19.1% |
| Rajasthan | Availability | 8760 | 14940 |
| | Requirement | 6600 | 11100 |
| | Surplus/Shortfall (MU) | 2160 | 3840 |
| | Surplus/Shortfall (%) | 32.7% | 34.6% |
| Uttar Pradesh | Availability | 13850 | 20600 |
| | Requirement | 12500 | 20500 |
| | Surplus/Shortfall (MU) | 1350 | 100 |
| | Surplus/Shortfall (%) | 10.8% | 0.5% |
| Uttarakhand | Availability | 1310 | 2230 |
| | Requirement | 1350 | 2180 |
| | Surplus/Shortfall (MU) | -40 | 50 |
| | Surplus/Shortfall (%) | -3.0% | 2.3% |
| Total NR | Availability | 44795 | 72515 |
| | Requirement | 40350 | 65700 |
| | Surplus/Shortfall (MU) | 4445 | 6815 |
| | Surplus/Shortfall (%) | 11.0% | 10.4% |

Annexure-II

# भाखड़ा ब्यास प्रबन्ध बोर्ड

## पी एवं सी निदेशालय

एस.एल.डी.सी. कॉम्पलैक्स,66 के.वी. उप केन्द्र,इंडस्ट्रीयल एरिया फेस-I, चण्डीगढ़
दूरभाष-0172-2652054,फैक्स-0172-2652054

प्रेषक,

निदेशक/ पी एंड सी,
बीबीएमबी, चंडीगढ़ ।

प्रेषिती,

मेम्बर सेक्रेटरी,
एनआरपीसी, नई दिल्ली ।

क्रमांक: 895-97 /डीपीसी/M-1ए दिनांक: 29/05/19

विषय: **Joint site visit of NRPC, NRLDC, PGCIL & BBMB at 400kV SubstationBBMB Bhiwani, PSTCL Rajpura, PGCIL Panchkula and BBMB Panipat for correction of phase nomenclature mismatch between BBMB and other interconnected substation.**

उपरोक्त विषय से संदर्भित पत्र आगामी कार्यवाही हेतु संलग्न है जी ।

संलग्न: उप्रोक्तानुसार

आर के चन्दन
(ई॰ आर के चंदन)
निदेशक/ पी एंड सी,
बीबीएमबी, चंडीगढ़ ।

प्रतिलिपि:-

1. मुख्य अभियन्ता/पारेषण प्रणाली, बीबीएमबी, चंडीगढ़ ।
2. अधीक्षण अभियंता /ऑपरेशन एनआरपीसी, नई दिल्ली ।

# भाखड़ा ब्यास प्रबन्ध बोर्ड

## पी एवं सी निदेशालय

एस.एल.डी.सी. कॉम्पलैक्स,66 के.वी. उप केन्द्र,इंडस्ट्रीयल एरिया फेस-I, चण्डीगढ
दूरभाष-0172-2652054,फैक्स-0172-2652054

भारवड़ा ब्यास
राष्ट्र गौरव

To,

Member Secretary
NRPC, New Delhi.

Memo No. 895-97 Dated- 29/05/19

**Sub:** **Joint site visit of NRPC, NRLDC, PGCIL & BBMB at 400kV SubstationBBMB Bhiwani, PSTCL Rajpura, PGCIL Panchkula and BBMB Panipat for correction of phase nomenclature mismatch between BBMB and other interconnected substation.**

On the subject matter, it is intimated that joint site visit of NRPC, NRLDC, PGCIL & BBMB representative was made on 27.05.19 & 28.05.19 at 400kV Substation BBMB Bhiwani, PSTCL Rajpura, PGCIL Panchkula and BBMB Panipat to check the technical suitability / material requirements for correction of phase nomenclature mismatch correction.

Work of correction of phase nomenclature mismatch for PGCIL lines at BBMB Bhiwani (PGCIL Hisar & Bhiwani), PSTCL Rajpura (BBMB Bhiwani & BBMB Dehar), PGCIL Panchkula (BBMB Panipat & BBMB Dehar) and BBMB Panipat (NTPC Dadri-1 & 2) will be executed by PGCIL. Various observations of PGCIL representatives have been raised in MOMs. Copy of MOM is here by enclosed for your reference, record and further necessary action.

In addition to the above, joint site visit of NRPC, NRLDC, PGCIL, HPSEB & BBMB representatives at 400kV Dehar Power House. and 220kV Substation HPSEB Kangoo is pending and that may be scheduled as early as possible.

**DA/ As Above**

(Er. R K Chandan)
Director/ P&C
BBMB, Chandigarh

**CC:**

1. Chief Engineer/ Transmission System, BBMB, Chandigarh.
2. SE / Operation, NRPC New Delhi.

**Minutes of meeting held between BBMB, NRPC, NRLDC, PGCIL & PSTCL on 27.05.19 at 400kV Substation PSTCL Rajpura.**

On 27.05.19, NRPC, NRLDC, PGCIL and BBMB representative visited PSTCL Rajpura to check the technical suitability / material requirements for correction of phase nomenclature mismatch at 400kV Substation PSTCL Rajpura for 400kV Rajpura-Bhiwani & 400kV Rajpura – Dehar Lines at Rajpura end.

On checking at site, it has been observed that:-

1. 400kV BBMB Bhiwani – Rajpura Line & 400kV BBMB Dehar - Rajpura Line existing conductor arrangement from PGCIL dead end tower (R, Y, B) to PSTCL Rajpura gantry (Y, B, R ) can be re-connected to R, Y, B at PSTCL Rajpura gantry of 400kV Rajpura – Bhiwani bay and 400kV Rajpura – Dehar bay.
2. Wave trap installed on 400kV BBMB Bhiwani – Rajpura Line & 400kV BBMB Dehar - Rajpura Line is on R & B phase at BBMB Bhiwani & Dehar end. Whereas at PSTCL Rajpura end, wave trap is installed on Y & B phase on both the lines. Accordingly, while correcting phase mis-match nomenclature wave trap at PSTCL Rajpura end installed on Y phase will be shifted on R phase on both the circuits at Rajpura end. Foundation for wave trap of R phase already exists on both the circuits.
3. For execution of the above, new conductor along with hardware accessories need to be procured for installation along with mobilization of adequate stringing gangs with T&P by PGCIL at PSTCL Rajpura. The dead end tower is plus 25 mtr height with overhead crossing with 400 kV Rajpura Thermal D/C and the distance between dead end tower and gantry is around 150 mtrs. The shifting of conductors needs very specialized gang. Contract award has to be done for shifting of conductor from dead end tower to gantry.
4. Moreover, vertical phase to phase clearance has to be seen as it can be less than the minimum required when the conductors will cross each other while reconnecting. There may be a chance of equipment and conductor misalignment also. All these factors need to be seen before carrying out the work. The equipments needs to be dismantled in order to avoid any damage as conductors are terminating at some angle on the gantry tower. It shall be a challenging task keeping in view the phase to phase clearance, the small quantity of work and mobilization of gangs at both lines. PLCC engineers need to be mobilized at BBMB Bhiwani & BBMB Dehar and Rajpura for tuning after conductor shifting at PSTCL Rajpura.
5. PGCIL shall take up the phase clearance issue with its engineering department to cross check the adequate clearance.

27/05/19 27/5/19 27/05/19 27/5/2019 27/05/19

**Minutes of meeting held between BBMB, NRPC, NRLDC, PGCIL & PSTCL on 27.05.19 at 400kV Substation PSTCL Rajpura.**

6. Shutdown for the above work will be required on both circuits for four days and two times separately which is to be planned with coordination of PGCIL, PSTCL and BBMB.

27/5/2019
(Er. R.K. Chandan)
Director/P&C
BBMB Chandigarh

27/5
(Er. J.P.Singh)
A.E.E./Maintenance
PSTCL, Rajpura

27/5/19
(Er. Nitin Yadav)
Manager, NRLDC
Delhi

27/5/19
(Er. Parveen Kumar)
Dy. General Manager
NR-II, PGCIL Jammu

27/05/19
(Shrey Kumar)
Asst. Executive Engineer
NRPC, Delhi

**Minutes of meeting held between BBMB, NRPC, NRLDC & PGCIL on 28.05.19 at 400kV Substation PGCIL Panchkula.**

On 28.05.19, NRPC, NRLDC, PGCIL and BBMB representative visited PGCIL Panchkula to check the technical suitability / material requirements for correction of phase nomenclature mismatch at 400kV Substation PGCIL Panchkula for 400kV PGCIL Panchkula – BBMB Panipat & & 400kV PGCIL Panchkula – BBMB Dehar.

On checking at site, it has been observed that:-

1. 400kV BBMB Panipat – Panchkula Line & 400kV BBMB Dehar – Panchkula Line existing conductor arrangement from PGCIL Gantry span of both the lines (R, Y, B) to Bay span of both the lines (Y, B, R ) through droppers can be re-connected to R, Y, B at Bay spans of both the lines by changing droppers of both the lines.

2. Wave trap installed on 400kV BBMB Panipat – Panchkula Line & 400kV BBMB Dehar - Panchkula Line is on R & B phase at BBMB Panipat & Dehar end. Whereas at PGCIL Panchkula end, wave trap is installed on R & Y phase on both the lines. Accordingly, while correcting phase mis-match nomenclature wave trap at PGCIL Panchkula end installed on Y phase will be shifted on B phase on both the circuits at Panchkula end. Foundation for wave trap of B phase already exists on both the circuits.

3. Work of correction of phase mis-match at PGCIL Panchkula for both the lines shall be done by PGCIL. Work of 400kV Panchkula – Panipat line & 400kV Panchkula – Dehar Line will be done in two steps along with the work plan of Panipat substation and Dehar P.H. simultaneously.

4. Shutdown for the above work will be planned according to shutdown required for Panipat & Dehar P.H. work for phase mis-match correction in coordination of PGCIL and BBMB.

28/5/19
(Er. R.K. Chandan)
Director/P&C
BBMB Chandigarh

28/5/19
(Er. Parveen Kumar)
Dy. General Manager
NR-II, PGCIL Jammu

(Er. G.K.Verma)
General Manager
PGCIL Panchkula

28/05/19
(Er. Nitin Yadav)
Manager, NRLDC
Delhi

28/05/19
(Shrey Kumar)
Asst. Executive Engineer
NRPC, Delhi

**Minutes of meeting held between BBMB, NRPC, NRLDC and PGCIL on 27.05.19 at 400kV Substation BBMB Bhiwani**

On 27.05.19, NRPC, NRLDC, PGCIL representative visited BBMB Bhiwani to check the technical suitability / material requirements for correction of phase nomenclature mismatch at 400kV Substation BBMB Bhiwani.

On checking at site, it has been observed that:-

1. 400kV PGCIL Hisar – BBMB Bhiwani & 400kV PGCIL Bhiwani – BBMB Bhiwani existing conductor arrangement from PGCIL dead end tower (R, Y, B) to BBMB Bhiwani gantry (B, R, Y) can be re-connected to R, Y, B at PGCIL dead end tower with R, Y, B at BBMB Bhiwani gantry.
2. Wave trap installed on 400kV BBMB Bhiwani – PGCIL Hisar Line & 400kV BBMB Bhiwani – PGCIL Bhiwani Line is on R & B phase at BBMB Bhiwani end. Whereas at PGCIL Hisar end & PGCIL Bhiwani end, wave trap is installed on R & Y phase. Accordingly, while correcting phase mis-match nomenclature wave trap at BBMB Bhiwani end installed on B phase will be shifted on Y phase on both the circuits. Foundation for wave trap of Y phase already exists on both the circuits.
3. For execution of the above, new conductor along with hardware accessories need to be procured for installation along with mobilization of adequate stringing gangs with T&P by PGCIL at Bhiwani (BBMB) and PSTCL Rajpura. Contract award has to be done for shifting of conductor from dead end tower to gantry. This shall be challenge task keeping in view the small quantity of work and mobilization of gangs at both locations simultaneously. PLCC engineers need to be mobilized at both ends for all lines for tuning after conductor shifting at PG & BBMB Bhiwani, Hisar and Rajpura.
4. R, Y, B phase output (220kV) from 400/220kV, 500MVA ICT Bank has been connected on common points of 220kV Bus-1 & 2 isolators of ICT Bank as incoming supply. R, Y, B phase output from 220kV Bus-1 & 2 isolators of ICT Bank shall be reconnected with R, Y, B phases of 220kV system bus-1 & 2 by BBMB.
5. CT secondary of 400/220kV, 500MVA ICT Bank shall also be rewired as per corrected phase nomenclature by BBMB.
6. Shutdown for the above work will be required for 2 days and to be planned with coordination of PGCIL, PSTCL and BBMB.

27/5/2019
(Er. R.K. Chandan)
Director/P&C
BBMB Chandigarh

27.5.19
(Er. Arun Kumar)
Dy. C.E. O&M Circle
BBMB Bhiwani

27/5/19
(Er. Parveen Kumar)
Dy. General Manager
NR-II, PGCIL Jammu

27/5/19
(Er. Sanjay Sinha)
General Manager
NR-I, PGCIL Bhiwani

(Er. Nitin Yadav)
Manager, NRLDC
Delhi

27.05.19
(SHREY KUMAR)
Asst. Executive Engg.
NRPC, Delhi

**Minutes of meeting held between BBMB, NRPC, NRLDC and PGCIL on 28.05.19 at 400kV Substation BBMB Panipat.**

On 28.05.19, NRPC, NRLDC, PGCIL representative visited BBMB Panipat to check the technical suitability / material requirements for correction of phase nomenclature mismatch at 400kV Substation BBMB Panipat. On checking at site, it has been observed that:-

1. 400kV NTPC Dadri - BBMB Panipat-1 & 400kV NTPC Dadri - BBMB Panipat-2 existing conductor arrangement from PGCIL dead end tower (R, Y, B) to BBMB Panipat gantry (B, R, Y) can be re-connected to R, Y, B at PGCIL dead end tower with R, Y, B at BBMB Panipat gantry of 400kV BBMB Panipat – NTPC Dadri-1 & 2 bay.
2. Wave trap installed on 400kV BBMB Panipat – NTPC Dadri -1 & 2 is on R & Y phase at Panipat. Whereas at Dadri end, wave trap is installed on R & Y phase on 400kV NTPC Dadri – BBMB Panipat – 2 and on Y & B phase on 400kV NTPC Dadri – BBMB Panipat – 1. Accordingly, while correcting phase mis-match nomenclature wave trap at Panipat end installed on R phase will be shifted on B phase on 400kV Dadri-1. Foundation for wave trap of Blue phase already exists. In case of 400kV Panipat - Dadri-2 line, wave trap is installed on R & Y phase at both ends and there will be no change in the position of wave trap.
3. For execution of the above, new conductor along with hardware accessories need to be procured for installation along with mobilization of adequate stringing gangs with T&P by PGCIL at BBMB Panipat for Dadri-1 & 2 lines and at Panchkula end for Panipat-Panchkula line. Contract award has to be done for shifting of conductor from dead end tower to gantry. This shall be challenge task keeping in view the small quantity of work and mobilization of gangs at both locations simultaneously. PLCC engineers need to be mobilized at both ends (NTPC Dadri, PGCIL Panchkula & BBMB Panipat) for all lines for tuning after conductor shifting.
4. R, Y, B phase output (220kV) from ICT Bank -1 & 2 has been connected on Y, B, R at common points of 220kV Bus-1 & 2 isolators of ICT Bank-1 & 2 as incoming supply. R, Y, B phase output (220kV) from ICT Bank -1 & 2 will be re-connected with R, Y, B at common points of 220kV Bus-1 & 2 isolators of ICT Bank-1 & 2. Also, CT secondary of 220kV ICT Bank-1 & 2 shall also be rewired as per corrected phase nomenclature. This work will be done by BBMB.
5. Shutdown for the above work will be required for 2 days and to be planned with coordination of PGCIL, NTPC and BBMB.

28/5/19
(Er. R.K. Chandan)
Director/P&C
BBMB Chandigarh

(Er. P.K. Kochar)
S.E.O&M Circle
BBMB Panipat

28/5/19
(Er. Parveen Kumar)
Dy. General Manager
NR-II, PGCIL Jammu

28/5/19
(Er. Sanjay Sinha)
General Manager
NR-I, PGCIL Bhiwani

28/05/19
(Er. Nitin Yadav)
Manager, NRLDC
Delhi

28/05/19
(SHREY KUMAR)
Asst. Executive Engineer
NRPC, Delhi

**ANNEXURE-III**

**Follow up issues from previous OCC Meetings**

| 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 of Schemes Submitted by the Entities for funding from PSDF is attached as Annexure-III/1 of the agenda of 159th OCC meeting. The updated status stands received from Punjab and Delhi. All other states are requested to update the status of the schemes to be funded from PSDF. |
| 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. |
| 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 April 2019) & Haryana (up to January 2019).<br>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.<br>All others are requested to submit information. |

| Sl. No. | Agenda point | Details | Status |
|---|---|---|---|
| 5 | 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.<br>All states except Punjab, UP & Rajasthan were requested to update. |

# POWER SYSTEM DEVELOPMENT FUND(PSDF)

## Status of Schemes Submitted by the Entities for funding from PSDF

**Annexure-III/1**

**Schemes approved under PSDF** **All figures in Rs Crore**

| SLNo | Name of State/Entity | Region | Name of Entity | Name of Scheme and Unique ID No | Project Cost accepted by Appraisal Committee. | Category of Funding | Quantum of Funding Recommended by Appraisal Committee | Grant Approved by Monitoring Committee | Dateof Issuanceof sanction order by MoP | Date of Signing of Agreement | Completion schedule (in Month) | Date of release of first Installment | Proposed Completion date as per sanction order | Amount Disbursed as on 31-07-2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I | II | | III | IV | IX | X | XI | XIII | XV | XVI | | | | |
| 1 | Rajasthan | NR | RRVPNL | Renovation and Upgradation of protection system of substations (003) | 159.53 | 5.1 (c ) | 90.00 | 143.58 | 31-Dec-14 | 6-Feb-15 | 24 | 31-Mar-16 | 31-Mar-18 | 14.85 |
| 2 | Rajasthan | NR | RRVPNL | Installation of Bus Reactors (005) | 23.87 | 5.1(b ) | 90.00 | 21.48 | 31-Dec-14 | 6-Feb-15 | 18 | 22-Mar-16 | 22-Sep-17 | 19.33 |
| 3 | Uttar Pradesh | NR | UPPTCL | Installation of Capacitors and FSC. (025) | 39.29 | 5.1(b) | 90.00 | 35.36 | 11-May-15 | 26-Nov-15 | 18 | 8-Mar-16 | 8-Sep-17 | 29.77 |
| 4 | Uttar Pradesh | NR | UPPTCL | Renovation and Upgradation of protection system of substations. (026) | 202.94 | 5.1 (c ) | 90.00 | 182.65 | 11-May-15 | 26-Nov-15 | 18 | 31-Mar-16 | 30-Sep-17 | 89.47 |
| 5 | NRPC | Central | NRPC | Study Program on the integration of renewable energy resources (054) | 6.45 | 5.1 (e) | 100.00 | 6.45 | 28-Oct-15 | 24-Nov-15 | 3 | 29-Dec-15 | 29-Mar-16 | 4.49 |
| 6 | Jammu & Kashmir | NR | PDD-J&K | Renovation and Upgradation of protection system of substations in Jammu(023) | 140.04 | 5.1(c ) | 100.00 | 140.04 | 28-Oct-15 | 5-Apr-16 | 18 | 14-Jul-17 | 14-Jan-19 | 26.40 |
| 7 | Himachal Pradesh | NR | HPSEBL | Renovation and Upgradation of Protection System (049) | 55.44 | 5.1(C ) | 100.00 | 55.44 | 5-Jan-16 | 8-Jun-16 | 18 | 31-May-17 | 30-Nov-18 | 34.44 |
| 8 | Jammu & Kashmir | NR | PDD-J&K | Renovation and Upgradation of protection system of substations in Kashmir(024) | 146.12 | 5.1 (c ) | 100.00 | 146.12 | 17-Mar-16 | 22-Apr-16 | 18 | | 16-Sep-17 | 26.40 |
| 9 | Delhi | NR | DTL | Renovation and Upgradation of Protection System.(049) | 125.98 | 5.1(c) | 90.00 | 113.38 | 17-Mar-16 | 4-May-16 | 27 | 25-Nov-16 | 25-Feb-19 | 20.75 |
| 10 | Uttrakhand | NR | PTCUL | Renovation and Upgradation of Protection System.(051) | 125.05 | 5.1(c) | 100.00 | 125.05 | 17-Mar-16 | 8-Jun-16 | 18 | 8-Nov-16 | 16-Sep-17 | 101.75 |
| 11 | Punjab | NR | PSTCL | Bus bar protection (052) | 18.21 | 5.1(c) | 90.00 | 16.39 | 17-Mar-16 | 29-Dec-16 | 18 | | 16-Sep-17 | |
| 12 | Uttar Pradesh | NR | UPPTCL | Reconductoring of existing line by HTLS conductor for relieving congestion. (027) | 80 | 5.1(d) | 75.00 | 60.00 | 17-Mar-16 | **Scheme withdrawn** | 18 | 20-Sep-17 | 16-Sep-17 | |
| 13 | Haryana | NR | DHVBN | Renovation and modernisation of distribution system of DHBVN, Haryana(077) | 364.27 | 5.1(d) | 75.00 | 273.20 | 2-Jan-17 | 24-Nov-17 | 18 | | 18-Feb-18 | 28.35 |
| 14 | Punjab | NR | PSTCL | Provision of second DC Source at 220KV & 132KV Grid Sub Station of PSTCL. (70) | 15.3 | 5.1 (c ) | 90.00 | 13.77 | 2-Jan-17 | 23-Mar-17 | 18 | | 1-Jul-18 | 3.01 |
| 15 | POWERGRID | Central | POWERGRID | Funding of BNC Agra HVDC (94) | 5778 | 4(3)(A) | 50.00 | 2889.00 | 10-Mar-17 | 23-May-17 | 54 | | 9-Sep-21 | |
| 16 | Uttar Pradesh | NR | UPPTCL | Repleacement of existing ACSR conductor by HTLS conductor for reliving cogestion. (89) | 63.31 | 5.1(d) | 75.00 | 47.48 | 16-May-17 | 27-Jul-17 | 18 | | 15-Nov-18 | 4.74 |
| 17 | Rajasthan | NR | RRVPNL | " Smart Transmission Operation Management Systeem (STOMS) " in Rajasthan Power System. (110) | 13.18 | 5.1(c) | 90.00 | 11.86 | 19-May-17 | 10-Oct-17 | 12 | | 18-May-18 | 1.186 |
| 18 | Rajasthan | NR | RRVPNL | Communication Backbone "Smart Transmission Network & Asset Management Systeem " Part-B (136) | 569.77 | 5.1(c) | 50.00 | 284.89 | 22-May-17 | 10-Oct-17 | 18 | | 21-Nov-18 | 56.969 |
| 19 | BBMB | Central | BBMB(038) | Renovation and Upgradation of protection system of substations. (038) | 25.86 | 5.1 (c ) | 90.00 | 23.27 | 15-Nov-17 | 19-Feb-18 | 22 | | | 2.33 |
| 20 | Rajasthan | NR | RRVPNL | Real Time Data Acquisition System for Monitoring & Control of Transmission Grid under STNAMS (PART A-1) (153) | 185.19 | 5.1(c ) | 50.00 | 92.60 | 15-Nov-17 | 23-Feb-18 | 24 | | | |
| 21 | Uttrakhand | NR | PTCUL | Implementation of OPGW based reliable communication at 132 kv and above substations. (129) | 37.46 | 5.1(c ) | 50.00 | 18.73 | 15-Nov-17 | | 36 | | | |
| 22 | Punjab | NR | PSTCL | Reliable Communication and data Acquisition System upto 132kV Substation in Punjab. (138) | 66.1 | 5.1(c ) | 50 | 33.05 | 27-Jul-18 | | 36 | | | |
| 23 | Himachal Pradesh | NR | HPSEBL | Strengthening of Transmission System incidenatls to Inter-State- Transmission System in the State of HP (134) | 24.38 | 5.1(d) | 100 | 24.38 | 27-Jul-18 | | 18 | | | |
| 24 | Himachal Pradesh | NR | HPSEBL | Reliable Communication and data Acquisition System upto 132kV Substation in Himachal Pradesh (135) | 18.64 | 5.1(c ) | 50 | 9.32 | 27-Jul-18 | | 18 | | | |

**Schemes approved under PSDF** **All figures in Rs Crore**

| Sl.No | Name of State/Entity | Region | Name of Entity | Name of Scheme and Unique ID No | Project Cost accepted by Appraisal Committee. | Category of Funding | Quantum of Funding Recommended by Appraisal Committee | Grant Approved by Monitoring Committee | Dateof Issuanceof sanction order by MoP | Date of Signing of Agreement | Completion schedule (in Month) | Date of release of first Installment | Proposed Completion date as per sanction order | Amount Disbursed as on 31-07-2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I | II | | III | IV | IX | X | XI | XIII | XV | XVI | | | | |
| 25 | NRPC | Central | NRPC | Creation and Maintanance of Web based Protection Database Management and PC based Protection Setting Calculation Tool for Northern Region Power System Network. (203) | 28.00 | 5.1(e ) | 100 | 28.00 | 27-Jul-18 | | 18 | | | |
| | | | | **Total** | **8,312.38** | | | **4,795.49** | | | | | | **464.24** |

**Schemes approved under PSDF** — **All figures in Rs Crore**

| Sl.No | Name of State/Entity | Region | Name of Entity | Name of Scheme and Unique ID No | Project Cost accepted by Appraisal Committee. | Category of Funding | Quantum of Funding Recommended by Appraisal Committee | Grant Approved by Monitoring Committee | Dateof Issuanceof sanction order by MoP | Date of Signing of Agreement | Completion schedule (in Month) | Date of release of first Installment | Proposed Completion date as per sanction order | Amount Disbursed as on 31-07-2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I | II | | III | IV | IX | X | XI | XIII | XV | XVI | | | | |

**Annexure-III/2**

**Downstream network by State Utilities from ISTS Stations**

| S. No. | Substation | Downstream network b ays | Commissioning status of S/s / Transformer | Planned 220 kV system and Implementation Status |
|---|---|---|---|---|
| 1 | 400/220 kV, 3x315 MVA Samba | 2 nos. bays utilized under ISTS. Balance 4 nos to be utilized | Commissioned (1st & 2nd –Mar'13 3rd –Oct'16) Bays-Mar'13 | • LILO of 220 kV Bishnha –Hiranagar D/c line. Target completion - Nov, 2019. • 220 kV D/c Samba (PG) – Samba (JKPDD) approved in 1st NRSCT. **PDD, J&K to update.** |
| 2 | 400/220kV, 2x315 MVA New Wanpoh | 6 Nos. of 220 kV bays to be utilized | Commissioned in Jul'14 Bays-Jul'14 | • 220 kV New Wanpoh - Mirbazar D/c line. Target completion – March, 2019. • 220 kV Alusteng - New Wanpoh Line. Target completion - March, 2019. **PDD, J&K to update.** |
| 3 | 400/220 kV, 2x315 MVA Parbati Pooling Station (Banala) | 2 Nos. of 220 kV bays to be utilized. | Commissioned in Dec'17 | • 220 kV Charor- Banala D/c line (18 km). • Expected by 30.06.2019. |
| 4 | 400/220 kV, 2x500 MVA Kurukshetra (GIS) | 8 nos. of 220 kV bays to be utilized | Commissioned in Mar'17. | • LILO of one circuit of Kaul-Pehowa 220 kV D/c line at Bhadson (Kurukshetra) - Commissioned on 07.03.2019 • LILO of one circuit of Kaul- Bastara 220 kV D/c line Bhadson(Kurukshetra) - Work awarded on 12.03.2018. Contractual completion date is 11.102019. • 220kV D/c Bhadson (Kurukshetra) – Salempur with HTLS conductor equivalent to twin moose - |

**Annexure-III/2**

| S. No. | Substation | Downstream network bays | Commissioning status of S/s / Transformer | Planned 220 kV system and Implementation Status |
|---|---|---|---|---|
| | | | | PO issued on 15.10.18. Contract agreement signed on 30.11.2018. Likely date of completion 30.04.2020. |
| 5 | 400/220 kV, 2x500 MVA Bagpat GIS | 8 nos. of 220 kV Downstream lines commissioned. Balance 3 Nos. of 220 kV bays to be utilized. | Commissioned in Mar/Jun'16 | • Bagpat(PG) - Modipuram-II 220 kV D/c line.<br>• Target completion – under planning.<br>• LILO of 220 kV S/c Muradnagar II –Baghpat (PG) at Baghpat SS.<br>• Completed |
| 6 | 400/220 kV, 2x315 MVA Saharanpur | All 6 nos. 220 kV bays utilised. | Commissioned in May'16 | • LILO of Khara-Shamli 220 kV S/C line at SRN(PG).<br>• 220 kV SRN(PG)-Sarasawa D/C Line.<br>• LILO of SRN-Nanauta 220 kV S/C line at SRN(PG).<br>• Completed |
| 7 | 400/220 kV, 2x315 MVA Dehradun | Out of 6 bays, only two bays used. Balance 4 bays to be utilised. | Commissioned in Jan'17 | • 220 kV Dehradun-Jhajra line.<br>Target completion: Nov, 2021 |
| 8 | 400/220 kV, 2x315 MVA Sohawal | 4 Nos 220 kV bays utilized. 2 Nos 220 kV bays to be utilized. | Commissioned in Jun'12 | • 220 kV D/C Sohawal (PG) – Gonda<br>• 220 kV D/C Sohawal (PG) – Gonda<br>• Target completion-November, 2019. |
| 9 | Shahjahanpur, 2x315 MVA 400/220 kV | Partially utilized. Balance 5 Nos. of 220 kV bays to be utilized. | Commissioned in Jun/Sep'14 | • 220 kV D/C Shajahnapur (PG) - Azizpur D/C line.<br>• Target completion –Dec., 2020.<br>• 220 kV D/C Shahajahanpur (PG) - Gola Lakhimpur line.<br>• Target completion – Dec., 2019. |

**Annexure-III/2**

| S. No. | Substation | Downstream network bays | Commissioning status of S/s / Transformer | Planned 220 kV system and Implementation Status |
|---|---|---|---|---|
| 10 | 02 nos. bays at Moga | Partially utilized. Balance 2 nos. of 220kV bays to be utilized. | Commissioned in Jun'15. | • Moga–Mehalkalan 220 kV D/c line.<br>• Commissioned on 24.03.2019. |
| 11 | Hamirpur 400/220 kV 2x 315 MVA Sub-station (Augmentation by 3x105 MVA ICT) | 2 nos. bays utilized under ISTS. Balance 6 nos to be utilized | 1st-Dec'13, 2nd – Mar'14 & 3rd Mar'19.<br>4 bays-Dec'13,<br>2 bays-Mar'14<br>2 bays-Mar'19 | • 220 kV D/C Hamirpur-Dehan line.<br>• Target completion - Apr, 2020. |
| 12 | Kaithal 400/220 kV 1x 315 MVA Sub-station | July 2017 (Shifting of transformer from Ballabhgarh) | Commissioned | 220 kV Kaithal(PG)-Neemwala D/c line - Target completion - 31.01.2020. Work awarded on 08.06.2018. Contractual completion date is 06.01.2020. |
| 13 | Sikar 400/220kV, 1x 315 MVA S/s | 2 Nos. of 220 kV bays | Commissioned | RVPNL requested to allocate the 220 kV bays for solar / wind developers or utilise for any other purpose. CTU stated that these bays were implemented on the request from RVPNL, however, allocation of these bays to RE developers can be considered in future depending on the stage-II application received at Sikar. |
| 14 | Bhiwani 400/220kV S/s | 6 nos. of 220kV bays | Commissioned | 220kV Bhiwani (PG) - Isherwal (HVPNL) D/c line. Target completion - 31.06.2020. 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. |

| S. No. | Substation | Downstream network b ays | Commissioning status of S/s / Transformer | Planned 220 kV system and Implementation Status |
|---|---|---|---|---|
| | | | | Likely date of award is 30.06.2019.<br>Likely date of completion is 31.12.2020. |
| 15 | Jind 400/220kV S/s | 6 nos. of 220kV bays | Commissioned | LILO of both circuits of 220kV D/c Narwana – Mund line at Jind (PG).<br>Target completion - 31.06.2020.<br>Price bid opened on 27.12.18.<br>Case scrutinized and sent to DS&D for placing in the next HPPC meeting for decision regarding award.<br>Likely date of award is 30.06.2019.<br>Likely date of completion is 31.12.2020. |
| 16 | 400/220kV Tughlakabad GIS (6 no of bays utilized out of 8 no of 220kV bays) | 4x 500 | Commissioned | RK Puram – Tughlakabad (UG Cable) 220kv D/c line.<br>Target completion – 2020-21. |
| 17 | 400/220kV Kala Amb GIS (TBCB) (6 nos. of 220kV bays) | 7x105 | Commissioned (Jul'17) | HPSEBL has planned one no. of 220kV D/c line from Kala Amb 400/220kV S/s to 220/132kV Kala Amb S/s. Details for remaining 4 nos. of line bays may be provided.<br>Target completion-2021 |

**Establishment of new 400/220 kV substations in Northern Region**

| Sl. No. | Name of Substation | MVA Capacity | Expected Schedule | Downstream connectivity furnished by States in 40th SCPSPNR |
|---|---|---|---|---|
| 1 | 400/220kV Dwarka-I GIS<br><br>(8 nos. of 220kV bays) | 4x 500 | Sep'19 | **DTL to update.** |

| | | | | |
|---|---|---|---|---|
| 2 | 220/66kV Chandigarh GIS (8 nos. of 66kV bays) | 2x 160 | Jun'19 | **Chandigarh to update.** |
| 3 | 400/220kV Jauljivi GIS<br><br>Out of these 8 nos. 220kV Line Bays, 4 nos. (Pithoragath-2, & Dhauliganga-2) would be used by the lines being constructed by POWERGRID and balance 4 nos. (Almora-2, Jauljivi-2) bays would be used by the lines being constructed by PTCUL. | 2x315 | Dec'2019 | • 220kV Almora-Jauljivi line.<br>• **DPR by July, 2019.**<br>• 220kV Brammah-Jauljivi line<br>• **Target completion: 2021** |
| 4 | 400/220kV Sohna Road Sub-station (TBCB)<br>(8 nos. of 220kV bays) | 2x500 | May'19 | • LILO of both circuits of 220kV D/c Sector-69 - Roj Ka Meo line at 400kV Sohna Road.<br>• LILO of both circuits of 220kV D/c Badshahpur-Sec77 line at 400kV Sohna Road.<br>• NIT to be floated shortly. Case processed for permission of Election Commission of India.<br>• 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.<br>• **Target completion: 31.05.2020** |
| 5 | 400/220kV Prithla Sub-station (TBCB) (8 nos. of 220kV bays) | 2x500 | May'19 | LILO of existing 220kV Palwal–Ranga Rajpur D/c line at Prithla.<br>Work awarded on 22.10.2018.<br>Contractual completion date is 08.02.2020.<br>220 kV D/c Prithla (400) –Sector-78, Faridabad S/s.<br>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. |
| 6 | 400/220kV Kadarpur Sub-station (TBCB) (8 nos. of 220kV bays) | 2x500 | May'19 | NIT floated on05.03.2019 with due date of submission on 22.04.2019 (opened on 23.04.2019 and under evaluation).<br>Target completion: 31.12.2020 |

**Annexure-IV**

| Sr. No. | Developer | Name of Project | Sector | State | FGD Phasing Plan (DD/MM/YYYY) | Remarks | FGD Status |
|---|---|---|---|---|---|---|---|
| 1 | CHINA LIGHT POWER | MAHATMA GANDHI TPS | Private Sector | Haryana | 31/12/2019 | FGD POSSIBLE | FGD Installed and is Under Renovation |
| 2 | CHINA LIGHT POWER | MAHATMA GANDHI TPS | Private Sector | Haryana | 31/12/2019 | FGD POSSIBLE | FGD Installed and is Under Renovation |
| 3 | HGPCorpn | PANIPAT TPS | State Sector | Haryana | 31/12/2019 | FGD POSSIBLE | Developer wants exemption |
| 4 | HGPCorpn | PANIPAT TPS | State Sector | Haryana | 31/12/2019 | FGD POSSIBLE | Feasbility Study Under Progress |
| 5 | HGPCorpn | PANIPAT TPS | State Sector | Haryana | 31/12/2019 | FGD POSSIBLE | Feasbility Study Under Progress |
| 6 | HGPCorpn | RAJIV GANDHI TPS | State Sector | Haryana | 31/12/2019 | FGD POSSIBLE | Feasbility Study Completed. |
| 7 | HGPCorpn | RAJIV GANDHI TPS | State Sector | Haryana | 31/12/2019 | FGD POSSIBLE | Feasbility Study Completed. |
| 8 | HGPCorpn | YAMUNA NAGAR TPS | State Sector | Haryana | 31/12/2019 | FGD POSSIBLE | Feasbility Study Completed. |
| 9 | HGPCorpn | YAMUNA NAGAR TPS | State Sector | Haryana | 31/12/2019 | FGD POSSIBLE | Feasbility Study Completed. |
| 10 | NTPC | INDIRA GANDHI STPP | Central Sector | Haryana | 31/12/2019 | FGD POSSIBLE | Bid awarded on 30 Jan 2018 |
| 11 | NTPC | INDIRA GANDHI STPP | Central Sector | Haryana | 31/12/2019 | FGD POSSIBLE | Bid awarded on 30 Jan 2018 |
| 12 | NTPC | INDIRA GANDHI STPP | Central Sector | Haryana | 31/12/2019 | FGD POSSIBLE | Bid awarded on 30 Jan 2018 |
| 13 | GVK Power Ltd. | GOINDWAL SAHIB | Private Sector | Punjab | 30/04/2020 | FGD POSSIBLE | EOI was invited vide newspaper advrt. On 18.06.2018 |
| 14 | GVK Power Ltd. | GOINDWAL SAHIB | Private Sector | Punjab | 28/02/2020 | FGD POSSIBLE | EOI was invited vide newspaper advrt. On 18.06.2018 |
| 15 | L&T Power Development LTD(Nabha) | Nabha TPP (Rajpura TPP) | Private Sector | Punjab | 31/12/2019 | FGD POSSIBLE | PSERC disallowed additional capital cost pass through under "Change in Law" provisions of PPA on the ground that Environment Clearance required space provision for FGD.<br>Tendering process is stalled due to regulatory hurdles as the Banks have put a condition of Regulatory clarity and additional capital cost pass through under PPA provisions.<br>NPL has approached the Appellate Tribunal. |
| 16 | L&T Power Development LTD(Nabha) | Nabha TPP (Rajpura TPP) | Private Sector | Punjab | 31/12/2019 | FGD POSSIBLE | Tendering process is stalled due to regulatory hurdles as the Banks have put a condition of Regulatory clarity and additional capital cost pass through under PPA provisions.<br>NPL has approached the Appellate Tribunal. |
| 17 | PSEB | GH TPS (LEH.MOH.) | State Sector | Punjab | 31/12/2019 | FGD POSSIBLE | Techanical Specification for installation of FGD have been drafted and are being finalised after approval |
| 18 | PSEB | GH TPS (LEH.MOH.) | State Sector | Punjab | 31/12/2019 | FGD POSSIBLE | Techanical Specification for installation of FGD have been drafted and are being finalised after approval |
| 19 | PSEB | GH TPS (LEH.MOH.) | State Sector | Punjab | 31/12/2019 | FGD POSSIBLE | Techanical Specification for installation of FGD have been drafted and are being finalised after approval |
| 20 | PSEB | GH TPS (LEH.MOH.) | State Sector | Punjab | 31/12/2019 | FGD POSSIBLE | Techanical Specification for installation of FGD have been drafted and are being finalised after approval |
| 21 | Talwandi Sabo Power Limited | TALWANDI SABO TPP | Private Sector | Punjab | 31/12/2019 | FGD POSSIBLE | Feasiblity Study Carried Out. PPA issues pending with regulator |
| 22 | Talwandi Sabo Power Limited | TALWANDI SABO TPP | Private Sector | Punjab | 31/12/2019 | FGD POSSIBLE | Feasiblity Study Carried Out. PPA issues pending with regulator |
| 23 | Talwandi Sabo Power Limited | TALWANDI SABO TPP | Private Sector | Punjab | 31/12/2019 | FGD POSSIBLE | Feasiblity Study Carried Out. PPA issues pending with regulator |
| 24 | Adani Power Ltd. | KAWAI TPS | Private Sector | Rajasthan | 31/08/2020 | FGD POSSIBLE | NIT to be issued soon. |
| 25 | Adani Power Ltd. | KAWAI TPS | Private Sector | Rajasthan | 30/06/2020 | FGD POSSIBLE | NIT to be issued soon. |
| 26 | RRVUNL | CHHABRA TPP | State Sector | Rajasthan | 31/12/2021 | FGD POSSIBLE | NIT floated on 13/5/2019. Target date for LOI is 31.09.2015 |
| 27 | RRVUNL | CHHABRA TPP | State Sector | Rajasthan | 31/10/2021 | FGD POSSIBLE | NIT floated on 13/5/2019. Target date for LOI is 31.09.2016 |
| 28 | RRVUNL | CHHABRA TPP | State Sector | Rajasthan | 31/08/2021 | FGD POSSIBLE | NIT floated on 13/5/2019. Target date for LOI is 31.09.2017 |
| 29 | RRVUNL | CHHABRA TPP | State Sector | Rajasthan | 31/08/2021 | FGD POSSIBLE | NIT floated on 13/5/2019. Target date for LOI is 31.09.2018 |
| 30 | RRVUNL | CHHABRA TPP | State Sector | Rajasthan | 30/04/2020 | FGD POSSIBLE | NIT floated on 13/5/2019. Target date for LOI is 31.09.2019 |
| 31 | RRVUNL | KALISINDH TPS | State Sector | Rajasthan | 30/06/2021 | FGD POSSIBLE | NIT floated on 13/5/2019. Target date for LOI is 31.09.2020 |
| 32 | RRVUNL | KALISINDH TPS | State Sector | Rajasthan | 30/04/2021 | FGD POSSIBLE | NIT floated on 13/5/2019. Target date for LOI is 31.09.2021 |
| 33 | RRVUNL | KOTA TPS | State Sector | Rajasthan | 31/12/2022 | FGD POSSIBLE | NIT floated on 13/5/2019. Target date for LOI is 31.09.2022 |
| 34 | RRVUNL | KOTA TPS | State Sector | Rajasthan | 31/12/2022 | FGD POSSIBLE | NIT floated on 13/5/2019. Target date for LOI is 31.09.2023 |
| 35 | RRVUNL | KOTA TPS | State Sector | Rajasthan | 31/10/2022 | FGD POSSIBLE | NIT floated on 13/5/2019. Target date for LOI is 31.09.2024 |
| 36 | RRVUNL | SURATGARH TPS | State Sector | Rajasthan | 31/12/2022 | FGD POSSIBLE | NIT floated on 13/5/2019. Target date for LOI is 31.09.2019 |
| 37 | RRVUNL | SURATGARH TPS | State Sector | Rajasthan | 31/10/2022 | FGD POSSIBLE | NIT floated on 13/5/2019. Target date for LOI is 31.09.2020 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 38 | RRVUNL | SURATGARH TPS | State Sector | Rajasthan | 31/08/2022 | FGD POSSIBLE | NIT floated on 13/5/2019. Target date for LOI is 31.09.2021 |
| 39 | RRVUNL | SURATGARH TPS | State Sector | Rajasthan | 30/06/2022 | FGD POSSIBLE | NIT floated on 13/5/2019. Target date for LOI is 31.09.2022 |
| 40 | RRVUNL | SURATGARH TPS | State Sector | Rajasthan | 30/04/2022 | FGD POSSIBLE | NIT floated on 13/5/2019. Target date for LOI is 31.09.2023 |
| 41 | RRVUNL | SURATGARH TPS | State Sector | Rajasthan | 28/02/2022 | FGD POSSIBLE | NIT floated on 13/5/2019. Target date for LOI is 31.09.2024 |
| 42 | Lalitpur Power Gen. Co | LALITPUR TPS | Private Sector | Uttar Pardesh | 28/02/2021 | FGD POSSIBLE | Petition was filed with UPERC for approval capital cost for installation of FGD and other associated systems. UPERC directed to approach CEA. |
| 43 | Lalitpur Power Gen. Co | LALITPUR TPS | Private Sector | Uttar Pardesh | 31/10/2021 | FGD POSSIBLE | Petition was filed with UPERC for approval capital cost for installation of FGD and other associated systems. UPERC directed to approach CEA. |
| 44 | Lalitpur Power Gen. Co. | LALITPUR TPS | Private Sector | Uttar Pardesh | 31/12/2020 | FGD POSSIBLE | Petition was filed with UPERC for approval capital cost for installation of FGD and other associated systems. UPERC directed to approach CEA. |
| 45 | Lanko Anpara Pow Ltd | ANPARA C TPS | Private Sector | Uttar Pardesh | 31/08/2022 | FGD POSSIBLE | Tender Specification made |
| 46 | Lanko Anpara Pow Ltd | ANPARA C TPS | Private Sector | Uttar Pardesh | 30/06/2022 | FGD POSSIBLE | Tender Specification made |
| 47 | NTPC | DADRI (NCTPP) | Central Sector | Uttar Pardesh | 31/12/2019 | FGD POSSIBLE | Dry Sorbent Injection (DSI) SYSTEM TO BE INSTALLED |
| 48 | NTPC | DADRI (NCTPP) | Central Sector | Uttar Pardesh | 31/12/2019 | FGD POSSIBLE | Dry Sorbent Injection (DSI) SYSTEM TO BE INSTALLED |
| 49 | NTPC | DADRI (NCTPP) | Central Sector | Uttar Pardesh | 31/12/2019 | FGD POSSIBLE | Dry Sorbent Injection (DSI) SYSTEM TO BE INSTALLED |
| 50 | NTPC | DADRI (NCTPP) | Central Sector | Uttar Pardesh | 31/12/2019 | FGD POSSIBLE | Dry Sorbent Injection (DSI) SYSTEM TO BE INSTALLED |
| 51 | NTPC | DADRI (NCTPP) | Central Sector | Uttar Pardesh | 31/12/2019 | FGD POSSIBLE | Awarded on 01 Feb 18. Work in progress |
| 52 | NTPC | DADRI (NCTPP) | Central Sector | Uttar Pardesh | 31/12/2019 | FGD POSSIBLE | Awarded on 01 Feb 18. Work in progress |
| 53 | NTPC | RIHAND STPS | Central Sector | Uttar Pardesh | 28/02/2022 | FGD POSSIBLE | NIT In Sep 18 |
| 54 | NTPC | RIHAND STPS | Central Sector | Uttar Pardesh | 31/12/2021 | FGD POSSIBLE | NIT In Sep 18 |
| 55 | NTPC | RIHAND STPS | Central Sector | Uttar Pardesh | 30/10/2021 | FGD POSSIBLE | Award in 31-08-2018 |
| 56 | NTPC | RIHAND STPS | Central Sector | Uttar Pardesh | 30/04/2021 | FGD POSSIBLE | Award in 31-08-2018 |
| 57 | NTPC | RIHAND STPS | Central Sector | Uttar Pardesh | 28/02/2021 | FGD POSSIBLE | Award in 31-08-2018 |
| 58 | NTPC | RIHAND STPS | Central Sector | Uttar Pardesh | 31/12/2020 | FGD POSSIBLE | Award in 31-08-2018 |
| 59 | NTPC | SINGRAULI STPS | Central Sector | Uttar Pardesh | 31/12/2021 | FGD POSSIBLE | NIT IN LOT-3 PLANNED IN OCT 2018 |
| 60 | NTPC | SINGRAULI STPS | Central Sector | Uttar Pardesh | 31/12/2021 | FGD POSSIBLE | NIT IN LOT-3 PLANNED IN OCT 2018 |
| 61 | NTPC | SINGRAULI STPS | Central Sector | Uttar Pardesh | 31/08/2021 | FGD POSSIBLE | NIT IN LOT-3 PLANNED IN OCT 2018 |
| 62 | NTPC | SINGRAULI STPS | Central Sector | Uttar Pardesh | 31/08/2021 | FGD POSSIBLE | NIT IN LOT-3 PLANNED IN OCT 2018 |
| 63 | NTPC | SINGRAULI STPS | Central Sector | Uttar Pardesh | 30/04/2021 | FGD POSSIBLE | NIT IN LOT-3 PLANNED IN OCT 2018 |
| 64 | NTPC | SINGRAULI STPS | Central Sector | Uttar Pardesh | 28/02/2021 | FGD POSSIBLE | NIT In Sep 18 |
| 65 | NTPC | SINGRAULI STPS | Central Sector | Uttar Pardesh | 31/12/2020 | FGD POSSIBLE | NIT In Sep 18 |
| 66 | NTPC | UNCHAHAR TPS | Central Sector | Uttar Pardesh | 31/12/2022 | FGD POSSIBLE | NIT IN LOT-3 PLANNED IN SEP 2018 |
| 67 | NTPC | UNCHAHAR TPS | Central Sector | Uttar Pardesh | 31/12/2022 | FGD POSSIBLE | NIT IN LOT-3 PLANNED IN SEP 2018 |
| 68 | NTPC | UNCHAHAR TPS | Central Sector | Uttar Pardesh | 31/10/2022 | FGD POSSIBLE | NIT IN LOT-3 PLANNED IN SEP 2018 |
| 69 | NTPC | UNCHAHAR TPS | Central Sector | Uttar Pardesh | 31/10/2022 | FGD POSSIBLE | NIT IN LOT-3 PLANNED IN SEP 2018 |
| 70 | NTPC | UNCHAHAR TPS | Central Sector | Uttar Pardesh | 30/04/2022 | FGD POSSIBLE | NIT IN LOT-2 PLANNED IN JULY 2018 |
| 71 | NTPC | UNCHAHAR TPS | Central Sector | Uttar Pardesh | 8-31-2020 | FGD POSSIBLE | Price bid submitted on 29.06.2018. |
| 72 | Prayagraj Power Generation Company LTD. | PRAYAGRAJ TPP | Private Sector | Uttar Pardesh | 30/04/2020 | FGD POSSIBLE | Feasibility Report cleared by CEA, Tariff petition being filed to state Regulator (UPERC) and Tender Specifications under preparation by consultants M/s TCE. |
| 73 | Prayagraj Power Generation Company LTD. | PRAYAGRAJ TPP | Private Sector | Uttar Pardesh | 30/06/2020 | FGD POSSIBLE | Feasibility Report cleared by CEA, Tariff petition being filed to state Regulator (UPERC) and Tender Specifications under preparation by consultants M/s TCE. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 74 | Prayagraj Power Generation Company LTD. | PRAYAGRAJ TPP | Private Sector | Uttar Pardesh | 29/02/2020 | FGD POSSIBLE | Feasibility Report cleared by CEA, Tariff petition being filed to state Regulator (UPERC) and Tender Specifications under preparation by consultants M/s TCE. |
| 75 | Rosa Power Supply Co | ROSA TPP Ph-I | Private Sector | Uttar Pardesh | 31/12/2021 | FGD POSSIBLE | Tendering Under Process |
| 76 | Rosa Power Supply Co | ROSA TPP Ph-I | Private Sector | Uttar Pardesh | 31/12/2021 | FGD POSSIBLE | Tendering Under Process |
| 77 | Rosa Power Supply Co | ROSA TPP Ph-I | Private Sector | Uttar Pardesh | 31/10/2021 | FGD POSSIBLE | Tendering Under Process |
| 78 | Rosa Power Supply Co | ROSA TPP Ph-I | Private Sector | Uttar Pardesh | 31/10/2021 | FGD POSSIBLE | Tendering Under Process |
| 79 | UPRVUNL | ANPARA TPS | State Sector | Uttar Pardesh | 31/10/2022 | FGD POSSIBLE | Tender is floated on 14 February 2019 and Techno- Commercial (Part-I) is scheduled to open on 14 may 2019 |
| 80 | UPRVUNL | ANPARA TPS | State Sector | Uttar Pardesh | 31/08/2022 | FGD POSSIBLE | Tender is floated on 14 February 2019 and Techno- Commercial (Part-I) is scheduled to open on 14 may 2019 |
| 81 | UPRVUNL | ANPARA TPS | State Sector | Uttar Pardesh | 30/06/2022 | FGD POSSIBLE | Tender is floated on 14 February 2019 and Techno- Commercial (Part-I) is scheduled to open on 14 may 2019 |
| 82 | UPRVUNL | ANPARA TPS | State Sector | Uttar Pardesh | 30/04/2022 | FGD POSSIBLE | Tender is floated on 14 February 2019 and Techno- Commercial (Part-I) is scheduled to open on 14 may 2019 |
| 83 | UPRVUNL | ANPARA TPS | State Sector | Uttar Pardesh | 28/02/2022 | FGD POSSIBLE | Tender is floated on 14 February 2019 and Techno- Commercial (Part-I) is scheduled to open on 14 may 2019 |
| 84 | UPRVUNL | ANPARA TPS | State Sector | Uttar Pardesh | 30/06/2021 | FGD POSSIBLE | Part -1 Techno Comm Bid opened on 27.11.2018 |
| 85 | UPRVUNL | ANPARA TPS | State Sector | Uttar Pardesh | 30/04/2021 | FGD POSSIBLE | Part -1 Techno Comm Bid opened on 27.11.2018 |
| 86 | UPRVUNL | HARDUAGANJ TPS | State Sector | Uttar Pardesh | 31/12/2019 | FGD POSSIBLE | Administrative approval is under process. |
| 87 | UPRVUNL | HARDUAGANJ TPS | State Sector | Uttar Pardesh | 31/12/2019 | FGD POSSIBLE | Administrative approval is under process. |
| 88 | UPRVUNL | OBRA TPS | State Sector | Uttar Pardesh | 31/08/2022 | FGD POSSIBLE | Feasiblity Study Under Progress |
| 89 | UPRVUNL | OBRA TPS | State Sector | Uttar Pardesh | 31/10/2022 | FGD POSSIBLE | Feasiblity Study Under Progress |
| 90 | UPRVUNL | OBRA TPS | State Sector | Uttar Pardesh | 31/12/2022 | FGD POSSIBLE | Feasiblity Study Under Progress |
| 91 | UPRVUNL | OBRA TPS | State Sector | Uttar Pardesh | 30/06/2022 | FGD POSSIBLE | Feasiblity Study Under Progress |
| 92 | UPRVUNL | OBRA TPS | State Sector | Uttar Pardesh | 30/04/2022 | FGD POSSIBLE | Feasiblity Study Under Progress |
| 93 | UPRVUNL | PARICHHA TPS | State Sector | Uttar Pardesh | 30/04/2022 | FGD POSSIBLE | Part -1 Techno Comm Bid opened on 22.02.2019 |
| 94 | UPRVUNL | PARICHHA TPS | State Sector | Uttar Pardesh | 30/04/2022 | FGD POSSIBLE | Part -1 Techno Comm Bid opened on 22.02.2019 |
| 95 | UPRVUNL | PARICHHA TPS | State Sector | Uttar Pardesh | 28/02/2022 | FGD POSSIBLE | Part -1 Techno Comm Bid opened on 22.02.2019 |
| 96 | UPRVUNL | PARICHHA TPS | State Sector | Uttar Pardesh | 31/12/2021 | FGD POSSIBLE | Part -1 Techno Comm Bid opened on 22.02.2019 |
| 97 | NTPC | Meja STPP | Central Sector | Uttar Pardesh | | FGD POSSIBLE | FGD will award in LOT-1A of NTPC |

Annexure-V(A)

| S. No. | Utilities | Appointment of organization-wise Chief Information Security Officers and its status | Identification of organization-wise Critical Infrastructure and its status | Preparation of organization-wise Crisis Management Plan and its status | Status of Cyber Security Mock Drill activity in coordination with CERT-In | Status of Training / Workshops on Cyber Security organized / participated by power sector entities | Status of action taken on CERT-In / NCIIPC advisories |
|---|---|---|---|---|---|---|---|
| 1 | **PSTCL** | √ | Identified at SLDC | √ | × | × | Cyber Security audit at Punjab SLDC is carried out in line with CERT–In advisories |
| 2 | **DTL** | √ | × | × | × | Attended round the clock conference. | × |
| 3 | **Adani Power Ltd.** | √ | The SCADA systems across all the locations have been identified as the critical infrastructure | A detailed & elaborate Crisis Management plan is under preparation. | × | √ | Adani Power is regularly updating the Cyber Security devices and review the applicability of the advisories to its infrastructure. |
| 4 | **BBMB** | √ | The identification of critical infrustructure is under process. | The doucmentation of Crisis Management Plan for SCADA/EMS System is under process. | × | The officers/offcials of BBMB regularly participate in the Training/Workshops on Cyber Security organized by external agencies. In house training calendar is being prepared. | The cyber security advisories received from CERT-In/NCIIPC are being implemented regularly on SCADA/EMS System. |
| 5 | **NTPC** | √ | The identification of Critical Information Infrastructure (Cll) is under process | √ | √ | √ | √ |
| 6 | **NPCIL RAPS, NAPS** | √ | √ | √ | √ | √ | √ |
| 7 | **PTCUL** | √ | Critical infrastructure identification is under process. | Under process | Under process | Under process | √ |
| 8 | **THDC** | √ | The Identification of Critical infrustrcture is yet to be identified. | √ | × | √ | √ |
| 9 | **SJVNL** | √ | × | Crisis Management plan is being drafted in line with the Crisis Management Plan of CERT- Hydro | √ | The HR/Training Deaprtment will organize the training programme | √ |

Annexure-V(A)

| S. No. | Utilities | Appointment of organization-wise Chief Information Security Officers and its status | Identification of organization-wise Critical Infrastructure and its status | Preparation of organization-wise Crisis Management Plan and its status | Status of Cyber Security Mock Drill activity in coordination with CERT-In | Status of Training / Workshops on Cyber Security organized / participated by power sector entities | Status of action taken on CERT-In / NCIIPC advisories |
|---|---|---|---|---|---|---|---|
| 10 | **Haryana** | √ | √ | × | Mock drill activities related to SCADA/EMS system are being carried out as per the already laid terms of contract & in unison with NRLDC as well as other power utilities of NR Region. | × | × |

Annexure-V(B)

## Status of Cyber Security Audit and VAPT of ICT infrastructure, website, web application

NPCIL:

VAPT is being conducted. All NPCIL units conduct quarterly cyber security audit of their infrastructure and submit reports. Periodic audits of NPCIL HQ and units are being conducted.

NHPC:

157th OCC meeting: As a pilot location, the auditing of IT infrastructure of IT&C Division and VAPT of two power stations have been done and the audit report has been submitted on 31.12.2018. The compliance of the observations is under progress.

SJVNL:

37th TCC/40th NRPC: CERT-In empanelled auditor has been requested for IT security audit & Vulnerability Assessment Analysis of IT security implementation & IT Network Infrastructure.

POWERGRID:

159th OCC meeting: VAPT of IT equipment has been done. For SCADA system, only VA is being done.

Rajasthan:

159th OCC meeting: 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.

BBMB:

159th OCC meeting: 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.

NRPC Secretariat:

The tender for cyber security audit of NRPC website portal has been floated and bids were opened on June 12, 2019.

**Annexure-1**

# NR-1 and NR-3

| STATION | TEMP °C | HUMD % | RATIO HUMID/TEMP |
|---|---|---|---|
| AGRA | s 19 | s 60 | s 3 |
| ALLAHABAD | 31 | 14 | 0 |
| ANTA | 32 | 10 | 0 |
| AURIYA | 15 | s 0 | s 0 |
| BADARPUR | 14 | 82 | 6 |
| BALIA | 41 | 14 | 0 |
| BALLABGARH | s 25 | s 102 | s 4 |
| BASSI | 31 | 4 | 0 |
| BHIWADI | 42 | 31 | 1 |
| DADRI HVDC | -27 | 13 | -0 |
| GORAKHPUR | 40 | 24 | 1 |
| KANPUR | 42 | 9 | 0 |
| LUCKNOW_PG | s 75 | 46 | s 1 |
| MAINPURI | 8 | 17 | 2 |
| MANDOLA | 43 | 16 | 0 |
| M'BAGH | 25 | 51 | 2 |
| MEERUT | 41 | 17 | 0 |
| RAIBAREILLY | 34 | s 0 | s 0 |
| RIHAND (HVDC) | 32 | 15 | 0 |
| RIHAND_NT | 31 | 12 | 0 |
| SINGRAULI | 31 | 12 | 0 |
| VINDHYACHAL | 30 | 17 | 1 |

# NR-2

| STATION | TEMP °C | HUMD % | RATIO HUMID/TEMP |
|---|---|---|---|
| ABDULLAPUR | 43 | 12 | 0 |
| AMRITSAR | 29 | 15 | 1 |
| BAHADURGARH | 39 | 0 | 0 |
| FATEHABAD | 48 | 128 | 3 |
| HISSAR | s 50 | 12 | s 0 |
| JALLANDHAR | s 50 | s 102 | s 2 |
| KAITHAL | 30 | 15 | 1 |
| KISHENPUR | 33 | 6 | 0 |
| MALERKOTLA | s 0 | 14 | 0 |
| MOGA | 29 | 18 | 1 |
| NALAGARH | s 19 | s 42 | s 2 |
| PATIALA_PG | 34 | 13 | 0 |
| WAGOORA | s 0 | s 0 | 0 |
| SONIPAT | 45 | 10 | |

# STATES

| STATION | TEMP °C | HUMD % | RATIO HUMID/TEMP |
|---|---|---|---|
| ABLOWEL | s 42 | s 4 | |
| BADDI | R 33 | R 0 | |
| BHIWANI | s 5 | s 10 | |
| BWANA | s -30 | s 8 | s -0 |
| DADRI | 45 | s *** | |
| GLADNI | s 0 | s 0 | |
| HEERAPURA | s 26 | s 27 | |
| JUTOGH | 19 | s 0 | |
| LUCKNOW | s 0 | s 7 | 0 |
| MINTOROAD | 43 | 11 | |
| MORADABAD | 0 | R 70 | |
| NARWANA | s 33 | s 0 | |
| PANIPAT | 44 | 15 | |
| RATANGARH | s 11 | s 0 | |
| PANIPAT - BB | 25 | s 99 | |

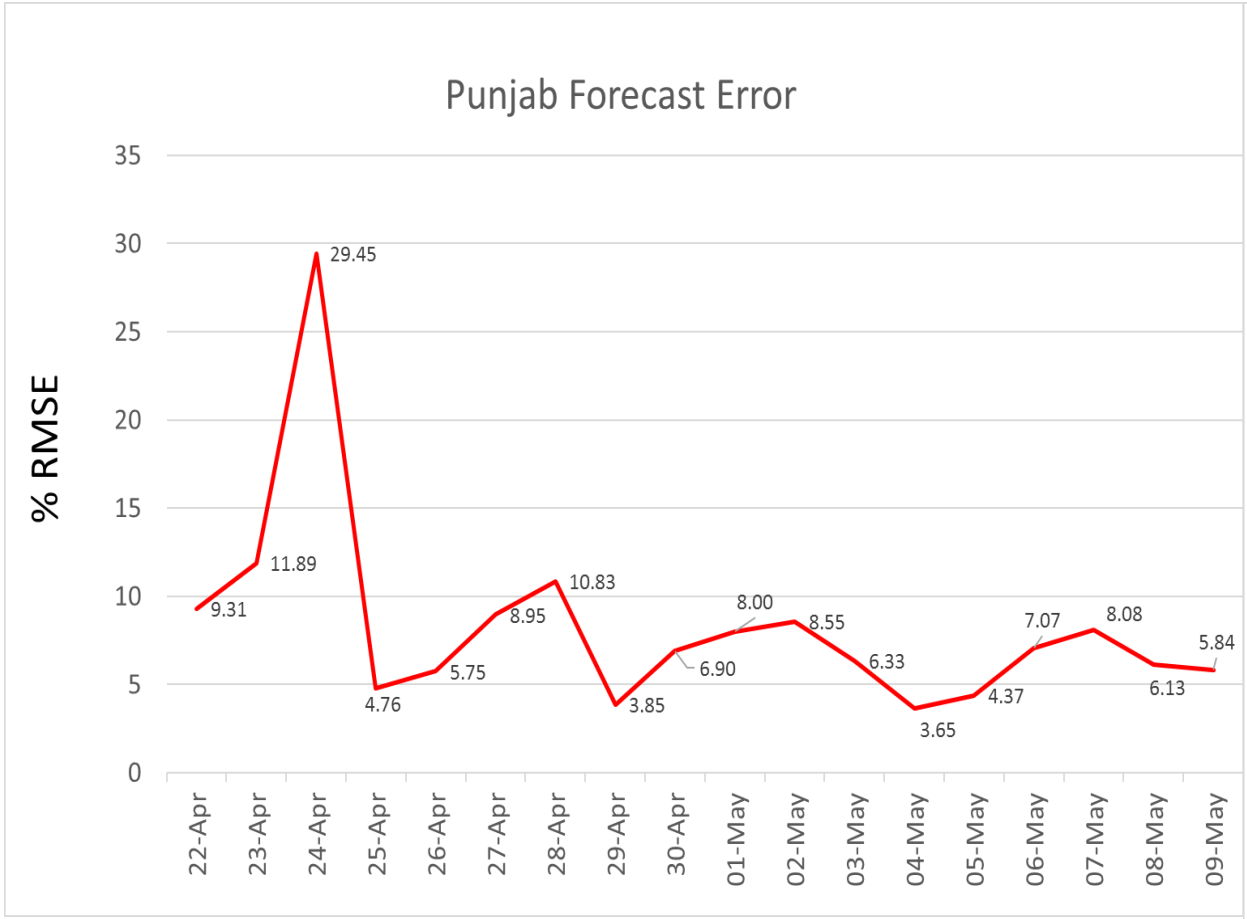
Annex-2

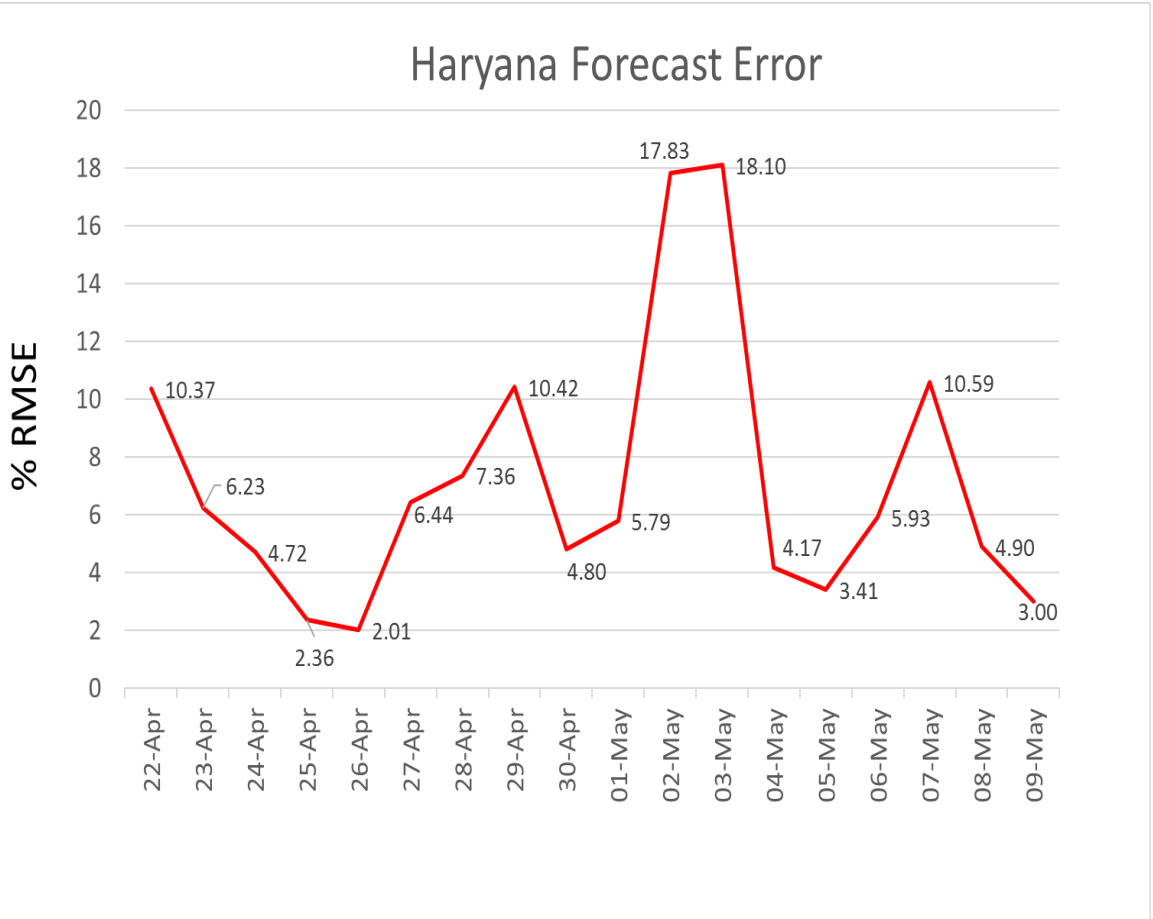
# State Forecast – File Status April -2019

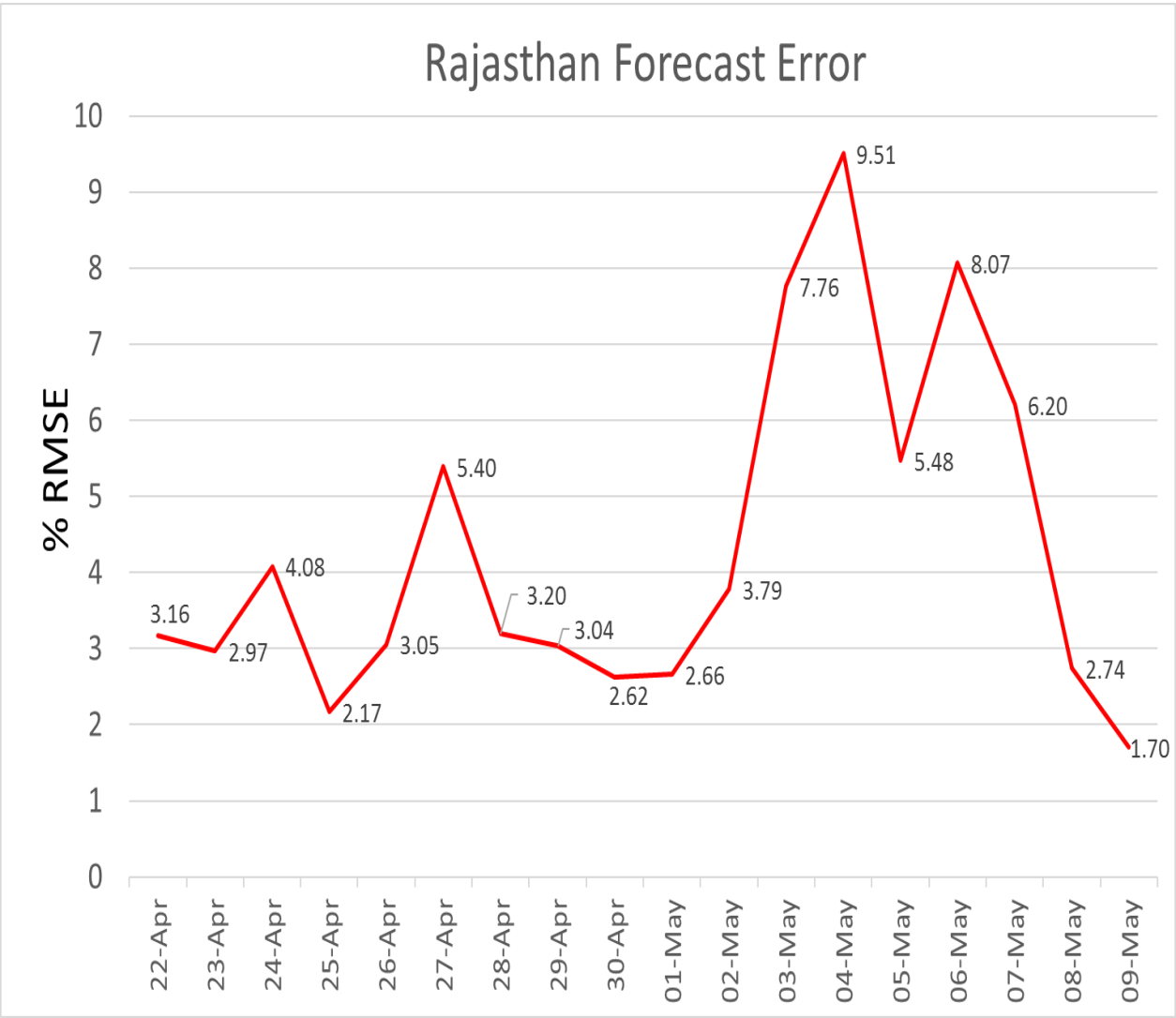
| संख्या | राज्य | Forecast File | |
|---|---|---|---|
| | | Received | Not Received/ Remarks |
| 1 | पंजाब | Yes | 5& 6th April |
| 2 | हरियाणा | Yes | During weekend it was uploaded on Monday |
| 3 | राजस्थान | Yes | - |
| 4 | दिल्ली | Yes | File Received on same day and During weekend it was uploaded on Monday |
| 5 | उत्तर प्रदेश | Yes | |
| 6 | उत्तराखंड | Not regular | 01,05,07,08,12,14,15,18,19, 20,21 & 22 April |
| 7 | हिमाचल प्रदेश | Not regular | 06,10,17,20 & 22 April(During weekend it was uploaded on Monday) |
| 8 | जम्मू और कश्मीर | Yes | |
| 9 | चंडीगढ़ | Yes | |

All SLDC has to upload day ahead load Forecast File by 5:00 pm

# Load Forecast Error

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3.05
5.40
3.20
3.04
2.62
2.66
3.79
7.76
9.51
5.48
8.07
6.20
2.74
1.70
22-Apr
23-Apr
24-Apr
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27-Apr
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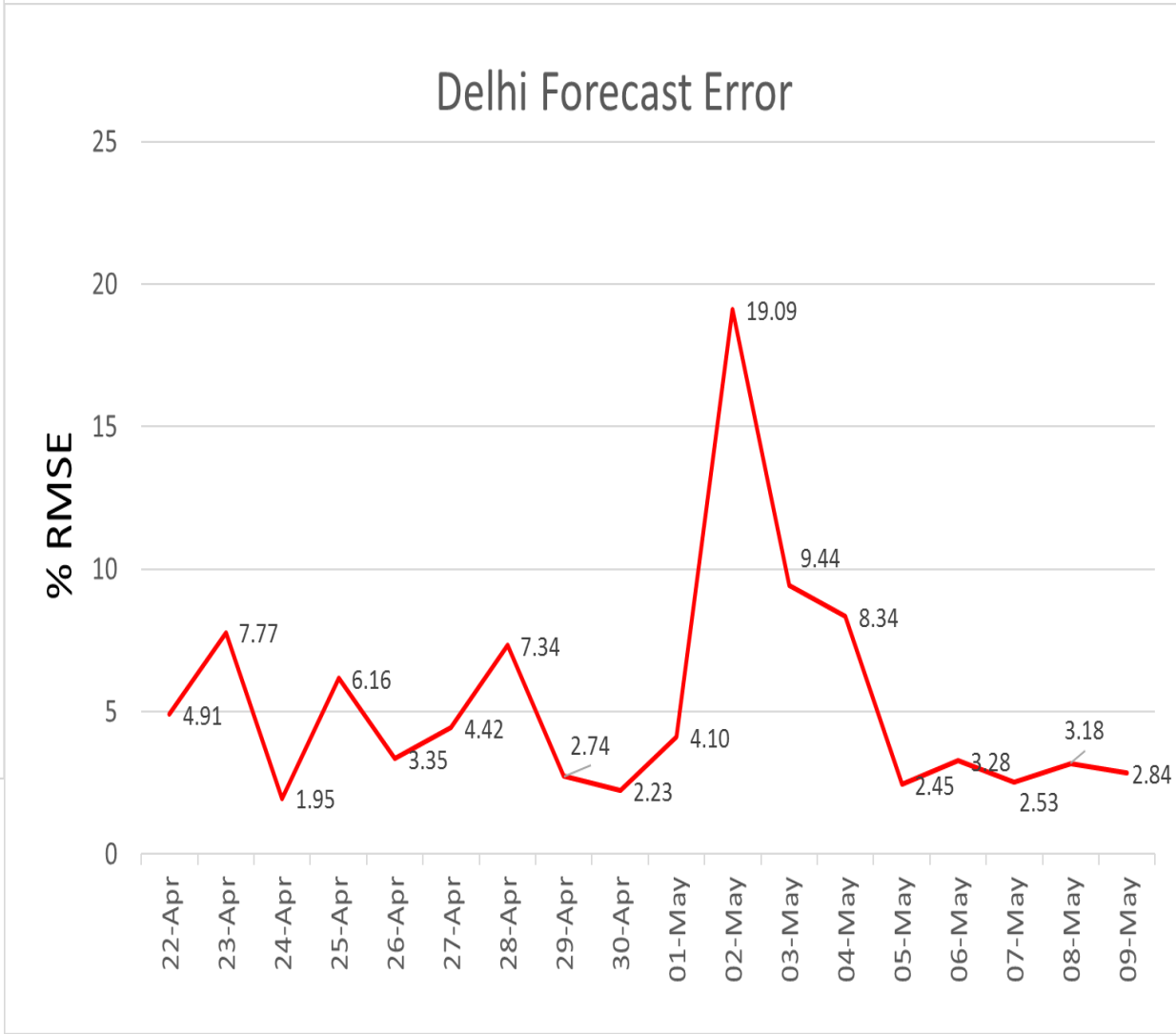
05-May
06-May
07-May
08-May
09-May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7.77
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6.16
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7.34
2.74
2.23
4.10
19.09
9.44
8.34
2.45
3.28
2.53
3.18
2.84
22-Apr
23-Apr
24-Apr
25-Apr
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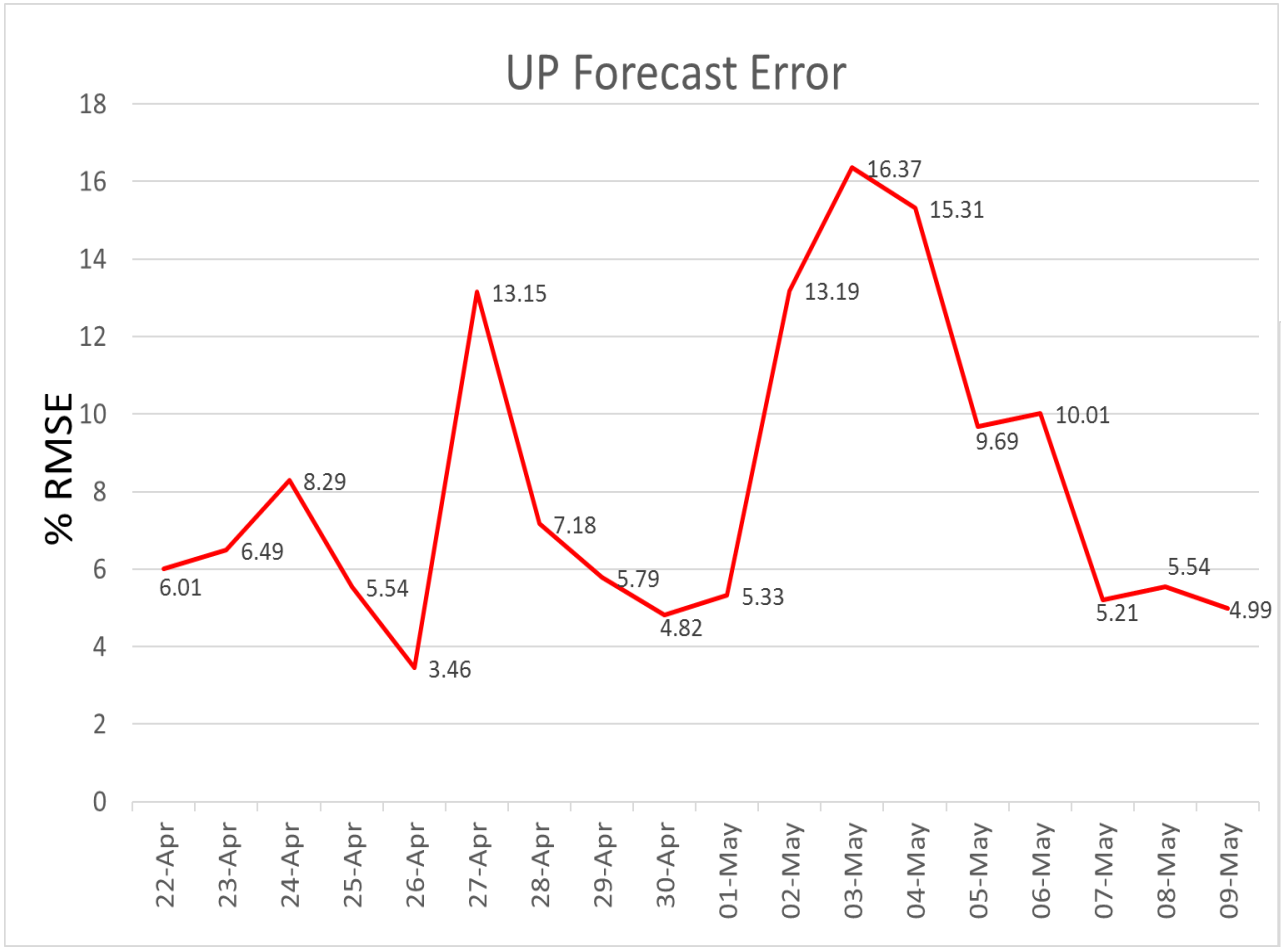
07-May
08-May
09-May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13.15
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13.19
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15.31
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10.01
5.21
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23-Apr
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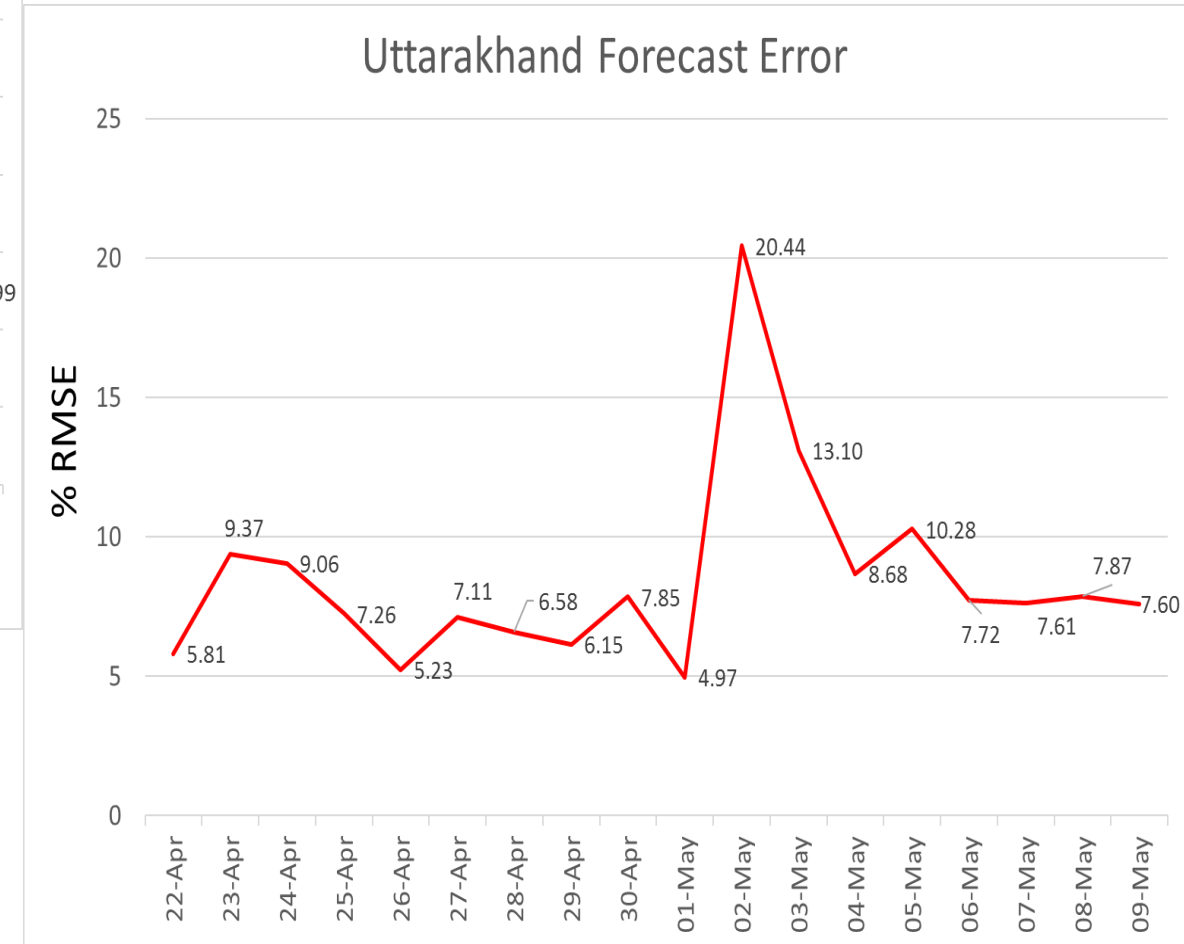
09-May


Uttarakhand Forecast Error
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4.97
20.44
13.10
8.68
10.28
7.72
7.61
7.87
7.60
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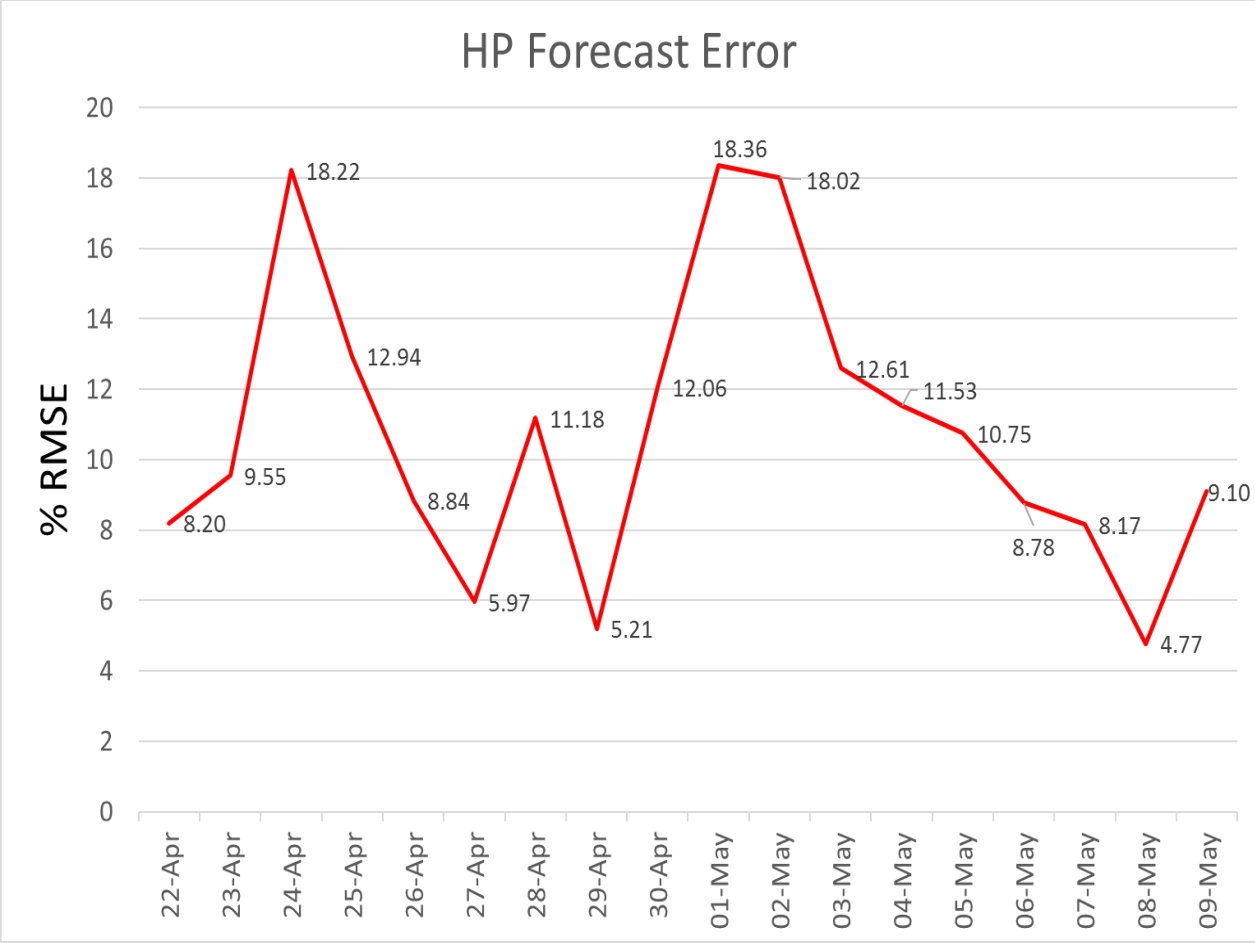
09-May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9.55
18.22
12.94
8.84
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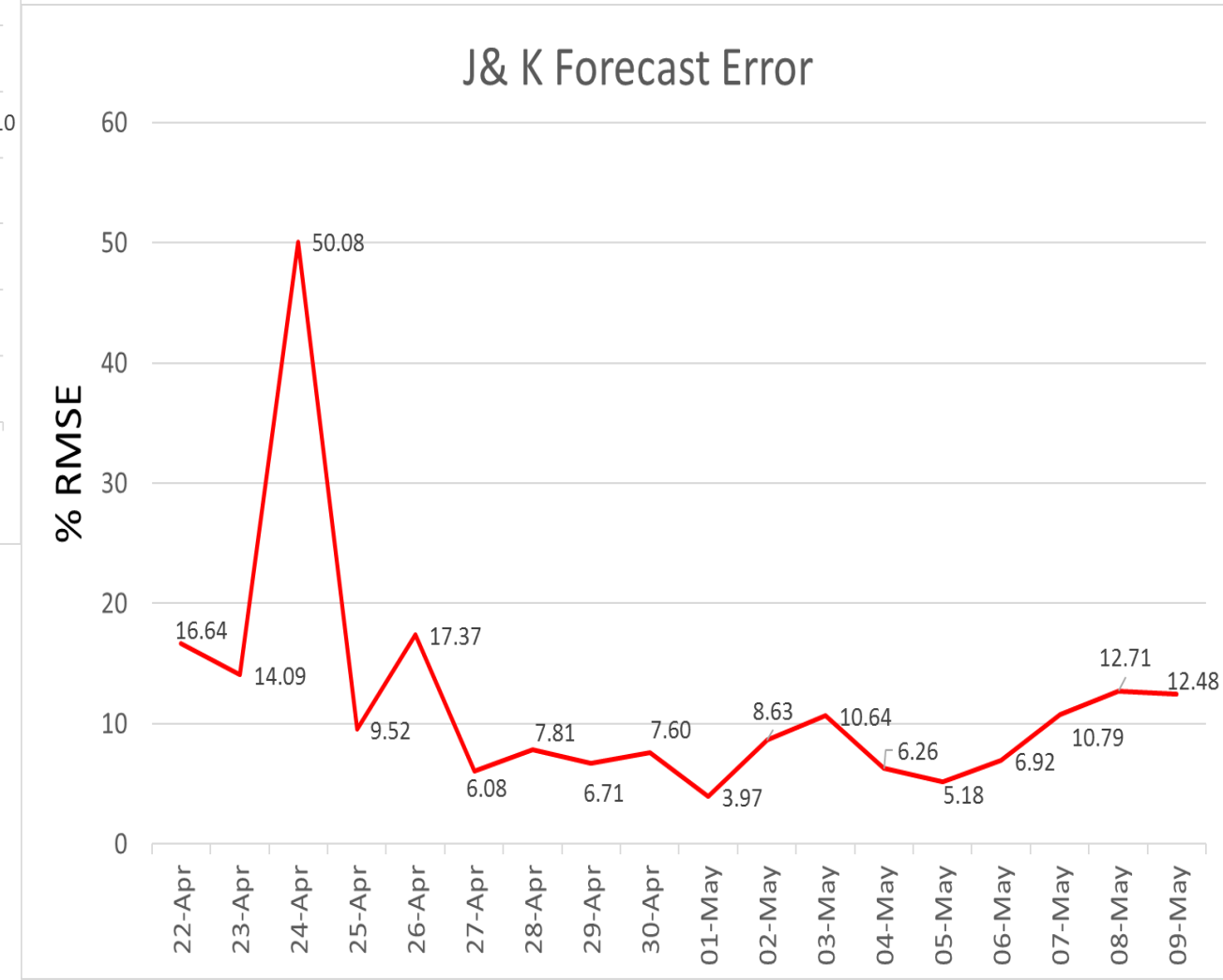
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10.79
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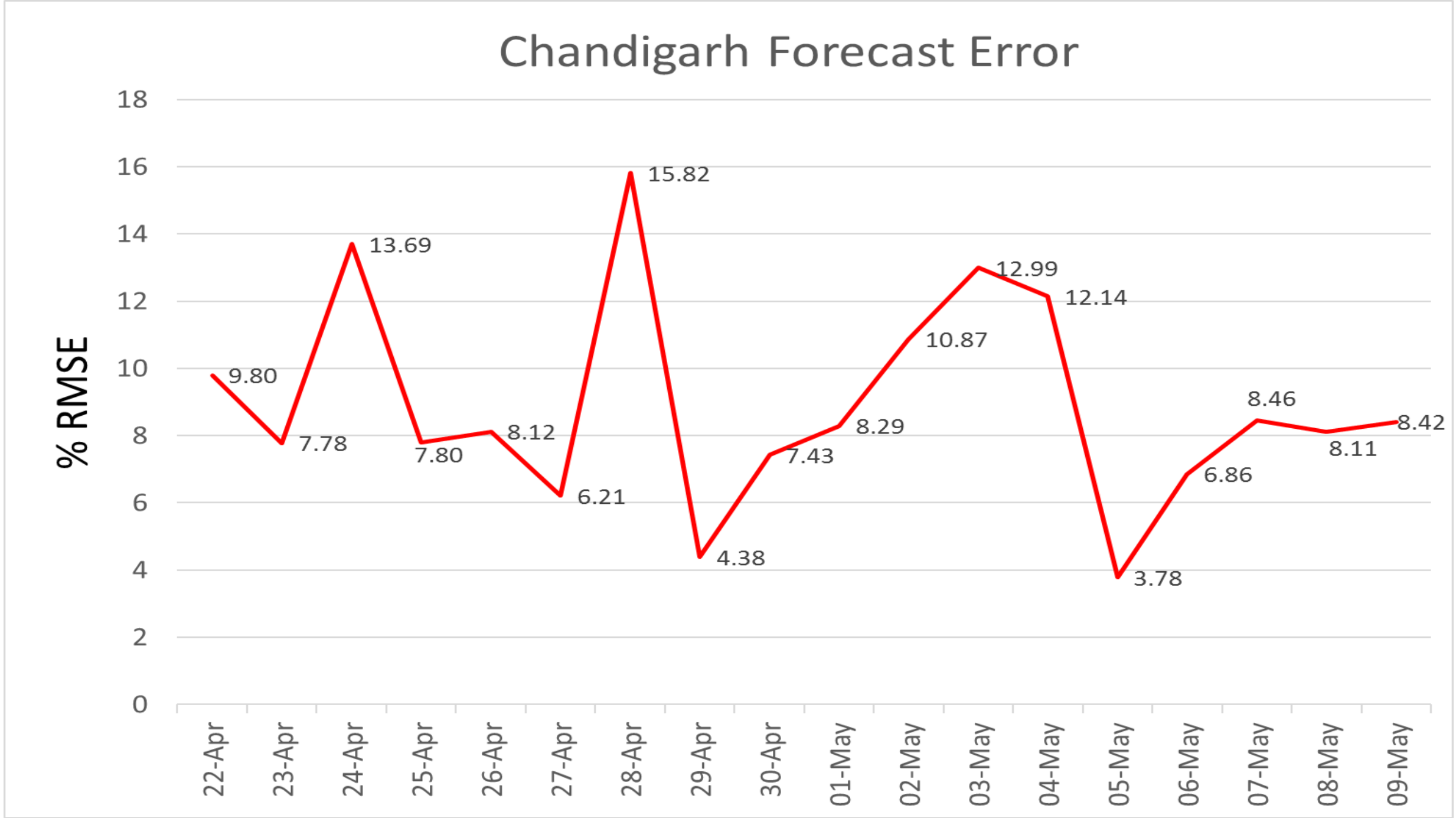
12.48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27-Apr
28-Apr
29-Apr
30-Apr
01-May
02-May
03-May
04-May
05-May
06-May
07-May
08-May
09-May

**Annexure-3**

| Sl. No. | Element Name | Outage Date | Outage Time | Reason/Remarks |
|---|---|---|---|---|
| 1 | 400kV Ajmer II(RRVPNL)-Bhilwara(RRVPNL) ckt-2 | 3-May-19 | 14.49 | Y-N fault, 65.8Km from Ajmer(Raj) end. As per PMU, either multiple B-N faults or difference in auto-reclosing time at two ends is observed. |
| | | 12-May-19 | 0.04 | B-N fault, 82.7Km from Bhilwara(Raj) end. either multiple B-N faults or difference in auto-reclosing time at two ends is observed. |
| | | 14-May-19 | 1.26 | Y-N fault, 72.6Km from Ajmer(Raj) end. either multiple B-N faults or difference in auto-reclosing time at two ends is observed. |
| | | 16-May-19 | 0.50 | B-N fault, 2.38Km from Bhilwara(Raj) end. As per PMU, No fault observed. |
| | | 17-May-19 | 16.30 | R-N fault, 34.08Km from Bhilwara(Raj) end. As per PMU, multiple R-N faults are observed. |
| 2 | 400kV Akal(RRVPNL)-Kankani(RRVPNL) ckt-2 | 10-May-19 | 23.38 | Y-N fault, 90.12 Km from Akal(Raj) end. As per PMU, Y-N fault occured, no auto-reclosing observed. |
| | | 11-May-19 | 0.34 | Y-N fault, 90.25 Km from Akal(Raj) end. As per PMU, Y-N fault occured, no auto-reclosing observed. |
| | | 11-May-19 | 23.15 | Inclement weather. As per PMU, Y-N fault occured, no auto-reclosing observed. |
| | | 15-May-19 | 23.04 | R-N fault. As per PMU, R-N fault occured, no auto-reclosing observed. |
| | | 16-May-19 | 19.19 | Y-N fault, 92.17 Km from Akal(Raj) end. As per PMU, Y-N fault occured, no auto-reclosing observed. |
| 3 | 220kV Kishenpur(PG)-Ramban(JK) | 2-May-19 | 20.53 | B-N fault, 11.53km from Ramban(JK) end. As per PMU, B-N fault occured, no auto-reclosing observed. |
| | | 5-May-19 | 15.30 | Fault due to heavy windstrom and low clearance of conductor to ground. As per PMU, No fault observed. |
| | | 6-May-19 | 17.39 | B-N fault, 3.13km from Ramban(JK) end. As per PMU, B-N fault occured, no auto-reclosing observed. |
| | | 8-May-19 | 16.03 | B-N fault, 1.56km from Ramban(JK) end. As per PMU, B-N fault occured, no auto-reclosing observed. |
| | | 20-May-19 | 0.30 | B-N fault, 12.63km from Ramban(JK) end. As per PMU, B-N fault occured, no auto-reclosing observed. |
| 4 | 400kV Alwar(RRVPNL)-Hindaun(RRVPNL) | 15-May-19 | 20.43 | R-N fault. As per PMU, R-N fault occured, no auto-reclosing observed. |
| | | 17-May-19 | 19.15 | Heavy rain & Thunder strom. As per PMU, No fault observed. |
| | | 23-May-19 | 17.50 | R-N fault, 91.32Km from Hindaun(Raj) end. As per PMU, No fault observed. |
| 5 | 400kV Anpara(UP)-Mau(UP) | 15-May-19 | 8.01 | Phase to earth fault. As per PMU, R-N fault occured, no auto-reclosing observed. |
| | | 25-May-19 | 17.16 | B-N fault, 107.2km from Anpara(UP) end. As per PMU, No fault observed. |
| | | 29-May-19 | 13.20 | R-N fault, 163.7Km from Mau(UP) end. As per PMU, No fault observed. |
| 6 | 400kV Bhadla(RRVPNL)-Bikaner(RRVPNL) ckt-1 | 12-May-19 | 17.45 | 400kV Bus-bar protection operated at Bikaner(Raj), due to blasting of Y-ph. CB pole of main CB (of 400kV Bikaner-Deedwana line) connected to 400kV Bus-2 (at Bikaner). As per PMU, R-N fault followed by B-N fault observed. |
| | | 15-May-19 | 2.01 | B-N fault, 6.07Km from Bhadla(Raj) end. As per PMU, R-N fault occured, no auto-reclosing observed. |
| | | 23-May-19 | 13.51 | B-N fault, 126.8Km from Bhadla(Raj) end. As per PMU, R-N fault occured, no auto-reclosing observed. |
| 7 | 400kV Bhadla(RRVPNL)-Merta (RRVPNL) | 13-May-19 | 21.15 | R-N fault, 233.1Km from Merta(Raj) end. As per PMU, R-N fault and unsuccessful auto-reclosing observed. |
| | | 15-May-19 | 21.53 | B-N fault. As per PMU, R-N fault and unsuccessful auto-reclosing observed. |
| | | 16-May-19 | 19.12 | R-N fault, 237.7Km from Merta(Raj) end. As per PMU, R-N fault occured, no auto-reclosing observed. |
| 8 | 400kV Bikaner(RRVPNL)-Merta(RRVPNL) | 6-May-19 | 13.23 | R-Y-B fault, 27.9Km from Merta(Raj) end. As per PMU, No fault observed. |

**Annexure-3**

| Sl. No. | Element Name | Outage Date | Outage Time | Reason/Remarks |
|---|---|---|---|---|
| | | 12-May-19 | 17.45 | 400kV Bus-bar protection operated at Bikaner(Raj), due to blasting of Y-ph. CB pole of main CB (of 400kV Bikaner-Deedwana line) connected to 400kV Bus-2 (at Bikaner). As per PMU, R-N fault followed by B-N fault observed. |
| | | 17-May-19 | 15.47 | B-N fault, 1.4Km from Merta(Raj) end. As per PMU, B-N fault occured, no auto-reclosing observed. |
| 9 | 800kV HVDC Agra(NR)-Alipurdwar(ER) Pole-4 at Agra HVDC | 4-May-19 | 11.58 | Converter Differential Protection Trip at Alipurdwar(ER) end. |
| | | 7-May-19 | 15.43 | Fire Trip indication (VESDA). |
| | | 24-May-19 | 7.32 | Tripped at Agra on protection indication related to Valve cooling of pole -4 at APD. |
| 10 | 400kV Mainpuri765(UP)-Orai(UP) ckt-1 | 3-May-19 | 9.38 | B-N fault, 30km from Mainpuri(UP) end. As per PMU, No fault observed. |
| | | 4-May-19 | 11.43 | DT received at Orai(UP) end. As per PMU, No fault observed. |
| | | 30-May-19 | 11.30 | Y-B fault, 15.3km from Mainpuri(UP) end. As per PMU, Y-B fault is observed. |
| 11 | 500kV HVDC Vindhyachal BtB Block 2 | 19-May-19 | 10.35 | Tripped along with generation outage at Vindhyachal(WR) and failure of 6.6KV auxilary supply feeder. |
| | | 22-May-19 | 15.34 | Tripped on loss of 400 KV NTPC-VSTPP Feeder2. |
| | | 28-May-19 | 9.30 | Mal operation of micro switch of PRD. |

Annexure-4

| S.No. | Name of Elements (Tripped/Manually opened) | Owner/ Agency | Outage | | Revival | | Duration | Event *(As reported)* | Generation Loss (MW) | Load Loss (MW) | Category as per CEA Grid Standards | Energy Unserved (in MU) | Preliminary Report receipt status | | | DR/EL receipt status | | | Detailed Report receipt status | | Fault Clearance time (in ms) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Date | Time | Date | Time | | | | | | | within 24hrs | after 24hrs | Not Received | within 24hrs | after 24hrs | Not Received | Received | Not Received | |
| 1 | 1) 400kV Tehri(THDC)-Koteshwar Pool(PG) ckt-1<br>2) 400kV Tehri(THDC)-Koteshwar Pool(PG) ckt-2 | THDC & POWERGRID | 2-May-19 | 10:53 | 2-May-19 | 13.13 | 2.20 | 400kV Tehri(THDC)-Koteshwar Pool(PG) ckt-1 & 2 tripped from Tehri end only, due to interruption in DC control supply at 400kV Tehri HEP(THDC). As per PMU, No fault is observed in the system. In antecedent conditions, 400kV Tehri(THDC)-Koteshwar Pool(PG) ckt-1 & 2 carrying 86 MW & 76 MW respectively and Unit#1 generating 166 MW. | 165 | | GD-1 | | Y(THDC) | | Y(PG) | | | Y(THDC), Y(PG) | | Y(THDC) | NA |
| 2 | 1) 400kV Bahadurgarh(PG)-Sonepat(PG) ckt-2<br>2) 400kV Bahadurgarh(PG)-Bawana(GT)(DTL) | POWERGRID & Delhi | 2-May-19 | 17:52 | 2-May-19 | 18.40 | 0.48 | 400kV Bahadurgarh(PG)-Sonepat(PG) ckt-2 tripped on R-N fault. At the same time, 400kV Bahadurgarh(PG)-Bawana(GT)(DTL) also tripped due to malfunctioning of relay. As per PMU, R-N fault with unsuccessful auto-reclosing is observed.. In antecedent conditions, 400kV Bahadurgarh(PG)-Sonepat(PG) ckt-2 & 400kV Bahadurgarh(PG)-Bawana(GT)(DTL) carrying 167 MW & 275 MW respectively. | | | GI-2 | | | | Y(PG), Y(Del) | | | Y(PG), Y(Del) | | Y(PG) | 80ms |
| 3 | 1) 400kV Baghpat(PG)-Kaithal(PG) ckt-1<br>2) 400kV Baghpat(PG)-Kaithal(PG) ckt-2<br>3) 400kV Baghpat(PG)-Dehradun(PG) | POWERGRID | 2-May-19 | 18:43 | 2-May-19 | 20.07 | 1.24 | 400kV Baghpat(PG)-Kaithal(PG) ckt-1 tripped on Y-N fault, 2.2 km from Bagpat(PG) end, 400kV Baghpat(PG)-Kaithal(PG) ckt-2 tripped on Y-N fault, 2.3 km from Bagpat(PG) end and 400kV Baghpat(PG)-Dehradun(PG) tripped on Y-N fault, 3.4 km from Bagpat(PG) end. As per PMU, Multiple Y-N faults are observed in the system. In antecedent conditions, 400kV Baghpat(PG)-Dehradun(PG), 400kV Baghpat(PG)-Kaithal(PG) ckt-1 & 2 carrying 69MW, 172MW & 169MW respectively. | | | GI-2 | | | | Y(PG) | | | Y(PG) | | Y(PG) | 80ms |
| 4 | 1) 400kV G.Noida 765(UP)-Noida sec-148(UP) ckt 1<br>2) 400kV G.Noida 765(UP)-Noida sec-148(UP) ckt 2 | UP | 3-May-19 | 19:24 | 3-May-19 | 22.09 | 2.45 | 400kV G.Noida 765(UP)-Noida sec-148(UP) ckt 1 tripped on B-N fault, 51.9km from 765/400kV G.Noida(UP) end. At the same time, 400kV G.Noida 765(UP)-Noida sec-148(UP) ckt 2 tripped on B-N fault, 54.4km from 765/400kV G.Noida(UP) end. As per PMU, B-N fault with no auto-reclosing is observed in the system. In antecedent conditions, 400kV G.Noida 765(UP)-Noida sec-148(UP) ckt 1 & 2 carrying 42 MW & 41 MW respectively. | | | GI-2 | | | | Y(UP) | | | Y(UP) | | Y(UP) | 80ms |
| 5 | 1) 220kV Sarna(PSTCL) –wadla(PSTCL) ckt 1 & 2<br>2) 220kV Sarna(PSTCL)-Kishenpur(PG) ckt 1 & 2<br>3) 220kV Sarna(PSTCL)-dasya(PSTCL) ckt 1 & 2<br>4) 220kV Sarna(PSTCL)-RSDPH1, RSDPH2, RSDPH3 & RSDPH4 | Punjab & POWERGRID | 4-May-19 | 10:41 | 4-May-19 | 11.02 | 0.21 | 220kV Sarna- Wadla ckt1 jumper snapped and casued bus fault. Since No availability of Bus bar protection at Sarna station, all the feader tripped on Over current protection and 220kv Sarna-Kishenpur ckt 1 & 2 tripped from Kishenpur(PG) end on Zone 2. As per PMU, a voltage dip (10kV) observed in R phase with delayed clearance of around 800ms is observed. In antecedent conditions, 220kV Sarna(PSTCL)-Kishenpur(PG) ckt 1 & 2 carrying 40MW each. | 300 | 100 | GD-1 | 0.04 | | Y(Pun) | Y(PG) | | Y(Pun) | Y(PG) | Y(Pun) | | 800ms |
| 6 | 1) 400kV Panki(UP)-Rewa Road(UP)<br>2) 400kV Panki(UP)-Unnao(UP)<br>3) 315 MVA ICT 2 at 400/220kV Panki(UP) | UP | 6-May-19 | 12:58 | 6-May-19 | 13.44 | 0.46 | 400kV Panki(UP)-Unnao(UP) tripped on Y-N fault, 40Km from Unnao end. At the same time, 400kV Panki(UP)-Rewa Road(UP) tripped only from Rewa Road end on R-N fault and 315 MVA ICT 2 tripped on 86A/86B relay flag. As per PMU, Y-N fault followed by R-N fault is observed. In antecedent conditions, 400kV Panki(UP)-Rewa Road(UP) & 400kV Panki(UP)-Unnao(UP) carrying 166 MW & 108 MW respectively. | | | GI-2 | | | | Y(UP) | | | Y(UP) | | Y(UP) | 80ms & 80ms |
| 7 | 1) 220kV Bus-2 at 400/220kV Samba(PG)<br>2) 315 MVA ICT 1 at 400/220kV Samba(PG)<br>3) 315 MVA ICT 2 at 400/220kV Samba(PG)<br>4) 315 MVA ICT 3 at 400/220kV Samba(PG)<br>5) 220kV Jammu(JK)-Samba(PG)<br>6) 220kV Hiranagar(JK)-Samba(PG)<br>7) 132kV Hiranagar(JK)-Sewa II(NHPC) ckt-1 & 2<br>8) 132kV Mahanpur (JK) - Sewa II(NHPC)<br>9) 132kV Kathua (JK) - Sewa II(NHPC)<br>10) 40 MW Unit#1, #2 & #3 at 132kV Sewa II(NHPC) | POWERGRID, NHPC, Punjab & J&k | 7-May-19 | 10:27 | 7-May-19 | 11.01 | 0.34 | During Shutdown work of 220kV Bus-I at 400/220kV Samba(PG) bird nest drooping from GI wire make a flash over and tripped 220kV Bus-2. 315 MVA ICT 1, 2 & 3 tripped from 220kV side only. At the same time, Complete outage of 132kV Sewa II(NHPC) occurs. As per PMU, R-N fault is observed in the system. In antecedent conditions, Unit#1, #2 & #3 at 132kV Sewa II(NHPC) carrying 39MW, 42MW & 40MW respectively. | 119 | 90 | GD-1 | 0.05 | Y(PG), (NHPC) | | Y(Pun), Y(JK) | Y(PG), (NHPC) | | Y(Pun), Y(JK) | | Y(PG), (NHPC) | 80ms |
| 8 | 1) 400kV Bikaner(RRVPNL)-Sikar(PG) ckt-1<br>2) 400kV Bikaner(RRVPNL)-Sikar(PG) ckt-2<br>3) 400kV Bhadla(RRVPNL)-Bikaner(RRVPNL) ckt-2 | Rajasthan & POWERGRID | 7-May-19 | 11:34 | 7-May-19 | 14.44 | 3.10 | 400kV Bhadla(RRVPNL)-Bikaner(RRVPNL) ckt-2 tripped due to R-Y fault, 6.64km from Bikaner end. At the same time, 400kV Bikaner(RRVPNL)-Sikar(PG) ckt-1 & 2 tripped on 86 A & 86 B relay tripped at Sikar(PG). As per PMU, Y-B fault is observed in the system. In antecedent conditions, 400kV Bhadla(RRVPNL)-Bikaner(RRVPNL) ckt-2 carrying 533 MW. | 800 | 300 | GD-1 | 0.90 | Y(Raj) | | Y(PG) | | | Y(Raj), Y(PG) | | Y(Raj) | 80ms |
| 9 | 1) 400kV Dhanonda(HVPNL)-Mohindergarh(Adani) ckt-1<br>2) 400kV Dhanonda(HVPNL)-Mohindergarh(Adani) ckt-2 | Haryana & Adani | 7-May-19 | 18:37 | 7-May-19 | 19.43 | 1.06 | 400kV Dhanonda(HVPNL)-Mohindergarh(Adani) ckt-2 tripped due to isolator burnt at Dhanoda end and 400kV Dhanonda(HVPNL)-Mohindergarh(Adani) ckt-1 tripped due to overloading. As per PMU, No fault is observed in the system. In antecedent conditions, 400kV Dhanonda(HVPNL)-Mohindergarh(Adani) ckt-2 carrying 713 MW. | | | GI-2 | | | Y(Har), Y(Adani) | | | Y(Har), Y(Adani) | | | Y(Har) | NA(over voltage) |
| 10 | 1) 400kV G.Noida(765kV)(UP)-Sikanderabad(UP) ckt-1<br>2) 400kV G.Noida(765kV)(UP)-Sikanderabad(UP) ckt-2 | UP | 10-May-19 | 19:09 | 10-May-19 | 20.24 | 1.15 | 400kV G.Noida(765kV)(UP)-Sikanderabad(UP) ckt-1 & 2 tripped due to malfunctioning of Relay. As per PMU, No fault is observed in the system. In antecedent conditions, 400kV G.Noida(765kV)(UP)-Sikanderabad(UP) ckt-1 & 2 carrying 265 MW & 269 MW respectively. | | | GI-2 | | Y(UP) | | | | | Y(UP) | | Y(UP) | NA |
| 11 | 1) 400 kV Bus 1 at 400/220kV Barmer(Raj)<br>2) 400kV Akal(Raj)-Barmer(Raj)<br>3) 400kV Bhainsra(Raj)-Barmer(Raj) Ckt-1 | Rajasthan | 10-May-19 | 23:08 | 11-May-19 | 0.56 | 1.48 | Bus Bar protection of 400 kV Bus 1 at 400/220kV Barmer(Raj) operated leading to tripping of 400kV Akal(Raj)-Barmer(Raj) & 400kV Bhainsra(Raj)-Barmer(Raj) Ckt-1. As per PMU, R-N fault is observed in the system. In antecedent conditions, 400kV Akal(Raj)-Barmer(Raj) carrying 76 MW. | | | GI-2 | | | | Y(Raj) | | | Y(Raj) | | Y(Raj) | 80ms |
| 12 | 1) 220kV Bhiwadi(PG)-Bhiwadi(RVPNL) ckt-1<br>2) 220kV Bhiwadi(PG)-Bhiwadi(RVPNL) ckt-2<br>3) 220kV Bhiwadi (PG)-Mau(HVPNL)<br>4) 220kV Bhiwadi(PG)-Bawal(HVPNL)<br>5) 220kV Bhiwadi(PG)-Rewari(HVPNL) ckt-1<br>6) 220kV Bhiwadi(PG)-Rewari(HVPNL) ckt-2 | POWERGRID, Rajasthan & Haryana | 11-May-19 | 10:24 | 11-May-19 | 10.57 | 0.33 | 06 Nos. of 220kV lines from 400/220kV Bhiwadi(PG) tripped due to maloperation of 220 kV bus protection during retrofitting work and scheme checking at Bhiwadi(PG). Load loss of around 300 MW reported by Rajasthan. No load loss reported by Haryana. As per PMU, Voltage rise in all three phases is observed. In antecedent conditions, 220kV Bhiwadi(PG)-Bhiwadi(RVPNL) ckt-1 & 2 carrying 159 MW & 146 MW respectively. | | 300 | GD-1 | 0.17 | | Y(Raj) | Y(PG), Y(Har) | | | Y(PG), Y(Har), Y(Raj) | | Y(PG) | NA |
| 13 | 1) 400 kV Bus 1 at 400/220kV Barmer(Raj)<br>2) 400kV Bhainsra(Raj)-Barmer(Raj) ckt-1 | Rajasthan | 11-May-19 | 21:34 | 11-May-19 | 23.34 | 2.00 | 400kV Bhainsra(Raj)-Barmer(Raj) ckt-1 tripped on R-N fault, 0.3Km from Barmer end. At the same time, 400kV Bus 1 at 400/220kV Barmer(Raj) tripped due to operation of Bus Bar protection. As per PMU, R-N fault is observed in the system. | | | GI-2 | | | | Y(Raj) | | | Y(Raj) | | Y(Raj) | 80ms |
| 14 | 1) 400kV Kota(PG)-Merta(RRVPNL)<br>2) 400kV Shree Cement(CSL)-Merta(RRVPNL)<br>3) 400kV Merta(RRVPNL)-Ratangarh(RRVPNL)<br>4) 315 MVA ICT 2 at 400/220kV Merta(RRVPNL) | Rajasthan & POEWRGRID | 12-May-19 | 5:07 | 12-May-19 | 6.30 | 1.23 | 400kV Kota(PG)-Merta(RRVPNL) tripped on Overvoltage(Over voltage indication at Merta end, DT received at Kota (PG) end). At the same time, 400kV Shree Cement(CSL)-Merta(RRVPNL) & 400kV Merta(RRVPNL)-Ratangarh(RRVPNL) also tripped on overvoltage. 315 MVA ICT 2 tripped along with 400kV Ratangarh-Merta (Main bay of ICT was out already). As per PMU, B-N fault is observed. In antecedent conditions, 400kV Kota(PG)-Merta(RRVPNL) & 400kV Shree Cement(CSL)-Merta(RRVPNL) carrying 167 MW & 283 MW respectively. | | | GI-2 | | | | Y(Raj), Y(PG) | | | Y(Raj), Y(PG) | | Y(Raj) | 80ms |

| S.No. | Name of Elements (Tripped/Manually opened) | Owner/ Agency | Outage | | Revival | | Duration | Event *(As reported)* | Generation Loss (MW) | Load Loss (MW) | Category as per CEA Grid Standards | Energy Unserved (in MU) | Preliminary Report receipt status | | | DR/EL receipt status | | | Detailed Report receipt status | | Fault Clearance time (in ms) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 1) 400 kV Barmer(Raj)-Rajwest(Raj)<br>2) 315 MVA ICT 1 at 400/220kV Barmer(Raj)<br>3) 220 kV Barmer(Raj)-Rajwest(Raj) ckt-1<br>4) 220 kV Barmer(Raj)-Rajwest(Raj) ckt-2<br>5) 220kV Balotra(Raj)-Barmer(Raj) | Rajasthan | 12-May-19 | 8:08 | 12-May-19 | 9.20 | 1.12 | 400 kV Barmer(Raj)-Rajwest(Raj) tripped from Rajwest end only. At the same time, 315 MVA ICT 1 at 400/220kV Barmer(Raj) also tripped. As per PMU, R-B fault with delayed clearance is observed in the system. In antecedent conditions, 400 kV Barmer(Raj)-Rajwest(Raj) carrying 74 MW and 315 MVA ICT 1 carrying 85 MW. | | 100 | GD-1 | 0.12 | | | Y(Raj) | | | Y(Raj) | | Y(Raj) | 1440ms |
| 16 | 1) 400kV Bikaner(RRVPNL)-Deedwana(RRVPNL)<br>2) 400kV Bikaner(RRVPNL)-Merta(RRVPNL)<br>3) 400kV Bikaner(RRVPNL)-SSCTPS(Raj) ckt-1 & 2<br>4) 400kV Bikaner(RRVPNL)-Suratgarh(Raj)<br>5) 400kV Bikaner(RRVPNL)-Sikar(PG) ckt-1 & 2<br>6) 400kV Bikaner(RRVPNL)-Bhadla(RRVPNL) ckt-1 & 2<br>7) 315MVA ICT 1 400/220kV Bikaner(Raj)<br>8) 315MVA ICT 2 400/220kV Bikaner(Raj)<br>9) 400kV Bus 1 & Bus 2 at 400/220kV Bikaner(Raj)<br>10) 50MVAR Bus Reactor 1 at 400/220kV Bikaner(Raj)<br>11) 125MVAR Bus Reactor 2 at 400/220kV Bikaner(Raj) | Rajasthan & POWERGRID | 12-May-19 | 17:45 | 12-May-19 | 19.01 | 1.16 | 400kV Bus-bar protection operated at Bikaner(Raj), due to blasting of Y-phase CB pole of main CB (of 400kV Bikaner-Deedwana line) connected to 400kV Bus-2 (at Bikaner). The incident occurred during opening of 400 kV Bikaner-Deedwana line on high voltage. As per PMU, R-N fault followed by B-N fault is observed. In antecedent conditions, 315MVA ICT 1 & 315MVA ICT 2 carrying 103 MW & 105 MW respectively. | | | GI-2 | | Y(Raj) | | Y(PG) | | Y(Raj) | Y(PG) | Y(Raj) | | 960ms |
| 17 | 1) 220kV Delina(JK)-Kishanganga(NHPC) ckt-1<br>2) 220kV Delina(JK)-Kishanganga(NHPC) ckt-2<br>3) 110MW Unit#1 at 220kV Kishanganga(NHPC)<br>4) 220kV Bus 2 at 220kV Kishanganga(NHPC)<br>5) 220kV Bus 1 at 220kV Kishanganga(NHPC) | NHPC, J&K & POWERGRID | 13-May-19 | 17:56 | 13-May-19 | 19.09 | 1.13 | 220kV Delina(JK)-Kishanganga(NHPC) ckt-2 tripped on R-Y fault, 15.60km from Kishanganga end. At the same time, 220kV Delina(JK)-Kishanganga(NHPC) ckt-1 tripped from Delina end only and 110MW Unit#1 tripped due to loss of evacuation path. As per PMU, R-Y fault is observed. In antecedent conditions, Unit#1 at 220kV Kishanganga(NHPC) generating around 104 MW. | 104 | | GD-1 | | | Y(NHPC) | Y(JK), Y(PG) | | Y(NHPC) | Y(JK), Y(PG) | | Y(JK), Y(PG) | 80ms |
| 18 | 1) 220kV Bus 1 at Chamera III HEP(NHPC)<br>2) 220kV Bus 2 at Chamera III HEP(NHPC)<br>3) 220kV Chamera III(NHPC)-Chamera pool(PG) ckt-1<br>4) 220kV Chamera III(NHPC)-Chamera pool(PG) ckt-2<br>5) 220kV Budhil(Lanco)-Chamera III(NHPC)<br>6) 77MW Unit#2 at 220kV Chamera III HEP(NHPC)<br>7) 77MW Unit#3 at 220kV Chamera III HEP(NHPC) | NHPC, Lanco & POWERGRID | 14-May-19 | 11:56 | 14-May-19 | 12.45 | 0.49 | All elements at 220kV Chamera III HEP(NHPC) tripped during shifting of 220kV elements from Bus-2 to BUS-1 due to operation of Bus bar protection. As per PMU, R-N fault is observed in the system. In antecedent conditions, Unit#2 & #3 generating 76MW & 77MW respectively. | 150 | | GD-1 | | Y(NHPC) | | Y(Lanco), Y(PG) | | | Y(NHPC), Y(Lanco), Y(PG) | | Y(NHPC) | 80ms |
| 19 | 1) 220kV Salal(NHPC)-Kishenpur(PG) ckt-3<br>2) 220kV Salal(NHPC)-Kishenpur(PG) ckt-4 | POWERGRID & NHPC | 14-May-19 | 22:55 | 14-May-19 | 23.00 | 0.05 | 220kV Salal(NHPC)-Kishenpur(PG) ckt-3 tripped on R-Y fault, 67.5Km from Kishenpur end. At the same time, 220kV Salal(NHPC)-Kishenpur(PG) ckt-4 tripped on R-Y fault, 53Km from Kishenpur end. As per PMU, R-Y fault is observed. In antecedent conditions, 220kV Salal(NHPC)-Kishenpur(PG) ckt-3 & 4 carrying 104MW each. | | | GI-2 | | | | Y(NHPC), Y(PG) | | | Y(NHPC), Y(PG) | | Y(NHPC), Y(PG) | 80ms |
| 20 | 1) 105MW Unit#7 at 220kV Harduaganj(UP)<br>2) 250MW Unit#8 at 220kV Harduaganj(UP)<br>3) 250MW Unit#9 at 220kV Harduaganj(UP) | UP | 15-May-19 | 1:16 | 15-May-19 | 4.21 | 3.05 | Fire incident occurred in Unit#7 (105MW) at Harduaganj(UP). Unit#7(105MW), Unit#8 (205MW) & Unit#9(250MW) tripped at Harduaganj (UP). At 1317Hrs, On attempt of synchronizing Unit#9 (250 MW), Bus bar protection operated resulting in the tripping of all associated lines, no load loss/Generation loss reported at this event. As per PMU, B-N fault is observed in the system. In antecedent conditions, Unit#8 & Unit#9 generating 228 MW each. | 500 | 300 | GD-1 | 0.90 | | | Y(UP) | | | Y(UP) | | Y(UP) | 160ms |
| 21 | 1) 400kV Abdullapur(PG)-Bawana(DTL) ckt-1<br>2) 400kV Bawana(DTL)-Mandola(PG) ckt-2<br>3) 315 MVA ICT 2 at 400/220kV Bawana(DTL)<br>4) 315 MVA ICT 3 at 400/220kV Bawana(DTL)<br>5) 315 MVA ICT 4 at 400/220kV Bawana(DTL) | Delhi & POWERGRID | 15-May-19 | 7:44 | 15-May-19 | 10.22 | 2.38 | Bus II jumper snapped at 400/220kV Bawana(DTL) resulting in tripping of 400kV Abdullapur(PG)-Bawana(DTL) ckt-1 due to Y-N fault, 116km from Abdullapur end, 400kV Bawana(DTL)-Mandola(PG) ckt-2 on RYB-phase, E/F and 315 MVA ICT 2, ICT 3 & ICT 4 tripped on differential protection. As per PMU, Multiple faults are observed in the system. In antecedent conditions, 400kV Abdullapur(PG)-Bawana(DTL) ckt-1 & 400kV Bawana(DTL)-Mandola(PG) ckt-2 carrying 132 MW & 138 MW respectively. | | | GI-2 | | Y(Del) | | Y(PG) | Y(Del) | | Y(PG) | Y(Del) | | 80ms & 240ms |
| 22 | 1) 400kV Bhadla(RRVPNL)-Jodhpur(RRVPNL)<br>2) 400kV Jodhpur(RRVPNL)-Rajwest(RRVPNL) ckt-1 | Rajasthan | 17-May-19 | 14:31 | 17-May-19 | 16.35 | 2.04 | 400kV Bhadla(RRVPNL)-Jodhpur(RRVPNL) tripped on R-Y fault, 3.86Km from Jodhpur end. At the same time, 400kV Jodhpur(RRVPNL)-Rajwest(RRVPNL) ckt-1 also tripped. As per PMU, R-Y fault is observed in the system. In antecedent conditions, 400kV Bhadla(RRVPNL)-Jodhpur(RRVPNL) & 400kV Jodhpur(RRVPNL)-Rajwest(RRVPNL) ckt-1 carrying 90MW & 113MW respectively. | | | GI-2 | | Y(Raj) | | | | | Y(Raj) | | | Y(Raj) | 80ms |
| 23 | 1) 400kV RAPS C(NPC)-Jaipur South(PG)<br>2) 400kV Kota(PG)-Jaipur South(PG) | POWERGRID & NPCIL | 17-May-19 | 16:31 | 17-May-19 | 16.40 | 0.09 | 400kV RAPS C(NPC)-Jaipur South(PG) tripped on B-N fault, 4.66Km from Jaipur end. At the same time, 400kV Kota(PG)-Jaipur South(PG) tripped on R-Y fault, 5.5Km from Jaipur end. As per PMU, multiple faults observed in the system. In antecedent conditions, 400kV RAPS C(NPC)-Jaipur South(PG) & 400kV Kota(PG)-Jaipur South(PG) carrying 201MW & 264MW respectively. | | | GI-2 | | | Y(NPCIL) | Y(PG) | | Y(NPCIL) | Y(PG) | | Y(PG) | 680ms |
| 24 | 1) 220kV Bareilly(UP)-Pithorgarh(PG)<br>2) 220kV Bareilly(UP)-Dhauliganga(NHPC) | UP, NHPC & POWERGRID | 19-May-19 | 12:25 | 19-May-19 | 13.29 | 1.04 | 220kV Bareilly(UP)-Pithorgarh(PG) and 220kV Bareilly(UP)-Dhauliganga(NHPC) tripped at 1233Hrs from Bareilly(UP) end only. As per PMU, Y-B fault with delayed clearance is observed. In antecedent conditions, 220kV Bareilly(UP)-Pithorgarh(PG) and 220kV Bareilly(UP)-Dhauliganga(NHPC) carrying 10MW & 21MW respectively. | | | GI-2 | | | Y(UP), Y(NHPC) | Y(PG) | | | Y(UP), Y(PG), Y(NHPC) | | Y(UP) | 1160ms |
| 25 | 1) 500kV HVDC Vindhyachal(PG) BtB Block 1<br>2) 500kV HVDC Vindhyachal(PG) BtB Block 2 | POWERGRID | 22-May-19 | 15:34 | 22-May-19 | 17.40 | 2.06 | 500kV HVDC Vindhyachal(PG) BtB Block 1 tripped on DC overcurrent. At the same time, 500kV HVDC Vindhyachal(PG) BtB Block 2 tripped on loss of 400KV NTPC-VSTPP Feeder2. As per PMU, fluctuations observed in the phase voltages. In antecedent conditions, 500kV HVDC Vindhyachal(PG) BtB Block 1 & 2 carrying 500MW (North to west). | | | GI-2 | | | Y(PG) | | Y(PG) | | | | Y(PG) | NA |
| 26 | 1) 765kV Anta(Raj)-Phagi(Raj) ckt-2<br>2) 660MW Unit#5 at 400/220kV Chhabra TPS<br>3) 660MW Unit#6 at 400/220kV Chhabra TPS | Rajasthan | 22-May-19 | 20:57 | 23-May-19 | 0.18 | 3.21 | 765kV Anta(Raj)-Phagi(Raj) ckt-2 tripped on B-N fault, 107Km from Phagi end. At the same time, 660MW Unit#5 & #6 at 400/220kV Chhabra TPS also tripped on electrical fault. As per PMU, Multiple R-Y faults are observed. In antecedent conditions, 765kV Anta(Raj)-Phagi(Raj) ckt-2 carrying 503MW. | 1050 | | GD-1 | | | | Y(Raj) | | Y(Raj) | | | Y(Raj) | 80ms & 120ms |
| 27 | 1) 400kV Bhiwani(PG)-Jind(PG) ckt-1<br>2) 400kV Bhiwani(PG)-Jind(PG) ckt-2 | POWERGRID | 23-May-19 | 17:15 | 23-May-19 | 19.51 | 2.36 | 400kV Bhiwani(PG)-Jind(PG) ckt-1 tripped on B-N fault, 42Km from Jind end. At the same time, 400kV Bhiwani(PG)-Jind(PG) ckt-2 tripped on B-N fault, 46Km from Jind end. As per PMU, multiple R-Y faults are observed in the system. In antecedent conditions, 400kV Bhiwani(PG)-Jind(PG) ckt-1 & 2 carrying 20MW & 19MW respectively. | | | GI-2 | | | | Y(PG) | | | Y(PG) | | Y(PG) | 80ms & 80ms |
| 28 | 1) 220kV Amargarh(NRSS29)-Delina(JK)<br>2) 220KV Delina(JK)-Zainkote(JK)<br>3) 220KV Kishenganga(NHPC)--Delina(JK) ckt-I<br>3) 220KV Kishenganga(NHPC)--Delina(JK) ckt-II<br>4) 110MW Unit#1 at Kishenganga(NHPC)<br>5) 110MW Unit#3 at Kishenganga(NHPC) | J&K, NHPC and NRSS29 | 26-May-19 | 17:50 | 26-May-19 | 18.32 | 0.42 | 220KV Ziankote--Delina line tripped due to inclement weather condition (Details Awaited from SLDC J&K) followed by tripping of all other 3 nos. line from Delina including 220KV Bus. This resulted outage of 2 nos. 110MW Units & generation loss of 134 MW at Kishenganga HEP. As per PMU, R-Y fault is observed in the system. In antecedent conditions, 220kV Amargarh(NRSS29)-Delina(JK) & 220KV Delina(JK)-Zainkote(JK) carrying 11MW & 70MW respectively. | 130 | 100 | GD-1 | 0.07 | | | Y(JK), Y(NHPC), Y(NRSS29) | | | Y(JK), Y(NHPC), Y(NRSS29) | | Y(JK) | 80ms |
| 29 | 1) 220kV Chamera III(NHPC)-Chamera pool(PG) ckt-1<br>2) 220kV Chamera III(NHPC)-Budhil(Lanco)<br>3) 77MW Unit#1, #2 & #3 at 220kV Chamera III(NHPC)<br>4) 35MW Unit#1 & #2 at 220kV Budhil(Lanco) | POWERGRID, NHPC & Lanco | 29-May-19 | 13:42 | 30-May-19 | 22.25 | | 220kV Chamera III(NHPC)- Chamera pool(PG) ckt-1 tripped due to conductor snapped during dismantling of tower near Span 24-25. 220 kV Chamera III (NHPC)- Chamera pool(PG) ckt. 2 is already under forced outage since 14.05.19, due to Circuit Breaker problem at Chamera III. Generation loss of around 228 MW of Chamera III and 69 MW of Budhil Hydro-station occurred due to non-availability of evacuation path. As per PMU, R-N fault with no auto-reclosing is observed in the system. | 300 | | GD-1 | | | | Y(PG), Y(NHPC), Y(Lanco) | | | Y(PG), Y(NHPC), Y(Lanco) | | Y(PG) | 80ms |
| 30 | 1) 220KV Bus-II at 220/132kV Khetri (Raj)<br>2) 220KV Khetri(Raj)-Behror(Raj)<br>3) 220KV Khetri(Raj)-Ratangarh(Raj) ckt-1 & 2<br>4) 220KV Khetri(Raj)-Jhunjhunu(Raj)<br>5) 220KV Khetri(Raj)-Babai(Raj) ckt-1 & 2<br>6) 220KV Khetri(Raj)-Dadri(BBMB) ckt-1 & 2<br>7) 100MVA ICT 4 at 220/132kV Khetri (Raj)<br>8) 100MVA ICT 5 at 220/132kV Khetri (Raj)<br>9) 100MVA ICT 6 at 220/132kV Khetri (Raj) | Rajasthan & BBMB | 30-May-19 | 23.59 | 31-May-19 | 1.36 | 1.37 | 220KV Khetri(Raj)-Behror(Raj) tripped due to Y-Ph CT blast at Khetri end. Due to this, 220KV Bus-II Bus bar protection operated leading to tripping of the lines and ICTs connected to 220 kV Bus-II (at Khetri). As per PMU, three phase fault is observed in the system. In antecedent conditions, 100MVA ICT 5 & 6 carrying 31MW & 36MW respectively. | | 80 | GD-1 | 0.13 | | | Y(Raj), Y(BBMB) | | | Y(Raj), Y(BBMB) | | Y(Raj) | 160ms |
| 31 | 1) 115MW Unit#5 at 220kV Salal HEP(NHPC)<br>2) 115MW Unit#1 at 220kV Salal HEP(NHPC)<br>3) 115MW Unit#2 at 220kV Salal HEP(NHPC)<br>4) 115MW Unit#3 at 220kV Salal HEP(NHPC)<br>5) 115MW Unit#4 at 220kV Salal HEP(NHPC)<br>6) 115MW Unit#6 at 220kV Salal HEP(NHPC) | NHPC | 31-May-19 | 18.40 | 31-May-19 | 18.52 | 0.12 | Unit#5 at 220kV Salal HEP(NHPC) tripped on overcurrent and other 5 units tripped due to overloading after tripping of Unit#5. As per PMU, R-N fault with delayed clearance of 400ms is observed. In antecedent conditions, Unit#1,2,3,4,5 & 6 carrying 118MW,118MW,117MW,122MW,122MW & 121MW respectively. | 715 | | GD-1 | | | | Y(NHPC) | | | Y(NHPC) | | Y(NHPC) | 400ms |

Annex-5

## Northern Regional inter regional lines tripping for May-19

| S. No. | Name of Transmission Element Tripped | Owner/ Utility | Outage | | Load Loss/ Gen. Loss | Brief Reason (As reported) | Category as per CEA Grid standards | Restoration | | # Fault Clearance Time (>100 ms for 400 kV and 160 ms for 220 kV) | *FIR Furnished (YES/NO) | DR/EL provided in 24 hrs (YES/NO) | Other Protection Issues and Non Compliance (inference from PMU, utility details) | Suggestive Remedial Measures | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Date | Time | | | | Date | Time | | | | | | |
| 1 | 800kV HVDC Champa-Kurukshetra line-2 | POWERGRID | 06-May-19 | 17.05 | Nil | Due to Operation of "Common Area Neutral Protection (CNAP)" in Lane 1 at Champa end | NA | 06-May-19 | 23.15 | NA | NO | NO | | Details of tripping yet to be received. | From PMU, no AC system fault observed. |
| 2 | HVDC Champa-Kurukshetra Pole-2 at Kurukshetra | POWERGRID | 07-May-19 | 10.45 | Nil | Tripping during changover of lane | NA | 07-May-19 | 11.40 | NA | NO | NO | | Details of tripping yet to be received. | From PMU, AC system fault observed. |
| 3 | HVDC Champa-Kurukshetra Pole-1 at Kurukshetra | POWERGRID | 07-May-19 | 12.25 | Nil | Tripped during automatic switchgear sequence connect (a part of deblocking sequence) in Pole 3, the HVHS failed to connect | NA | 07-May-19 | 13.26 | NA | NO | NO | | Details of tripping yet to be received. | From PMU, no AC system fault observed. |
| 4 | 800kV HVDC Champa-Kurukshetra line-1 | POWERGRID | 09-May-19 | 9.09 | Nil | Tripped due to malfunctioning of software during blocking of Pole-3 at Kurukshetra. | NA | 09-May-19 | 17.40 | NA | NO | NO | | Details of tripping yet to be received. | From PMU, no AC system fault observed. |
| 5 | HVDC Champa-Kurukshetra Pole-2 at Kurukshetra | POWERGRID | 30-May-19 | 15.33 | Nil | Main and Standby AC supply for B-phase Converter transformer failed and cooling system stopped working. As a result Converter trasformer tripped on WTI trip. | NA | 30-May-19 | 16.18 | NA | YES | YES | WTI tripping in place of alarm. | Alarm for supply failure needs to be monitored at control room. WTI tripping to be looked into as alarm is generally kept for WTI. | From PMU, no AC system fault observed. |
| 6 | HVDC Vindhyachal BtB block-2 | POWERGRID | 19-May-19 | 10.35 | Nil | Tripped along with generation outage at Vindhyachal, WR and failure of 6.6KV auxilary supply feeder. | NA | 19-May-19 | 18.09 | NA | NO | NO (DR provided for different time) | Sensitive DC overcurrent protection. | Details of tripping yet to be received. Sensitive DC overcurrent protection to be looked into. | From PMU, AC system fault observed. |
| 7 | HVDC Vindhyachal BtB block-1 | POWERGRID | 22-May-19 | 15.34 | Nil | Both block of HVDC Vindhyachal Bi-pole tripped due to disturbance at Vindhyachal NTPC switchyard (CB blasted at | GI-2 | 22-May-19 | 17.40 | NA | YES (After 24hrs) | YES (After 24hrs) | Sensitive DC overcurrent protection. | Sensitive DC overcurrent protection to be looked into. | From PMU, AC system fault observed. |
| 8 | HVDC Vindhyachal BtB block-2 | | | | | | | 22-May-19 | 18.32 | | NO | NO | | | |
| 9 | HVDC Vindhyachal BtB block-2 | POWERGRID | 28-May-19 | 9.30 | Nil | Due to maloperation of micro switch of PRD | NA | 28-May-19 | 12.19 | NA | NO | NO | Maloperation of protection. | Details of tripping yet to be received. Maloperation of protection to be looked into. | From PMU, no AC system fault observed. |
| 10 | HVDC Vindhyachal BtB block-1 | POWERGRID | 28-May-19 | 12.09 | Nil | Tripped due to DC OVERCURRENT Protection. | NA | 28-May-19 | 13.59 | NA | NO | NO | Sensitive DC overcurrent protection. | Details of tripping yet to be received. Sensitive DC overcurrent protection to be looked into. | From PMU, AC system fault observed. |
| 11 | 800kV HVDC Agra-BNC pole-4 at Agra | POWERGRID | 04-May-19 | 11.58 | Nil | Blocked due to Converter Differential Protection Trip at Alipurdwar end. | NA | 04-May-19 | 17.44 | NA | NO | YES (After 24hrs) | | Complete details of tripping yet to be received. | From PMU, slight dip in all three voltage phases observed. |
| 12 | 800kV HVDC Agra-BNC pole-4 at Agra | POWERGRID | 07-May-19 | 15.43 | Nil | Tripped on Fire Trip indication (VESDA) | NA | 07-May-19 | 20.28 | NA | YES (After 24hrs) | YES (After 24hrs) | | VESDA operated but no abnormality found. VESDA protection operation needs to be checked, tuned for any unneccessary operation. | From PMU, slight dip in all three voltage phases observed. |
| 13 | 800kV HVDC Agra-BNC pole-4 at Agra | POWERGRID | 24-May-19 | 7.32 | Nil | Tripped at Agra on protection indication related to Valve cooling of pole -4 at APD. | NA | 24-May-19 | 8.06 | NA | NO | YES | | Complete details of tripping yet to be received. Timestamp mismatch of ~12sec observed in DR as compared to PMU data to be corrected. | From PMU, no AC system fault observed. |

| S. No. | Name of Transmission Element Tripped | Owner/ Utility | Outage | | Load Loss/ Gen. Loss | Brief Reason (As reported) | Category as per CEA Grid standards | Restoration | | # Fault Clearance Time (>100 ms for 400 kV and 160 ms for 220 kV) | *FIR Furnished (YES/NO) | DR/EL provided in 24 hrs (YES/NO) | Other Protection Issues and Non Compliance (inference from PMU, utility details) | Suggestive Remedial Measures | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **14** | 800kV HVDC Agra-BNC pole-3 at Agra | POWERGRID | 30-May-19 | 11.46 | Nil | Tripped due to Earth Fault | NA | 30-May-19 | 13.33 | NA | NO | YES | | Complete details of tripping yet to be received. Timestamp mismatch of ~12sec observed in DR as compared to PMU data to be corrected. | From PMU, no AC system fault observed. |
| **15** | 220kV Auraiya(NTPC)-Malanpur(MPPTCL) | NTPC/MP | 13-May-19 | 17.38 | Nil | R-N fault | NA | 13-May-19 | 18.29 | NA | NO | NO | | Details of tripping yet to be received. | From PMU, multiple faults observed. |
| **16** | 220kV Auraiya(NTPC)-Malanpur(MPPTCL) | NTPC/MP | 15-May-19 | 19.01 | Nil | R-N fault, FC= 1.768KA, 93.38km from Auraiya end | NA | 15-May-19 | 19.29 | NA | NO | NO | Auto-reclosing didn't occur. | Details of tripping yet to be received. Auto-reclosing at Auraiya end to be put in service at the earliest. | From PMU, R-N fault observed without auto-reclosing. |
| **17** | 220kV Ranpur(RRVPNL)-Bhanpura(MPPTCL)^^ | Rajasthan/MP | 16-May-19 | 17.40 | Nil | B-N fault, FC= 11KA , FD=.5km from Ranpur end | NA | 16-May-19 | 19.07 | NA | YES (After 24hrs) | YES (After 24hrs) | | | From PMU, B-N fault observed with unsuccessful auto-reclosing. |
| **18** | 220kV Ranpur(RRVPNL)-Bhanpura(MPPTCL)^^ | Rajasthan/MP | 31-May-19 | 14.46 | Nil | R-Y fault , 21.8km from Ranpur. Charging attempt failed at 17.26 hrs | NA | 31-May-19 | 12.30 | NA | NO | NO | | Details of tripping yet to be received. | From PMU, R-Y fault observed. |
| **19** | 22kV Sahupuri(UP)-Sasaram(PG) | POWERGRID | 14-May-19 | 12.18 | Nil | B-N fault | NA | 14-05-2019 | 13.11 | NA | NO | NO | Auto-reclosing didn't occur. | Details of tripping yet to be received. | From PMU, B-N fault observed with no auto-reclosing attempt. |
| **20** | 765kV Orai(PG)-Gwalior(PG)^^ | POWERGRID | 15-May-19 | 18.43 | Nil | Multiple Y-N faults | NA | 15-05-2019 | 23.38 | NA | YES (After 24hrs) | YES (After 24hrs) | | | From PMU and DR, Multiple Y-N faults occurred. Line tripped on fault within reclaim time. |
| **21** | 765kV Agra(PG)-Gwalior(PG)-2^^ | POWERGRID | 15-May-19 | 18.25 | Nil | R-N fault, Fault current=5.1KA and Distance of fault=111.7KM from Agra | NA | 15-05-2019 | 19.06 | NA | YES (After 24hrs) | YES (After 24hrs) | | | From PMU and DR, R-N fault observed with unsuccessful auto-reclosing. |
| **22** | 765kV Phagi(RRVPNL)-Gwalior(PG)-1 | Rajasthan/ POWERGRID | 17-May-19 | 16.31 | Nil | Y-N fault,Dist.-29.6km, FC=10KA, from phagi end | NA | 18-May-19 | 16.32 | NA | NO | NO | | Details of tripping yet to be received. | From PMU, multiple faults observed. |
| **23** | 400kV Balia(PG)-Biharshariff(PG)-2 | POWERGRID | 30-May-19 | 10.19 | Nil | DT received at Balia end | NA | 30-05-2019 | 12.40 | NA | NO | NO | | Details of tripping yet to be received. | From PMU, no fault observed. |

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

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

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

***^^ tripping seems to be in order as per PMU data, reported information. However, further details may be awaited.***

Reporting of Violation of Regulation for various issues for above tripping

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

**Annex-6**

| Concerned Utilites | Locations | Observation during Mock Testing | Action taken by the utiities | Action pending by the utilities |
|---|---|---|---|---|
| Punjab | **220 kV Dhandhari 2** | Failure of DC supply at 220 kV Dhandhari-2 before the testing resulted into DTPC major alarm, however DC supply to DTPC was restored before testing of condition-5 in which signal extended to Dhandhari-2 | The issue has been resolved. The supply provided through second source | |
| | **220 kV Jamsher** | At the time of mock testing, load on 66kV Nakodar ckt-1 & 2 was nil against planned load relief of 100MW (minimum) | Presently load of both these feeders has been shifted to 220 kV Badshahpur. These feeders are used to provide back up feeding on requirement. The matter will be taken up with PSTCL to provide alternate feeders to get desired load relief of 100 MW | Pending from Punjab |
| | | Display of DTPC Counter was faulty | The matter reagrding faulty display of DTPC counter has already been taken up with POWERGRID. Accordingly the action has to be taken by POWERGRID to repalce the display of DTPC counter | POWERGRID may kindly check the counter and replace the same if faulty. |
| | **220 kV Ablowal** | At the time of mock testing, load on 66 kV Barn, Passiana-1 was nil against planned load relief of 18MW (minimum) | Presently the load of 66 kV Passiana-1 has been shifted to 220 kV Passiana after upgradation of 66 kV Passiana. Now 66 kV Passiana-1 feeder is used to provide back feeding on requirement.<br>It is observed that during summer/paddy season, 66 kV Baran is being operated from 220 kV Ablowal while during winter/lean period it is being operated from Bahadurgarh (Bhateri) | Alternate feeder details to be provided instead of 66 kV Passiana-1 at 220 kV Ablowal station. 66 kV barn feeders to be connected at 220 kV Ablowal station throughout the year. |
| | **220 kV Bahadurgarh (Bhateri)** | 66 kV Ghanour feeder was non-radial feeder | 66 kV Ghanour feeder is radial (wrong reporting) | |
| | | 66kV Patiala feeders was not wired for tripping | The SPS wiring of 66 kV Patiala feeder has been cpmpleted. However, the connections are pending at POWERGRID end | Remedial measures to be taken by POWERGRID |
| | | At the time of mock testing, total load wired under SPS scheme at Bahadurgarh station was ~43MW against planned load relief of 135MW (minimum) | The load relief observed during mock testing was less due to wiring issues/ lean period going on in Punjab control area | Pending from Punjab |
| | **220 kV Mandi Gobindgarh2** | 66kV Grain market feeder was not wired for tripping | The matter regarding wiring of 66 kV Grain Market is being taken up with POWERGRID | Remedial measures to be taken by POWERGRID |
| | | At the time of mock testing, total load on the feeders wired under SPS scheme at Mandi Gobindgarh 2 station was ~61MW against planned load relief of 90MW (minimum) | The load relief observed during mock testing was less due to wiring issues/ lean period going on in Punjab control area | Pending from Punjab |
| | **220 kV Mandi Gobindgarh1** | Is 66kV Chourwala ckt-2 and Focal Point ckt is wired in old SPS scheme of Agra-Gwalior? | These feeders are covered under old SPS scheme | |

**Annex-6**

| Concerned Utilites | Locations | Observation during Mock Testing | Action taken by the utiities | Action pending by the utilities |
|---|---|---|---|---|
| | **220 kV Mohali-I** | Clarity require from Punjab for feeders connected at Mohali-I in old scheme and new scheme | In old scheme, the no. of feeders covered were: 66 kV Phae-1, 66 kV Phase-7, 66 kV Phase-8, 66 kV Phase-71.<br>In new scheme, the no. of feeders covered are 2 No. 100MVA X-mer, 1 No. 160 MVA X-mer and 4 No. 66 kV circuits from Mohali to Chandigarh. | Duplicacy in load relief. Load relief in old scheme will automatically covered in load relief in new scheme (As ICTs tripped) |
| | | Feeders connected on DTPC under DIP-5000 scheme are non-radial in nature | Feeders connected on DTPC under DIP-5000 scheme are radial. However, limited backup supply for energization of station is available if any supply failure/ emergent condition | |
| | **220 kV Ajitwal** | Planned load relief of Ajitwal station is still pending (at the time of mock testing load was around 15MW) | The maximum load on 4 No. of wired feeders where SPS is installed is around 90 MW and minimum load is around 15 MW | |
| **Delhi** | **Bamnauli (DTL)** | 220 kV Bamnauli-Pappankalan ckt-1 & 2 were non-radial in nature | Wrongly reported. Feeders are radial in nature. However for load relief, exact details would be presented in 160th OCC meeting. | |
| **Haryana** | **220 kV Fatehabad (PG)** | 220 kV Fatehabad (PG)-Fatehabad (HVPNL) ckt-1 &2 were non-radial in nature | 220 kV Fatehbad_PG - Fatehbad D/C & 200 kV Fatehbad_PG- Sirsa included with planned relief of 45 MW . It is to inform that 220 kV Fatehbad(HVPNL) run in the synch. mode via 220 Fatehbad_PG - Fatehbad D/C , 220 kV Hisar_PG - Fatehbad D/C & 220 kV Fatehbad_HVPN - Rania(HVPN) due to which for the stability and security of the state grid during paddy season couldn't be made in radial mode. However 220 kV Sirsa ( load relief range 50 to 150 MW) run in radial mode from 400 kV Fatehbad_PG, will provide required load relief planned for the group i.e. Group-H . So it is requested to exclude 220 kV Fatehbad_PG - Fatehbad D/C From the Group-H. | |
| | **132 kV PTPS** | Feeders were non-radial in nature | Wrongly reported. Haryana informed that these feeders are radial in nature | |
| | **Narwana** | Narwana: Display of DTPC Counter was faulty | POWERGRID will do the necessary action | One to one testing needs to be done between Bhiwadi PG & Narwana |
| | **Charkhi Dadri (HVPNL)** | What is the status of feeders & ICTs (132kV Dadri city, 132kV Matenhail, 132kV Kalanaur, 132kV Bahu, 132/33kV T/F 20/25MVA, 132/133V T/F 16/20 MVA) from Charkhi Dadri connected in load Group-G, which is used in Balia-Bhiwadi SPS scheme? | These are separate feeder in Load Group G | |

**Annex-6**

| Concerned Utilites | Locations | Observation during Mock Testing | Action taken by the utiities | Action pending by the utilities |
|---|---|---|---|---|
| Rajasthan | **General Issue** | Total 362 MW load shedding is planned under Agra - Gwalior SPS scheme against target of 550MW. It seems Rajasthan has taken lower load relief in planning itself than how target load relief will be achieved | Revised proposal of feeder Load Groups for System Protection Schemes has been prepared by shifting the feeders from one group to another group and by adding new feeder in load group "K" and all load group (A to K) are matched with the target load by considering minimum assured load enclosed at Annexure "A".<br><br>Due to shifting of feeders, DTPC NSD-570 is totally free at Beawar. | To be discussed in 160th OCC meeting |
| | **220/132 kV Ratangarh (Sardar Sahar ckt)** | It's mapped for load Group-B but DTPC is not found at Ratangarh site | Pertains to POWERGRID | Pending from POWERGRID |
| | | 220/132 kV Ratangarh (Sardar Sahar ckt) | 132 kV Sardar Sahar was fed from 220 kV GSS Halasar due to failure of Transformer at 220 kV GSS Ratangarh. Replacement of Transformer is expected in July 2019. There is no any alternate feeder for time being shifting of SPS | Pending from Rajasthan |
| | **220kV Ratangarh** | 132 kV Fatehpur ckt was non-radial in nature | 132 kV Fatehpur was fed from 220 kV GSS Laxmangarh due to failure of Transformer at 220 kV GSS Ratangarh. Replacement of Transformer is expected in July 2019. There is no any alternate feeder for time being shifting of SPS | Pending from Rajasthan |
| | **220 kV Merta** | 132 kV Lamba+Gotan and Kuchera needs to be wired from DTPC NSD-70D at Merta, so that these feeders will also be tripped in case of tripping operation of load group C&D | 132 kV Lamba+Gotan and Kuchera has been wired from DTPC NSD-70D at 220 kV GSS Merta. Now, DTPC DIP-5000 is totally free at Merta | |
| | **220 kV Alwar** | 132 kV Bansur feeder was non-radial in nature | 132 kV Bansur is being fed from 220 kV GSS Bansur due to failure of Transformer at 220 kV GSS Alwar. Replacement of Transformer is expected in August' 2019. **Meanwhile, the 132 KV GSS Ramgarh feeder has been connected in SPS for load relief** | |

**Annex-6**

| Concerned Utilites | Locations | Observation during Mock Testing | Action taken by the utiities | Action pending by the utilities |
|---|---|---|---|---|
| | **220 kV Debari** | 132kV Bhatewar feeder was non-radial in nature (132kV Bhatewar fed from 220 kV GSS Nimbahera due to system constraints). | 132 kV Bhatewar feeder is being fed radially from 220 kV GSS Debari but at the time of mock testing, 132 kV Bhatewar GSS was shifted on 220 kV GSS Nimbahera due to shut-down of 220 KV RAPPA – Debari Line. **After completion of Shut- Down, 132 kV Bhatewar again shifted and connected radially at 220 kV GSS Debari**. | |
| **Uttar Pradesh** | **220 kV Modipuram** | 132kV Kankankhera feeder was non-radial in nature | Wrongly reported, Radial in nature, alternate supply source available from 132 kV Vaidvayaspuri S/S | |
| | | Lower load relief during actual operation on 25th Mar 2019 | No tripping occurred due to DTPC SPS cabinet installed at 220 kV Modipuram was defective since long back and was set right by PGCIL on dated 09.04.19 | |
| | **220 kV Modipuram** | Communication issue resulting in major DTPC alarm at Nara | DTPC major alarm problem at 220 kV Nara S/S was rectified by PGCIL after mock testing at 16:10hrs on dated 01.05.19. | |
| | | Display of DTPC Counter was faulty | Display of DTPC counter at 220 kV Nara S/S is still faulty which would be rectified by PGCIL. | Pending from POWERGRID |
| | **220 kV Nanauta** | 132kV Deoband line was non-radial in nature | Wrongly reported, Radial in nature, alternate supply source available from 132 kV Kota (UP) S/S. | |
| | | At the time of mock testing, total load on the feeders wired under SPS scheme at Nanauta (UP) station was ~60MW against planned load relief of 195MW (minimum) | Load relief of 60 MW against planned load relief of 195 MW due to loading of 220 kV Nanauta S/S has been shared by newly commissioned S/s in the region. However load shedding through SPS would be reviewed. | Pending from Uttar Pradesh |
| | **220 kV Saharanpur** | 132kV Ambala Road was non-radial in nature | Wrongly reported, Radial in nature, alternate supply source available from 132 kV Ambala Road-II. | |
| | | At the time of mock testing, total load on the feeders wired under SPS scheme at Saharanpur (UP) station was ~86MW against planned load relief of 152MW (minimum) | Load relief of 86 MW against planned load relief of 152 MW was due to loading of 220 kV Saharanpur has been shared by Newly commissioned S/S in the region however load shedding through SPS would be reviewed. | Pending from Uttar Pradesh |
| **Common Issues** | | Load Groups Finalization | | Concerned Utilities agreed to submit the details before upcoming 160th OCC meeting. |