Minutes

of

169th OCC Meeting

Date: 27.07.2020

Eastern Regional Power Committee

14, Golf Club Road, Tollygunge

Kolkata: 700033

Eastern Regional Power Committee

Minutes of 169th OCC Meeting held on 27th July 2020

The meeting was conducted through WebEx online platform. List of participants is enclosed at **Annexure-A**.

PART A

Item No. A.1: Confirmation of minutes of 168th OCC meeting of ERPC held on 17.06.2020

The minutes of 168th OCC meeting were uploaded in ERPC website and circulated vide letter dated 29.06.2020 to all the constituents.

Members may confirm the minutes of 168th OCC meeting.

Deliberation in the meeting

The members confirmed the minutes of 168th OCC meeting.

PART B: ITEMS FOR DISCUSSION

Item No. B.1 Bus split arrangement at 400 KV Sundergarh (Jharsuguda)--ERLDC

In the 16th meeting of Standing Committee on Power System Planning of ER, held at New Delhi on 2nd May 2014, bus splitting arrangement at Sundergarh (Jharsuguda) substation at 765kV & 400kV voltage levels was agreed. The bus split scheme at Sundergarh has been completed in Nov '19. Comments were also sought on the proposal of CTU shared with email.

Subsequently ERLDC has independently carried out the Bus-splitting simulation studies. In the simulation 400 kV Buses at OPGC was considered as coupled (which is how system is operating at present), while in the shared by CTU study same was decoupled. Through simulation it was observed that system remains N-1 secured without any skewed flow when Sundergarh operates in Bus Split mode at 400 kV level, which is in line with CTU study report.

Fault level pre and post bus split observed in simulation is as follows

Substation	Fault level before bus Splitting	Fault level Post bus Splitting
400 kV Sundergarh (Jharsuguda)	66.5 kAmps	46.4 kAmps /46.5 kAmps

Subsequently by letter dated 14th July 2020 CTU suggested to implement bus split arrangement at 400 kV Jharsuguda citing reference to CEA 3rd July 2020 letter.

Members may discuss.

Deliberation in the meeting

Powergrid informed that they are ready to operationalize the bus split arrangement at 400 kV Jharsuguda S/s.

ERLDC informed that they had carried out a simulation study wherein it was found that there is no issue in meeting N-1 contingency with the Bus splitting at 400 kV Jharsuguda S/s and the results are almost matching with the CTU study. The bus splitting scheme could be put in service. However, two group protection settings must be implemented at 400 kV Jharsuguda S/s and nearby substations for proper operation of protection relays during common bus operation and split bus operation at 400kV Jharsuguda S/s. Similarly, the zone settings of remote end substations are to be reviewed considering changes in the longest and shortest line.

It was informed that the protection issues were already discussed in 92nd PCC Meeting held on 22nd July 2020. PCC advised all the concerned constituents to review the protection settings considering the above-mentioned points.

After detailed deliberation, OCC agreed for operationalization of the bus split arrangement at 400 kV Jharsuguda S/s. OCC advised Powergrid to coordinate with the remote end substations for implementation of the revised protection settings and inform a suitable date to ERLDC for putting the bus splitting scheme in operation.

Item No. B.2 Implementation of Automatic Demand Management Scheme (ADMS)

The latest status along with proposed logic as follows:

Sl. No	State/Utility	Logic for ADMS operation	Implementation status/target	Proposed logic (if different from under implementation logic)
1	West Bengal	F <49.7 AND deviation > 12 % or 150 MW	Implemented2 on 5.11.16	F <49.9 AND deviation > 12 % or 150 MW
2	DVC	F <49.7 AND deviation > 12 % or 150 MW	Implemented1 on 7.06.2016	
3	Bihar	F <49.7 AND deviation > 12 % or 150 MW	They would place the order to Chemtrol for implementation.	F <49.9 AND deviation > 12 % or 150 MW
4	Jharkhand	1. System Frequency < 49.9 Hz AND deviation > 12 % or 25 MW 2. System Frequency < 49.9 Hz AND deviation > 12 % or 50 MW 3. System Frequency < 49.9 Hz AND deviation > 12 % or 75 MW	In service from 21st August 2019.	Condition 1: Block I feeders will be selected for load shedding Condition 2: Block I & II feeders will be selected for load shedding Condition 3: Block I, II & III feeders will be selected for load shedding
5	Odisha	1. System Frequency < 49.9 Hz 2. Odisha over-drawl > 150 MW 3. DISCOM over-drawl > (40MW)	10 Months Sent for PSDF approval. It was informed that tender for the work has been floated.	Logic 2 and 3 is AND or OR, in case it is AND then ADMS may not operate when discom are in schedule but GRIDCO is overdrawing due to less generation at state embedded generators
6.	Sikkim			Sikkim informed that they have submitted a proposal to PSDF Committee for installation of OPGW cables which is under approval stage. Sikkim added that ADMS scheme would be implemented after installation of OPGW

In 42nd TCC, TCC opined that uniform logic and settings are to be implemented for all the states. TCC advised to discuss the issue in next OCC Meeting to formulate uniform logic and setting of ADMS.

In 165th OCC, ERLDC gave a presentation on the uniform logic. The proposed logic for ADMS operation is given below:

If frequency is less than 49.9 Hz for 3 minutes
and
Overdrawal/Under injection > 150 MW or 12 %

In 166th OCC, OCC agreed to the ERLDC proposed logic.

OCC advised all the states to implement above logic in ADMS. It was also decided that the performance of the ADMS would be analyzed in monthly OCC Meetings, if necessary, the logic would be reviewed.

In 168th OCC meeting SLDC DVC informed that revised settings of ADMS had been successfully implemented and detailed report had been mailed to ERPC and ERLDC.

ERLDC requested DVC to share the details of quantum of power that would be disconnected on operation of ADMS.

SLDC Jharkhand informed that revised ADMS settings could not be implemented due to lockdown and they are planning to implement the revised settings by end of June 2020.

SLDC Bihar informed that testing of ADMS got delayed due to lockdown and Chemtrol is planning to test the ADMS during third week of June 2020.

SLDC Odisha informed that ADMS would be implemented by July 2021.

SLDC Sikkim informed that installation of OPGW is in progress. It would take 18 months for completion ADMS scheme would be implemented after installation of OPGW.

Members may update.

Deliberation in the meeting

SLDC West Bengal was not present in the meeting.

SLDC Jharkhand informed that the revised ADMS settings could not be implemented due to lockdown and they are planning to implement the revised settings by 1st week of August 2020.

SLDC Bihar informed that testing of ADMS scheme would be done in coordination with Chemtrol engineers.

SLDC Odisha informed that the tendering process for implementation of ADMS would be completed by August 2020.

SLDC Sikkim informed that OPGW work will resume from 1st August 2020 and ADMS would be implemented after installation of OPGW links.

Item No. B.3 Implementation of Automatic Generation Control in Eastern Region

In compliance to CERC's direction in order dated 06/12/2017 in petition no 79/RC/2017, AGC was commissioned in NTPC Barh on 01st August 2019 and operationalized since 23rd August 2019.

Vide order dated 28th August 2019, CERC in Petition No.: 319/RC/2018 directed that all the ISGS stations whose tariff is determined or adopted by CERC shall be AGC-enabled and the ancillary services including secondary control through AGC be implemented as per the following direction:

I. All thermal ISGS stations with installed capacity of 200 MW and above and all hydro stations having capacity exceeding 25 MW excluding the Run-of-River Hydro Projects irrespective of size of the generating station and whose tariff is determined or adopted by CERC are directed to install equipment at the unit control rooms for transferring the required data for AGC as per the requirement to be notified by NLDC. NLDC shall notify the said requirements within one month of this order.

II. All such ISGS stations whose tariff is determined or adopted by CERC shall have communication from the nearest wide band node to the RTU in the unit control room.

III. The Central Transmission Utility (CTU) is directed to have communication availability from NLDC/ RLDCs to the nearest wide band node/ switchyard for the generating stations in a redundant and alternate path ensuring route diversity and dual communication.

IV. The NLDC is also directed to commission the required communication infrastructure.

V. The expenditure as a result of compliance of the above directions may be claimed as per relevant regulations or provisions of the PPA.

VI. The NLDC is directed to monitor implementation of the above directions so that all the ISGS stations whose tariff is determined or adopted by CERC are AGC-enabled within six months of this order.

VII. The framework regarding compensation for AGC support and deviation charges as stipulated in the Commission's Order in Petition no. 79/RC/2017 dated 06.12.2017 shall apply to the five pilot projects as also to other ISGS as and when they are AGC enabled. This arrangement shall remain in place till the relevant regulations inter alia on compensation for AGC services are framed by the Commission.

VIII. NLDC/RLDCs are allowed to operate the AGC system for enabling the signals to the power plants at the earliest.

IX. All new thermal ISGS stations with installed capacity of 200 MW and above and hydro stations having capacity exceeding 25 MW excluding the Run-of-River Hydro Projects irrespective of size of the generating station and whose tariff is determined or adopted by CERC shall mandatorily have the capability to provide AGC support.

All concerned plants may please ensure taking necessary action for arranging the communication (through redundant and alternate paths) from the existing nearest wideband communication node to their unit control rooms through two fiber optic cables, in coordination with CTU. It may please be noted that all the ISGS stations whose tariff is determined by or adopted by CERC should be AGC-enabled before 28th February 2020, as per order of CERC.

A. Status of implementation of AGC for ISGS stations

Status of implementation as updated in 166th OCC Meeting and 5th TeST Meeting as follows:

Sl. No	Station	Status of Communication link from plant substation to PGCIL node	Status of communication system integration from unit to plant substation	Target date for implementation of AGC at plant
1	Farakka STPS - I & II	Both links established	Pending	June 2020
2	Kahalgaon STPS - II	Both links established	Pending	June 2020
3	Barh STPS	Both links established	Installed	Running since August 2019
4	NPGC, Nabinagar	Links from Gaya and Patna has been established.	NPGC, Nabinagar informed that OPGW is available but end equipment needs to be procured and installed to establish communication link from their station to NLDC. NTPC further informed that they have placed order for Providing the end equipment.	June 2020
5	Maithon Power Limited	One link established. Another link, Ranchi-Maithon (RB) would complete by March 2020.	In progress	July 2020
6	Talcher STPS - I	Both links established.		June 2020
7	Kahalgaon STPS - I	Both links established.	NTPC informed that they are approaching CERC for exemption.	
8	Nabinagar Thermal Power Project - BRBCL	Only one link Sasaram- Nabinagar OPGW installation is pending. It would take two years for Completion.		June 2020
9	Darlipalli STPS	Communication established.	Integration is in progress	June 2020
10	Teesta – V	One link established		June 2020
11	Farakka STPS - III	Link established		June 2020
12	MTPS Stage – II (Kanti)	Link established		June 2020
13	Rangit HPS	One link established		June 2020

Note: OPGW from Barh to Gorakhpur is redundant path for ER to NR which would be completed by March 2020.

In 168th OCC meeting NTPC ER-II informed that implementation of AGC got delayed due to lockdown and it would take around 6 months to implement AGC.

MPL informed that they have received all the materials and the AGC implementation work is expected to be completed by July 2020.

BRBCL informed that they would implement AGC after installation of OPGW link in 400kV Sasaram-Nabinagar line.

Powergrid informed that OPGW installation would take around one and half year.

Members may update.

Deliberation in the meeting

NTPC informed that the contract has been awarded to ABB and the AGC would be implemented by Dec 2020.

MPL informed that they are ready to commission AGC, but they are yet to receive the communication PORT details from NLDC.

OCC advised MPL to interact with ERLDC for necessary details and implementation.

ERLDC agreed to coordinate with NLDC and MPL.

NPGC-Nabinagar informed that they need integration of communication links at both Gaya & Patna ends to complete AGC implementation for which they need support from Powergrid.

OCC then advised NPGC to communicate the issues to ERPC and ERLDC, the issue would be discussed in TeST Committee meeting.

B. Status of implementation of AGC as a pilot project instates

In 42nd TCC, DVC intimated that AGC shall be implemented in unit 7 and 8 of Mejia as per the given schedule by 31st July 2020.

Odisha informed that SLDC and OPGC will sit together and finalize the scheme.

WBPDCL informed that they have already collected offer from Siemens for implementation of AGC and they are awaiting the concurrence from SLDC.

SLDC, WB informed that they are not in a position to implement AGC unless a clear direction is given by WBERC. Further, implementation of intra state DSM is a prerequisite for implementation of AGC in the state.

It was decided to request CERC to include this as an issue in the Agenda for discussion in the meeting of Forum of Regulators.

Summary of status of implementation:

State	Station/Unit	Action plan
DVC	Mejia unit # 7 & 8	NIT has been floated. Order placement 30th March 2020 Commissioning of AGC 31st July 2020
West Bengal	Unit # 5 of Bak reswar TPP	SLDC, WB to establish the required hardware for generating AGC signal at SLDC.
Odisha	Unit # 3 of OPGC	Joint meeting between SLDC, Odisha and OPGC was held wherein, it was decided to visit Barh, NTPC and NLDC to get acquainted with the AGC Implementation and formulate a plan.

In 168th OCC meeting DVC informed that AGC would be implemented by October 2020. Further DVC added that the work was delayed due to lockdown.

Further OCC advised Odisha to prepare a plan of AGC implementation and share it with ERPC and ERLDC.

Members may update.

Deliberation in the meeting

SLDC DVC informed that due to COVID-19 pandemic, participation in the tender was very less therefore they are floating a new tender for implementation of AGC. AGC would be implemented by Feb 2021.

Odisha informed that they could not visit Barh NTPC and NLDC due to ongoing COVID 19 pandemic situation.

OCC advised SLDC, Odisha and OPGC to interact with Barh NTPC & ERLDC to get the technical specifications & the procedure for implementation of AGC.

Item No. B.4 Outage of important transmission lines

1. 400 kV Kishenganj-Patna D/C lines:

In 162nd OCC, Powergrid informed that one circuit of 400 kV Kishenganj-Patna D/C line would be restored through ERS by December 2019. Powergrid added that permanent restoration of both the circuits of 400 kV Kishenganj-Patna D/C lines would be completed by March 2020.

MS, ERPC submitted that Powergrid had repeatedly changed their schedule of restoration of the line. He advised Powergrid to give a report on restoration schedule committed till date in chronological order along with the reason for changing the scheduled dates.

He added that a Committee would visit the site once again in 2nd week of November 2019 to access the situation.

In 163rd OCC, Powergrid informed that both circuits of 400 kV Kishenganj-Patna D/C line would be

restored through ERS by December 2019. Powergrid added that permanent restoration of both the circuits of 400 kV Kishenganj-Patna D/C lines would be completed by March 2020.

Thereafter, Powergrid vide letter dated 3rd January 2020 informed that the temporary restoration of the line using ERS could not be completed due to pathetic condition of approach road, unprecedented cold weather condition and continued heavy water current in the Ganga river.

Powergrid added that restoration work is under progress in war footing basis and it is expected to be restored temporarily by 3rd/4th week of January 2020 however permanent restoration is expected to be completed by end of March 2020.

In 24th January 2020 meeting held at Patna, Powergrid informed that both circuits of 400 kV Kishenganj-Patna D/C line was restored through ERS on 22nd January 2020.

In 166th and 167th OCC, Powergrid informed that that permanent restoration of both the circuits of 400 kV Kishenganj-Patna D/C lines would be completed by April 2020.

In 168th OCC meeting Powergrid informed that both the circuits of 400 kV Kishenganj-Patna D/C line would be restored by July 2020, but they required shutdown of both the lines for 20 days.

ERLDC informed that NLDC is not permitting shutdown of both the lines simultaneously and advised to take the shutdown of one circuit at a time.

Further Powergrid informed that shutdown of one circuit at a time is not possible.

OCC advised Powergrid to share the relevant details with ERLDC to take up with NLDC.

Powergrid and ERLDC may update and discuss.

Deliberation in the meeting

Powergrid informed that 400 kV Kishanganj-Patna D/C line is under shutdown to restore the line on permanent towers. Powergrid explained that the restoration work of 400 kV Kishanganj-Patna D/C line was delayed due to severe rain fall and huge in-flow of water from upstream. Powergrid requested to extend the shutdown of 400 kV Kishanganj-Patna D/C line up to 30th July 2020.

Powergrid added that they will bring 400 kV Kishanganj-Patna D/C line into service by 30th July 2020 using ERS as they could not complete the tower erection work falling in the Kosi river. Powergrid explained that because of huge discharge of water from Nepal, it is not possible to erect the tower in Kosi river during this monsoon. They will take up this work after the monsoon and shift the line to permanent towers until that 400 kV Kishanganj-Patna D/C line would be on ERS. Powergrid submitted that single moose conductor which is capable of carrying 500 MW has been used for each circuit of the ERS.

OCC expressed serious concern over delay in permanent restoration of 400 kV Kishanganj-Patna D/C line and advised Powergrid to restore the line on permanent towers at the earliest. OCC agreed for extension of shutdown of 400 kV Kishanganj-Patna D/C line up to 30th July 2020 to restore the line on ERS. Further, OCC advised Powergrid to maintain the healthiness of the ERS till restoration of the line on permanent towers.

2. 400 kV Barh-Motihari D/C and 400 kV Barh-Gorakhpur D/C lines

Eastern Region Power Committee (ERPC) letter dated 21.11.2019, a six month restoration time starting from the zero date of 15.12.2019 was granted to DMTCL to restore the 400 kV D/C Barh-Motihari-Gorakhpur Lines by re-erecting 6 towers on pile foundations following the washing away of

four towers on account of heavy water discharge and change in course of Gandak river last monsoon season.

DMTCL vide its letter dated 21st May 2020 informed that due to the severe impact of COVID 19 Pandemic as well as other Force Majeure events such as unseasonal heavy rains which ultimately affected the pace of DMTCL transmission line restoration work progress and requested for a suitable extension in terms of timelines for completion of restoration work.

To appraise DMTCL challenges, issues, work progress and current position related to restoration work, a consolidated presentation was submitted.

In 168th OCC meeting, DMTCL informed that due to the severe impact of COVID 19 Pandemic as well as other Force Majeure events such as unseasonal heavy rains, the progress of DMTCL transmission line restoration work got affected. DMTCL shared a detailed presentation on the work progress.

DMTCL further added that if weather conditions would be favorable then the work would have been completed by 15th July 2020.

Thereafter OCC advised DMTCL to complete the restoration work at the earliest and advised DMTCL to share the details of work progress on weekly basis to ERPC.

DMTCL may update.

Deliberation in the meeting

DMTCL informed that because of bad weather conditions and high-water level in Gandak river they are getting less working hours to carry out the tower erection works. Therefore, the restoration works of 400 kV Barh-Motihari D/C and 400 kV Barh-Gorakhpur D/C lines are getting delayed. DMTCL added that ERS of 400kV Barh-Motihari S/C line which had been used to restore the line on temporary basis was also washed out because of the heavy water flow. They are working hard to restore 400kV Barh-Motihari S/C line on permanent towers and the line would be restored within two days provided the water level recedes and they get the opportunity to work.

OCC advised DMTCL to complete the restoration work at the earliest.

Thereafter, DMTCL informed that the 400kV Darbhanga (DMTCL) S/s may get flooded as the water level in river Ganges has reached the highest level of last 30 years.

ERLDC opined that a bypass arrangement should be planned at 400kV Darbhanga (DMTCL) S/s so that the 400kV Kishanganj-Darbhanga-Muzaffarpur link could be kept in service in case of flooding of the substation.

OCC advised DMTCL to interact with the respective transmission utilities for possibilities of making bypass arrangement at 400kV Darbhanga (DMTCL) S/s and submit the details to ERPC and ERLDC.

Further, OCC decided that a separate meeting with the concerned utilities may be convened to discuss the issue of bypass arrangement at 400kV Darbhanga (DMTCL) S/s in after receiving the preliminary details from DMTCL.

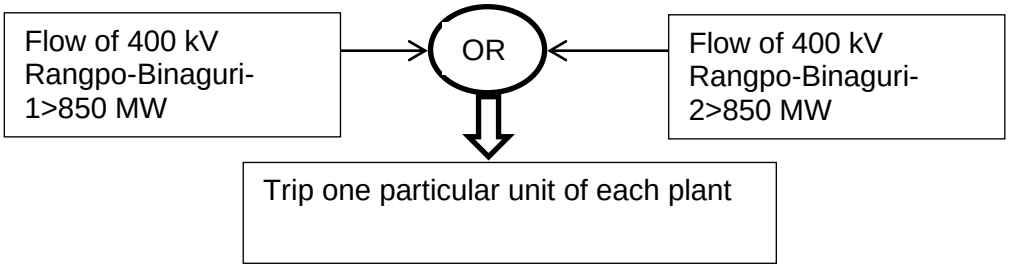
Item No. B.5 SPS for taking care of N-2 Contingency of 400 kV outgoing lines form Sikkim Complex--ERLDC

As per the decision taken in 161st OCC meeting no SPS is required when all the four 400 kV evacuating lines are in service. However, based on the study following proposal are made for the consideration of the forum:

1. When all 4 lines are in service only N-1 contingency of 400 kV Rangpo-Dikchu is critical due to cable portion of Teesta III- Kishenganj section. That part is taken care of by Teesta III local SPS.
2. When all 4 lines in service, following N-2 contingencies are critical
   a. 400 kV Rangpo-Kishanganj & 400 kV Teesta-III-Kishenganj
   b. 400 kV Rangpo-Kishanganj& 400 kV Rangpo-Binaguri one ckt
   c. 400 kVTeesta-III-Kishanganj& 400 kV Rangpo-Binaguri one ckt

From the past experience and due to sharing some common corridor N-2 contingency of 400 kV Rangpo-Kishanganj & 400 kV Teesta-III-Kishanganj is a credible contingency. Following SPS logic may be implemented for ensuring reliability during the above mentioned three critical N-2 contingency:

SPS:



In 168th OCC meeting ERLDC informed that the SPS is required till completion of reconductoring work of 400kV Rangpo-Binaguri D/C lines for safe evacuation of hydro generation in Sikkim during any contingency.

Powergrid informed that they would communicate the proposal to their corporate office for their views.

Powergrid may update.

Deliberation in the meeting

Powergrid informed that the SPS scheme has been shared with their corporate office and also submitted the reply to the queries raised by their corporate office. Powergrid added that they would submit the feasibility report along with the hardware details to ERPC and ERLDC within a week.

OCC decided to discuss the issue along with the protection coordination issues in Sikkim in a separate meeting with the concerned utilities.

Item No. B.6 Requirement of AMR data for preparation of Power Supply Position Report (PSP)--ERLDC

PSP report is prepared by night shift executive every day during night hour containing daily actual operational data of Generators, drawl/injection of utilities, and Interrogational/transactional exchange with connecting regions/nations. This report is shared with MOP and also referred by other organizations for operational data. Presently, any actual data for the report is either collected from the utilities over the phone or filled by RTAMC/ utilities night shift executives in reporting software. But these data are often received late or sometimes erroneous data are received.

Therefore, for more reliable and correct actual data, the SEM data through AMR may be used for PSP preparation. So, the availability of SEM data through AMR may be used for PSP preparation. The availability of SEM data through AMR for the previous day needs to be available by 01:00 hrs of the day.

Powergrid may please deliberate.

Deliberation in the meeting

Powergrid informed that RTAMC is already providing the requisite data to ERLDC however they are interacting with the OEM for feasibility of PSP preparation using AMR and the cost implication.

ERLDC explained that at present they are collecting the data over phone and preparing the report manually. The data entry errors could be avoided, if the AMR data is integrated for PSP report preparation.

State constituents informed that they are in severe crisis and facing huge shortage of revenue because of ongoing pandemic situation. They requested to postpone such proposals which are having cost implication on states and non-emergency nature.

OCC decided to postpone the above proposal for time being and advised Powergrid to ensure the relevant data availability to ERLDC from RTAMC.

Item No. B.7 Shutdown of 400kV Nabinagar-Sasaram D/C line and 400kV Sasaram-Daltonganj D/C line -- Powergrid

In 168th OCC meeting BRBCL explained that they are not in a position to avail the unit overhauling from 20.6.2020 due to non-availability of BHEL engineers because of the prevailing circumstances of COVID-19.

Powergrid informed that they urgently need the shutdown of 400kV Nabinagar-Sasaram line to rectify the bent tower, which is already in a precarious condition, otherwise the tower might collapse at any time during this monsoon.

Powergrid further added that they have already mobilized the gang to begin the rectification work. Moreover, during the monsoon season it is very difficult to maintain the ERS which has been erected since March 2020 to evacuate Nabinagar generation with an interim arrangement using 400 kV Sasaram - Daltonganj line.

Powergrid intimated that 500 MW power can be evacuated through the interim arrangement during the shutdown of 400kV Sasaram-Nabinagar lines and further committed that they would put all the efforts to complete the tower rectification work by 30.06.2020.

OCC observed that power requisition by the beneficiaries was within 500 MW during first two weeks of June 2020 which can be evacuated through the interim arrangement.

OCC felt that in case of tower collapse there would not be any evacuation path for Nabinagar generation. In that eventuality, BRBCL would be entitled to recover full fixed cost from its beneficiaries by declaring full DC under force majeure condition. This may result in huge financial implication on the beneficiaries of BRBCL.

After detailed deliberation, OCC decided to allow the shutdown from 20.06.2020. OCC advised

BRBCL to approach its beneficiaries and get the consent so that BRBCL generation would be within 500 MW during the shutdown period. OCC then advised Powergrid to complete the tower rectification work by 30.06.2020.

Thereafter, Powergrid vide mail dated 1st July 2020 informed that due to severe rain, thunderstorm and lightning, the interim arrangement was tripped on 29th June, 1st July 2020 due to no provision of earth wire in the ERS section. It was suspected that galloping of conductors might have caused the said tripping. Thereafter which guy wire arrangement for holding the conductor has been provided by Powergrid.

Powergrid vide mail dated 7th July 2020 informed that, ERLDC accorded the shutdown of 400 kV Sasaram-Nabinagar Ckt-2 for 10 days w.e.f 23.06.2020 to 02.07.2020 vide their message no.: ERLDC/Ft-02 dtd. 19.06.2020 for the said rectification work. This was apart from the three (03) day shutdown of 400 kV Nabinagar- Sasaram Ckt-1, which was approved from 20.06.2020 to 23.06.2020 for the interconnection of 400 kV Nabinagar- Sasaram Ckt-1 & Daltonganj- Sasaram Ckt-1 through 04 nos. ERS towers for making special alternative arrangement for power evacuation. Subsequently, POWERGRID has completed the said arrangement on 24.06.2020 (13:36).

The shutdown of 400 kV Sasaram-Nabinagar Ckt-2 approved from 23.06.2020 was allowed w.e.f. 27.06.2020 (22:09 hrs) which was returned on 05.07.2020 (16:38 hrs, 8 days).

BRBCL vide letter dated 22nd July 2020 informed that all the running units of BRBCL tripped on 29th June 1st July and 7th July 2020 because of tripping of interim arrangement provided during the shutdown period. BRBCL requested for declaration of deemed DC of the units. The letter is enclosed at **Annexure-B.7**.

BRBCL, Railway, BSPTCL and Powergrid may discuss.

Deliberation in the meeting

BRBCL requested for declaration of deemed DC for the revival time of the units which are under RSD and outage DC revision time up to 8th Block for the units which were tripped due to tripping of the available evacuation path. Details are given in the Annexure.

OCC pointed that the units were tripped due to non-availability of second evacuation path as the BRBCL generation is being evacuated through 400 kV Sasaram-Nabinagar D/C lines only. This situation may arise at any point of time therefore BRBCL should explore to expedite the construction of alternate evacuation path.

It was informed that the issue of constructing alternate evacuation path was discussed in 41st TCC and ERPC Meetings held on 26th & 27th August 2019 wherein NTPC had agreed to expedite the construction of 400kV NPGC-BRBCL Nabinagar line and also agreed to submit the proposal of LILO of 400kV Daltonganj-Sasaram line at BRBCL to CEA & CTU for discussion in Standing Committee Meeting.

BRBCL informed that BHEL has awarded for the construction work of 400kV NPGC-BRBCL Nabinagar line to new contractor and they are expecting that the construction of the line would be completed at the earliest.

After detailed deliberation, OCC advised BRBCL to take consent from beneficiaries of BRBCL Nabinagar station i.e. Railway and Bihar for the deemed DC mentioned in the annexure and the DC would be revised accordingly.

OCC also advised BRBCL to expedite the construction of alternate evacuation path as per the decisions taken in 41st TCC & ERPC Meetings so that such issues do not arise in near future.

Item No. B.8 Updated Operating procedure of Eastern Region, 2020. --ERLDC

The Operating Procedure of every region has to be updated and revised annually by the concerned RLDC, in compliance to section 5.1(f) of the IEGC. Accordingly, ERLDC vide email dated 14th July 2020 circulated the draft Operating Procedure of Eastern Region to all regional entities of Eastern Region for their valuable suggestions and observations. The procedure is finalized and uploaded at ERLDC website by 20-07-2020, taking into consideration comments received till 18-07-20.

Members may please note.

Deliberation in the meeting

ERLDC informed that the updated operating procedure of ER has been uploaded in the ERLDC website however still there is scope for reviewing of the procedure.

Powergrid informed that they had received some comments from their corporate office which would be communicated to ERLDC.

After detailed deliberation, OCC advised all the constituents to go through the operating procedure and submit their comments, if any to ERLDC within a week.

Item No. B.9 Finalization of procedure for PSS tuning of power plants -- ERLDC

Power System Stabilizer (PSS) tuning is an ongoing exercise in Eastern regional grid after observation of various low frequency oscillation from time to time in the grid. In line with this, OCC has decided that all generating plants in eastern region will submit their PSS tuning plan to ERLDC/ERPC and the test reports for validation.

Considering above and other technical and regulatory requirement of CEA and CERC PSS tuning is being done at different generating station, however at present no formal guideline is available for carrying out the same. Due to which it was observed that result shared by the generating units are not standardized and sometimes some tests are missed out.

To take care of the same a draft procedure for PSS tuning is prepared and the same is given in **Annexure B.9**. All are requested to go through it and give comment so that it can be finalized in OCC meeting.

Members may discuss

Deliberation in the meeting

*OCC advised all the generators to go through the draft procedure enclosed at **Annexure-B9** and submit their comments to ERLDC within 15 days.*

OCC advised ERLDC place this procedure in the separate meeting on RGMO wherein most of the generators present in the meeting.

Item No. B.10 Additional Agenda

1. Scheduling of ISGS units to meet the technical minimum requirement – SLDC, Odisha

It is observed that in-spite of zero requisition submission for certain ISGS stations like Farakka-I, II & III and Kahalgaon-I & II though out of 96 blocks of a day, as a normal practice ERLDC is scheduling certain quantum of power from those generating stations in some blocks of the day to meet technical minimum requirement of unit.
Sometimes, this forcefully scheduled power is creating under drawl situations at high frequency

conditions when system demand is low. Further, to do away with this power, GRIDCO is forced to sell this power at a lower cost than the variable cost of the scheduled power, thereby creating a financial burden and audit issue. Therefore, ERLDC may please be advised to review the practice of scheduling of power from ISGS stations during zero requisition period. Further, it is requested that in case of zero requisition by any constituent, the power share of that constituent may be scheduled among the other beneficiaries who are availing power during other part of the day.

Deliberation in the meeting

SLDC, Odisha requested ERLDC to explore the requirement of power to other beneficiaries of the respective stations during zero requisition period to avoid injection of power during low demand conditions in Odisha.

ERLDC informed that the schedule is being enforced to ensure the technical minimum of the unit. The other beneficiaries of the station are also being consulted while giving such schedule. Because of huge variation in demand pattern it is difficult to avoid such conditions.

OCC advised SLDC, Odisha to plan their own resources such as hydro generation to manage such conditions and coordinate with ERLDC, if necessary.

PART C: ITEMS FOR UPDATE

Item No. C.1: ER Grid performance during June 2020

The average and maximum consumption of Eastern Region and Max/Min Demand (MW), Energy Export for the month of June – 2020 were as follows:

Month	Average Consumption (mu)	Maximum Consumption(mu)/ Date	Maximum Demand (MW) Date/Time	Minimum Demand (MW) Date/Time	Schedule Export (Mu)	Actual Export (Mu)
June, 2020	422	401.5; 10/06/20	21931 MW on 24-06-2020	13998 MW on 01-06-2020	3213	3087

ERLDC will present Highlight/ Performance of Eastern Regional Grid during OCC meeting.

ERLDC may present the performance of Eastern Regional Grid.

Deliberation in the meeting

ERLDC presented the ER grid performance during June 2020 and shown the variation in demand pattern during last few months. The presentation is enclosed at ***Annexure-C1****.*

Members noted.

Item No. C.2: Performance primary frequency response of generating stations in Eastern Region for the event in the month of June 2020.

Frequency response characteristics (FRC) has been analyzed pan India for one event of sudden frequency change occurred during the month of June 2020. The details of that event and the overall response of Eastern region have been summarized in the Table given below.

Table 1: Summary of the events and Frequency Response Characteristic (FRC) of Eastern Region for the events

Event	Frequency Change	ER FRC
Event: On 11th June 2020, at 11:59:28:840hrs, 2100 MW generation loss at Bhadla NR.	**50.06 Hz to 49.80 Hz**. Later stabilized at **49.93 Hz**	**9.5%**

Despite of repeated reminders to generating stations, **generation end data (generation output in MW and frequency/speed measured at generator end) are yet to be received from NTPC Kahalgaon and Barh. FRC of state control area is yet to be received from SLDC Jharkhand, Bihar and WB**. Based on data received from generating stations & SLDCs and SCADA data archived at ERLDC, performance of regional generating stations and state control areas has been analyzed and summarized in table 2. Based on data received from generating stations & SLDCs, performance of state generating stations has been analyzed and summarized in table 3.

During the event of May 2020, satisfactory response has been observed in case of unit 1 & 2 at Budge Budge, Balimela unit 3 and Teesta V units. During this event response was non-satisfactory for all units at these units. Unit 1 & 3 at Budge Budge were running at more than Installed capacity prior to the event.

Table 2: performance of regional generating stations and state control areas for the events in the month of June 2020

Category	Name of generating stations and state control area
Satisfactory response	MPL, Dikchu, GMR, Talcher unit 2, BRBCL unit 3, Adhunik unit 1
Response has been observed but tuning required	--
Non-Satisfactory response	Teesta V, Talcher unit 1, 3, 4, 5&6, KhSTPP Stage 1 & 2, FSTPP unit 4, 5 & 6, JITPL, BRBCL unit 1, GRIDCO SLDC, Bihar SLDC, DVC SLDC, Jharkhand SLDC, WB SLDC
Unit not available	Adhunik unit 2, NTPC Darlipalli, KhSTPP unit 5 and 6
No Margin for primary response	Teesta III (All the running units were at 10% overloading of IC)
Oscillatory response observed	NPGC
Data were not available (data not received from SLDC/regional generating station)	NTPC Kahalgaon, NTPC Barh, Bihar SLDC, Jharkhand SLDC, WB SLDC.

Table 3: performance of state generating stations for the events in the month of June 2020 (Based on data received from SLDC/generating stations)

Category	Name of generating stations and state control area
Satisfactory response	Balimela unit 5 & 6, Mejia B unit 7 & 8, Koderma unit 1 & 2 and DSTPS unit 1 & 2,

Category	Name of generating stations and state control area
Response has been observed but tuning required	HEL unit 1 & 2,
Non-Satisfactory response	Balimela unit 3, 7 & 8, Rengali, Indravati, U Kolab, IBTPS, Budge Budge unit 1, 2 & 3, RTPS unit 1 & 2, Bokaro A unit 1, Sagardighi unit 3 & 4

In case of **Adhunik unit 1 and Talcher unit 2**, performance of generating units may be tuned to **reduce the time for providing of full response of generating units**. In case of **BRBCL unit 3, Mejia B unit 7 & 8, Koderma unit 1 & 2 and DSTPS unit 1 & 2**, generation reduction has been observed after the initial response. Within 30 seconds, another sustained and satisfactory response has been observed. Performance may be tuned for these generating stations, **for reducing generation decrease after the initial response**. Detail observation from ERLDC side is attached in annexure. Reason for non-satisfactory response has only received from Teesta V and shown in table 4.

Table 4: Reason for generating stations for non-satisfactory response of generating units (as shared by generating stations)

Name	Reason
Teesta V	All machines were running at maximum Load. Due to deposition of trash at intake of Dam, machine did not respond adequately

Points to be discussed:

1. **NTPC Talcher, KhSTPP, FSTPP, JITPL, BRBCL, GRIDCO SLDC, Bihar SLDC, DVC SLDC, Jharkhand SLDC, WB SLDC may share for the reason of non-satisfactory performance at the boundary of their control areas.**
2. **NPGC may share the reason for oscillatory response.**
3. **NTPC Kahalgaon and Barh may share the reason for non-sharing of generator end data**
4. **Bihar, Jharkhand and WB SLDC may share the reason for non-sharing FRC of their control areas.**

Deliberation in the meeting

*ERLDC gave a presentation on the performance of the generators during 11th June 2020 event. Presentation is enclosed at **Annexure-C2.1**.*

OCC advised all the generators and SLDCs to submit the relevant information to ERLDC within a week.

*It was informed that a separate meeting on RGMO had been conducted with regional level ISGS and IPPs on 23rd July 2020. Minutes of the meeting is enclosed at **Annexure-C2.2**.*

Item No. C.3: Status of UFRs healthiness installed in Eastern Region

In 161st OCC, Bihar was advised to review the UFR feeders as per the revised system configuration and suggested to shift the UFRs to unimportant radial loads.

168th OCC meeting BSPTCL informed that they are in process of reviewing the UFR feeders.

OCC advised concerned utilities to submit UFRs healthiness certificate to ERPC.

Concerned Utilities may update.

Deliberation in the meeting

It was informed that UFR healthiness certificate has been received from DVC. OCC advised all the other constituents to submit the healthiness certificate to ERPC.

Item No. C.4: Status of Islanding Schemes healthiness installed in Eastern Region

At present, the following islanding schemes are in service:

1. CESC as a whole Islanding Scheme,CESC
2. BkTPS Islanding Scheme,WBPDCL
3. Tata Power Islanding Scheme,Haldia
4. Chandrapura TPS Islanding Scheme,DVC
5. Farakka Islanding Scheme,NTPC
6. Bandel Islanding Scheme,WBPDCL

In 108th OCC meeting, respective constituents agreed to certify that the islanding schemes under their control area are in service on monthly basis.

In 163rd OCC, DVC informed that since all units of CTPS-A would be retired shortly, instead of Chandrapura TPS islanding scheme, they are planning to implement an islanding scheme with units 5 & 6 of Mejia TPS (old).

OCC advised DVC to submit the detailed draft plan of the islanding scheme to ERPC and ERLDC.

In 167th OCC, DVC informed that units 5 & 6 of Mejia TPS were old and not in service. They are planning to implement the islanding scheme with unit 7 and unit 8 of Mejia TPS.

OCC advised DVC to share the plan of their new islanding scheme to ERPC. OCC also advised CESC to send the updated details of their islanding scheme to ERPC.

In 168th OCC meeting DVC informed that during the preliminary study they identified that the implementation of islanding scheme with Mejia units 7 and 8 was not possible therefore now they had considered Chandrapura unit 7&8 for the implementation of islanding scheme.

Thereafter ERLDC advised DVC to submit at least a preliminary draft plan to ERPC and ERLDC. However, such plan is yet to be received from DVC.

DVC may update.

Deliberation in the meeting

It was informed that healthiness certificate has been received from WBPDCL and Tata Power, Haldia. NTPC confirmed that Farakka islanding scheme is in service.

OCC advised DVC to send the draft plan of the islanding scheme to ERLDC.

A. Status of Islanding Scheme of IBTPS

Islanding scheme of IBTPS was discussed and finalized in earlier OCC and PCC meeting, OPGC ensured that the islanding scheme will be in place within 6 months post finalization of scheme.

In 167th OCC, OCC advised OPGC to share the status of islanding scheme to ERPC.

OPGC may share the status of islanding scheme.

Deliberation in the meeting

OPGC representative was not available in the meeting.

B. Status of Islanding Scheme of KBUNL

As the islanding Scheme discussion is not progressing, it is desired that one Meeting at ERPC or KBUNL may be called where the scheme finalization may be completed.

In 167th OCC, KBUNL informed that they are ready to implement the islanding scheme, but they need confirmation from Bihar on availability of radial load at Gopalganj.

OCC advised BSPTCL to go through the islanding scheme finalized in earlier OCC Meetings and advised to take necessary action to provide the radial load for the islanding scheme.

In the 168th OCC meeting after detailed deliberation, OCC decided to conduct a separate meeting with KBUNL and BSPTCL to discuss the islanding scheme of KBUNL within this week.

In line with decision taken in 168th OCC, a meeting was held through WebEx on 22-June-2020 for discussing and finalizing islanding scheme of KBUNL St-II. Meeting was attended by participants from BSPTCL, Bihar SLDC, KBUNL (NTPC) and ERLDC. Minutes of Meeting is attached in ***Annexure C.4****.*

Members may update.

Deliberation in the meeting

ERLDC informed that as per the decision taken in the separate meeting, Bihar and KBUNL have to submit some details to ERLDC for finalization of the scheme.

ERLDC added that they have received some details from SLDC Bihar but few details are yet to be received. Further ERLDC mentioned that no details have been received from KBUNL.

OCC advised Bihar and KBUNL to submit all the relevant details to ERLDC at the earliest.

Item No. C.5: Transfer capability determination by the states

Latest status of State ATC/TTC declared by states for the month of July-2020

Sl. No	State/Utility	TTC (MW)		RM(MW)		ATC Import (MW)		Remark
		Import	Export	Import	Export	Import	Export	
1	BSPTCL	6450	--	129	--	6321	--	Sep-20
2	JUSNL	1245	--	34	--	1231	--	Aug-20
3	DVC	1628	2742	66	52	1562	2690	Jun-20
4	OPTCL	2112	1071	83	60	2029	1011	Aug-20
5	WBSETCL	4625	--	400	--	4153	--	Jun-20
6	Sikkim	295	--	2.5	--	292.5	--	Dec-19

Sikkim has stopped sending the TTC values as well as PSSE files.

In 168th OCC meeting ERLDC informed that Sikkim, West Bengal and DVC are not sharing the details of ATC, TTC for few months.

DVC told that due to lockdown the studies were not conducted for upcoming months and agreed to share the details at the earliest.

OCC then advised all the concerned utilities to share the details to ERPC and ERLDC at the earliest.

All concerned Utilities may share the details of ATC, TTC.

Deliberation in the meeting

OCC advised all the SLDCs to compute the ATC and TTC figures and submit to ERLDC in time.

Item No. C.6: Mock Black start exercises in Eastern Region – ERLDC

Mock black start date for financial year 2019-20 is as follows:

Sl. No	Name of Hydro Station	Schedule	Tentative Date	Schedule	Tentative Date
		Test-I		Test-II	
1	U.Kolab	Last week of May, 2019	Done on 19th July 2019	Last Week of January 2020	28 March 2020
2	Maithon	1st week of June 2019	Taken up only after replacing the governing systems of the units	1st Week of February 2020	After June 2020
3	Rengali	2nd week of June 2019	Done on 27th June 2019	Last week of November 2020	Done on 17th January 2020
4	U. Indarvati	3rd week of June 2019	Done on 7th November 2019	2nd week of February 2020	March 2020
5	Subarnarekha	1st week of October 2019	Done 20th August 2019	1st week of January 2020	After Aug 2020
6	Balimela	3rd week of October 2019	Done on 17th July 2019	1st week of March 2020	*Done on 12th Feb 2020*
7	Teesta-V	2nd week of May 2019	Done on 28th Nov 2019	Last week of February 2020	
8	Chuzachen	Last Week of Dec 2019	Done on 5th December 2019	Last week of March 2020	
9	Burla	Last Week of June 2019	Done on 20th July 2019	Last week of February 2020	Done on 11th Feb 2020
10	TLDP-III	1st Week of June 2019	November-19	2nd Week of January 2020	
11	TLDP-IV	Last Week of June 2019	December-19	1st Week of February 2020	
12	Teesta-III	Last Week of Oct 2019		First Week of March 2020	
13	Jorthang	First Week of May 2019		First Week of Feb 2020	

14	Tasheding	2nd Week of May 2019		2nd Week of Feb 2020	
15	Dikchu	Sep 2019		3rd Week of Feb 2020	Attempted on 19th Feb 2020 but not Successful

Further Balimela Power House has informed that the district administration have declared large area of Balimela as containment zone in view of the spread of Covid-19 till 19.07.2020 due to which there is severe shortage of manpower at Balimela P.H. and had requested for deferring the mock black start exercise of Balimela Power House which was scheduled on 15.07.20 and decided to defer the mock black start exercise to a next suitable date after 19.07.2020 which will be communicated in advance.

In the 168th OCC meeting Odisha informed that they are planning to conduct the black start exercise for Burla and Rengali HEP during June 2020.

Odisha and other members may update.

Deliberation in the meeting

Odisha informed that they are planning to conduct the mock black start exercise for Burla and Rengali in Sept 2020. They further informed that because of COVID-19 situations they were unable to carry out the black start exercise for Balimela HEP as per schedule in July 20 and they will conduct the same by Sep 2020.

Item No. C.7: Phase Sequence issue at Lower voltage level observed in Bihar System during charging of 400 kV Barh-Motihari 2. --ERLDC

In 168th OCC meeting BSPTCL informed that the phase sequence of RYB at Barh end was synchronized with the phase sequence of RBY of Motihari end. This problem had been identified and would be resolved by 25th June 2020.

BSPTCL may update.

Deliberation in the meeting

It was informed that the issue would be resolved after the availability of 400kV Barh-Motihari line.

OCC advised BSPTCL to resolve the issue at the earliest.

Item No. C.8: Single Bus Operation at 220 kV Chandil--ERLDC

220/132 kV Chandil is an important substation of Jharkhand, having three 220 kV lines outgoing lines connecting Ramchanderpur, Ranchi (PG), and Santhaldih (WBPDCL), it also has 3 x 150 MVA and 1 x 100 MVA, 220/132 kV ATRs, with a peak load of around 200-250 MW.

However, even after being such an important substation, Chandil has only a Single Bus scheme at 220 kV level, which is significantly reducing the reliability of the substation. Previously a committee was also formed to explore the possibility of upgrading the substation to a double bus scheme, however, after going for sight visit committee was of the view that upgrading to double bus is not possible without acquiring additional space, thus committee recommended to go with bus sectionalizer.

In the 168th OCC meeting JUSNL explained that estimate of Bus sectionalizer had been made but the same is yet to be approved.

JUSNL may update the timeline for the same.

Deliberation in the meeting

Jharkhand informed that the approval for the proposal is still awaited.

Item No. C.9: Multiple outage of Isolators & Circuit Breakers at Ramchanderpur S/S (JUSNL)--ERLDC

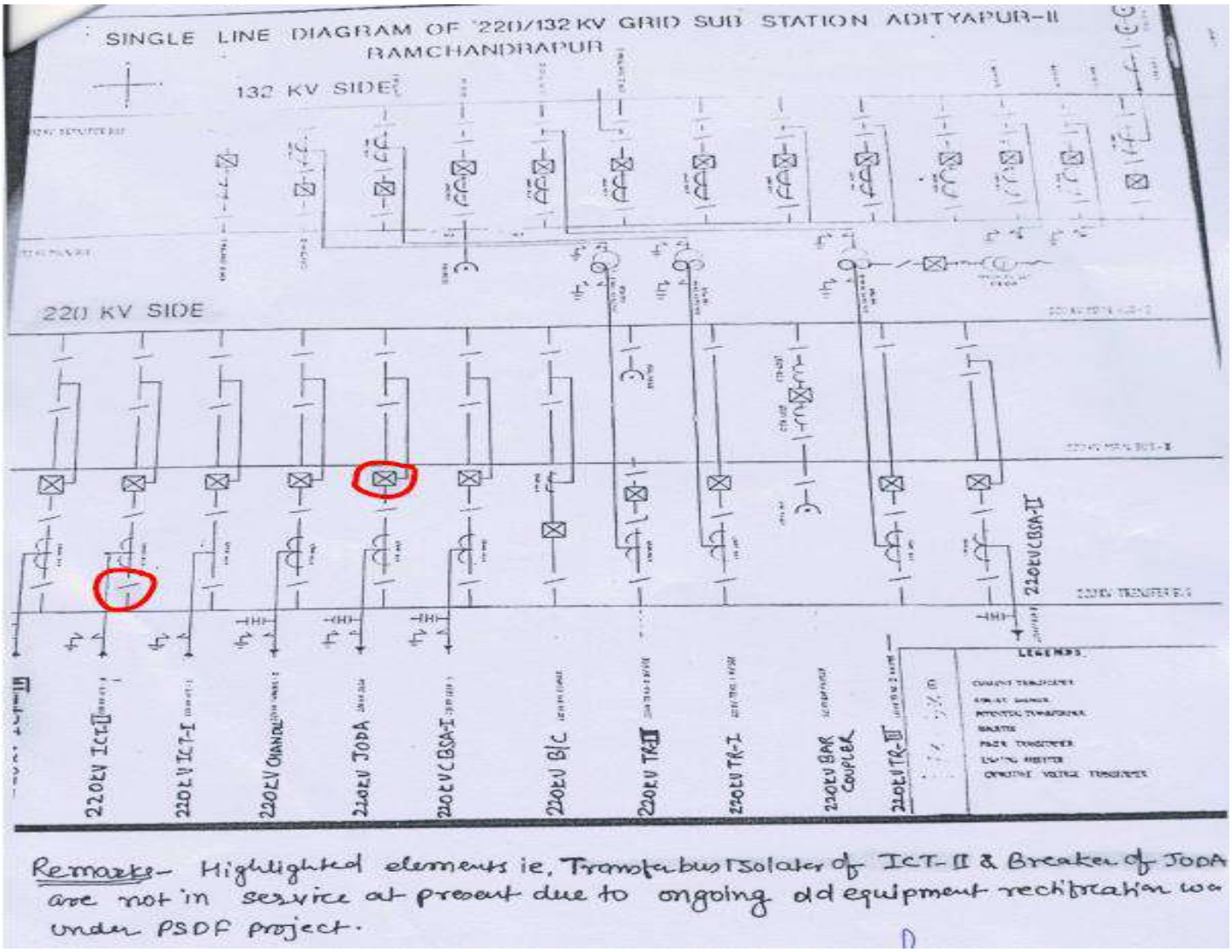
ERLDC had issued shutdown to indenting agency PGCIL of 400KV/220KV 315 MVA ICT-2 at JAMSHEDPUR for 29/Jun/2020 from 09:00-17:00 Hrs vide approval number: APP NO : RQ3258 to facilitate replacement of porcelain insulator string with Polymer insulator string at Jamshedpur S/S switchyard due to high pollution. After returning shutdown closing code was issued ER/06/C/01349 at 29/06/2020 16:30 Hrs. However, It could be charged from 400 KV side only as 220 KV side (Ramchanderpur) ICT-2 could not be charged due to problem in Bph CB pole of this ICT-2 at Ramchanderpur (Entire 220kV switchyard at Ramchanderpur is owned & maintained by JUSNL).

Being a double main transfer bus scheme at Ramchanderpur ICT still could not be taken into service via transfer bus coupler as Isolator associated with ICT-2 connecting to transfer bus was not resent. While issuing consent for the above shutdown vide mail dated Fri, Jun 26, 1:33 PM JUSNL didn't mention the non-availability transfer bus coupler Isolator associated with ICT-2. Being an important load center and connecting point to other regions such non-availability of key elements are unwarranted. It has also come into notice that several isolators and breaker remains either out of service or non-existent at Ramchanderpur S/S. Being an ISTS connected station availability of all elements are necessary for secure and reliable system operation.

Following are list of List of Isolators & Circuit Breakers that remains out of service & nonexistent –

Breaker/Isolator Number	Associated Element Name	Status(In Service/Out of Service/Non-existent)	Reason for not being in service & Duration of outage
Breaker	220 kV Joda Breaker	Out of service	Due to ongoing Old equipment replacement work under PSDF project. Expected to be functional within 10-15 days depending upon availability of S/D.
isolator	220kV Tr. Bus isolator of ICT-2	Out of service	Due to ongoing Old equipment replacement work under PSDF project. Expected to be functional within 10-15 days depending upon availability of S/D.
isolator	220kV Main Bus-2 isolator of Tr no-1	Non- existent	Not Present since inception of this GSS.
isolator	220kV Main Bus-1 isolator of Tr no-2	Non- existent	Not Present since inception of this GSS.
isolator	220kV Main Bus-2 isolator of Tr no-3	Non- existent	Not Present since inception of this GSS.

THE SLD OF 220 KV RAMACHANDERPUR S/S (JUSNL)



JUSNL may update the status of the restoration of above elements.

Deliberation in the meeting

Jharkhand informed that replacement of isolator and circuit breakers is in progress under PSDF project. They have applied for shutdown from 1st Aug for normalizing all the Breakers and Isolators.

ERLDC informed that they are not getting any information on healthiness of the elements as a result they are facing problem in real time operation.

OCC advised SLDC, Jharkhand and other utilities to ensure availability of all elements in ISTS connected stations for secure and reliable system operation and inform about any outage of the elements in their substation to ERLDC at the earliest. .

Item No. C.10: Persisting issue of CVT error at APNRL causing monitoring issue--ERLDC

The CVT error at APNRL 400 kV Level is resulting in the wrong SCADA update of APNRL voltage. The voltage due to CVT error is reported on the higher side by 8-10 kV causing the monitoring and decision-making ability of Real-Time operator at ERLDC control room. This issue was highlighted earlier also during voltage issue at APNRL in OCC and APNRL informed that it will be rectified. However, the issue is persisting.

APNRL is advised to correct the issue as early as possible.

Deliberation in the meeting

APNRL representative was not present in the meeting.

It was informed that the issue would be taken up with APNRL for necessary action.

Item No. C.11: Delay in charging of 400KV FSTPP – Baharampur after tripping: ERLDC

400 KV Baharampur-FSTPP D/c tripped at 17:04 Hrs on 19th July - 2020. After tripping, Ckt I remain charged from FSTPP end and Ckt II remain charged from Baharampur end. Charging code was issued from ERLDC at 17:15 Hrs for restoration, however line was charged at 18:03 Hrs (Ckt II) and 18:04 Hrs (Ckt I).

NTPC, FSTPP may please deliberate delay in charging of such important transmission link.

Deliberation in the meeting

OCC advised NTPC and Powergrid to coordinate with the far end sub-station to avoid unwanted delay in charging of such important link.

Item No. C.12: Prolonged outage of bays in Koderma (DVC) substation: ERLDC

The main CB of 400 KV Koderma-Bokaro-2 at Koderma was out since 25.12.2019 due to damage in the double interrupter chamber and the line is charged through the tie CB with B/R-2. On 15.07.2020, due to leakage of oil pressure of the main CB of B/R-2, DVC requested emergency S/D of the line due to the unavailability of main CB. Tie CB of B/R-1 and Gaya-1 was also out since 22.10.2019 due to oil leakage from B-ph CT and problem in CB hydraulic mechanism. Such prolonged outages of breakers at such an important substation which has connectivity to ISTS system as well as generating station hamper the reliability and security of the system operation.

DVC may update the status of restoration of above-mentioned bays.

Deliberation in the meeting

DVC mentioned that bays of the Gaya line are made available. Work has already been started for restoring the Koderma line bays and the same would be available by 2nd Aug 20.

Item No. C.13: PSS tuning status in Eastern Region. --ERLDC

Details of units where PSS have not been tuned in last three years are given in **Annexure C.13**.It has been observed that utility such as OPGC, OHPC, WBSEDCL, NTPC, GMR and few others have yet not submitted their plan for PSS tuning to ERLDC/ERPC.

A report on analysis of PSS tuning done so far will be circulated separately.

Members may discuss.

Deliberation in the meeting

OCC advised all the concerned generators to submit the plan for PSS tuning to ERLDC and ERPC.

OCC advised ERLDC to discuss the issue along with RGMO in the separate meeting of RGMO.

Item No. C.14: Operationalizing Bus splitting at Biharsariff--ERLDC

Bus split arrangement at Biharsariff was already commissioned, however it was not put in service as split bus arrangement was causing uneven loading in 400/220 kV ICTs at Biharsariff. Thus, earlier it was decided that the same will be put in service after commissioning of 4th ICT at Biharsariff. After commissioning of 4th ICT simulation studies are carried out at ERLDC and same is also shared with Bihar SLDC. From the study it is observed that Bus-split at Biharshariff has no significant effect on loading of 400 KV lines but 400/220 KV ICT flows is getting significantly skewed.

- N-1 contingency of 500 MVA ICT-IV leads to 265 MW loading on ICT –II (315 MVA rating) where in base case without bus-split, total ICT loading at Biharshariff was 560 MW and Bihar demand 4650MW.
- If we consider summer peak case having 6000 MW Bihar demand with 660 MW Biharshariff ICTs loading, N-1 contingency of 500 MVA ICT-IV leads to 301 MW loading on ICT –II (315 MVA rating).

In 166th OCC, ERLDC informed that no network constraint had been observed during the simulation study.

OCC advised Bihar to check the demand considered for the simulation study and send their comments to ERLDC within a week, if any.

In 167th OCC, OCC advised Bihar to send the updated demand details to be considered for the simulation study to ERLDC.

BSPTCL via their letter dated 12th March 2020, informed that in simulation Bihar load is considered as 5300 MW they have already met 5891 MW in last summer. Further they pointed considering the stability in power supply in view of upcoming election period in Bihar, bus split arrangement shall not be prudent.

In 168th OCC meeting BSPTCL informed that in simulation study Bihar load has been considered as 5300 MW whereas they have already met a load of 6450 MW.BSPTCL informed that they are doing simulation study on this issue where it was found that 315MVA ICT loading is increasing up to 300 MW during the outage of one 500 MVA ICT.

Therein OCC advised Bihar to send the updated demand details to be considered for simulation study to ERPC and ERLDC. OCC further advised Bihar to make short term plan and long term plan

to resolve the issue and submit the details to ERPC and ERLDC.

BSPTCL may share the simulation studies result and short-term plan and long-term plans.

Deliberation in the meeting

ERLDC informed that Bihar had submitted a report wherein Bihar agreed for the implementation of bus-split arrangement. Report is enclosed at ***Annexure-C14****.*

ERLDC added that Bihar has to make load shedding scheme to avoid the tripping of 315 MVA ICT on overload during tripping of 500 MVA ICT.

OCC opined that depending on the power flows after putting the bus splitting scheme in service, the SPS scheme should be decided.

OCC advised Powergrid to make necessary changes in protection settings for implementation of the bus-split arrangement and also to coordinate with remote end sub-stations. OCC advised Powergrid to intimate a suitable date to ERLDC for putting the bus splitting scheme in service at Biharshariff.

Item No. C.15: Testing and Calibration of Special Energy Meter: ERLDC

As per decision of 42nd TCC/ERPC meeting and 41st CCM, the testing and calibration of old and highly time drifted SEMs are to be carried out by Powergrid and accordingly the priority list of 314 SEM's is prepared by ERLDC and shared it in 42nd TCC meeting.

In 168th OCC meeting, Powergrid informed that the matter regarding testing & calibration and time drifting has been taken up with concerned vendors involved in testing and calibration. Powergrid also informed that the Vendors are ready for doing the testing however they are not ready to set time drifting as it is only possible through OEM i.e. L&T. The matter has also been taken up with OEM (M/s L&T), who have confirmed that the heavily time drifted meter shall require to be sent to factory for time correction.

Powergrid informed in 168th OCC meeting that time correction of old meters is not possible. Powergrid further added that testing and calibration of old SEMs would cost around Rs 9000 / unit whereas cost of new SEM would be around Rs 12000/ unit.

In 168th OCC meeting, it was decided that since time correction is not possible it would be better to buy new SEMs instead of going for calibration & testing also advised ERLDC to place the requirement of SEMs in next OCC meeting.

Accordingly, ERLDC proposed to procure 300 energy meters and the details of the same is already shared in 42nd TCC meeting,

Powergrid and ERLDC may update.

Deliberation in the meeting

Powergrid informed that they have already placed the order for 300 energy meters as a repeat order.

ERLDC informed that all the energy meters will be consumed in 2020-21 and there would be a requirement of additional 300 energy meters approximately to replace the old and time drifted SEMs.

Powergrid added that still there is a scope to place the repeat order for 180 SEMs in the existing contract.

Considering the present requirement of SEMs in the Eastern Region, OCC agreed for the procurement of additional 180 meters. Further, in view of current pandemic circumstances OCC advised Powergrid to process for purchase of 180 SEMs under the existing contract and recommended that post facto approval of the same may be taken in the next CCM/ERPC meeting.

Item No. C.16: Proposal for procurement of SEM on account of Bhutan--Powergrid

In 166th OCC, DCD (data downloading device) used to download the energy meter data from SEM energy meter of 400kV Siliguri and 220kV Binaguri feeder has gone faulty because of which Malbase substation is not able to send the meter data to the concerned authority since 06.01.2020.

Powergrid informed that no spare DCDs are available.

After detailed discussion, it was decided that some DCDs are to be procured and kept as spares.

OCC advised Powergrid to prepare an estimate and send the details to ERPC Secretariat.

Thereafter, Powergrid informed that at present there are multiple connectivity exists between Bhutan & India (Jigmeling, Malbase, Tala & Chukha) from Eastern Region. At Bhutan side also, SEM installed as per POWERGRID TS & installed on behalf of PTC. During normal maintenance activity it is observed that due to different snag in the SEM or associated data collecting devices, the SEM data could not be received at ERLDC/NLDC.

The matter already discussed in 166th OCC Meeting held on 20 Feb 2020. In 166th OCC, it was recommended for procurement of few DCD's & SEM on account of different S/S of Bhutan, where SEMs are already installed on behalf of PTC.

The technology up-gradation had already taken place in SEM, therefore, it is better to migrate from old SEM where DCD is still required to new type SEM where data can be fetched by Laptop.

Based upon requirement of the SEM the said items will be handed over to Bhutan by POWERGRID on behalf of PTC. However, Installation & maintenance of all SEM & associated devices installed at Bhutan will be sole responsibility of concerned transmission licensee of Bhutan only. At present GENUS make is SEM is already available with Eastern Region and the same make is considered for Bhutan also and approximate cost of procurement of 20 no's SEMs shall be Rs. 3,19,166/- including GST.

Above SEM will be kept in stock at nearby POWERGRID S/S (Alipurduar/Binaguri) & based upon requirement generated at Bhutan it will be handed over on receipt of request through PTC. Necessary installation & maintenance to be taken care by Bhutan only. Cost to be recovered from PTC on one-time reimbursement basis.

In 167th OCC, Powergrid informed that based on the requirement of the SEMs, the said items will be handed over to Bhutan by Powergrid on behalf of PTC. However, Installation & maintenance of all SEMs & associated devices installed at Bhutan will be sole responsibility of concerned utility of Bhutan only.

OCC advised Powergrid to coordinate with Bhutan for completion of the work.

OCC decided that the entire cost for completion of above work would be recovered from PTC.

In 168th OCC meeting Powegrid informed that order of 300 SEMs has been placed.

Powergrid further added that they would hand over 20 SEMs to Bhutan as soon as they would receive first installment of the order.

Powergrid may update.

Deliberation in the meeting

Powergrid informed that they would hand over 20 SEMs to Bhutan as soon as they would receive first installment of the order.

Item No. C.17: Auxiliary Power consumption by Powergrid-- GRIDCO

GRIDCO informed that in 163rd OCC Meeting, OCC advised Powergrid to file a petition before OERC for exemption of Security Deposit, Maximum charges, Meter rent etc.

GRIDCO added that Powergrid not yet approached OERC.

In 166th OCC, Powergrid informed that they are in process of filing the petition before OERC. The petition would be filed by end of February 2020.

In 167th OCC Powergrid informed that petition would be filed in March 2020.

In 168th OCC meeting Powergrid informed that relevant documents are ready for filling the petition before OERC but due to ongoing lockdown they are not able to do it. They would file the petition after 3rd July 2020 as and when OERC starts accepting the petition.

GRIDCO then requested Powergrid to become a customer of Discoms in the meanwhile and liquidate the outstanding charges. GRIDCO representative ensured that the directions of OERC shall be duly complied with and GRIDCO shall return the recovered charges, if necessary, based on the directions of OERC.

Powergrid informed that they are ready to pay the energy charges as per their energy consumption.

OCC advised Powergrid and GRIDCO to discuss the issues bilaterally and make an interim arrangement until the OERC decision.

Powergrid and GRIDCO may update.

Deliberation in the meeting

Powergrid informed that the petition would be filed on 27th July 2020. Powergrid informed that they

are in process of doing some interim arrangement with GRIDCO.

Item No. C.18: Replacement of defective commercial energy meter (SEM) at NPGCL.

Commercial Special Energy Meter (SEM) of Gaya Line – 1(MAIN ER-1320A) was defective wef 24.06.2020. ERLDC had advised PGCIL to replace the SEM with new one.

Despite of several request from NPGCL as well as ERLDC, PGCIL didn't agree to replace the SEM at NPGCL.

Seeing the importance of energy accounting, NPGCL has collected SEM from PGCIL Gaya s/s &replaced them on its own.

As per clause – 4 of **Connection Agreement** executed between PGCIL and NPGCL on 30.01.2018

and **IEGC regulation_2010, chapter- 6.4 – point no. 21** (Demarcation of responsibilities).

Quote "IEGC Chapt- 6.4 – point no. 21

The CTU shall install special energy meters on all interconnections…….. The installation, Operation and maintenance of special energy meters shall be in accordance with Central Electricity Authority (installation and operation of meters) Regulation 2006. …….

Unquote"

It is requested to clarify the responsibility center for replacement of defective commercial Special Energy Meter (SEM).

Members may discuss.

Deliberation in the meeting

Powergrid informed that they are only custodian of meters and the meters are being handed over as per the instruction of ERLDC. But if constituents want to get it installed by Powergrid then installation charges have to be borne by the individual constituents.

ERLDC informed that the same procedure is being followed in the Eastern Region.

OCC advised NPGC to follow the existing procedure.

Item No. C.19: Nomination of nodal persons for communication related to tripping of grid elements and primary frequency response observed at generating stations. --ERLDC

For smooth communication regarding this transfer of data, all the regional generating stations, transmission utilities and SLDCs were requested in 168th OCC meeting to nominate at least two persons as nodal person(s) for tripping analysis of any grid element and for primary frequency response analysis of generating units. Nomination was not received from new regional generating and all SLDCs. List is shown in following table. These generating units and SLDCs are requested to nominate at the earliest.

Entity	Nodal Person(s) for tripping analysis (At least 2 persons)		Nodal Person(s) for primary frequency response analysis (At least 2 persons)	
	Nodal Person- 1 Name & Contact Details (Phone, email id)	Nodal Person- 2 Name & Contact Details (Phone, email id)	Nodal Person- 1 Name & Contact Details (Phone, email id)	Nodal Person- 2 Name & Contact Details (Phone, email id)
NTPC, Kahalgaon	Nomination not received	Nomination not received	Nomination not received	Nomination not received
NTPC, Talcher	Nomination not received	1 Nomination not received	Nomination not received	Nomination not received
NTPC, Daripalli	Nomination not received	Nomination not received	-------	------
Adhunik	Nomination not received	Nomination not received	Nomination not received	Nomination not received
GMR	Nomination not received	Nomination not received	Nomination not received	Nomination not received
KBUNL	Nomination not received	Nomination not received	Not applicable	
Teesta V	Nomination not received	Nomination not received	Nomination not received	Nomination not received

Entity	Nodal Person(s) for tripping analysis (At least 2 persons)		Nodal Person(s) for primary frequency response analysis (At least 2 persons)	
	Nodal Person- 1 Name & Contact Details (Phone, email id)	Nodal Person- 2 Name & Contact Details (Phone, email id)	Nodal Person- 1 Name & Contact Details (Phone, email id)	Nodal Person- 2 Name & Contact Details (Phone, email id)
Teesta III	Nomination not received	Nomination not received	Nomination not received	Nomination not received
Rangit	Nomination not received	Nomination not received	Not applicable	
Chujachen	Nomination not received	Nomination not received	Not applicable	
Jorethang	Nomination not received	Nomination not received	Not applicable	
Tashiding	Nomination not received	Nomination not received	Not applicable	
Dikchu	Nomination not received	Nomination not received	Nomination not received	Nomination not received
Bihar SLDC	Nomination not received	Nomination not received	Nomination not received	Nomination not received
DVC SLDC	Nomination not received	Nomination not received	Nomination not received	Nomination not received
GRIDCO SLDC	Nomination not received	Nomination not received	Nomination not received	Nomination not received
WB SLDC	Nomination not received	Nomination not received	Nomination not received	Nomination not received
Sikkim SLDC	Nomination not received	Nomination not received	Not applicable	

Concerned Utilities may update the nodal persons.

Deliberation in the meeting

OCC advised the Utilities to nominate the nodal person at the earliest and send the details to ERPC and ERLDC.

PART D:: OPERATIONAL PLANNING

Item No. D.1: Anticipated power supply position during August 2020

The abstract of peak demand (MW) vis-à-vis availability and energy requirement vis-à-vis availability (MU) for the month of August 2020 were prepared by ERPC Secretariat on the basis of LGBR for 2019-20 and feedback of constituents, keeping in view that the units are available for generation and expected load growth etc. is enclosed at **Annexure D1.**

Members may confirm.

Deliberation in the meeting

*Updated anticipated power supply position for the month of Aug 20 is enclosed at **Annexure D1.***

Item No. D.2: Shutdown proposal of transmission lines and generating units for the month of August 2020

Generator shutdown for August 2020 is shown below

Proposed Maintenance Schedule of Thermal Generating Units of ER during 2020-21 in the month of August							
(as finalised in draft LGBR meeting held on 06.12.2019)							
System	**Station**	**Unit**	**Capacity (MW)**	**Period**		**No. of Days**	**Reason**
				From	**To**		
DVC	**DSTPS**	**2**	**500**	**12.08.20**	**21.09.20**	**41**	COH(Blr,FGD&DeNOX Burner,Turb,Gen)
ODISHA	TTPS	3	60	21.08.20	07.09.20	18	AOH
WBPDCL	Kolaghat TPS	6	210	22.08.20	31.08.20	10	Boiler License renewal
	Sagarighi TPS	2	300	06.08.20	30.08.20	25	AOH/Boiler Overhauling
CESC	SOUTHERN	1	67.5	06.08.20	09.08.20	4	Not Specified
		2	67.5	15.08.20	03.09.20	20	Not Specified

ERLDC may place the list of transmission line shutdown discussed on 24th July 2020.

Members may confirm.

Deliberation in the meeting

DVC informed that the shutdown has been deferred.

CESC informed that its Southern Unit-I will go for shutdown from 1st Aug for 7 days. Shutdown for its Southern Unit-II is not yet finalized but it will be taken within Aug 20.

Odisha and WBPDCL informed that they will carry out the shutdown activity as per the schedule.

*Approved shutdown list of transmission elements is enclosed at **Annexure-D2**.*

Item No. D.3: Prolonged outage of Power System elements in Eastern Region as on10-06-2020

(i) Thermal Generating units:

Sl.No	Station	State	Agency	Unit No	Capacity MW	Reason(s)	Outage Date and Time
1	NABINNAGAR(BRBCL)	BIHAR	NTPC	1	250	TRIPPED DUE TO LOSS OF EVACUATION PATH LATER PUT ON RSD W.E.F. 05.07.20 09:02HRS	14-Jul-2020 05:51
2	BARAUNI TPS	BIHAR	BSPHCL	7	110	RSD/LOW SYSTEM DEMAND	28-May-2020 07:00
3	BOKARO 'B'	DVC	DVC	3	210	DESYN ON LOW SYSTEM DEMAND	19-Jun-2020 08:20
4	CHANDRAPURA TPS	DVC	DVC	3	130	TURBINE BLADE DAMAGE	30-Jul-2017 00:00
5	DPL	WEST BENGAL	WBPDCL	7	300	RSD/LOW SYSTEM DEMAND	11-Jul-2020 17:19
6	GMR 3	ODISHA	GMR-Infra	3	350	LOW COAL STOCK	03-Jul-2020 00:01

7	KODERMA	DVC	DVC	1	500	SUSPECTED TUBE LEAKAGE LATER ON LOW SYSTEM DEMAND	08-Jul-2020 01:09
8	KOLAGHAT	WEST BENGAL	WBSETCL	1	210	POLLUTION PROBLEM	10-May-2018 23:05
9	KOLAGHAT	WEST BENGAL	WBSETCL	2	210	ESP FIELD MAINTENANCE	26-Dec-2019 22:48
10	KOLAGHAT	WEST BENGAL	WBPDCL	3	210	RSD/LOW SYSTEM DEMAND	13-Jun-2020 15:15
11	KOLAGHAT	WEST BENGAL	WBSETCL	5	210	RSD/LOW SYSTEM DEMAND	16-Jan-2020 23:37
12	KOLAGHAT	WEST BENGAL	WBSETCL	6	210	RSD/LOW SYSTEM DEMAND	16-Jan-2020 12:08
13	MEJIA TPS	DVC	DVC	1	210	RSD/LOW SYSTEM DEMAND	10-Mar-2020 13:32
14	MEJIA TPS	DVC	DVC	2	210	LOW SYSTEM DEMAND	23-Jun-2020 13:32
15	MUZAFFARPUR TPS	BIHAR	BSPHCL	1	110	RSD/LOW SYSTEM DEMAND	13-Dec-2019 19:45
16	MUZAFFARPUR TPS	BIHAR	BSPHCL	2	110	RSD/LOW SYSTEM DEMAND	19-Oct-2019 13:10
17	RTPS	DVC	DVC	1	270	RSD/LOW SYSTEM DEMAND	07-Jul-2020 15:04
18	ADHUNIK	JHARKHAND	APNRL	1	270	CONDENSER TUBE LEAKAGE	07-Jul-2020 15:04
19	ADHUNIK	JHARKHAND	APNRL	2	270	GT FANS TRIPPED, DETAILS UNDER INVESTIGATION	12-Jul-2020 22:13
20	JITPL	ODISHA	JITPL	1	600	PA FAN PROBLEM	05-Jul-2020 04:52
21	BAKRESHWAR	WEST BENGAL	WBPDCL	2	210	HIGH PRESSURE BY-PASS VALVE OF BOILER IN-OPERATIVE	12-Jul-2020 22:13
22	BARAUNI TPS	BIHAR	BSPHCL	6	110	ELECTRICAL PROTECTION TRIP; PROBLEM IN BEARING GEAR MOTOR	25-Feb-2020 18:10
23	SAGARDIGHI	WEST BENGAL	WBSETCL	2	300	AUXILLARY SUPPLY FAILED	18-Mar-2020 12:20
24	STERLITE	ODISHA	SEL	4	600	PROBLEM IN ASH HANDLING PLANT	12-Jul-2020 18:10

Generators/ constituents are requested to update the expected date of revival of the units.

(ii) Hydro Generating units:

Sl.No	Station	State	Agency	Unit No	Capacity (MW)	Reason(s)	Outage Date and Time
1	BALIMELA HPS	ODISHA	OHPC	1	60	R & M WORK	05-Aug-2016 00:00
2	BALIMELA HPS	ODISHA	OHPC	2	60	R & M WORK	20-Nov-2017 00:00
3	BURLA HPS/HIRAKUD I	ODISHA	OPTCL	1	49.5	R & M WORK	14-Mar-2018 17:20
4	BURLA HPS/HIRAKUD I	ODISHA	OPTCL	5	37.5	R & M WORK	25-Oct-2016 09:00
5	BURLA HPS/HIRAKUD I	ODISHA	OPTCL	6	37.5	R & M WORK	16-Oct-2015 09:00
6	BURLA HPS/HIRAKUD I	ODISHA	OPTCL	7	37.5	ANNUAL MAINTENANCE	06-Dec-2019 12:00
7	BALIMELA HPS	ODISHA	OHPC	4	60	SPARKING IN PMG	02-Mar-2020 17:40
8	U. KOLAB	ODISHA	OHPC	3	80	GUIDE BEARING TEMPERATURE HIGH	07-Jan-2020 07:55

It is seen that about 422 MW hydro capacities in Odisha is under forced outage / planned outage in the period of peak monsoon and therefore not available for providing the much-needed peaking support during evening peak. SLDC / OHPC may please indicate restoration plan of the units.

(iii) Transmission elements

SL NO	Transmission Element / ICT	Agency	Outage Date and Time	Reasons for Outage
1	400 KV IBEUL JHARSUGUDA D/C	IBEUL	29-04-2018 17:30	TOWER COLLAPSE AT LOC 44,45
2	220/132 KV 100 MVA ICT I AT LALMATIA	FSTPP/JUSNL	22-01-2019 11:13	FAILURE OF HV SIDE BREAKER
3	220 KV PANDIABILLI-SAMANGARA D/C	OPTCL	03-05-2019 11:10	49 NOs OF TOWER COLLAPSED. AS REPORTED BY SLDC OPTCL, TOTAL 60 NOs OF TOWER IN BETWEEN 220KV PANDIABILI – SAMANGARA LINE IN WHICH 48 NOs TOWERS FULLY DAMAGED AND 12 NOs TOWERS PARTIALLY DAMAGED. WORK UNDER PROGRESS.
4	400 KV MOTIHARI(DMTCL)-GORAKHPUR-II	POWERGRID /DMTCL	13-08-2019 22:05	EARLIER RECONFIGURED BARH-GORAKHPUR # II AGAIN LILOED BACK AT MOTIHARI AND THE PORTIONBEYOND MOTIHARI SHALL BE TERMED AS 400 KV MOTIHARI(DMTCL)-GORAKHPUR-II
5	400 KV BARH-MOTIHARI(DMTCL) -I	POWERGRID/ DMTCL	13-08-2019 22:04	LINE SWITCHED OFF DUE TO ANTICIPATED TOWER COLLAPSE AT LOC 27/0(132) DUE TO CHANGE OF COURSE OF GANDAK RIVER. TOWER COLLAPSED REPORTED AT LOC 27/0(132) ON 15/08/19 AT 07:00 HRS. 400KV BARH- GORAKHPUR 1 CHARGED AT 18:57 HRS ON 05:02:20 AS INTERIM ARRANGEMENT BYPASSING LILO PORTION OF MOTIHARI.
6	400 KV BARH-MOTIHARI(DMTCL) –I	POWERGRID/ DMTCL	04-09-2019 04:36	TOWER COLLAPSE AT LOCATION 26/0 AND 25/5. 400 KV BARH-GORAKHPUR 2 CHARGED AT 10:06 HRS ON 31.01.20 AS INTERIM ARRANGEMENT BYPASSING LILO PORTION OF MOTIHARI. 400 KV BARH – GORAKHPUR 1 CHARGED AT 18:57 HRS ON 05:02:20 AS INTERIM ARRANGEMENT BYPASSING LILO PORTIION OF MOTIHARI.
7	400 KV MERAMUNDALI-NEW DUBRI-D/C	OPTCL	23-03-2020 18:07	3 NOs OF D/C TOWER COLLAPSED AT LOC NO 17, 18 AND 19 AT APPROX 10 KM FROM MEERAMUNDALI.
8	220 kV Howrah - KTPP II	WBSETCL	01-04-2020 15:53	TOWER COLLAPSE AT LOC NO 66 DUE TO SOIL EROSION.
9	400 KV KOLAGHAT-NEW CHANDITALA	WBSETCL	25-04-2020 08:33	FOR CONNECTIVITY IN BETWEEN 220KV KTPP-HOWRAH CKT AND 400KV KTPP-NEW CHANDITAL CKT.PART OF LINE TO BE USED AT 220 KV TO SUPPLY POWER TO HOWRAH FROM KOLAGHAT.
10	220/132 KV 100 MVA ICT 3 at Chandil	JUSNL	30-04-2020 19:30	ICT BURST AND DAMAGED AFTER FIRE REPORTED
11	220 KV-BEGUSARAI-NEW PURNEA-2	BSPTCL	17-05-2020 11:29	B-N DIST-146.8km FC-Ib-1.18kA FROM NEW PURNEA,TRIPPED AGAIN ON SOTF AT 12:00 HRS. ON PATROLLING IT WAS DISCOVERED THAT AT LOC141-142, CLEARANCE WITH 33 KV FEEDER IS LESS. LINE ANTI THEFT CHARGED FROM BEGUSARAI.
12	765 KV- ANGUL-JHARSUGUDA-3	POWERGRID	27-06-2020 02:39	VOLTAGE REGULATION.

13	132 KV SONENAGAR-RIHAND CKT	UPPCL/JSEB/ BSPTCL	26-06-2020 11:26	CONSENT FROM BSEB AND JSEB OBTAINED FOR CHARGING, CONSENT FROM NR YET TO BE FURNISHED.
14	132 KV NEW KISHENGANJ-BARSOI S/C	BSPTCL	02-07-2020 12:55	TO EXECUTE TAPING WORK BETWEEN OVERCROSSING OF 132KV NEW KISHENGANJ-BARSOI S/C AND 132KV PURNEA (PG)-KISHENGANJ (OLD) S/C JUMPERS (TEMPORARY ARRANGEMENT FOR SUPPLYING POWER TO 132KV 132KV BARSOI SS FROM 132KV KISHENGANJ (OLD) SS, THERE IS HEAVY SOIL EROSION BY RIVER KANKAIHAS BEEN OBSERVED THE LOC NO 140 AND 141 OF 132KV KISHENGANJ NEW –BARSOI T/L DURING FLOOD, WHICH MAY CAUSE COLLAPSING OF THE SAI D TOWER.
15	132KV-PURNEA (PG)-KISHENGANJ(OLD) S/C	BSPTCL	02-07-2020 12:55	
16	765 KV JHARSUGUDA-RAIPUR (DURG)-I	POWERGRID	05-07-2020 15:43	VOLTAGE REGULATION.
17	400 KV PATNA-KISHENGANJ-I	POWERGRID	06-07-2020 08:29	FOR PERMANENT RESTORATION ON NEWLY CONSTRUCTED PILE FOUNDATION.
18	400 KV PATNA-KISHENGANJ-II	POWERGRID	06-07-2020 08:30	
19	400KV- MOTIHARI- BARH-2	POWERGRID/ DMTCL	08-07-2020 02:19	DUE TO SOIL EROSION IN GANDAK RIVER, 5 ANCHORS OF THE ERS HAVE BEEN WASHED.
20	40KV MAIN BAY OF KHSTPP-I AT BARH	POWERGRID	09-07-2020	Y PHASE CT OF MAIN BAY SENSING CURRENT ; TEED OPERATED DURING TRIPPING OF BARH-KHSTPP 1 AT 13:41 HRS ON 09-07-20.

(Reported as per Clause 5.2(e) of IEGC)

** Transmission licensees whose line were out due to tower collapse/ bend, may please update the detail restoration plan and as on date work progress status in OCC.

Also, Monthly progress report to be submitted to ERLDC/ERPC till restoration of the element. In the 168th OCC meeting, *OCC advised all concerned constituents to update list.*

All concerned constituents may update the list.

Deliberation in the meeting

OCC advised all the constituents to update the list.

Item No. D.4: Commissioning of new transmission elements in Eastern Region

The details of new units/transmission elements commissioned in the month of June – 2020 based on the inputs received from beneficiaries.

SL NO	Element Name	Owner	Charging Date	Charging Time	Remarks
1	400 KV Gaya NPGC-I (Modified)	PGCIL	24-06-2020	04:23	Only LILO portion (up to Dead end towers) – upcoming LILO of Gaya-NPGC at Chanduti s/s
2	400 KV Gaya NPGC ckt-II (Modified)	PGCIL	24-06-2020	17:41	

3	132 KV Samangara – Satasankha ckt-I	OPTCL	25-06-2020	16:35	
4	132 KV Samangara – Satasankha ckt-I	OPTCL	25-06-2020	16:40	

Deliberation in the meeting

Members noted.

Item No. D.5: UFR operation during the months of March to June 2020.

Frequency profile for the months as follows:

Month	Max (Date/Time)	Min (Date/Time)	% Less IEGC Band	% Within IEGC Band	% More IEGC Band
March, 2020	50.32; 22/03/20; 17:04:10	49.69; 19/03/20 & 31/03/20; 15:29:30&05:12:10	**5.74**	**71.16**	**23.10**
April, 2020	50.30; 04/04/20;18:02:10	49.61; 01/04/20;22:07:30	**4.99**	**75.20**	**19.81**
May, 2020	50.29; 26/05/20 & 28/05/20; 18:04:10& 19:01:00	49.57; 28/05/20; 17:27:10	**4.23**	**76.69**	**19.08**
June, 2020	50.31; 21/06/20; 09:56:20	49.63; 09/06/20 22:12:50	**4.49**	**76.94**	**18.57**

Hence, no report of operation of UFR has been received from any of the constituents.

Deliberation in the meeting

Members noted.

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Annexure A

Name	Email Addr	Job Title	Company I	Address1	Address2	City	Phone nun	Fax nu
ABHIJIT CHAKRABORT	abhijit.cha	DY. CHIEF ENGIN	DAMODAR	GOSWAMI	P.O MAITHON	DHANBAD	91-8670221267	
Abhinaba Basu	abasu.14b	AEE	BSPTCL	63 May dit	Dakshineswa	Kolkata	91-7033091492	
Akhouri A Prasad	aaprasad@	AGM EEMG	NTPC Ltd	BRBCL	NTPC Ltd	Aurangaba	91-9425293583	
Amaresh Mallick	amareshm	Chief General Ma	POSOCO	Golf Club Road		Kolkata	1-9436302720	
Ankur Kumar	ankur@powergridindia.com		POWERGRID					
BIPLAB CHATTERJEE	biplab.chatterjee@tatapow		Tata Powe	Gokulpur,	Nadia, Kalyan	Kalyani	1-9204857100	
Bibhuti Bhoi	bibhu@posoco.in		POSOCO	14,Powerg	Tollygunge	KOLKATA	1-9432351830	
DEBI PRASAD PUITAND	debiprasac	SE(E)	DVC	DVC TOWER KOLKATA		KOLKATA	1-9434745905	
Debajyoti Majumder	debajyoti.r	Manager SO	POSOCO				91-9903593500	
Devendra Kumar Bathu	devendra.l	DGM	Teesta Urj	Teesta-III	Mangan	North Sikk	1-7719379087	
GAGAN KUMAR	gagankmis	ELECTRICAL EXEC	SLDC,BSPTCL				1-7992486100	
Gaurav Agrawal	gayravgolu59@gmail.com		POSOCO					
Gopal Mitra	gopalmitra@posoco.in		ERLDC				1-9831297392	
Hansraj Prasad	hansraj@p	Chief Manager	Power Gric	ER-1 RHQ Patna		Patna	1-9431815689	
J Ganesh Rao	ganesh.jada@gov.in		ERPC	29-5-D, 1B	Udaya Sankar	Kolkata	WEST BENGAL	
Jogesh C Patra	jcpatra@ntpc.co.in		TSTPS, NTPC Ltd					
Karikal chozhan mayav	mcchozha	AGM	NTPC	NTPC Fara	NTPC	Farakka	India	
Kazi Md Hanif	kazi.dvc@gmail.com		Damodar Valley Corporation				1-9831940849	
Kranthi Kumar Vellanki	kranthikun	AGM O&M	Dikchu H.E	Dikchu HEI	East Sikkim	East Sikkim	1-08374666599	
Laldhari Kumar	laldhari@posoco.in		POSOCO				91-9831379478	
MANAS DAS	manasdas123@gmail.com		POSOCO	ERLDC		KOLKATA	1-09007070925	
Makarand Joshi	makarand	Plant Head	Dikchu H.E	Dikchu HEI	East Sikkim	East Sikkim	1-09816102343	
NISHANT KUMAR	nishant.ku	MANAGER (O&M	DMTCL	Darbhanga	Motihari Trar	Darbhanga	1-07987210324	
NISIT GUPTA	nkgupta.bs	ASSISTANT EXEC	BSPTCL	VIDYUT BHAWAN		PATNA	1-7033095872	
Nimisha Kumari	go4nishu2006@gmail.com		BSPTCL				1-7763817773	
PARTHA GHOSH	partha.ghc	Chief Manager (A	POWERGR	NEW TOW	ACTION AREA	KOLKATA	1-09434748263	
PRAKASH GUPTA	pgupta@wbpdcl.co.in		WBPDCL					
PRASANTA KUMAR SAT	ele.pksatp	Sr. General Mana	OPTCL	SLDC, Nea	Bhubaneswar	Bhubanesv	1-9438907410	
Pallavi Kansal	pallavikans	Senior Manager	Teestavall	17, Barakh	2nd Floor, Vij	New Delhi	1-9898596883	
Prasant Senapathy	prasant.se	AGM	GMR Kama	GMR Kama	GMR Kamalar	Dhenkanal	1-8114918762	
R K Mandal	rkmandal@ntpc.co.in		NTPC Kahalgaon				1-9431600132	
Raj Protim Kundu	rajprotim@posoco.in		ERLDC POSOCO					
Rajdeep Bhattacharjee	rekolbsphcl@gmail.com		BSPHCL				91-9830380689	
Rajesh Kumar	rajesh.kum	Dy. Chief Enginee	Damodar V	DVC Towers		Kolkata	91-9434480578	
Rakesh Kumar Pradhan	rkpradhan	Manager	POSOCO	ERLDC				
SAIBAL GHOSH	saibal@po	Dy. Manager	POSOCO	Ircon tower C5/1, new t		KOLKATA	91-8584072079	
SURESH CHANDRA BEH	scbehera@ntpc.co.in		NTPC LTD	Bhubaneswar				
Samten Samten	samten@bpc.bt		Bhutan NL	Thimphu			975-17280264	
Sanjay Kumar Sharma	sanjay.sharma@dvc.gov.in		Damodar V	OS&U Sect	DVC Towers	Kolkata	91-9434539423	
Satya Deep Tangudu	satyadeep	Sr. Manager O&M	Dikchu H.E	Dikchu HEI	East Sikkim	East Sikkim	1-07797305405	
Saurabh Kumar	saurabhkumar01@ntpc.co.i		BRBCL	QR NO: C	BRBCL TOWN	AURANGA	BIHAR	
Saurav Sahay	saurav.sahay@posoco.in		POWER SY	Erldc POSC	14 Golf Club F	Kolkata	West Bengal	
Shailendra Kumar Gaut	shailendra	AGM, Operation	Gati Infra I	Chuzacher	110 MW	Rongli	91-8016099975	
Sugandh Barnwal	spbarnwal@posoco.in		POSOCO	Flat No: 1	Near Eden Ele	Kolkata	1-9433041812	
Sumanta Padhi	sumanta.p	Team Member	Teesta Urj	Teesta-III	Mangan	North Sikk	1-7719365592	
Sunil Kumar Sharma	sksharma06@ntpc.co.in		ER-I Hq, NTPC					
Surajit Banerjee	surajit.banerjee@posoco.in		Power System Operation Corporation Ltd				1-919433041823	
Tanmay Rastogi	tanmayrastogi@posoco.in		POSOCO					
VP SRIVASTAVA	vpsrivastava@ntpc.co.in		NPGCL				91-9650994778	
Vivek Karthikeyan	vivek.karth	Chief Manager	Sterlite Power				1-8966903034	
chandan kumar	chandan@	Manager	POSOCO ERLDC				91-9869251460	
sonam ongchuk lepcha	lepchawor	Assistant Enginee	SLDC	DPH area, Gangtok,Sikkir		Gangtok	1-7548917326	
tushar ranjan	ranjtushar	MANAGER	SLDC,JUSN	SDC BUILD	DORANDA	RANCHI	1-9326374226	

Annexure B.7

Date -22-07-2020

To,

The Member Secretary
ERPC, Kolkata

Sub: Deemed availability of BRBCL units during Grid Disturbance on 29th June, 1st July and 7th July'2020

Dear Sir,

BRBCL Nabinagar all running Units tripped as all the outgoing lines (Main and ERS) tripped during repair work of bent Tower leg of 400KV Nabinagar Sasaram line. All the outages have been approved as Grid Disturbance by ERLDC (GD1) and subsequently SG has been made equal to AG as per IEGC grid code.

However, we have not received any DC for the outage of the Unit during the grid disturbance for running as well as RSD units as per the details below:

Date	Date & Time of Tripping	Date & Time of Restoration	RSD UNITS	Unit tripped	Deemed DC required (Period)	Remarks (Reason for DC)
29-06-20	29.06.2020, 21:53	29.06.2020, 22:25	U#3		U#3 from 21:52 hrs 29-6-20 to 06:20 hrs 30-6-20	Revival time for Cold start during RSD. (08 hrs)
				U#1&2	U#1 &2 From 21:52 hrs to 23:45 hrs	Outage DC revision time 8th block
01-07-20	01.07.2020, 05:50 hrs	01.07.2020, 10:05 hrs	U#3		U#3 from 05:51 hrs 01-7-20 to 18:00 hrs 01-7-20	Revival time for Cold start during RSD after evacuation Line and power supply restoration
				U#1&2	Unit_1 &2 06:00 hrs to 07:45 hrs	Outage DC revision time 8th block
07-07-20	07.07.2020, 23:58 hrs	08.07.2020, 03:56 hrs	U#1		U#1 from 23:57 hrs 07-7-20 to 12:00 hrs 08-7-20	Revival time for Cold start during RSD after evacuation Line and power supply restoration
				U#2&3	U#2 &3 from 23:57 hrs to 02:00 hrs 08-07-20	Outage DC revision time 8th block

It is therefore, requested to provide Deemed Availability (DC) of running and RSD units during the said period as mentioned above.

Thanking You,

22-7-2020

A A Prasad
AGM (EEMG)

CC:

1. ED (ERLDC)
2. GM (ERLDC)
3. CEO, BRBCL

PSS Tuning Study and Implementation

1. Regulatory Provision on PSS and Its Tuning

Quote 1:

"CEA (Technical standards for connectivity to the Grid) Regulation, 2007: *Power System stabiliser means controlling equipment which receives input signal of speed, frequency and power to control the excitation via the voltage regulator for damping power oscillation of a synchronous machine".*

Unquote 1:

PSS is controlling equipment which receives input signals from speed, frequency and power of generating unit and based on these it controls the generating unit excitation system for damping the power system oscillation.

Further, the PSS need to be Multi-Input PSS (input signal from speed, frequency and power of generating unit) rather than single input for better performance and stability.

Quote 2:

CEA Technical Standard for Construction of Electrical Plants and Electric Lines (Published in 2010):

- *For Coal or lignite based Thermal Generating Stations (10.2. g.i:), Gas turbine based Thermal generating stations (18), Internal Combustion(IC) engine based Thermal generating station (27) : Suitable Excitation System, as well as Automatic voltage regulator (AVR), shall be provided with the generator as per CEA (Technical standards for connectivity to the Grid) Regulation, 2007. Power System Stabiliser (PSS) shall be provided in AVR for generator of 100 MW and above rating.*
- *For Hydro power Plan (37.3.e): All the performance requirements of AVR, PSS shall be in accordance shall be in accordance with CEA (Technical standards for connectivity to the Grid) Regulation, 2007 and CEA (Grid standard)regulation as and when they come into force.*

CEA (Technical standards for connectivity to the Grid) Regulation, 2007:

- *For New generating Units (part II. 1. C): The AVR of generator of 100 MW and above shall include Power system stabiliser (PSS)*
- *For Old Units: (part II. 2. 2): For thermal generating units of having rated capacity of 200 MW and above and Hydro Units having rated capacity of 100 MW and above,*

following facility should be provided at the time of renovation and modernization : Every generating unit of capacity having rated capacity higher than 100 MW shall have PSS.

Standard technical features of BTG system for supercritical 660/ 800 MW thermal units, CEA, July 2013 (16.2.4.iii.d.5)

- *Power system stabilizer (PSS): The excitation system shall be provided with power system stabilizer for achieving the dynamic stability of the system under most stringent conditions of operation in the phase of disturbance created by short circuits conditions, load rejections, switching on/ off of transmission lines as per manufacturer's practice*

Standard technical specification for main plant package of sub- critical thermal power project 2 X (500 MW or above), CEA, Sept 2008 (5.2.4.iv):

- *Power system stabilizer (PSS):*

a) *The excitation system shall be provided with power system stabilizer for achieving the dynamic stability of the system under most stringent conditions of operation in the phase of disturbance created by short circuits conditions, load rejections, switching on/ off of transmission lines.*

b) *The power system stabilizer should have adoptable settings, which should automatically adjust to system reactance. In other words, the system should provide automatic and continuous measurement of system reactance and power system stabilizer setting must continually adjust itself for any changes in the system reactance so as to provide required dynamic stability margins.*

Unquote 2:

For any new Thermal/Gas/Hydro plant above 100 MW must have PSS along with AVR. For old Thermal/Hydro Power plants Commissioned prior to 2007 above 100 MW must provide AVR and PSS during their renovation and modernization.

Quote 3:

IEGC 5.2.k: *All generating units shall normally have their automatic voltage regulators (AVRs) in operation. In particular, if a generating unit of over fifty (50) MW size is required to be operated without its AVR in service, the RLDC shall be immediately intimated about the reason and duration, and its permission obtained. Power System Stabilizers (PSS) in AVRs of*

generating units (wherever provided), shall be got properly tuned by the respective generating unit owner as per a plan prepared for the purpose by the CTU/RPC from time to time. CTU /RPC will be allowed to carry out checking of PSS and further tuning it, wherever considered necessary.

***CEA (Technical standards for connectivity to the Grid) Regulation, 2007 6.g**: The requester and user shall cooperate with RPC and appropriate Load despatch centre in respect of matter listed below, but not limited to: Cooperate with RPC for tuning of PSS provided in the excitation system of generating Unit.*

Unquote 3:

The Power System Stabilizers (PSS) in AVRs of generating units (wherever provided), shall be got properly tuned by the respective generating unit owner as per a plan prepared for the purpose by the CTU/RPC from time to time. Further, they should also coordinate with appropriate load despatch centre for the PSS tuning activities. Also, CTU /RPC will be allowed to carry out checking of PSS and further tuning it, wherever considered necessary.

Quote 4:

Standard technical features of BTG system for supercritical 660/ 800 MW thermal units, CEA, July 2013 16.2.5:

Stability studies: The detailed computer studies shall be carried out by the supplier considering single machine with infinite bus so as to confirm the suitability of the turbine generator and its excitation system in the grid for maintaining the power system stability under dynamic and transient conditions and tune the PSS parameters at site for all the machines. The details of simulation technique and method proposed to be used for this purpose shall be furnished.

Standard technical specification for main plant package of sub-critical thermal power project 2 X (500 MW or above), CEA, Sept 2008 5.2.4.b:

Stability studies, both dynamic (long duration, transient) and steady state, shall be carried out to evaluate various parameters of the excitation system, e.g. response time, response ratio, ceiling voltage, loop gains, power system stabilizer (PSS) parameters etc., so as to meet the operational requirements of the grid particularly on loading side as the power station is connected to the grid by long transmission lines. The purchaser will furnish all

information/ data necessary to carry out the stability studies to the contractor at detail engineering stage.

Unquote 4:

The detailed computer studies shall be carried out by the supplier considering a single machine with the infinite bus so as to confirm the suitability of the turbine generator and its excitation system in the grid for maintaining the power system stability under dynamic and transient conditions and tune the PSS parameters at site for all the machines. The details of simulation technique and method proposed along with report and model used during simulation used for this purpose shall be furnished to concerned RLDC/CEA/RPC/SLDC/CTU/STU/Other Concerned Utilities.

Quote 5:

Report of the Task Force on Power System Analysis under Contingencies: *Power System Stabilizers (PSS) as part of the generators installed in the network are also critical for damping the local area oscillations and imparting stability to the networks. Optimal tuning of PSS also enhance effectiveness of other HVDC and FACTs controllers in supporting overall/ inter-area stability. Necessary exercise to retune PSS should be undertaken at interval of 3-4 years or even earlier depending on network additions in vicinity of specific generators.*

Unquote 5:

The exercise of PSS tuning should be done with an interval of 3-5 years or even when there is a considerable change in network topology around the vicinity of the power plants for damping of power system oscillation.

Based on the above regulation, standards and reports, the procedure for PSS Tuning has been given in the next section.

2. Procedure for PSS tuning of Generating Unit

During the whole process of PSS tuning of the generating units as per the relevant regulations, standards and reports, following major steps are involved:

A. PSS Tuning Study Report Based on Power System Simulation.
B. Validation of PSS tuning Study Report by concerned CEA/ POSOCO/ SLDC/ CTU/STU/Other Concerned Utilities.
C. PSS Tuning Field Testing and Implementation at generating Units.
D. Validation of PSS Tuning Testing Report by concerned CEA/ POSOCO/ SLDC/ CTU/STU /Other Concerned Utilities.
E. Feedback and remarks if any.

Next Few Sections Describes each of these steps in details in order to ensure proper and adequate PSS tuning of the generating units in the Indian Grid.

3. PSS Tuning Study Report Based on Power System Simulation.

A. Submission of Generator Data

The Generating Power Plant where the PSS Tuning has to be carried out will submit the Generating Unit Data used for PSS Tuning Study along with the PSS Tuning Study Report to CEA/POSOCO/CTU/STU. These details need to be provided prior to the actual tuning of the generating plant in advance by 2 Months for validation by CEA/POSOCO/CTU/STU.

The Generator Data Submission will consist of the following details:

A. Generator Dynamic and Short Circuit Data (Standard IEEE Dynamic Model as per PSS/E Software being used by CEA/POSOCO/SLDC/CTU/STU)
B. Combined Generator-Turbine inertia of the Unit (in Sec)
C. Generator Transformer Details (R, X, R0, X0, Voltage Ratio, Rating)
D. Generator Excitation Characteristic Details (Type, Make etc.)
E. Curves to be Submitted: Generator PQ Capability Curve, VEE Curve, Open and short circuit saturation curve
F. IEEE Standard Model/ Transfer Function Block Diagram of AVR and PSS and their variation range (As per the PSS/E Software being used by CEA/POSOCO/SLDC/CTU/STU)
G. IEEE Standard Model/Transfer Function Block Diagram of Generator Governor and their parameter (As per the PSS/E Software being used by CEA/POSOCO/SLDC/CTU/STU)
H. Rotor and Stator Current limits.
I. Overexcitation and Under Excitation Limit of AVR
J. Any other details required for Studies.

Following Data can be taken from the POSOCO during the system study for PSS tuning of generating unit:

A. Low frequency Oscillation Range for Inter-Area, Major Inter area mode observed in the grid based on analysis of Oscillation monitoring system history of last six months.
B. Minimum and Maximum Fault level of the Generator Bus and Adjacent Bus without the contribution of generating unit where PSS has to be commissioned and tuned.

Whenever the Generator Components Models (Generator / AVR / PSS / Governor/ Limiters) are not as per standard IEEE models, the onus will be on generating station to submit a

verified generic model in PSS/E format to CEA/ POSOCO/ SLDC/ CTU/STU. The new model submitted should capture the input/output relationship appropriately in the simulation. Further, the Curves submitted should be easily readable. In case it is not readable, then the generator plant should submit at least a set of suitably spaced 10-20 data points to enable reconstruction of the manufacturer curves.

The Guideline to be followed by the power plant while carrying out the PSS tuning study is provided in the next section.

B. Guidelines for PSS Tuning Study for Generating Plants

The PSS Tuning study is performed to tune or adjust the setting of the PSS in order to obtain the optimal damping for a broad range of system frequency. The Report of PSS Tuning should discuss the methodology and results of the PSS tuning study for the generating power station. Both the frequency domain as well as the time domain analysis needs to be performed to arrive at the optimal setting of the PSS parameters [8-18]. Further, in order to verify the adequacy of the selected setting, time domain simulation for various step change in terminal voltage reference for checking the generator response also needs to be carried out. These results should be used during actual implementation and testing of the performance of PSS. The report should consist of the details of the Local mode of oscillation (frequency, damping, the magnitude in various parameters) prior to PSS tuning and after PSS tuning.

The PSS Tuning Report should be able to demonstrate the following:

A. Improved damping following a step change in voltage from 1% -5%.
B. Improved damping of frequencies in the band 0.02 Hz – 4 Hz.
C. Any oscillations getting damp out within 2 cycles.
D. No appreciable instability at 3 times proposed gain.
E. Improved Damping under variable system operating condition (Real and Reactive Power and Terminal voltage) and network topologies by varying the system impedance ($15\ \% < X_{\text{system impedance}} < 50\ \%$).
F. Improved Damping after the short circuit as for a duration defined in CEA transmission planning Criteria 2013 on the directly connected lines from the generating station [6].

G. Should not have negative interaction or any adverse impact on the torsional mode of the generator (Applicable for Large Steam Turbine generating unit on single shaft units)

Modeling of Power Plant during Study: Any Generating power plant where PSS tuning has to be carried out may not have the details of complete Indian power system for dynamic study. However, they have the details of the transmission system evacuating from their substation. So, a detailed modeling of the generator with adjacent nodes needs to be done during PSS tuning [3]. Further, in case of multiple units are present then the details may be taken from CEA/POSOCO/SLDC/ CTU/STU for the dynamic parameters of nearby Units along with network data. In case of any issue in getting the data of nearby generators, it may be discussed in the respective regional power committee appropriate forum.

Hypothesis during Study: During the Study, the generating power station is connected to an infinite grid that means constant voltage and constant frequency. An estimated total external grid reactance varying from (including main transformer reactance 0.15 p.u. to 0.50 p.u. (on Generator MVA base) connecting the generator to the infinite grid need to be used for simulation [3-4, 14-18]. This will enable to check the AVR response and PSS output during varying network topologies ranging from strong to week system.

Determination of suitable time constants and gain for PSS: During the system study, the aim is to find the suitable Gain and time constant for the PSS. So the whole study is subdivided into three parts as described below:

1. Checking how much phase lag is there with the help of frequency domain analysis between the generator speed and its electrical torque under various operating condition. Basically, it yields uncompensated PSS open loop transfer function (GEP(s)).
2. Checking the AVR response with PSS under operating various scenarios and comparing with sl. no 1 to find the best suitable PSS parameters for suitable phase compensation.
3. Checking the PSS gain Margin to obtain suitable PSS gain having no adverse impact under various operating scenarios. Also, check the PSS gain with root locus method to obtain suitable gain constant so that system is stable even if the gain is increased to three times.

The step 1 and 2 as described during PSS parameters tuning can be described by the frequency domain analysis of the transfer function generator, exciter and power system (GEP(s) and Power system stabiliser compensation (PSS(s) [12, 14-18].

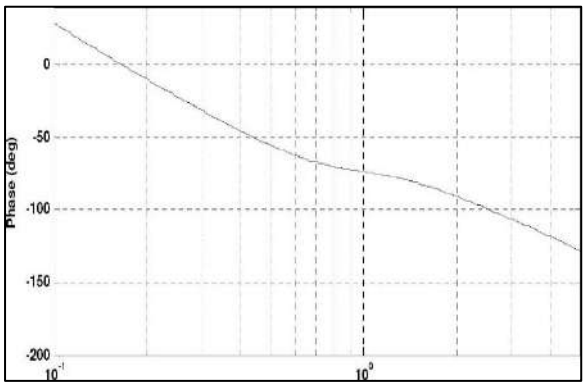

Figure 3.1: Phase of function GEP(s)

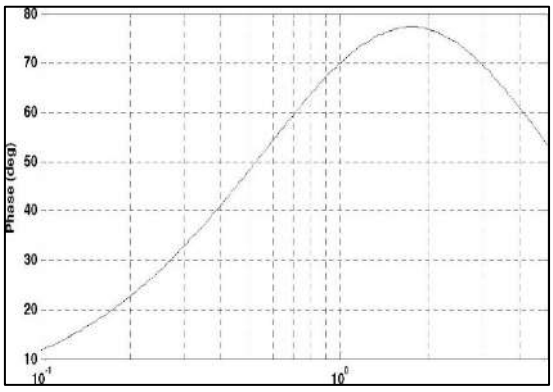

Figure 3.2: Phase introduced by the PSS lead-lag filters

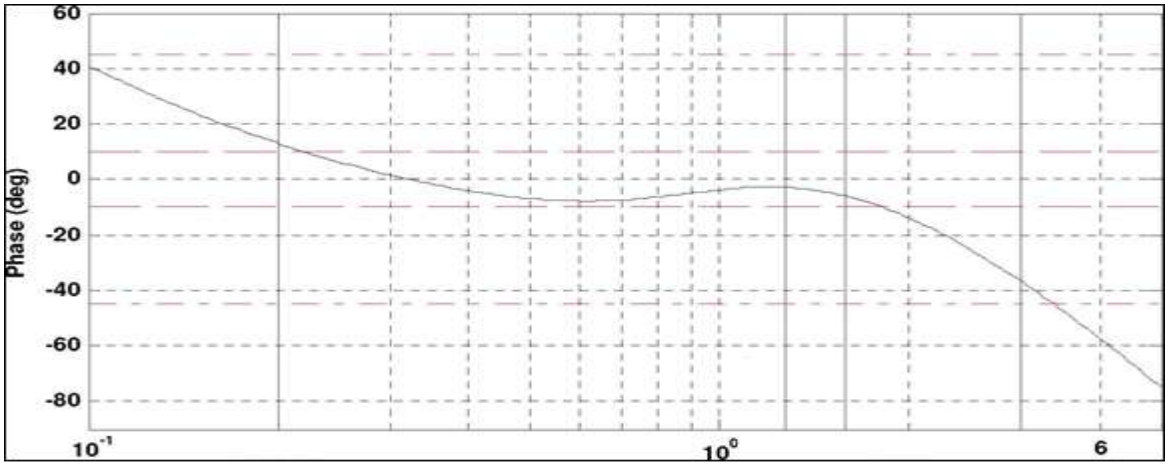

Figure 3.3: Global phase compensation (After Tuning of PSS with Phase compensation)

The PSS transfer function should compensate the phase characteristics of the generator, exciter, and power (GEP) system transfer function so the compensated transfer function ((PSS(s) * GEP(s)) has a phase characteristic of ± 30 degrees in the frequency range of 0.1 Hz to 3 Hz [Ref]. This is illustrated with the help of figure 3.1, 3.2 and 3.3. The GEP(s) transfer function is a theoretical transfer function, and its phase characteristic cannot be directly measured during field tests (only via simulation) [12,14-18]. Thus, the Requirement recognizes the practical approach of measuring the frequency response between voltage reference set point and terminal voltage (E_{term}/V_{ref}) and using the phase characteristic of such frequency response as being the phase characteristic of GEP(s). The phase characteristic of E_{term}/V_{ref}) is a better approximation to the phase characteristic of GEP(s) when the frequency response E_{term}/V_{ref}) is obtained with the generator synchronized to the grid at its minimum stable power output.

In order find the suitable PSS time constants, the above parameter estimation has to be done for a wide range of external network reactance i.e. from 0.15 p.u. to 0.5 p.u.

After determining the suitable phase margin, the step 3 is to find a suitable gain constant for the PSS. Based on literature available, the gain margin can be best computed using frequency domain analysis with the help of root locus method (Eigenvalue analysis/small signal stability studies). As the simulated model can be either a two area system (Machine with infinite bus) or small area system with nearby buses, so the small signal stability analysis of the system will yield the Eigenvalue and the respective local and control modes. The gain value has to be selected such that it is significantly away from the instability. This has to be calculated again for a wide range of external network reactance varying from 0.15 p.u. to 0.5 p.u.

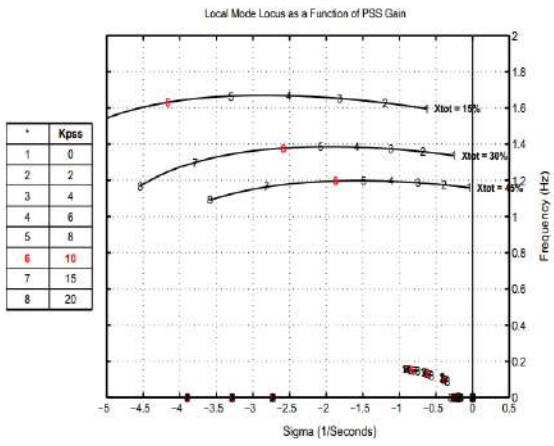

Figure 3.4: Root Locus of Local mode for different system strength [Ref]

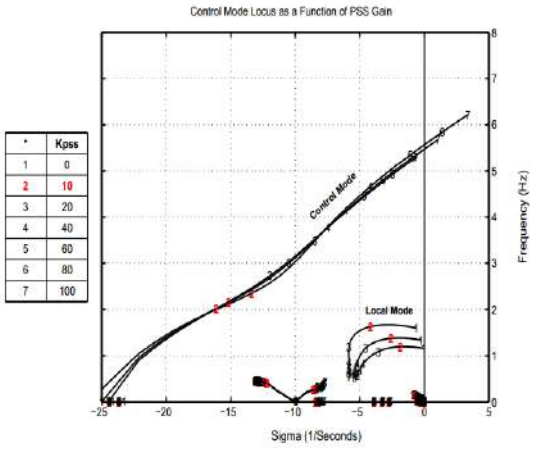

Figure 3.5: Root Locus of Control Mode for different system strength [Ref]

Figure 3.4 and 3.5 shows the local and control mode oscillation root locus plot with a variation of gain constant at three different system impedances. During selection of gain margin, it should be verified that the selected gain margin when multiplied by three times then also system should be stable [9-18]. With this, one gain value can be chosen for one set of external system reactance and similarly for others.

Determination of Local Mode of Oscillation for the generator: During the selection of gain margin, it is highly desirable to compute the local mode of oscillation for the generators. This local mode of oscillation frequency helps in validating the parameters of the generator during the testing to be done at the field. This oscillation frequency is obtained during gain constant determination from root locus method when the external network impedance used is in close proximity of actual system. The obtained gain constant at this frequency is more

suitable during actual implementation at site however it may vary depending on the testing carried out at the site.

Studies to ascertain the applicability of the tuned PSS parameters: After a suitable selection of parameters of PSS gain and time constant, the various time domain studies need to be performed to ascertain the impact of tuning of the PSS on the generator parameters during various grid conditions and perturbation. For the analysis purpose, the response of generator terminal voltage in p.u. (Vterm), Field voltage in p.u. of air gap filed voltage (Efd), Real power (MW), Reactive Power (MVAr), Generator Speed (Hz) and PSS output in p.u. of terminal voltage to be plotted. These plots should be made for PSS OFF and ON condition under varying operating condition and perturbation combination which is described below.

The varying operating conditions are:

1. **External Network Reactance:** By Varying External Network reactance from 0.15 p.u. to 0.5 p.u. in step of 0.05- and 0.1 p.u.
2. **Generator Reactive Power:** keeping reactive power to Maximum, Minimum and Zero with maximum real power output.

The various perturbations applied are:

1. **Step Response:** The perturbation consists in voltage reference steps increase as well as a decrease of 2 % and 5 % magnitude.
2. **3 phase Fault on Transmission line connecting the generator and its tripping:** 100 ms three phase fault on the mid-way of the line with connecting the generator with the grid followed by its tripping. This is to be done for all the lines if the generator is connected to multiple substations (Only if detailed modeling is done)
3. **3 phase fault on the HV side of main generating transformer:** 100 ms three phase fault on the generating transformer.

The above test will provide the best suitable PSS parameters which will help the generator to be having good damping torque under varying scenarios as described above. **The above section is meant to provide a PSS Tuning Study report for the generating unit and has been adopted based on various references/reports/procedure/reliability guidelines across the world. However, the concerned CEA/POSOCO/SLDC/CTU/STU would be happy to accept any alternative procedure submitted by the generators if they are able**

to demonstrate the system stability improvement with PSS for the described varying grid conditions.

The testing of the PSS parameters will, in general, be done during normal operating condition at the generating plant during its implementation with variation in the step response and generated power outputs. It's generally not possible to test for robustness under stressed conditions including major outages; therefore, it is strongly recommending that the optimal gain and effectiveness of the PSS be validated by simulation. Further, in real time PSS robustness cannot be ascertained for inter-area oscillation so suitable low amplitude band-limited noise injection (0.1 Hz to 4 Hz) may be given in the AVR signal for checking the response for such oscillation [17].

4. Validation of PSS tuning Study Report

The PSS Tuning Study report has to be submitted to the CEA/POSOCO/SLDC/CTU/STU prior to 2 months of actual PSS tuning to be done at the generating station for validation purpose. The concerned authority CEA (RPCs), POSOCO (RLDCs) and SLDC in coordination with STU and CTU will validate the same and confirm within the next 15 days after submission of the study report by the plant. In case of any remarks, the CEA/POSOCO/SLDC/CTU/STU will have sufficient time to inform the concerned generating station for any clarification and correction if any.

After getting the permission from the CEA/POSOCO/SLDC/CTU/STU (within next 15 Days), the generator can then suitably apply for a fixed date for PSS tuning by informing the Regional OCC Forum. It is highly desirable that one representative from CEA, POSOCO, CTU, Concerned SLDC and STU should also be present during this tuning process in the field.

On the day of PSS tuning in the field, Generator plant should inform RLDC for the code in order to proceed for actual tuning in the units. After completing the PSS tuning of the unit at the plant, the generator will inform RLDC.

5. PSS Tuning Field Testing and Implementation at generating Units.

The next step after tuning studies and estimation of PSS tuning parameters is to implement these in the AVR of the generating units and its performance testing. It is assumed that AVR tuning has already been completed along with standardized testing as per IEEE Std 421.2-2014 [10].

The PSS tuning involves various tests and it is recommended to carry out these tests with unit running between 80-100 % of its MCR. In order to ascertain the PSS performance under various condition following tests are to be done with and without PSS in order to ascertain the impact of PSS in improving the damping torque.

1. **Gain Margin Test:** It is to ascertain that PSS gain is set with an adequate margin so that even if it is increased to 3 times of its nominal gain, then also the system is stable. This can be achieved by first keeping PSS gain as 0 and then recording the various parameters (Generator terminal voltage, Field voltage, Real power, Reactive Power, Generator Speed, and PSS output). Then increase the PSS gain to nominal gain as calculated during the simulation and then increase it to twice nominal, thrice nominal and four times the nominal value and check whether the response is nominal. If in between any oscillation is observed, then stop the test and reduce the gain by more than 1/3 of the gain at which instability/unwanted oscillation is observed. In general, such instability may not be observed even for four time's nominal gain [9, 14-18].

2. **Step Response Test:** The time domain performance of the Excitation System shall be tested by application of voltage step changes to terminal voltage reference corresponding to 1% and 3% of the nominal terminal voltage, repeating with and without the PSS in service [9,14-19]. The voltage step change has to be applied for step increase as well as step decrease. Here also the parameters as described in Gain margin test has to be recorded and plotted so that PSS in and out effect can be compared for actual as well as simulated response.

   The sample of one such plot for active power is shown in figure 5.1 and 5.2. The plots are able to demonstrate that the with the increasing/decreasing voltage step change, the PSS is able to damp the oscillation faster. Further, it also validates the model as the actual response is in closely resembles the simulated response. Apart from this it also validates the local mode of oscillation calculated from the simulation as well as the actual test.

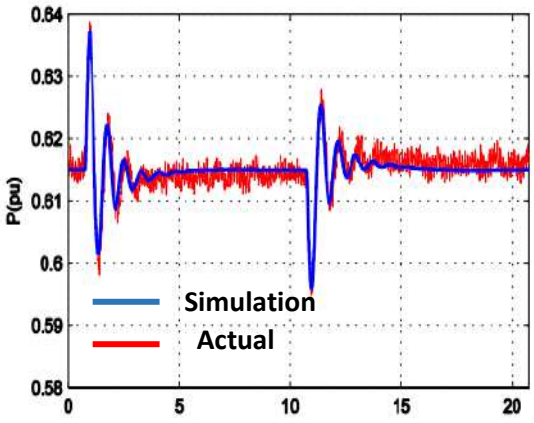

Figure 5.1: Active Power Output without PSS for step response of 3 %.

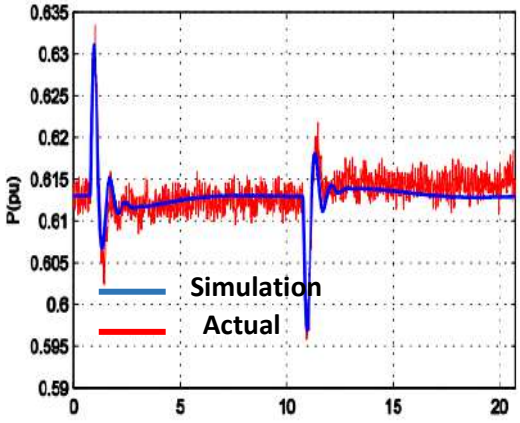

Figure 5.2: Active Power Output with PSS for step response of 3 %.

If the step response of the unit and simulated response do not match closely with each other, then the model or the model data used for simulation of the Unit is not correct. In order to find that, Frequency Response may also be carried out as given in the next section.

3. **Frequency Response Test:** Frequency Response test serves two purposes during PSS tuning which are (a) validation of transfer function of the AVR/PSS and (b) Checking the desired response from PSS over a wide range of frequency. The closed-loop AVR transfer function and Open loop PSS transfer function are computed during these test and the same is compared with the simulated response obtained during the PSS tuning study under step 1 and 2. If the plots closely resemble then it verified the model as well the PSS tuning parameters calculated. If it is not in close agreement, then OEM of Generator and Exciter should be asked for verification for submitted model data used for PSS tuning and the study has to be carried out again.

   The frequency domain tuning of the PSS is demonstrated by injecting a 0.2 Hz- 4 Hz band-limited random noise signal into the AVR reference voltage with the Generating Unit operating at full load and technical minimum load. The setpoint Power output of the generator can be changed in between these depending on the requirement of utility performing the test as it is best judged in the real-time scenario.

   The PSS effect for varying inter-area oscillation frequency cannot be directly tested in real time as they are very difficult to excite with a single machine connected to a very strong bus. So, a validation of the transfer function of AVR/PSS ensures over a long range of frequency ensures that the PSS effect will be similar to what has been observed in simulation. This also ensures that the PSS does not act adversely for

various low frequency oscillations and hence the frequency response test is performed.

It is desired that the generator parameters should not show any growing oscillation when the varying frequencies signals are being injected in the terminal reference voltage.

The above test to be performed if the step response results are not matching or based on the decision of the OEM/Vendors/Generating plant to ascertain the PSS performance over a wide range of frequency.

4. **Impulse Test:** As the actual disturbance cannot be applied to units during PSS tuning at the site, so in order to check unit the response for the various disturbance, impulse test can be carried out [18]**.** As demonstrated like the frequency response test, random noises as done for frequency response test, low magnitude Impulse type signal can be superimposed over the generator terminal voltage reference for a step change in impulse input, the response of generator and exciter parameters can be checked with and without PSS.

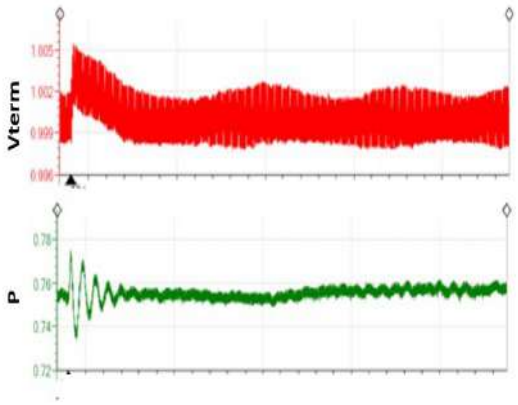

Figure 5.3: Terminal voltage and Active Power Output without PSS for impulse test.

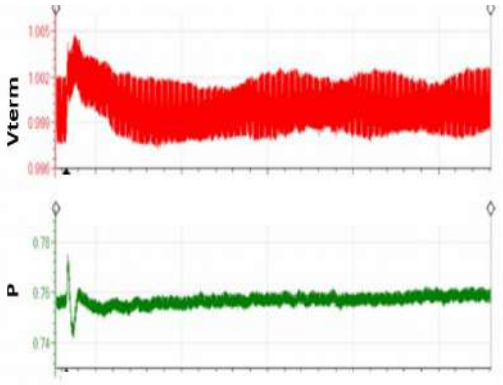

Figure 5.4: Terminal voltage and Active Power Output with PSS for impulse test.

This test has to be carried out with the consultation of the OEM of the generator and excitation system. Figure 5.3 and 5.4 shows the terminal voltage with impulse input and the resultant active power output with PSS OFF and ON respectively. The plots depict that the system is stable for such impulse signal to the generator and helps in validating the PSS performance during the large disturbance.

5. **Under-excitation limiter Interaction test:** This shows the dynamical behavior when the limitation is entered (no adverse action with the PSS function), and also when the limitation is left [9]. After the gain is set, under excite the machine until the UEL becomes active and perform a step and/or an impulse response test while monitoring the output power (MW). Ensure that the UEL is not interacting with the PSS in such a way that the damping level is reduced or instability is observed. If instability is observed, retuning of the UEL or PSS is required.
6. **Over-excitation limiter Interaction test:** This limitation presents a fixed time delay characteristic [9]. The test shows the dynamical behavior of the system when the limitation is entered. After the gain is set, overexcite the machine until the OEL becomes active and perform a step and/or an impulse response test while monitoring the output power (MW). Ensure that the OEL is not interacting with the PSS in such a way that the damping level is reduced or instability is observed. If instability is observed, retuning of the OEL or PSS is required.

Additional test which can also be performed by the generator in order to ascertain the PSS response under other varying condition.

1. **Active Power Response Test:** The interaction of the PSS with changes in Active Power should also be tested by application of a +0.5 Hz frequency injection to the governor while the Generating Unit is selected to Frequency Sensitive Mode [9].

2. **Actual Disturbance Test:** The PSS performance also to be tested with creating actual disturbance like the opening of transmission lines/Switching of Reactors/Other after consultation with RPC and RLDC. This ensures the conformance of PSS tuning impact in real time [20].

Consideration While Performing the PSS tuning.

1. The test should be stopped when the large deviation is observed in simulated and actual response.
2. Any Test should be immediately stopped when growing/sustained oscillation is observed in the parameters of the generator.
3. When performing a frequency response test on a generator connected to the grid, caution should be exercised when injecting frequencies that are close to the resonant frequencies of the machine (e.g., local mode, inter-area mode, intra-plant mode) or

neighboring machines.

4. Extreme care should be taken when injecting frequencies higher than 3 Hz, as these may correspond to the lowest shaft torsional frequencies of turbogenerator sets. The turbine manufacturer should be consulted to obtain a torsional profile of the rotor-turbine shaft prior to proceeding with testing.

In order to validate the whole PSS Tuning testing at generating power plant, it is desirable that one representative from CEA, POSOCO, CTU, Concerned SLDC and STU should also be present to witness these tests. This will ease out the process of validating the actual tuning with the study report.

PSS Testing Typical Procedure for Assisting Generators

The following typical procedure is provided to assist Generators in drawing up their own site-specific procedures for the PSS tuning tests and performance

Test	Method	Remarks
A	**Frequency Response Test, Step Response Test, Impulse Test without PSS**	
	Synchronous Generator running rated MW, unity pf, PSS Switched Off	
	1. Record steady state for 10 seconds 2. Inject +1% step to AVR Voltage Reference and hold for at least 10 seconds until stabilised 3. Remove step returning AVR Voltage Reference to nominal and hold for at least 10 seconds	
	1. Record steady state for 10 seconds 2. Inject 3% step to AVR Voltage Reference and hold for at least 10 seconds until stabilised 3. Remove step returning AVR Voltage Reference to nominal and hold for at least 10 seconds	
	1. Inject band limited (0.2- 4Hz) random noise signal into voltage reference and measure frequency spectrum of Real Power. 2. Remove noise injection.	
	1. Inject Limited Magnitude Impulse signal (Recommendation of OEM) into voltage reference and measure frequency spectrum of Real Power. In between change the magnitude of Impulse to inject the disturbance. 2. Remove Impulse Injection.	
B	**Gain Margin Test, Frequency Response Test, Step Response**	

	Test, Impulse Test without PSS, Active power response test.	
	Synchronous Generator running rated MW, unity pf, PSS Switched ON	
	1. Increase PSS gain at 30 second intervals. i.e. x1 – x1.5 – x2 – x2.5 – x3– x4 2. Return PSS gain to initial setting	
	1. Record steady state for 10 seconds 2. Inject +1% step to AVR Voltage Reference and hold for at least 10 seconds until stabilised 3. Remove step returning AVR Voltage Reference to nominal and hold for at least 10 seconds	
	1. Record steady state for 10 seconds 2. Inject +3% step to AVR Voltage Reference and hold for at least 10 seconds until stabilised 3. Remove step returning AVR Voltage Reference to nominal and hold for at least 10 seconds	
	1. Inject band limited (0.2-3Hz) random noise signal into voltage reference and measure frequency spectrum of Real Power. 2. Remove noise injection.	
	1. Select the governor for Frequency Sensitive Mode (FSM) 2. Inject +0.5 Hz step into the governor. 3. Hold until generator MW output is stabilised 4. Remove step	
C	**Under-excitation limiter Interaction test**	
	Synchronous generator running rated MW at unity power factor. Under-excitation limit temporarily moved close to the operating point of the generator	
	1. PSS on. 2. Inject -2% voltage step into AVR voltage reference and hold at least for 10 seconds until stabilised 3. Remove step returning AVR Voltage Reference to nominal and hold for at least 10 seconds	
	Under-excitation limit moved to the normal position. Synchronous generator running at rated MW and at leading MVAr close to Under-excitation limit.	
	1. PSS on. 2. Inject -2% voltage step into AVR voltage reference and hold at least for 10 seconds until stabilised 3. Remove step returning AVR Voltage Reference to nominal and hold for at least 10 seconds	
D	**Over-excitation limiter Interaction test**	
	Synchronous Generator running rated MW and maximum lagging MVAr. Over-excitation Limit temporarily set close to this	

	operating point. PSS on	
	1. Inject positive voltage step into AVR voltage reference and hold. 2. Wait till Over-excitation Limiter operates after sufficient time delay to bring back the excitation back to the limit. 3. Remove step returning AVR Voltage Reference to nominal	
	Over-excitation Limit restored to its normal operating value. PSS on	

6. Validation of PSS Tuning Testing Report

After the PSS Tuning at the filed, the generating power plant will submit the testing report. This report should consist of the relevant plot as described in the previous section and its comparison viz-a-viz the study report plots in order to ensure that the PSS tuning is proper and adequate.

Based on the report, the concerned authority CEA (RPCs), POSOCO (RLDCs) and SLDC in coordination with STU and CTU will validate the same and confirm within the next 15 days. In case of any clarification or remarks, the concerned authority CEA (RPCs), POSOCO (RLDCs) and SLDC in coordination with STU and CTU will give their feedback to the generating station.

7. The periodicity of PSS tuning study and testing

The detailed PSS tuning and testing as described in this report have to be done at an interval of five years or whenever there is a large network change near to the generating plant as per the feedback of CEA/POSOCO/CTU/STU/SLDC [7]. The testing at five years has to be done taking in the consideration of a change in the parameters of generating units due to aging, wear and tear effect etc..

After the completion of detailed study based PSS tuning and testing at generating plant, the step response test has to be done on annual basis on each unit of generating plant during its annual maintenance outage for comparing the PSS response. If it is found to be adequate, then there is no need of detailed PSS tuning till the completion of five years interval. However, if the response is not adequate as described in this testing procedure, then the detailed PSS tuning and testing have to be performed immediately.

8. Concerns of Generating Station during PSS tuning

There is always a concern on unit tripping during the PSS tuning activity in the field. Generators, OEM and Vendors take due care and best effort so that the unit should not trip during the PSS tuning. However, it has been observed that unit may trip during this process. As, PSS tuning is being done during full/high load so tripping of unit results in commercial losses to the generating plant. Any such commercial losses on account of PSS tuning needs to be deliberated in the respective RPC meeting of region or State OCC Meeting. However, in order to deliberate on the fact of generation tripping on account of PSS tuning, it is desirable that one representative from CEA, POSOCO, CTU, Concerned SLDC and STU should also be present to witness these tests. This issue on tripping of generating unit may be discussed in each RPC forum and a consensus may be built for System Reliability.

9. Reference

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[4]. Standard technical specification for main plant package of sub- critical thermal power project 2 x (500 MW or above), CEA, Sept 2008

[5]. CERC, Indian Electricity Grid Code 2010

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[8]. NERC, VAR-501-WECC-3 – Power System Stabilizer Standard

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[10]. IEEE Std 421.2-2014: IEEE Guide for Identification, Testing, and Evaluation of the Dynamic Performance of Excitation Control Systems

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[13]. ERCOT Nodal Operating Guides

[14]. E. V. Larsen and D. A. Swann, "Applying Power System Stabilizers Part I: General Concepts," in *IEEE Transactions on Power Apparatus and Systems*, vol. PAS-100, no. 6, pp. 3017-3024, June 1981.

[15]. E. V. Larsen and D. A. Swann, "Applying Power System Stabilizers Part II: Performance Objectives and Tuning Concepts," in *IEEE Transactions on Power Apparatus and Systems*, vol. PAS-100, no. 6, pp. 3025-3033, June 1981.

[16]. E. V. Larsen and D. A. Swann, "Applying Power System Stabilizers Part III: Practical Considerations," in *IEEE Transactions on Power Apparatus and Systems*, vol. PAS-100, no. 6, pp. 3034-3046, June 1981.

[17]. GE PSS Tuning Guidelines and Reports.

[18]. ABB PSS Tuning Study Reports.

[19]. BHEL PSS Step Response Test Reports

[20]. Report on PSS tuning of Karcham Wangtoo HEP

10. Annexure: Commonly Used PSS as Per IEEE Standard

1. **PSS1 A:** Generalized form of a PSS with a single input. Some common stabilizer input signals, are speed, frequency, and power. Typical design parameter for power system stabilizers with frequency or speed input is given in the table 1 and 2 respectively.

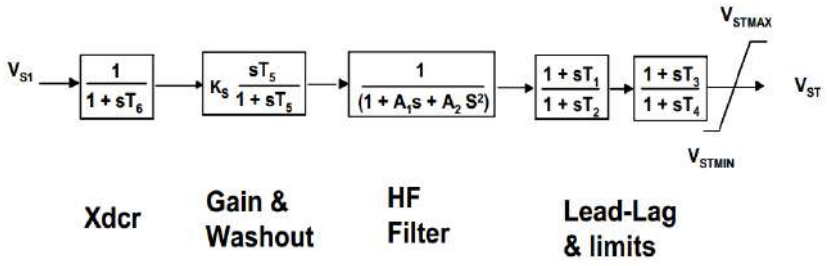


Figure 10.1 : PSS1A

Table 1 :Range of typical design parameters for power system stabilizers with frequency or speed input

Symbol	Typical range	Definition
T_6	0 s to 0.04 s	Transducer time constant
T_5	0.5 s to 50 s	Washout (reset) time constant
T_1, T_3	0.03 s to 2.0 s	Lead (zero) time constant
T_2, T_4	0.01 s to 10 s	Lag (pole) time constant
K_S	0.10 pu to 10 pu	Stabilizer gain
V_{STMIN}, V_{STMAX}	±0.02 pu to ±0.10 pu	Stabilizer output signal limits

Table 2 :Range of typical design parameters for power system stabilizers with power input

Symbol	Typical range	Definition
T_6	0 s to 0.04 s	Transducer time constant
T_5	0.5 s to 50 s	Washout (reset) time constant
T_1, T_3	0.1 s to 2.0 s	Lead (zero) time constant
T_2, T_4	0.01 s to 0.20 s or 10 s to 20 s	Lag (pole) time constant
K_S	±0.10 pu to 10 pu	Stabilizer gain (sign depends upon choice of input signal)
V_{STMIN}, V_{STMAX}	±0.02 pu to ±0.10 pu	Stabilizer output signal limits

2. **PSS2A/2B:** This stabilizer model is designed to represent a variety of dual-input stabilizers, which normally use combinations of power and speed or frequency to derive

the stabilizing signal. In particular, this model can be used to represent two distinct types of dual-input stabilizer implementations as described as follows:

A. Stabilizers that, in the frequency range of system oscillations, act as electrical power input stabilizers. These use the speed or frequency input for the generation of an equivalent mechanical power signal, to make the total signal insensitive to mechanical power change.

B. Stabilizers that use a combination of speed (or frequency) and electrical power. These systems usually use the speed directly (i.e., without phase-lead compensation) and add a signal proportional to electrical power to achieve the desired stabilizing signal shaping.

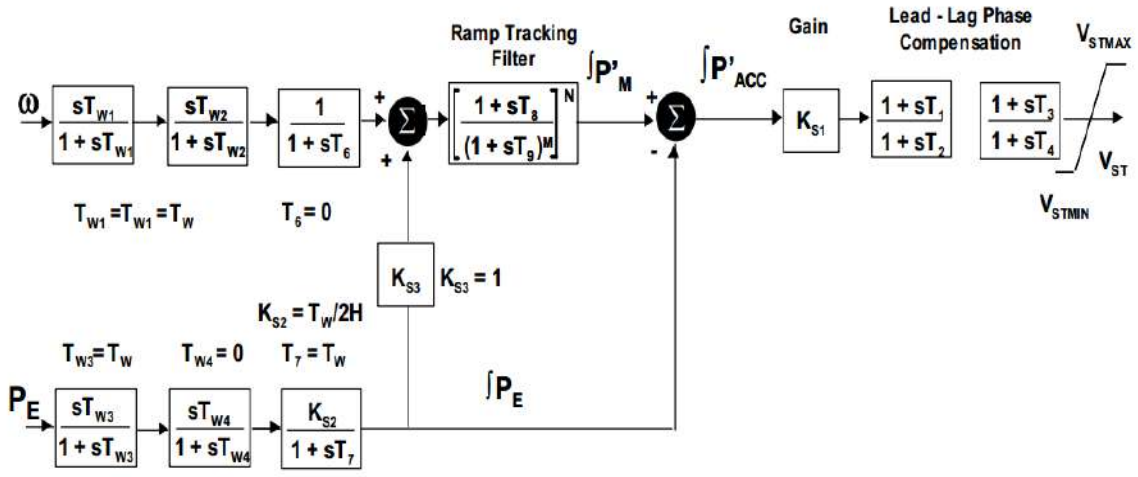


Figure 10.2 : PSS2A

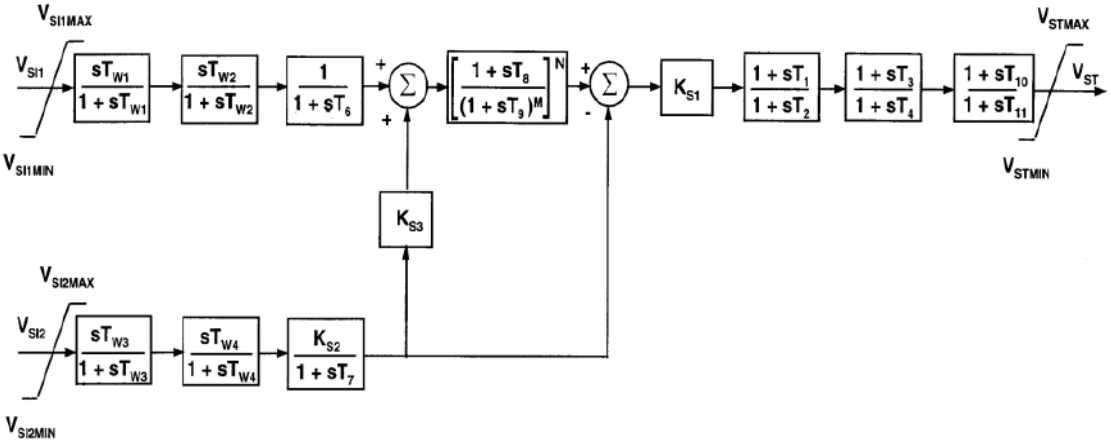


Figure 10.3: PSS2B

Table 3 : Range of typical design parameters for dual input power system stabilizers (PSS2A/2B)

Symbol	Typical range	Definition
T_6	0 s to 0.04 s	Transducer time constant
T_{W1} through T_{W4}	0 s to 20 s	Washout (reset) time constants[a]
K_{S2}	0 pu to 10 pu	Mixing gain
K_{S3}	1	Mixing gain[b]
T_8, T_9, N, M	T_8 = 0.5 s; T_9 = 0.1 s; N = 1; M = 5 or T_8 = 0.3; T_9 = 0.15; N = 4; M = 2	Selected to minimize voltage change during mechanical power changes[c]
T_7	0 s to 20 s	Low pass filter time constant[b]
T_1, T_3, T_{10}	0.01 s to 6.0 s	Lead (zero) time constant
T_2, T_4, T_{11}	0.01 s to 6.0 s	Lag (pole) time constant
K_{S1}	0.10 pu to 50 pu	Stabilizer gain[d]
V_{STMIN}, V_{STMAX}	±0.02 pu to ±0.10 pu	Stabilizer output signal limits[d]

[a] A value of 0 indicates a bypassed block.
[b] When the PSS2A or PSS2B structure is used to represent integral-of-accelerating-power-based PSS units K_{S3} = 1, T_7 = T_{W2}, T_{W4} = 0, K_{S2} = T_7/(2 × inertia).
[c] Some special circumstances may require alternative selection of T_8, T_9, N, and M.
[d] V_{STMAX} and K_{S1} typical values assume V_{REF} summation point PSS.

3. **PSS 3B:** The PSS model PSS3B has dual inputs of electrical power (V_{SI1}) and rotor angular frequency deviation (V_{SI2}). The signals are used to derive an equivalent mechanical power signal. By combining this signal with electrical power, a signal proportional to accelerating power is produced. The time constants T_1 and T_2 represent the transducer time constants, and the time constants T_{W1} to T_{W3} represent the washout time constants for electric power, rotor angular speed, and derived mechanical power, respectively. In this model, the stabilizing signal V_{ST} results from the vector summation of processed signals for electrical power and angular frequency deviation.

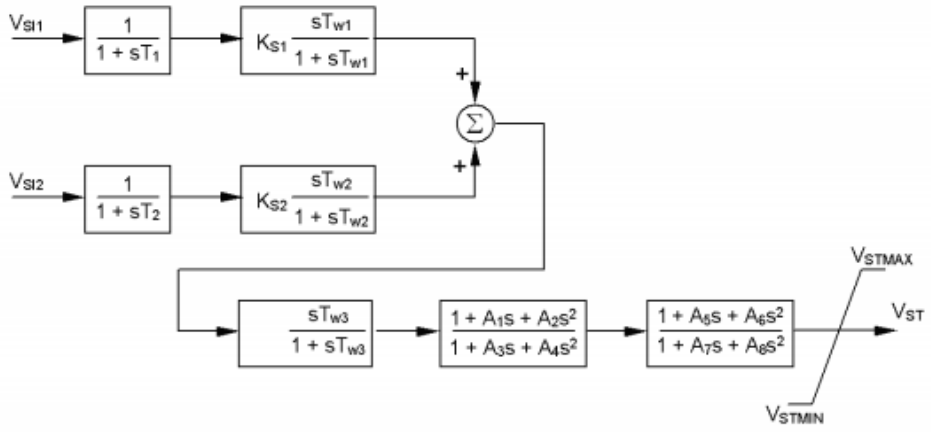


Figure 10.4: PSS3B

4. **PSS4B:** The PSS4B model represents a structure based on multiple working frequency bands. Three separate bands, respectively dedicated to the low-, intermediate- and high-frequency modes of oscillations, are used in this delta-omega (speed input) PSS. The low band is typically associated with the power system global mode, the intermediate with the

inter-area modes, and the high with the local modes. Each of the three bands is composed of a differential filter, a gain, and a limiter. Their outputs are summed and passed through a final limiter V_{STMIN} /V_{STMAX} resulting in PSS output V_{ST}

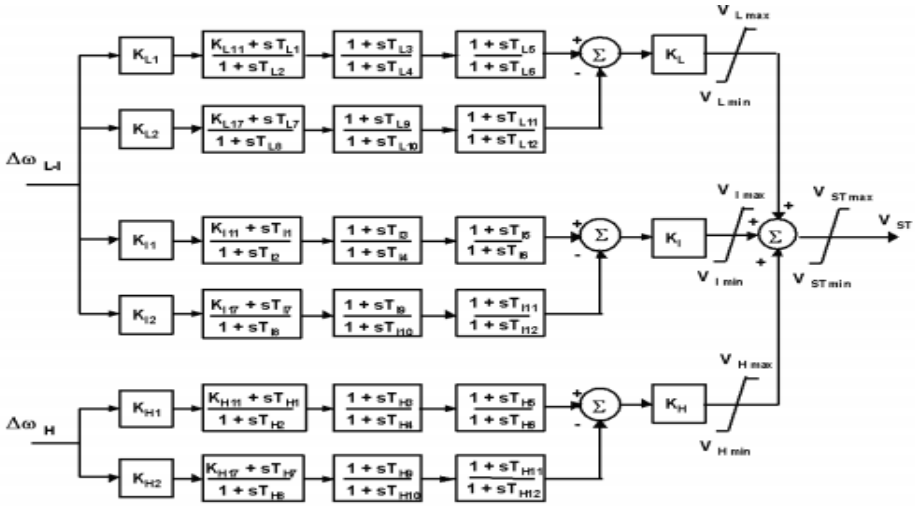


Figure 10.5: PSS4B

Table 4 : Range of typical design parameters for multi-band power system stabilizers

Symbol	Typical range	Definition
F_L	0 Hz to 0.3 Hz	Low band central frequency
F_I	0.3 Hz to 2 Hz	Intermediate central frequency
F_H	2 Hz to 10 Hz	High band central frequency
K_L	0 pu to 10 pu	Low band gain
K_I	0 pu to 50 pu	Intermediate band gain
K_H	0 pu to 100 pu	High band gain
VL_{MIN}, VL_{MAX}	0 pu to 1.0 pu	Low band output signal limits
VI_{MIN}, VI_{MAX}	0 to 1.0 pu	Intermediate band output signal limits
VH_{MIN}, VH_{MAX}	0 to 1.0 pu	High band output signal limits
V_{STMIN}, V_{STMAX}	0 to 0.1 pu	Stabilizer output signal limits

Annexure C 1

Power System Operation Corporation Ltd.

169th OCC Meeting

At ERPC, Kolkata

27th July, 2020

ER Grid Performances

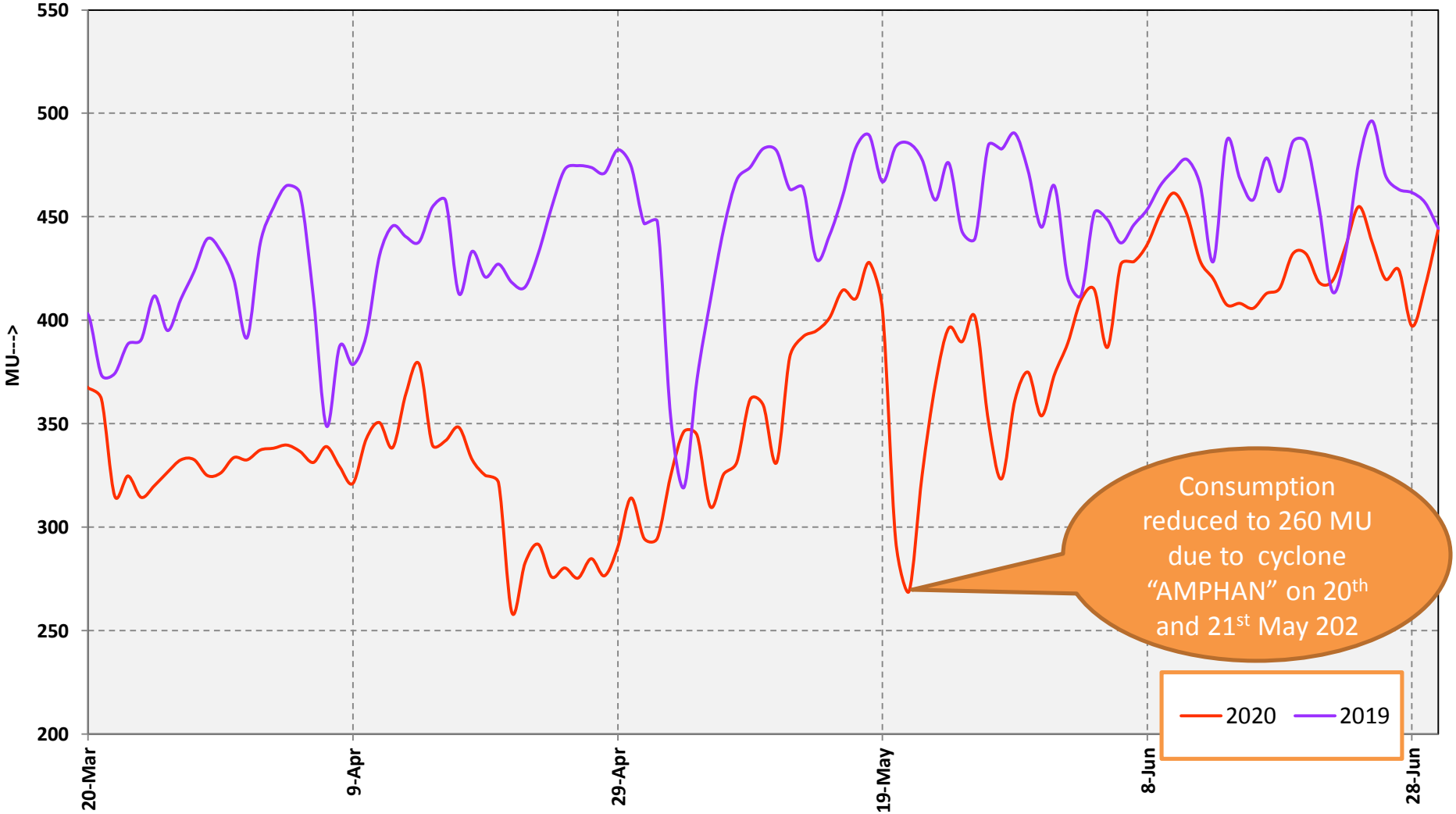
So Far Highest Demand

Constitute	Demand (in MW)	Date	Time	Dmd met (MW) on 24th June'20 (max dmd met day)	
				MW	Time
Bihar	5972	03-Sep-19	20:07	5571	21:02
DVC	3543	21-Dec-19	18:06	2761	20:08
Jharkhand	1470	18-May-20	20:20	1325	19:40
Odisha	5558	23-Aug-18	20:21	4361	22:44
Sikkim	193	24-Jan-20	18:28	95	18:57
W. Bengal	9546	27-May-19	23:31	8267	23:21
ER	23451	21-Aug-19	20:47	21931	22:44

So Far Highest Energy Consumption

Constitute	Energy consumption (in MUs)	Date	Energy met on 24th June'20 (max dmd met day)
Bihar	121.4	02-Sep-19	109
DVC	75.8	12-Jul-18	61
Jharkhand	28.3	25-May-20	26
Odisha	123.5	02-Oct-18	89
Sikkim	2.5	28-Jan-20	1
W. Bengal	199.9	28-May-19	168
ER	506.0	25-Jun-19	455

Daily Consumption pattern of Eastern Region

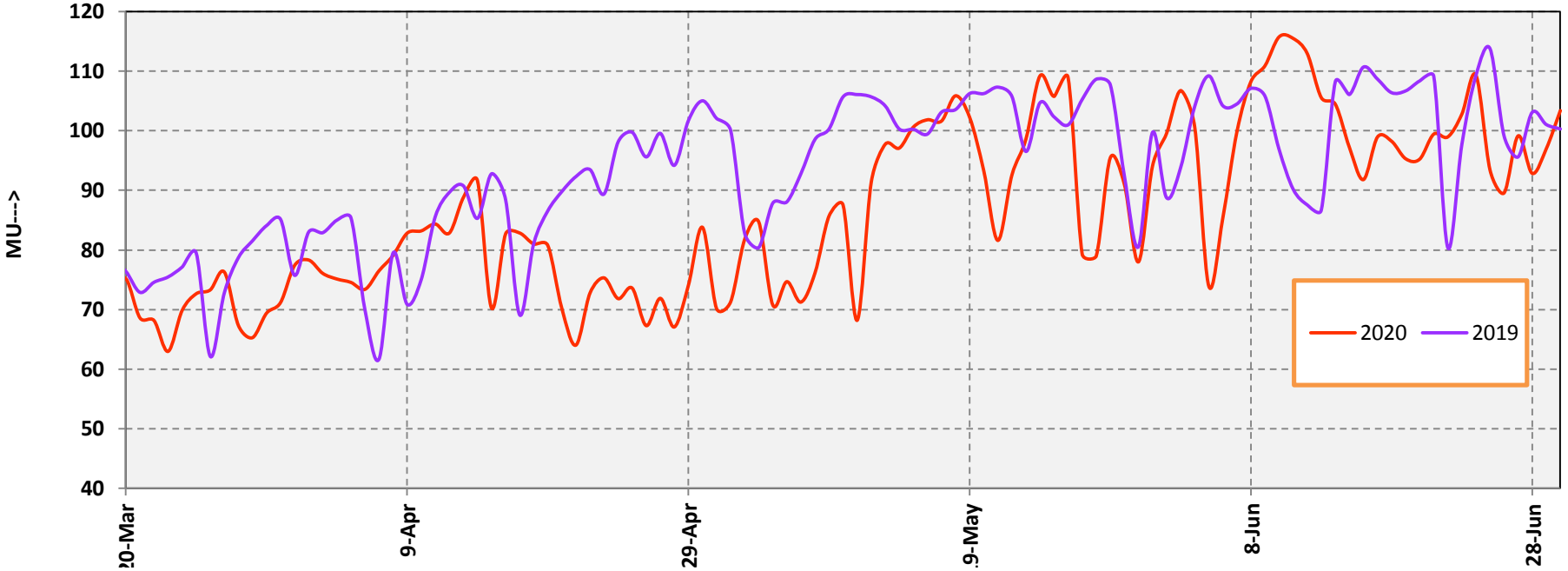


Due to outbreak of COVID-19, All India luck down has been declare as

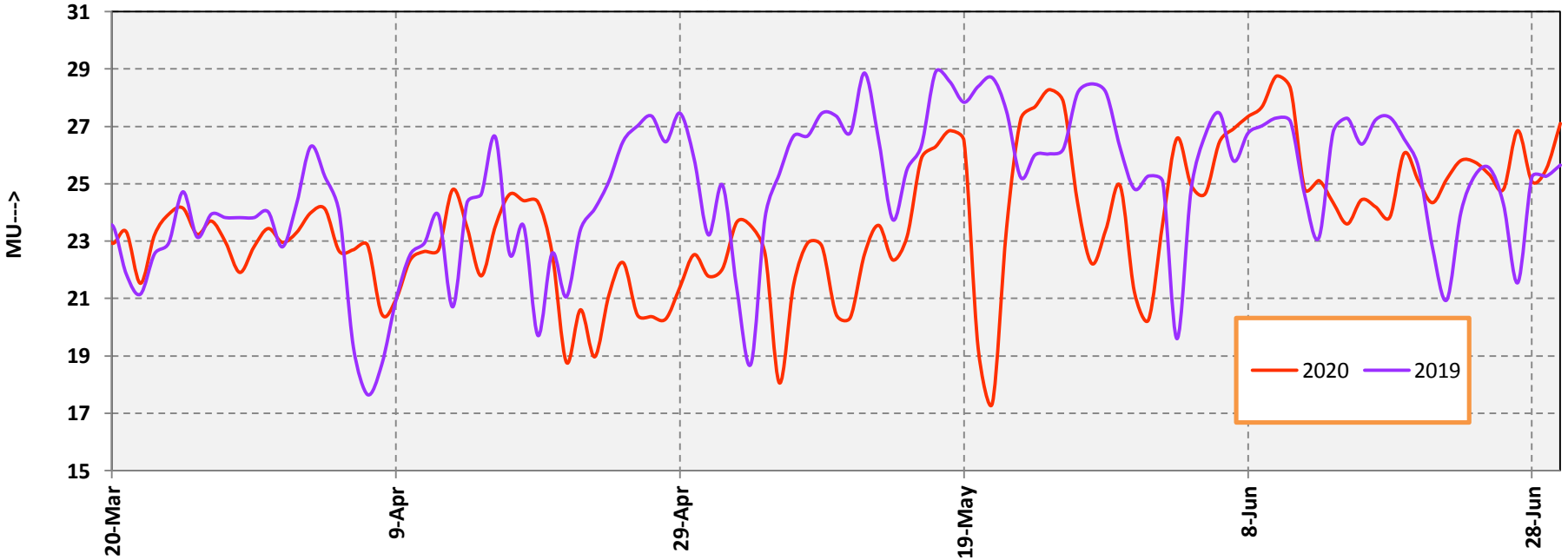
L1: 25-03-20 to 14-04-20 L2: 15-04-20 TO 03-05-20

L3: 04-05-20 to 17-05-20 and L5: 18-05-20 to 31-05-20

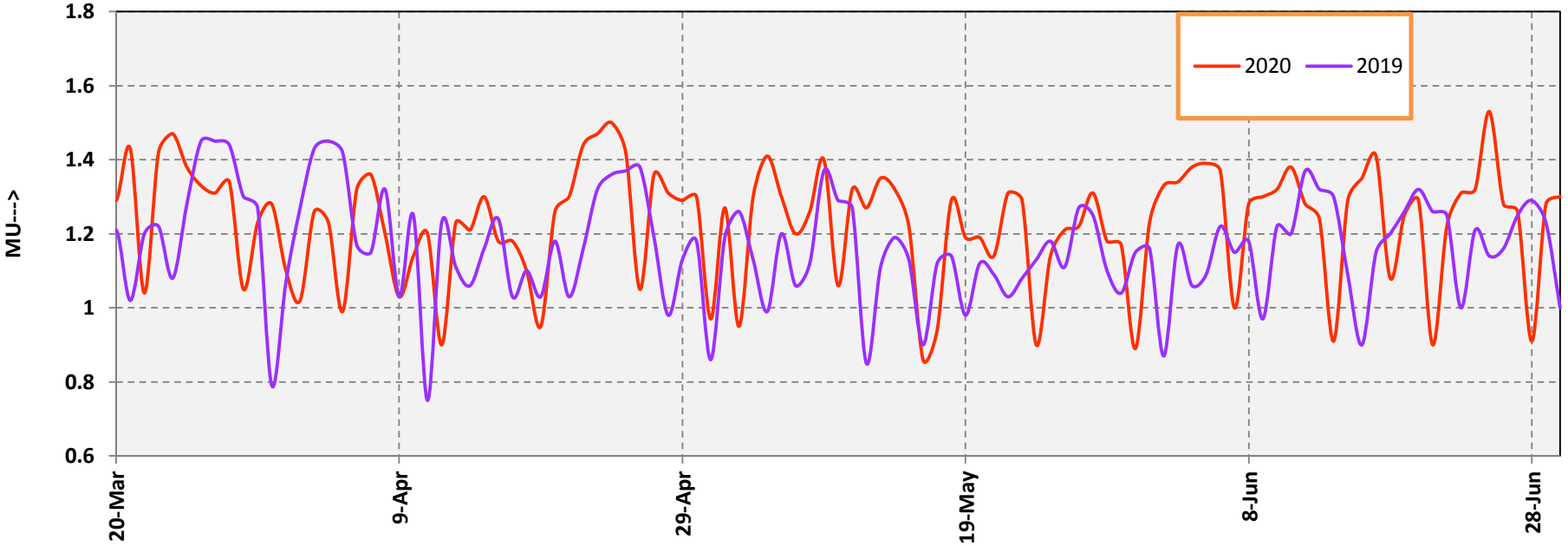
Daily Consumption pattern of Bihar



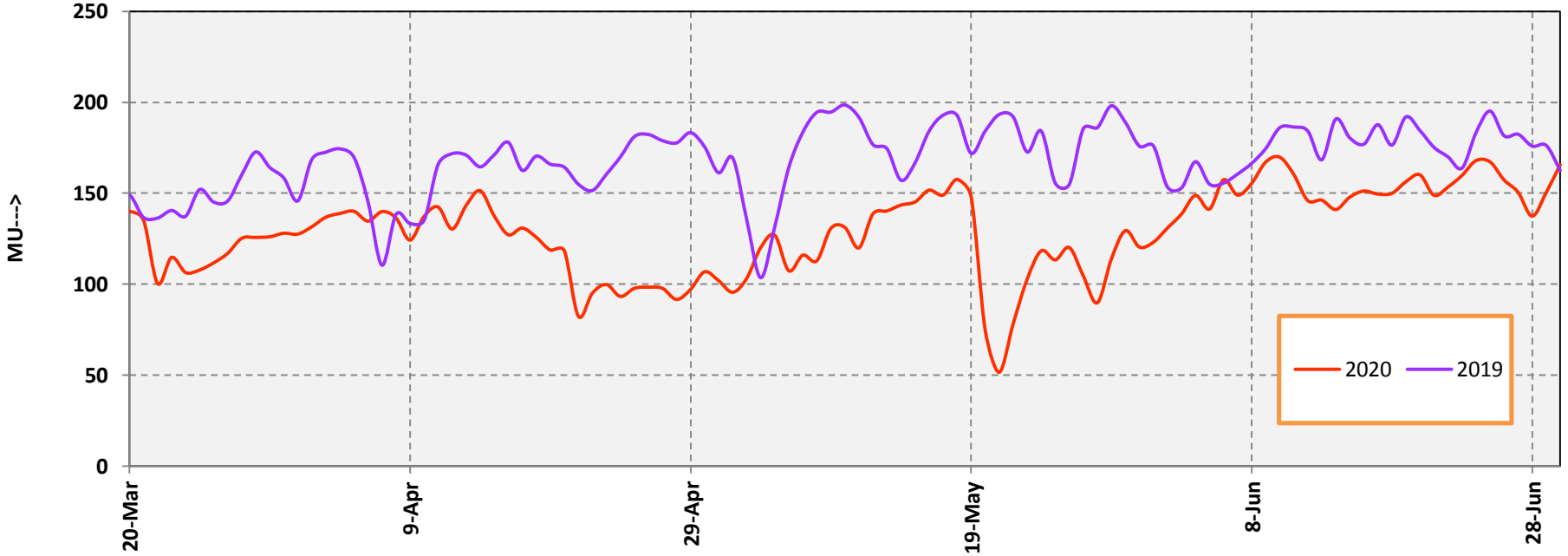
Daily Consumption pattern of Jharkhand



Daily Consumption pattern of Sikkim



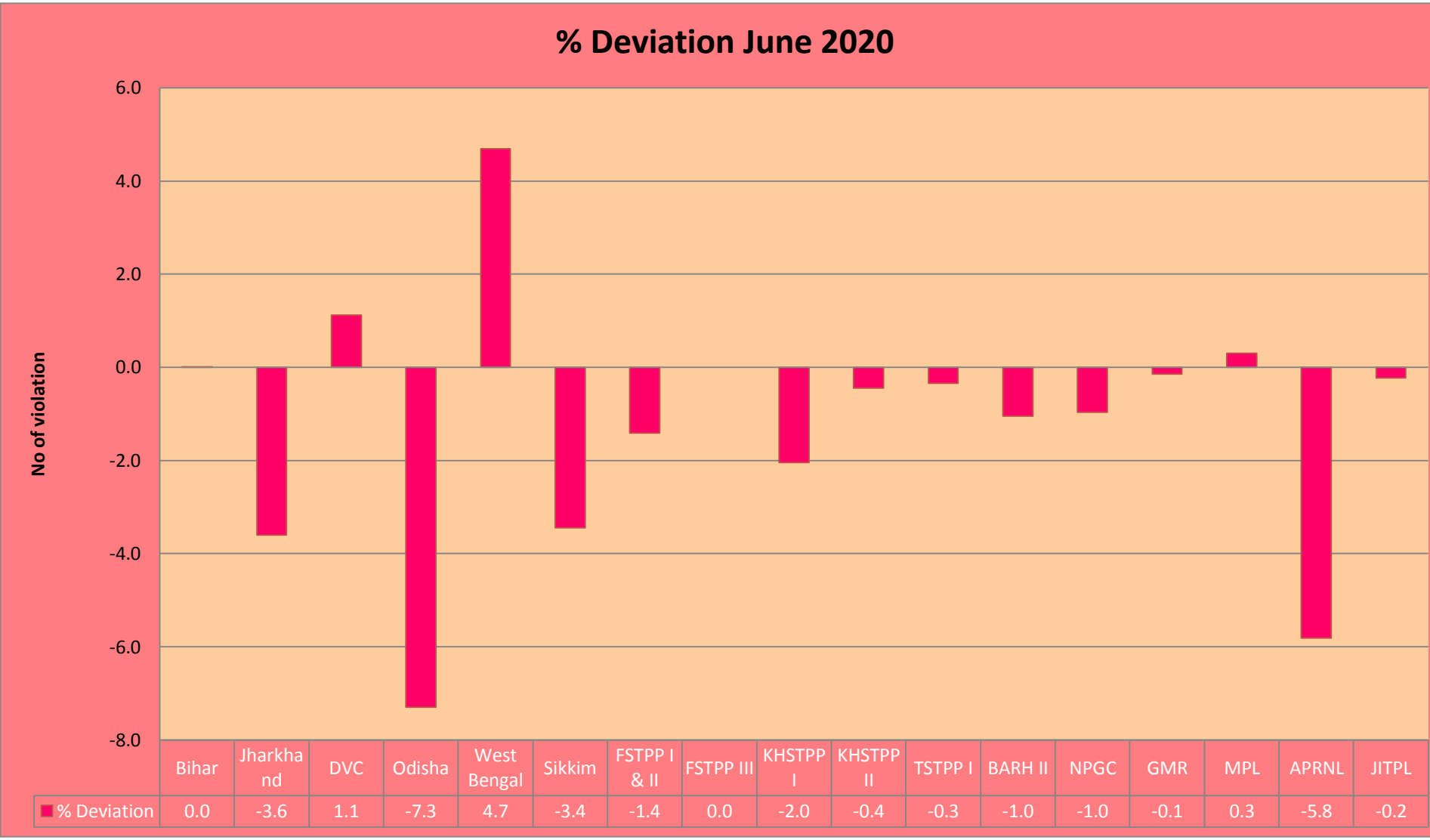
Daily Consumption pattern of WB



June 2020 Schedule vs Actual Status

	Schedule (MU)	Actual (MU)	OD (MU)	Daily Avg OD (MU)	% Deviation
Bihar	2848	2849	0	0.0	0.0
Jharkhand	563	542	-20	-0.7	-3.6
DVC	-1040	-1029	12	0.4	1.1
Odisha	232	215	-17	-0.5	-7.3
West Bengal	1450	1518	68	2.2	4.7
Sikkim	40	39	-1	0.0	**-3.4**
FSTPP I & II	510	503	-7	-0.2	-1.4
FSTPP III	208	205	-3	-0.1	0.0
KHSTPP I	414	405	-8	-0.3	-2.0
KHSTPP II	653	650	-3	-0.1	-0.4
TSTPP I	604	602	-2	-0.1	-0.3
BARH II	542	536	-6	-0.2	-1.0
NPGC	400	396	-4	-0.1	-1.0
GMR	350	349	-1	0.0	-0.1
MPL	469	470	1	0.0	0.3
APRNL	195	183	-11	-0.4	-5.8
JITPL	378	377	-1	0.0	-0.2

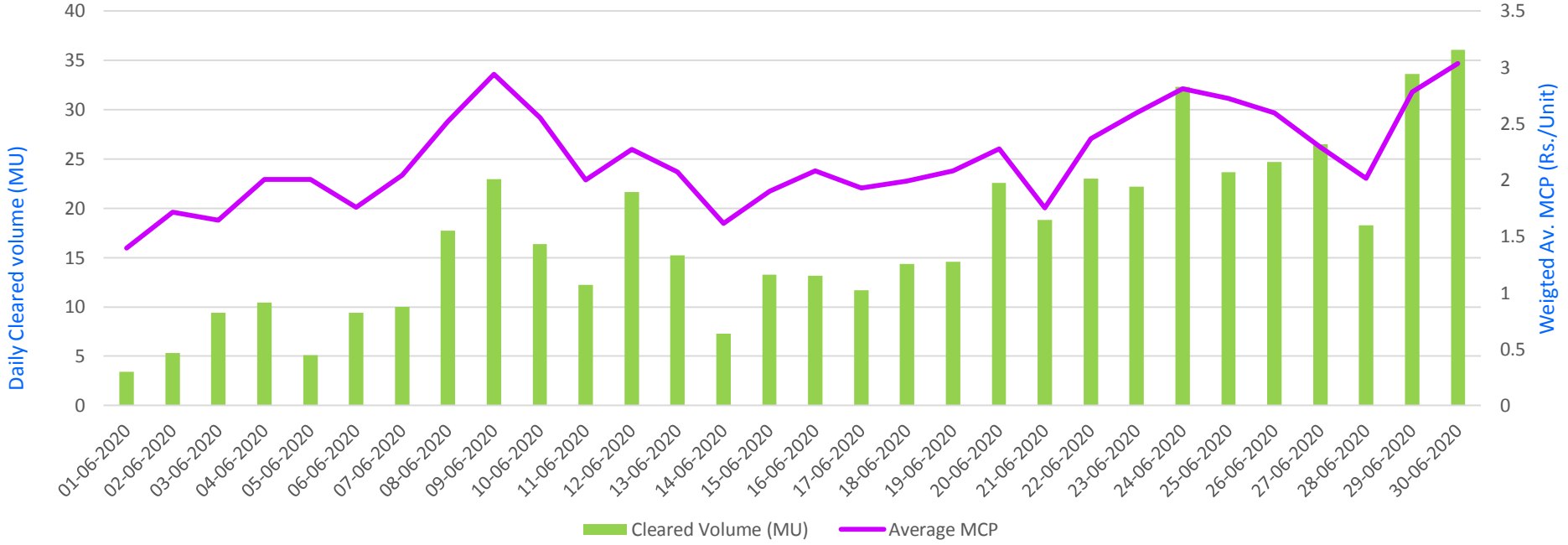
% Deviation June 2020



	Bihar	Jharkhand	DVC	Odisha	West Bengal	Sikkim	FSTPP I & II	FSTPP III	KHSTPP I	KHSTPP II	TSTPP I	BARH II	NPGC	GMR	MPL	APRNL	JITPL
% Deviation	0.0	-3.6	1.1	-7.3	4.7	-3.4	-1.4	0.0	-2.0	-0.4	-0.3	-1.0	-1.0	-0.1	0.3	-5.8	-0.2

RTM Update
June-2020

June RTM Performance (Cleared volume & Average MCP)



July RTM Performance (Cleared volume & Average MCP)

Elements long outages leading to transmission constraint

- 400KV/220KV 315 MVA ICT 1 AT INDRAVATI. was under shutdown since 19-02-2020 for replacement of SF-6 in CB —OPTCL may please update status of restoration.

- 400 kV New Duburi – Meramundali – D/C were out since 19-03-20 due to 3 Nos tower collapsed at Loc. No-17,18 &19 from Meramundali end. —OPTCL may please update status of restoration.

- 400 kV Patna – Kisanganj I&II were out since 01/09/18 & 06/07/19 respectively on tower collapse. Restored on single moose through ERS on 22/01/2020.

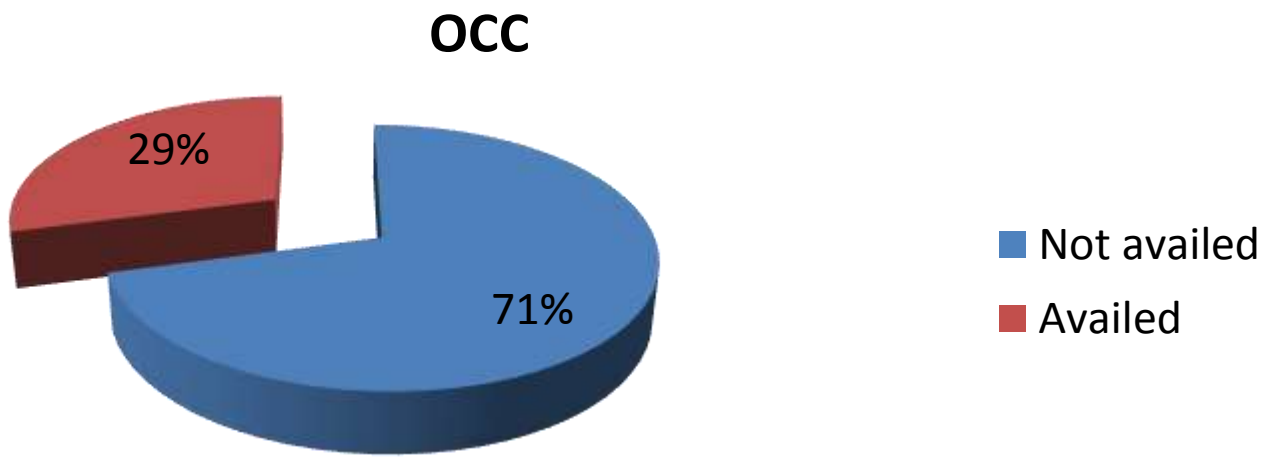
  Shutdown allowed for restoration on Normal tower since 05-07-20 – Powergrid ER-1 may please update status

- 400 KV Gorakhpur –Motihari (DMTCL) – Barh D/C were out since 13/08/2019 and 04/09/19 on tower collapse. 400 kV Barh – Gorakhpur – I & II made direct (bypassing DMTCL S/S) on 05-02-2020 (ckt-I) and 21-01-2020 (ckt - II) respectively. 400 kV Barh - Motihari – II was restored on ERS 19.03.20 and Gorakhpur – Motihari-II was antitheft charged till location 532. – DMTCL may please update restoration plan.

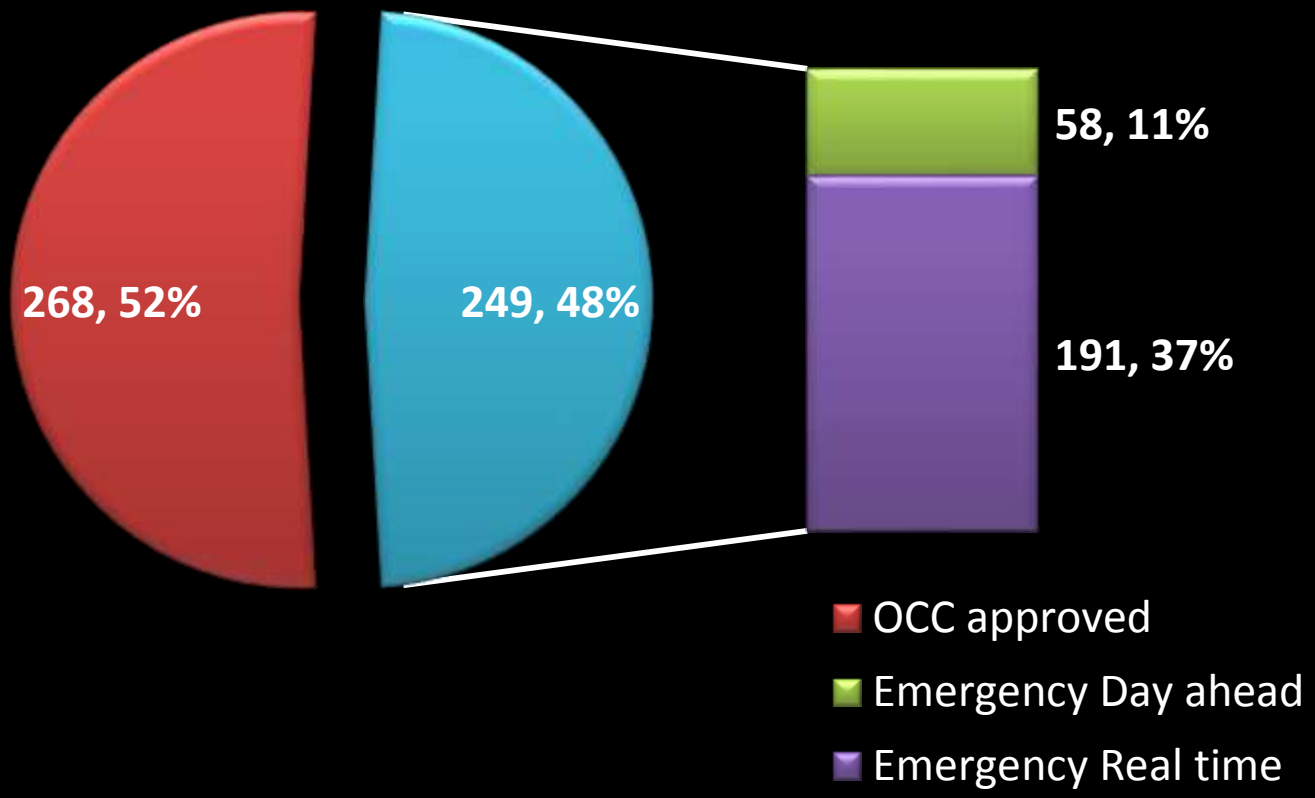
Review of Transmission Elements Outage Approved in 170th OCC-Outage Meeting

170th OCC Shutdown Review

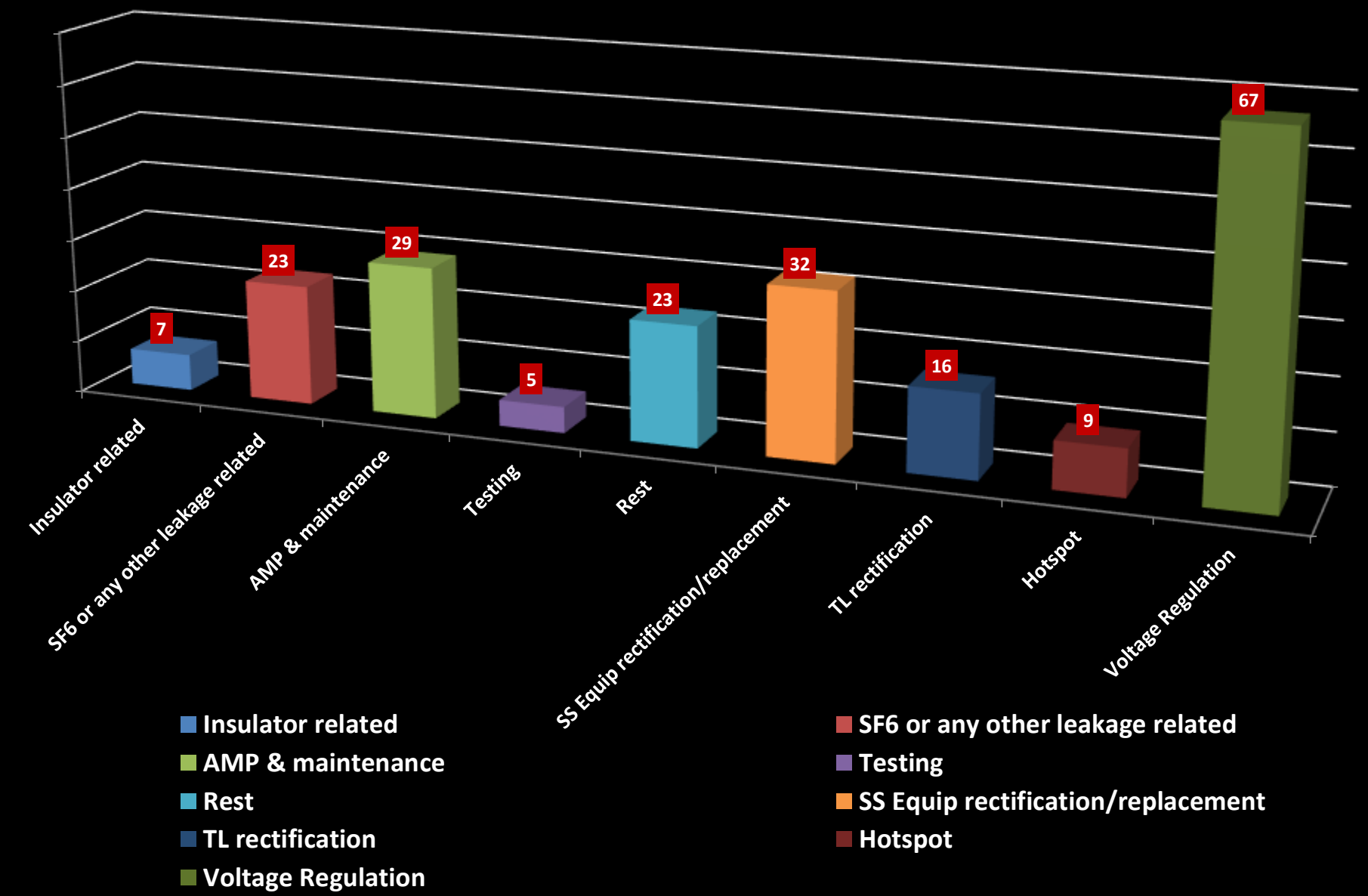
- ✓ Total Number of Outages Approved at OCC – 883
- ✓ Total Number of Outages Applied in (D-3) – 233
- ✓ Total Number of Outages Not Applied in (D-3) - 650
- ✓ Total Number of Outages Approved in (D-2) – 233
- ✓ Total Number of outages Availed on D – 233



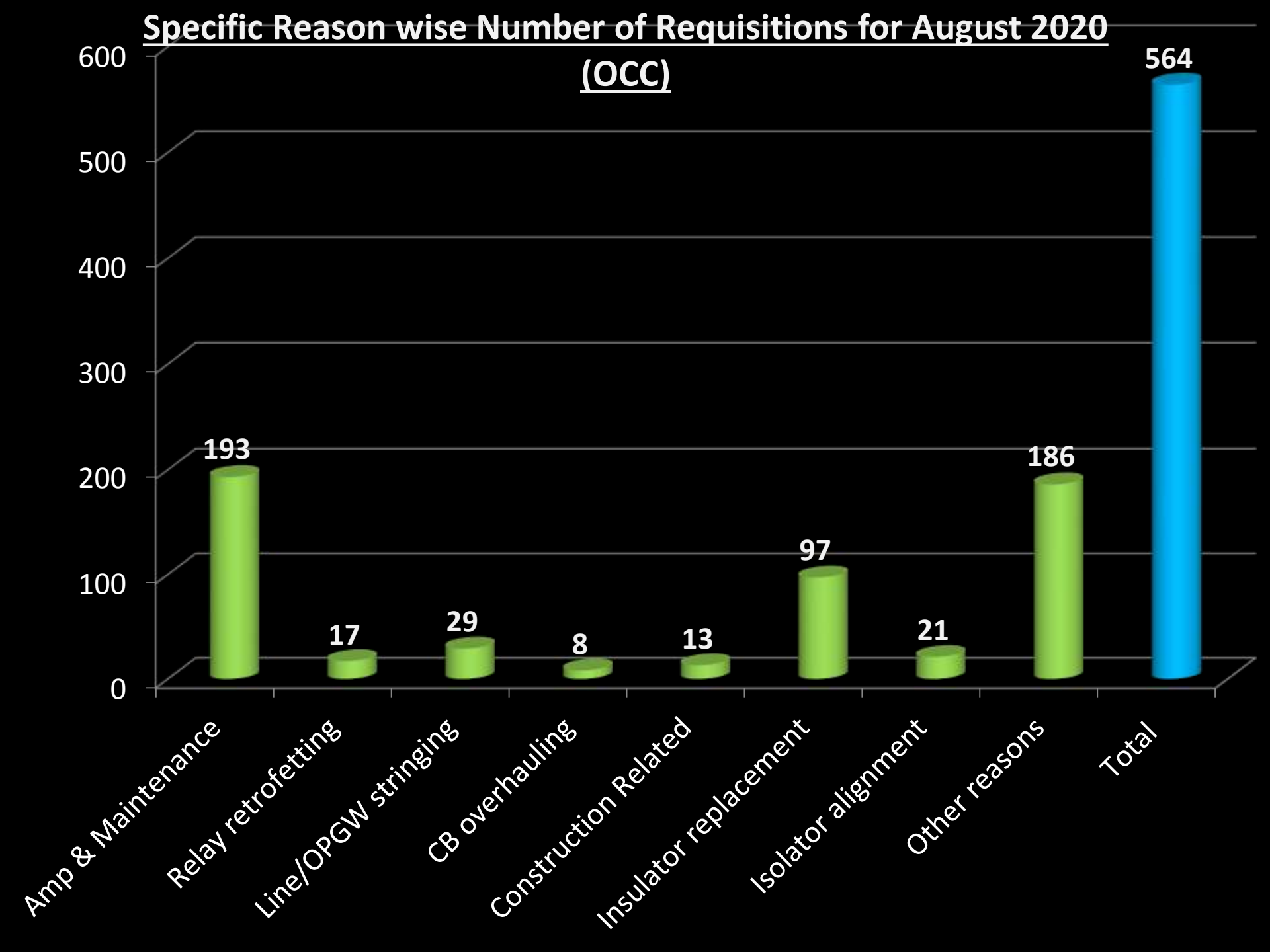
Outages Availed in June 2020



Various outages allowed in the month of June on Realt time basis (D)



Specific Reason wise Number of Requisitions for August 2020 (OCC)



Following Outages were allowed by ERPC secretariat for the month of June 2020 –

- Emergency Shutdown of 400KC D/C Biharsharif- Varanasi CKT- I & II & 400KV D/C Biharsharif- Sasaram CKT-I & II for replacement of Bend cross Arm
- Shut Down of 765 KV Bus-2 to facilitate to Conductor Swing Issue at the entry to Gantry (Bay-09) at Darlipalli
- 400KV Nabinagar - Pusauli Line for the rectification of bent tower at tower Loc-170
- 400kV D/C Purnia-Biharshrif Line shutdown for tower strengthening of 46/9A(DBN+30M) for the span of 1100Mtrs between 46/9A to 47/1
- 765 kV Gaya-Varansai-I for final strengthening of delta type suspension towers (Wind Zone-2) from 25.06.2020 to 27.06.2020 ODB (two extra day due to monsoon i.e on 26.06.2020 and 27.06.2020)

Minutes of the Meeting to discuss the performance of primary frequency response of ISGS and IPP Generating plants in Eastern Region on 23rd July 2020

A meeting to discuss and deliberate on the performance of governor response of ISGS and IPPs generating power plants of Eastern Region, was organised by ERLDC on 23rd July 2020. The meeting started with a welcome address by Sr. General Manager (SO & SS), ERLDC in which he highlighted the importance of frequency control and compliance of the relevant regulatory stipulations by the generators. This was followed by the initiation of discussions on the subject matter by Manager (SS), ERLDC where he focussed on the issues and concerns of system operator on the performance of various ISGS and IPPs observed during the events of sudden frequency change, that occurred during March to July 2020.

After this, ERLDC took up the analysis of response observed of each ISGS and IPPs Power plant for the six frequency events which occurred from March to July 2020 and based on the MoM of last Meeting on RGMO held on 12th July 2019. The summary of the discussions held with generators is provided in attached table.

In addition to the above, a few other issues were also deliberated during the meeting which are as follows:

1. Generators were advised to improve their RGMO logic and its fine-tuning to detect sudden frequency change beyond 0.03 Hz, maintaining the primary frequency response (MW output change) for at least 5 minutes thereafter, and subsequent withdrawal of response with a rate of 1% per minute.
2. It was strictly advised to all the generating plants not to operate their units in Valve Wide open (VWO) mode as this reduces the margin for primary frequency response expected from the generators. Further, if at any point of time a generating unit is compulsorily required to be operated with its primary response out of service, then the same should be immediately informed to RLDC, together with reasons thereof and expected time of resumption of FGMO/RGMO. This is as per provisions of the IEGC.
3. From the DCS data received from many generating stations it is observed that the response variables (plant output MW and speed (RPM)/Frequency (Hz)) are not updating as expected due to improper setting in the DCS system and resolution of the data is inferior to one sample per second. It was decided that all generating plants would explore all possibilities for providing DCS data of better resolution and accuracy by changing the logic implemented for the update of data in their DCS system.

4. For all future frequency events, after receiving intimation from ERLDC, all generating plants will extract their respective DCS data with resolution of one sample per second, analyse their Units' response, evaluate the actual response as percent of the ideal response and find out the reason for inadequate response, if any. The analysis will also be submitted to ERLDC.

The meeting ended with vote of thanks from CM (SS), ERLDC and all generators assured to take corrective action as discussed during this meeting. ERLDC's presentation along with list of participants is given in Annexure I.

Table 1: Generator Primary Frequency Response and Meeting Discussion

Generating Power Plants	Response of the Power Plant on 12th July 2019 as observed from ERLDC SCADA data/Power Plant Data	Course of Action decided during Last Meeting on 12th July 2019	Response Discussed on 22nd July 2020	Status on Course of Action and Future work
Farakka NTPC	**Stage 1 (3 X 200 MW):** Old Siemens Make SSI system where finetuning of RGMO is not feasible.	**Stage 1:** Old system would be replaced with new BHEL make MAX DNA DCS system. during the AOH, as per latest LGBR. RGMO tuning would be completed after such upgradation.	Response is not adequate for all the units.	Status of upgradation : For unit 3 R&M has been completed in Feb 2020. Its Tuning will be shortly taken up with proper testing plan. Due to COVID19, R&M of the other two units Planned in Feb 2020 are now postponed as vendor has left the site
	Stage 2 (2 X 500 MW): Performance is being monitored.	**Stage 2 (U-4 & U-5):** Further finetuning will be carried out if the performance is not adequate.	Unit 4 and 5 response is not adequate. BHEL has completed the governor controller tuning but RGMO tuning was not completed by them due to COVID19.	NTPC has implemented the RGMO logic for Unit 4 & 5, and will complete its tuning by 15th Aug 2020.
	Stage 3 (500 MW): Software has been upgraded for the better response of Governing system	**Stage 3:** Finetuning of parameters will be done by NTPC for better response.	Ok	Ok.

Generating Power Plants	Response of the Power Plant on 12th July 2019 as observed from ERLDC SCADA data/Power Plant Data	Course of Action decided during Last Meeting on 12th July 2019	Response Discussed on 22nd July 2020	Status on Course of Action and Future work
Kahalgaon NTPC	**Stage 1 (4 X 210 MW):** These are Russian make old units having mechanical governor. The performance of Unit 4 is not good due to the control valve issue.	**Stage 1 (4 X 210 MW):** During the next AOH, issue of Unit 4 will be rectified for better response.	Response is not adequate and is not sustaining.	Unit 3 Tuning has been done and for other units tuning will be done during next AOH
	Stage 2 (3 X 500 MW): The response is unsatisfactory even after tuning.	**Stage 2 (3 X 500 MW):** The matter of poor response has been taken with BHEL. Unit 6 and 7 will be tuned by mid of August 2019, for which no shutdown would be required.	Stage 2 Units have been tuned. Response will be checked for recent events.	NTPC to share the unit wise performance after tuning.

Generating Power Plants	Response of the Power Plant on 12th July 2019 as observed from ERLDC SCADA data/Power Plant Data	Course of Action decided during Last Meeting on 12th July 2019	Response Discussed on 22nd July 2020	Status on Course of Action and Future work
Talcher NTPC	**Stage 1 (2 X 500 MW):** Old GE make Units and poor response is observed.	**Stage 1 (2 X 500 MW):** NTPC informed that the GE make units 1 & 2 are quite old and their performance had been unsatisfactory since beginning. However, the vibration problem of U-2 has been rectified by the OEM. It was further stated by NTPC that their corporate engineering has taken up the matter with GE and their response is awaited. There are plans to attend to the governor problems during the next overhauling in November 2019. ERLDC requested NTPC to update any development on this front.	Unit 1 R& M was completed in Feb and Emereson Governor has replaced old GE governor.	Fine tuning of governor response of Unit 1 is not completed and will be done at earliest. Unit 2 R&M will be completed during planned Nov-Dec 2020 AOH activity.

Generating Power Plants	Response of the Power Plant on 12th July 2019 as observed from ERLDC SCADA data/Power Plant Data	Course of Action decided during Last Meeting on 12th July 2019	Response Discussed on 22nd July 2020	Status on Course of Action and Future work
	Stage 2 (4 X 500 MW): Unit 3 is providing an oscillatory response. Other units' performance was also not satisfactory	**Stage 2 (4 X 500 MW):** The oscillatory response observed for unit 3 will be rectified in the AOH. Unit 4,5 and 6 response will be tuned by the end of Mid Sept 2019.	Response is observed but not sustaining and is not consistent. MW, Speed etc. data for Stg-2 should have resolution of one sample per second.	Unit 3-6, Tuning for governor to be done with help of DVC for sustained response and gradual reduction with 1 % limit. Possibility of DCS data with higher resolution and accuracy will be explored.
Barh NTPC	**Unit 4 and 5 (2X660 MW):** NTPC Barh units have Siemens make governor whose response was not satisfactory. Barh responded that they have adopted the logic from NTPC Mouda whose performance is good and will implement the same. In addition, there are some limitation due to boiler and need modification.	**Unit 4 and 5:** NTPC Barh intimated that new logic (RGMO) will be implemented in Barh Units by end of Aug 2019, together with tuning of AGC software. The modification in the boiler will be completed during the AOH of the Units as per LGBR schedule.	Unit 4 response has improved with boiler modification by Siemens. Unit 5, Boiler modification work is pending and response is not adequate and sustaining in nature.	For unit 4, fine tuning of governor logic will be done within a week with helps of Siemens. Unit 5 boiler modification and fine tuning to be taken up by NTPC by next AOH. In the meantime, RGMO logic of Unit 4 will be implemented for U-5 also after successful validation in the Unit4. Possibility of DCS data with higher resolution and accuracy will be explored.

Generating Power Plants	Response of the Power Plant on 12th July 2019 as observed from ERLDC SCADA data/Power Plant Data	Course of Action decided during Last Meeting on 12th July 2019	Response Discussed on 22nd July 2020	Status on Course of Action and Future work
BRBCL	The response of the units is not satisfactory. Change in frequency is not being correctly detected. Correction in load reference (in response to frequency change) is being generated after 1 minute.	BRBCL intimated that they will implement the new logic for RGMO within 2 weeks and will share the response with high-quality data for analysis.	Unit 3 response is good while unit 1 and 2 are providing response but not adequate.	Unit 3 logic has been implemented and response has been observed to be satisfactory. RGMO has been implemented in Unit 1 and 2 and final testing and fine tuning will be completed by Aug 2020.
NPGC Nabinagar			Hunting has been observed in some events and the response in some event is not satisfactory.	Overload Valve hunting were observed which has been rectified and a report will be shared with ERLDC. Response has been tuned and for recent event response will be checked and report on the same will be shared.
Darlipalli	Unit 1 (800 MW)		Unit was not in service during all the events except event 2. During event 2, unit was being ramped up prior to the event. As such its response couldn't be verified.	NTPC To check the response of its Unit 1.

Generating Power Plants	Response of the Power Plant on 12th July 2019 as observed from ERLDC SCADA data/Power Plant Data	Course of Action decided during Last Meeting on 12th July 2019	Response Discussed on 22nd July 2020	Status on Course of Action and Future work
GMR	The units are Chinese make. Response is observed; however, it is not adequate	GMR will fine-tune and improve the logic for detection of frequency event and Response will be analysed during the next frequency event to find whether any improvement has taken place.	RGMO gets automatically disabled at Tech min of 55 % which has been rectified by GMR and set at 35 % now. Further, for units 1 & 2 Control Logic problem in providing auto-response was there, but now the same has been rectified. One particular valve in HP turbine was getting stuck. U3 does not have such problem. So, now RGMO response will be there even if unit is running at Technical minimum.	HP Control Valve issue is there due to which lagging response is observed for unit 1 & 2 and it has been taken up with OEM and based on opportunity it will be resolved.

Generating Power Plants	Response of the Power Plant on 12th July 2019 as observed from ERLDC SCADA data/Power Plant Data	Course of Action decided during Last Meeting on 12th July 2019	Response Discussed on 22nd July 2020	Status on Course of Action and Future work
JITPL	Poor Response has been observed.	No JITPL representative attended the meeting.	Response in not proper as its increases for first 10 seconds and comes down to same value. After that there is no response observed. Data is also not good and need better precision to provide better input for analysis of frequency response.	Even after intimation no representative from JITPL attended the meeting. This was the third repeated absence of JITPL in Meeting on RGMO. JITPL has been intimated to provide the response and sustain it followed by reduction with 1 % rate.
MPL	Good Response was observed in many cases and fine-tuning is being done as per the event response. U1 was generally operating in VWO mode.	MPL intimated that they have changed the settings for sliding pressure curve which has provided better response and the units are being operated in throttled valve condition rather than VWO to give the response as per IEGC.	Unit 1 response is good. Logic of Unit 1 is now implemented in unit 2 where a time delay for response to sustain for 3 min has been introduced. MPL further informed that ramping in response to frequency change poses difficulty if the unit is already operating at its technical minimum level as significant drum level fluctuation occurs.	Unit 2 will be tuned for sustaining the RGMO response with backing down at 1 % rate after the RGMO response.

Generating Power Plants	Response of the Power Plant on 12th July 2019 as observed from ERLDC SCADA data/Power Plant Data	Course of Action decided during Last Meeting on 12th July 2019	Response Discussed on 22nd July 2020	Status on Course of Action and Future work
APNRL	Based on data recorded at ERLDC, response of APNRL units has been observed to be delayed and inadequate. APNRL informed that they will send the data for these events where satisfactory response has been obtained as checked by them.	APNRL intimated that frequency influence detection and associated action were intentionally having a delay to check the RGMO logic. The delay has now been removed and better response can be observed from now onwards.	New logic for RGMO has been implemented. The logic has been verified by simulation but in field it has been observed that the desired signal is actually not getting transmitted to the final control element. This is being sorted out. RGMO logic and governor controller tuning is to be done as response is adequate but starts with 3-4 minutes delay.	Delayed response will be resolved in Next 15 days (1st week of Aug 2020)
Teesta V	Generation response is slow during frequency response event.	Teesta V intimated that they will check the RGMO software and remove any delay in the governor control to provide an adequate response.	Response during frequency change events were not satisfactory for many events. Delay in governor response has been resolved as observed from the recent events.	Teesta V has shared the information that they are running at full load in the ongoing high hydro season. So response is not there in many events. However, during lesser generation with available margin response is observed.

Generating Power Plants	Response of the Power Plant on 12th July 2019 as observed from ERLDC SCADA data/Power Plant Data	Course of Action decided during Last Meeting on 12th July 2019	Response Discussed on 22nd July 2020	Status on Course of Action and Future work
Teesta III	The response of Teesta III Units is fast, adequate and sustaining.	Teesta III intimated that they have tuned their RGMO logic due to which they are now able to provide good response.	Teesta III response is good and satisfactory	Adequate Response during all events. However, there is scope for improving response of U6 which needs to be looked into by TUL
Dikchu	Dikchu intimated that they have not implemented RGMO, so units are run under FGMO.	Dikchu will take help from Teesta 3 to fine-tune their primary response.	Dikchu has implemented FGMO logic for its units. However, RGMO is also possible with manual intervention	FGMO should be with manual intervention so that during recovery of frequency below 50.0 Hz , after a frequency dip has occurred in the system, there is no reduction in generation.

Annexure 1

List of participants who attended the meeting held on 23rd July 2020 to discuss the perfromance of primary frequency response of ISGS and IPP generating units in ER.				
Sr No	**Name**	**Email Address**	**Company Name**	**Job Title**
1	RAGHUNATH P V	raghunath.p@gmgroup.in	GMR kamalanga energy limited	Operations
2	Ajay Bangde	ajaybangde@adhunikpower.co.in	APNRL	GM
3	Ajay Kumar	ajaykumar03@ntpc.co.in	NTPC/BRBCL	
4	Akhouri Prasad	aaprasad@ntpc.co.in	NTPC Ltd	AGM
5	Alok Mahto	alokmahto@ntpc.co.in	NTPC LTD	AGM (EEMG)
6	BAIKUNTHA DALAL	dalal2002@gmail.com	NTPC	
7	BANAMALI MOHANTA	banamali.mohanta@gmrgroup.in	GMR	ASSOCIATE GENERAL MANAGER
8	BIPLAB CHATTERJEE	biplab1234@gmail.com	Tata Power Limited	
9	Devendra Kumar Bathula	devendra.b@teestaurja.com	Teesta 3	DGM
10	J C Patra	jcpatra@ntpc.co.in	Talcher NTPC	
11	Kranthi Kumar Vellanki	kranthikumar.v@greenkogroup.com	Dikchu H.E.P	AGM (O&M)
12	MANISH KUMAR	teestav.maintenance@gmail.com	Teesta-V Power Station	
13	Makarand Prakash Joshi	makarandprakash.j@greenkogroup.com	Dikchu H.E.P	Plant Head
14	NASEEM MD	mnaseem@ntpc.co.in	NTPC	
15	P MOHANTY	pmohantyntpc@gmail.com	NTPC Ltd	AGM(Operation)
16	PUSPA MAHAPATRA	pbehera@ntpc.co.in	NTPC LTD	service
17	RAHUL ANAND	rahulanand@ntpc.co.in	NTPC	Sr. Manager ER1
18	Rahul Sharma	rahulsharma@ntpc.co.in	NTPC	
19	Raj Protim Kundu	rajprotim@posoco.in	POSOCO	
20	SAIKAT BARMAN	saikat.barman@rpsg.in	HALDIA ENERGY LTD.	
21	SUSOVAN CHOUDHURY	susovan.choudhury@rpsg.in	CESC LTD	Deputy General Manager
22	Saurabh Kumar	saurabhkumar01@ntpc.co.in	BRBCL	Manager
23	Saurav Sahay	saurav.sahay@posoco.in	POSOCO ERLDC	
24	Soumya Mukherjee	soumya.mukherjee@rpsg.in	Haldia Energy Limited	Deputy Manager-Operations

Sr No	Name	Email Address	Company Name	Job Title
25	Soumyadip Baral	soumyadip.baral@tatapower.com	Maithon Power Limited	Lead Control Desk Engineer-Operations
26	Sudhansu Sahoo	eemgtstps@ntpc.co.in	NTPC Ltd	
27	Sumanta Padhi	sumanta.padhi@andritz.com	Teestaurja Ltd	Team Member
28	Surajit Banerjee	surajit.banerjee@posoco.in	POSOCO ERLDC	Sr. GM
29	TUSHAR KANUNGO	tusharkanungo@ntpc.co.in	NTPC LTD	
30	V P SRIVASTAVA	vpsrivastava@ntpc.co.in	NPGCL	
31	Chandan Kumar	chandan@posoco.in	POSOCO ERLDC	Manager

Performance of regional generating units in Eastern Region

March – July 2020

Calculation of Generation response

Analysis of the event:

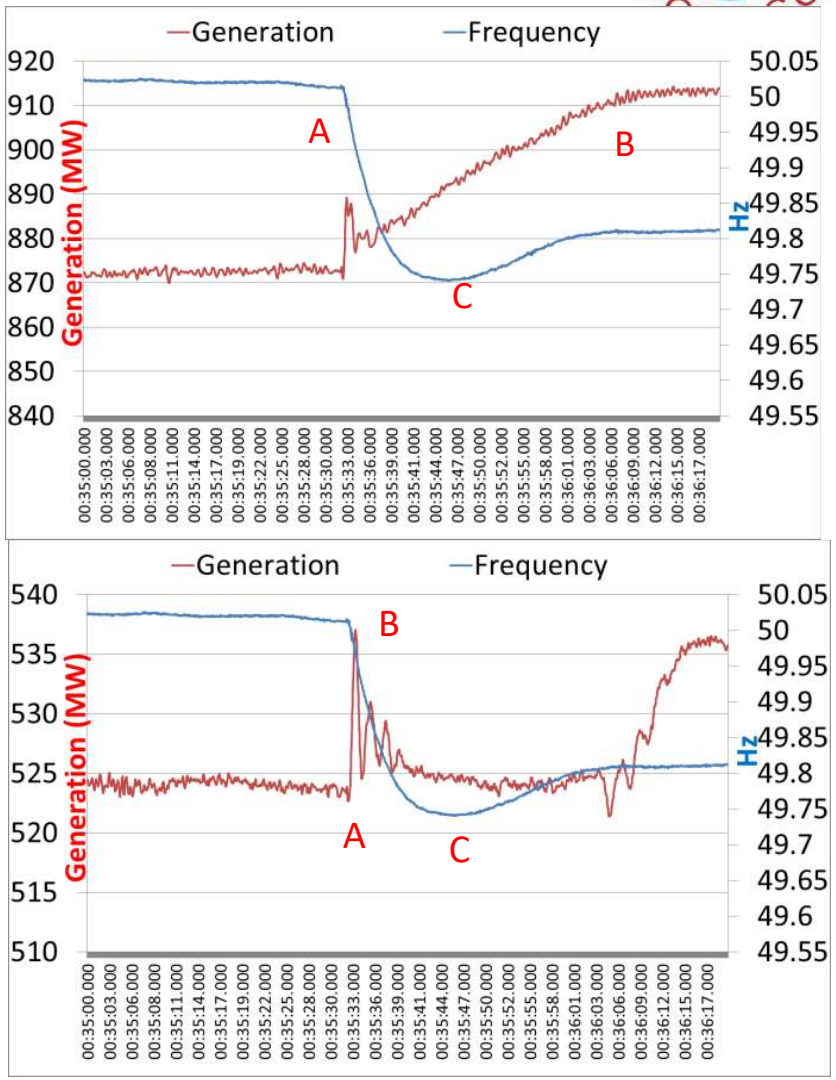
Time to reach full response (T): Tb – Ta

Frequency change during the event (F): Fc - Fa

Response observed (P): Pb – Pa

Ideal response (P_{ID}): F/2.5*(Installed Capacity) subjected to 5% of initial generation

Duration of the response: Time duration between Tb and the instant when withdrawal of governor response started.

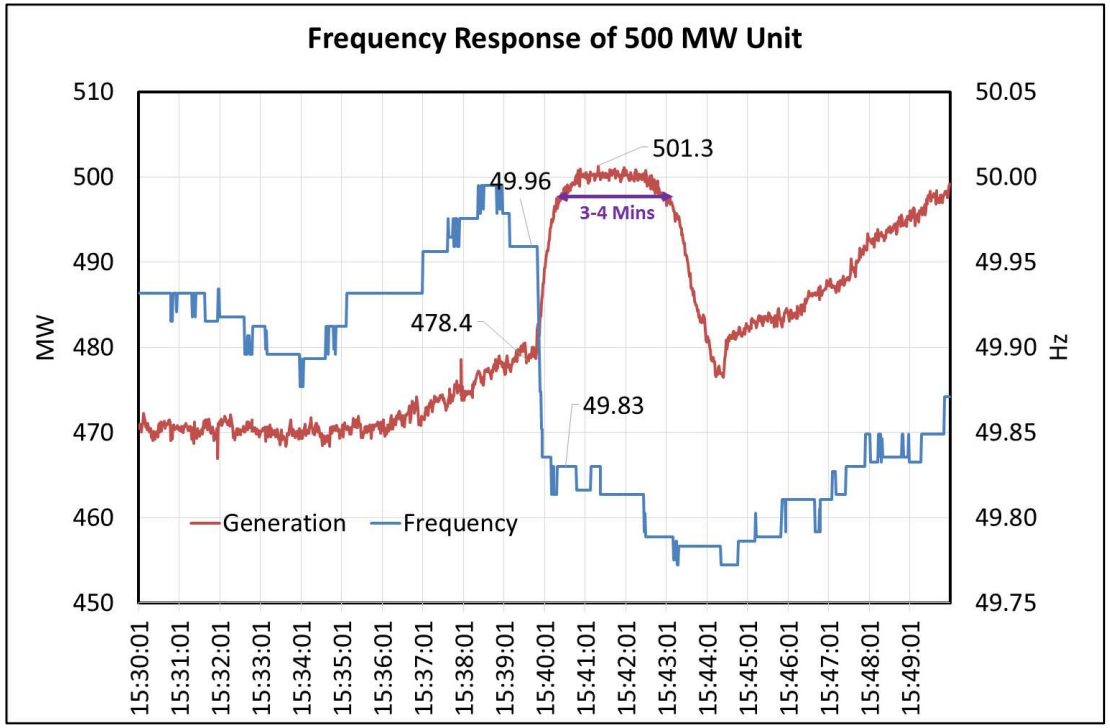


Event date & time	Frequency change observed	Generation change observed	% of ideal response	Duration of the response	Time to reach final response	Reason for non-satisfactory response

Non-satisfactory response

- **Response will be considered non-satisfactory in case of any event if**
  - % of ideal response < 80%
  - Response observed is oscillatory in nature
  - Time taken for final response was more than 30-60 seconds
  - Response did not sustain for the duration of 3 min or ramping rate more than 1% per min during withdrawal of the response

What is Adequate Governor Frequency Response



Delta f = 0.13 Hz

Droop = 5% , MCR = 500 MW

Ideal Response = (0.13/50) x (100/5) x 500 = 26 MW

Actual response = 22.9 MW = Delta P observed

Actual response as % of Ideal Response = 88 %

Summary of the events

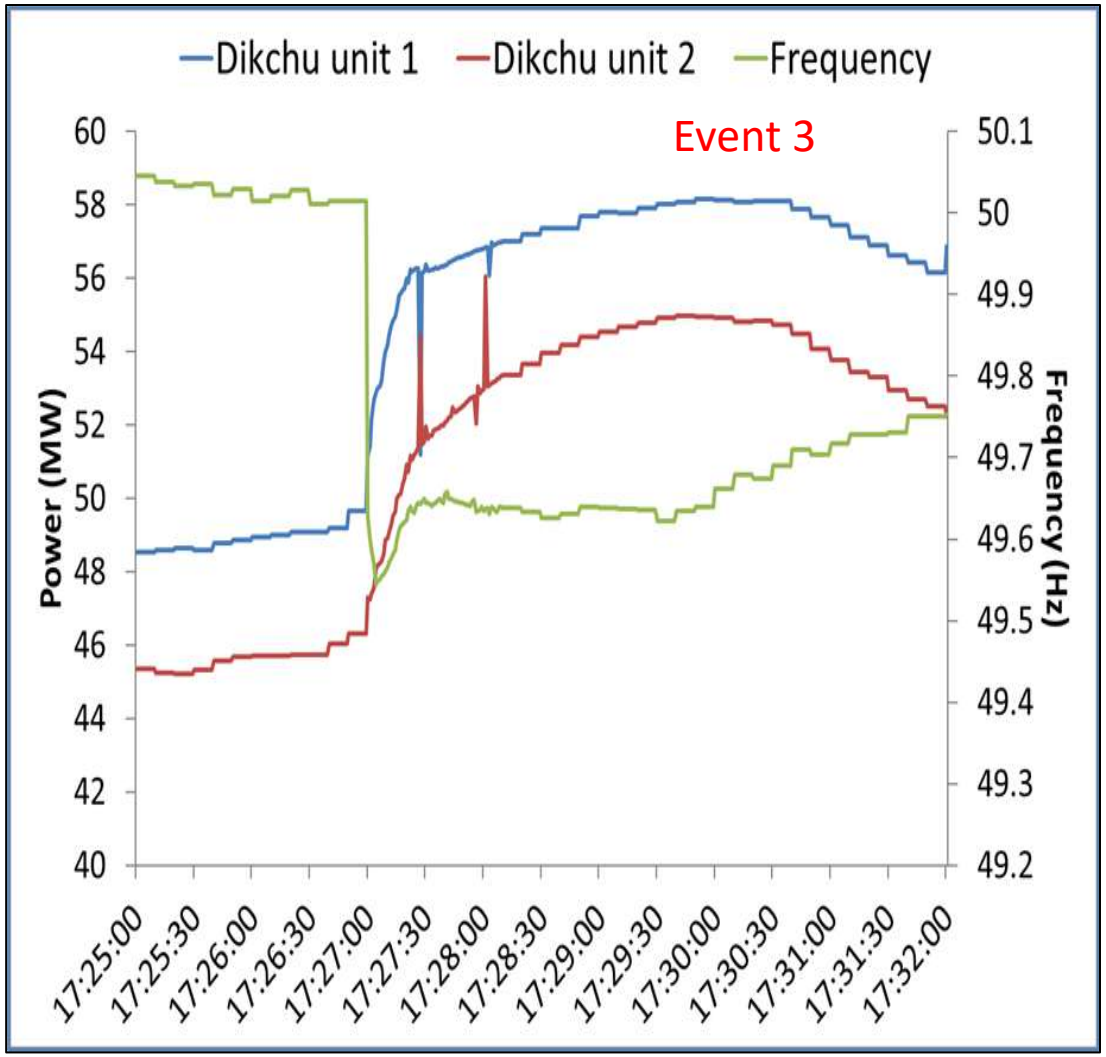
Event No	Event Descript	Frequency change	ER FRC
1	**01st March 2020, at 6:09:25:680 hrs**, 1340 MW hydro generation loss at Naphtha Jhakri Complex in NR.	**50.012 Hz to 49.969 Hz**. Frequency reduced to **49.88 Hz at Nadir point**.	23%
2	**19th March 2020, at 14:36:50 hrs**, 1139 MW generation loss occurred at JPL	**50.051 Hz to 49.976 Hz**. Frequency reduced to **49.941 Hz at Nadir point**.	26%
3	**28th May 2020, at 17:26:50.760 hrs**, 5346 MW generation loss at Sassan, Vindhyachal and Rihand STPP in WR.	**50.021 Hz to 49.549 Hz**. Later stabilized at 49.649 **Hz.**	20%
4	**11th June 2020, at 11:59:28:840 hrs**, 2100 MW generation loss at Bhadla in NR.	**50.06 Hz to 49.80 Hz**. Later stabilized at 49.93 **Hz.**	9.5 %
5	**14th July 2020, at 14:10:51.560 Hrs**, 975 MW generation loss at Koyna in WR.	**50.00 Hz to 49.90 Hz** at nadir point. Later it stabilized at **49.96 Hz**	11%
6	**16th July 2020 at 16:27:21.480 Hrs**, 1400 MW generation loss at Teesta III and Dikchu.	**49.99 Hz to 49.86 Hz** at nadir point. Later it stabilized at 49.91 Hz	35%

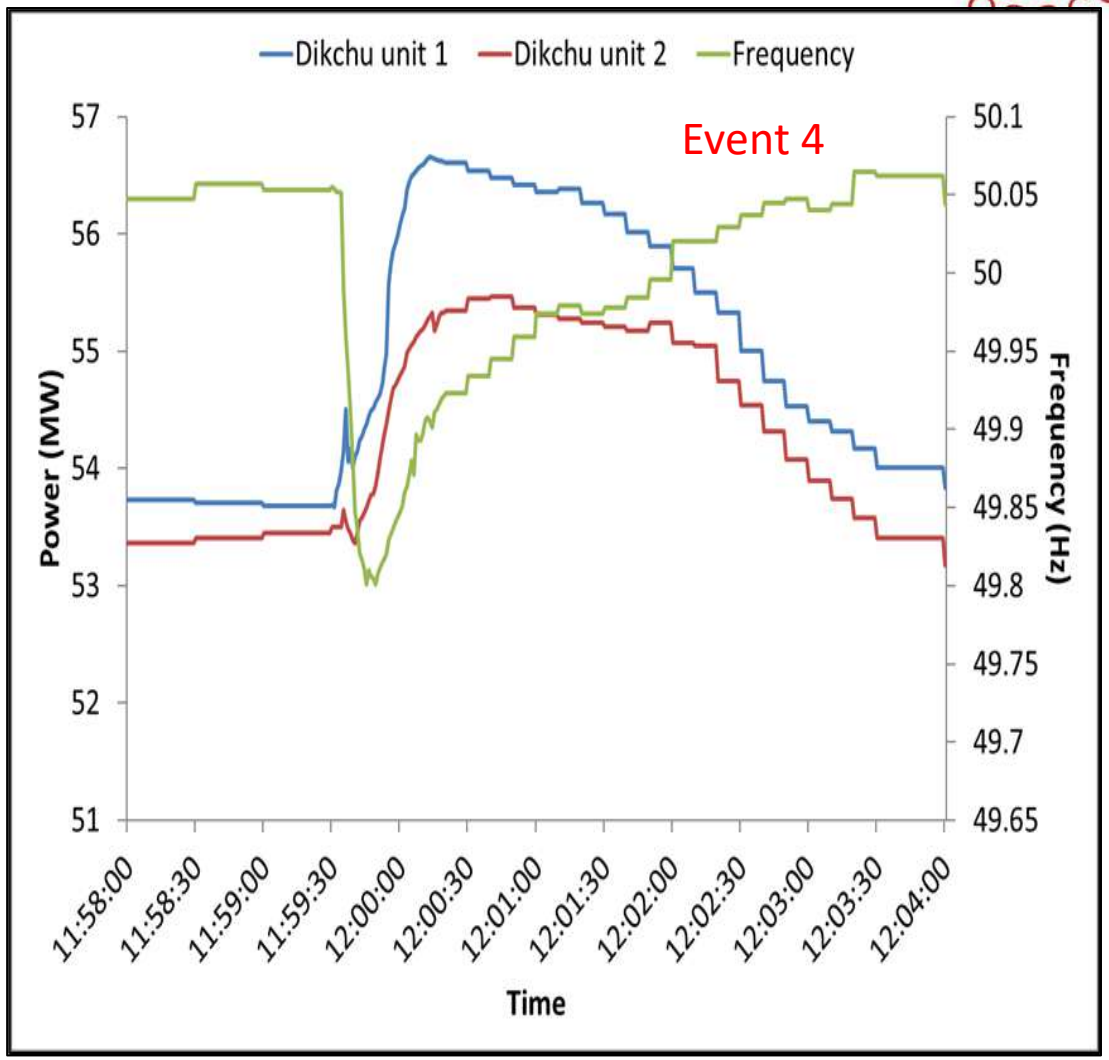
Hydro units

Dikchu

Event No	Response observed
01st March 2020, at 6:09 hrs	Unit was not in service
19th March 2020, at 14:36 hrs	Unit was not in service
28th May 2020, at 17:26 hrs	Satisfactory
11th June 2020, at 11:59 hrs.	Satisfactory
14th July 2020, at 14:10 Hrs	Satisfactory (As per FRC)
16th July 2020 at 16:27 Hrs,	Unit was involved in the event.

Dikchu

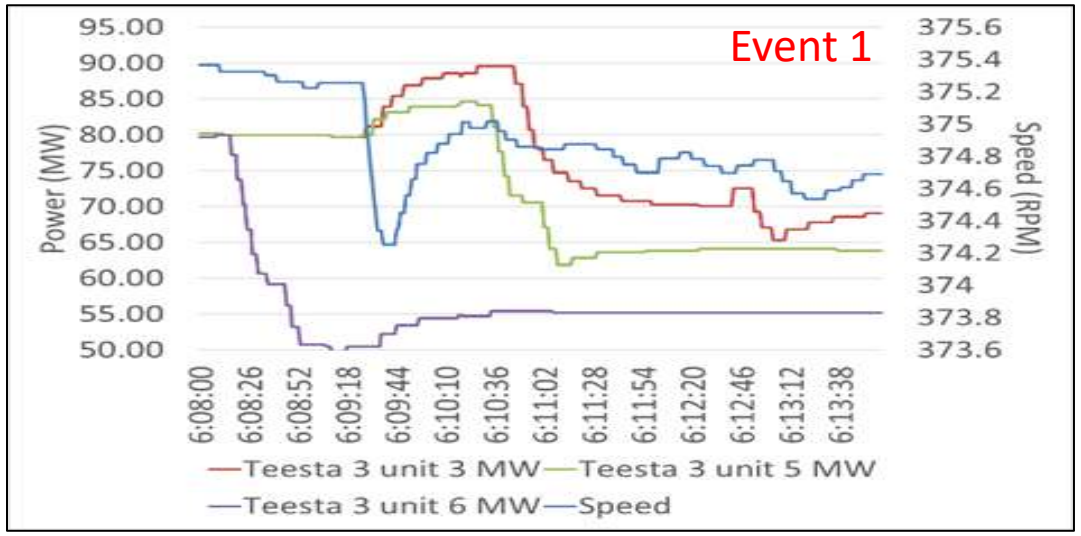

Dikchu unit 1
Dikchu unit 2
Frequency
Event 3
Power (MW)
Frequency (Hz)
60
58
56
54
52
50
48
46
44
42
40
50.1
50
49.9
49.8
49.7
49.6
49.5
49.4
49.3
49.2
17:25:00
17:25:30
17:26:00
17:26:30
17:27:00
17:27:30
17:28:00
17:28:30
17:29:00
17:29:30
17:30:00
17:30:30
17:31:00
17:31:30
17:32:00

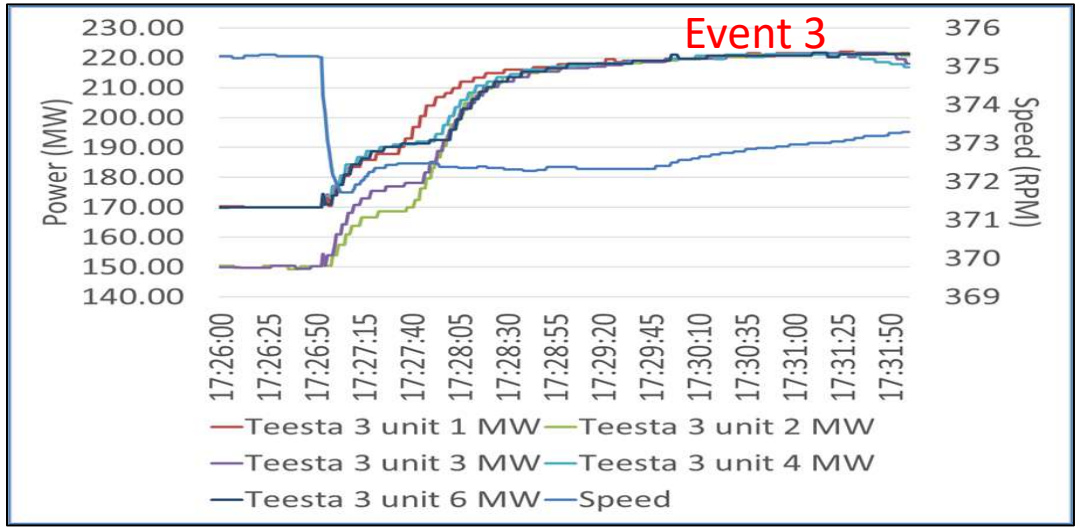

Dikchu unit 1
Dikchu unit 2
Frequency
Event 4
Power (MW)
Frequency (Hz)
Time
57
56
55
54
53
52
51
50.1
50.05
50
49.95
49.9
49.85
49.8
49.75
49.7
49.65
11:58:00
11:58:30
11:59:00
11:59:30
12:00:00
12:00:30
12:01:00
12:01:30
12:02:00
12:02:30
12:03:00
12:03:30
12:04:00

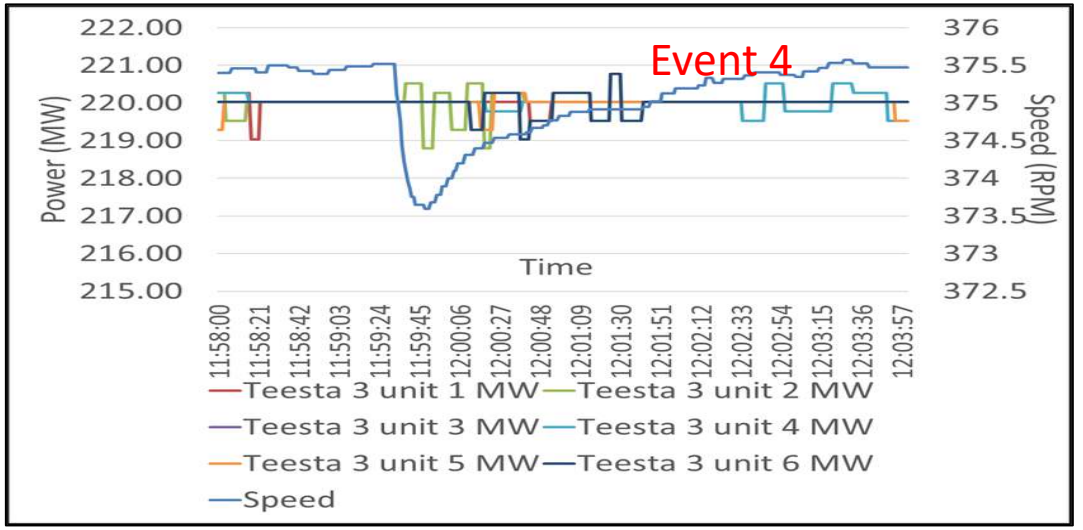
Teesta III

Event No	Response observed
01st March 2020, at 6:09 hrs	Satisfactory
19th March 2020, at 14:36 hrs	Unit was not in service
28th May 2020, at 17:26 hrs	Satisfactory
11th June 2020, at 11:59 hrs.	Machines were being run at full capacity. No Margin for RGMO.
14th July 2020, at 14:10 Hrs	Machines were being run at full capacity. No Margin for RGMO.
16th July 2020 at 16:27 Hrs,	Unit was involved in the event.

Teesta III


Event 1
Power (MW)
Speed (RPM)
95.00
90.00
85.00
80.00
75.00
70.00
65.00
60.00
55.00
50.00
375.6
375.4
375.2
375
374.8
374.6
374.4
374.2
374
373.8
373.6
6:08:00
6:08:26
6:08:52
6:09:18
6:09:44
6:10:10
6:10:36
6:11:02
6:11:28
6:11:54
6:12:20
6:12:46
6:13:12
6:13:38
Teesta 3 unit 3 MW
Teesta 3 unit 5 MW
Teesta 3 unit 6 MW
Speed

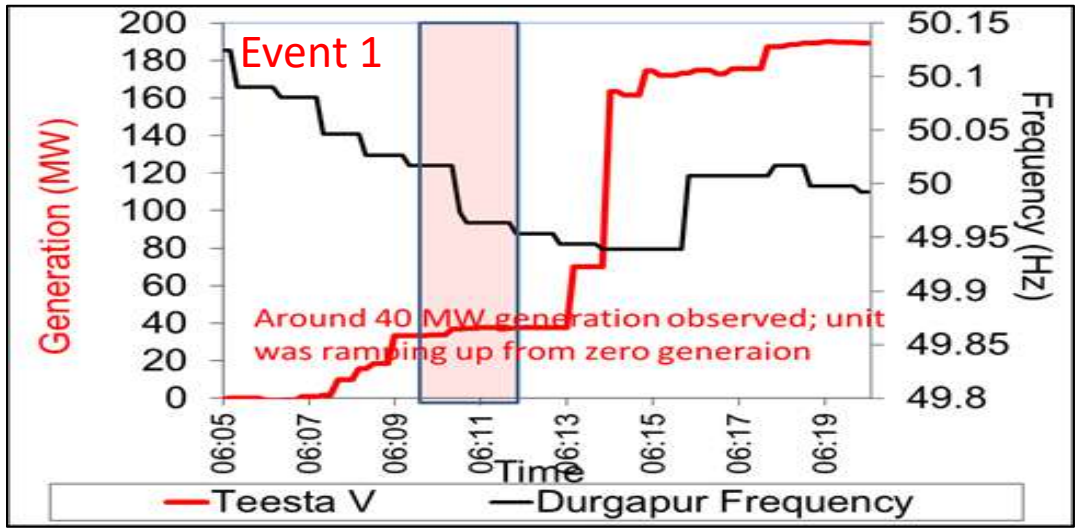

Event 3
Power (MW)
Speed (RPM)
230.00
220.00
210.00
200.00
190.00
180.00
170.00
160.00
150.00
140.00
376
375
374
373
372
371
370
369
17:26:00
17:26:25
17:26:50
17:27:15
17:27:40
17:28:05
17:28:30
17:28:55
17:29:20
17:29:45
17:30:10
17:30:35
17:31:00
17:31:25
17:31:50
Teesta 3 unit 1 MW
Teesta 3 unit 2 MW
Teesta 3 unit 3 MW
Teesta 3 unit 4 MW
Teesta 3 unit 6 MW
Speed

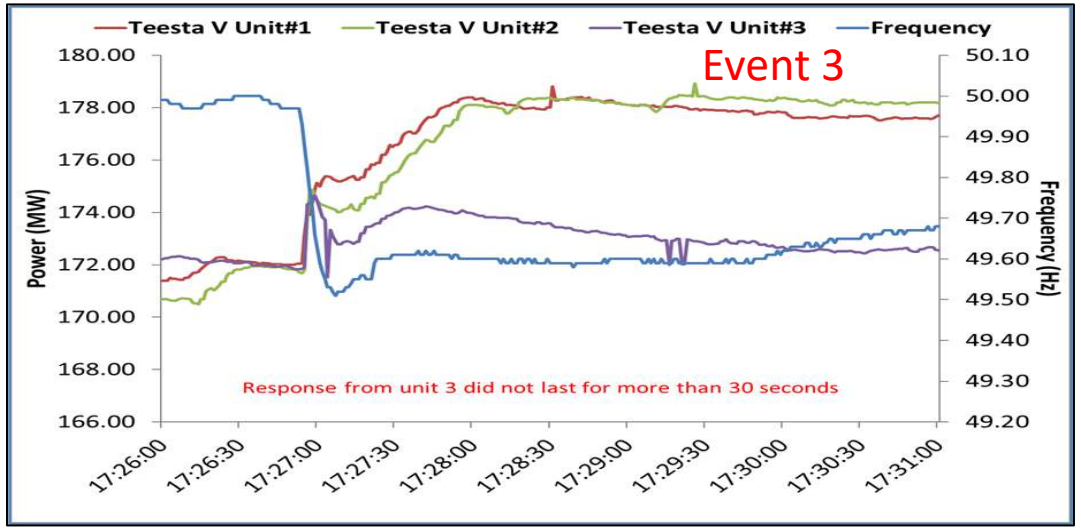

Event 4
Power (MW)
Speed (RPM)
222.00
221.00
220.00
219.00
218.00
217.00
216.00
215.00
376
375.5
375
374.5
374
373.5
373
372.5
Time
11:58:00
11:58:21
11:58:42
11:59:03
11:59:24
11:59:45
12:00:06
12:00:27
12:00:48
12:01:09
12:01:30
12:01:51
12:02:12
12:02:33
12:02:54
12:03:15
12:03:36
12:03:57
Teesta 3 unit 1 MW
Teesta 3 unit 2 MW
Teesta 3 unit 3 MW
Teesta 3 unit 4 MW
Teesta 3 unit 5 MW
Teesta 3 unit 6 MW
Speed

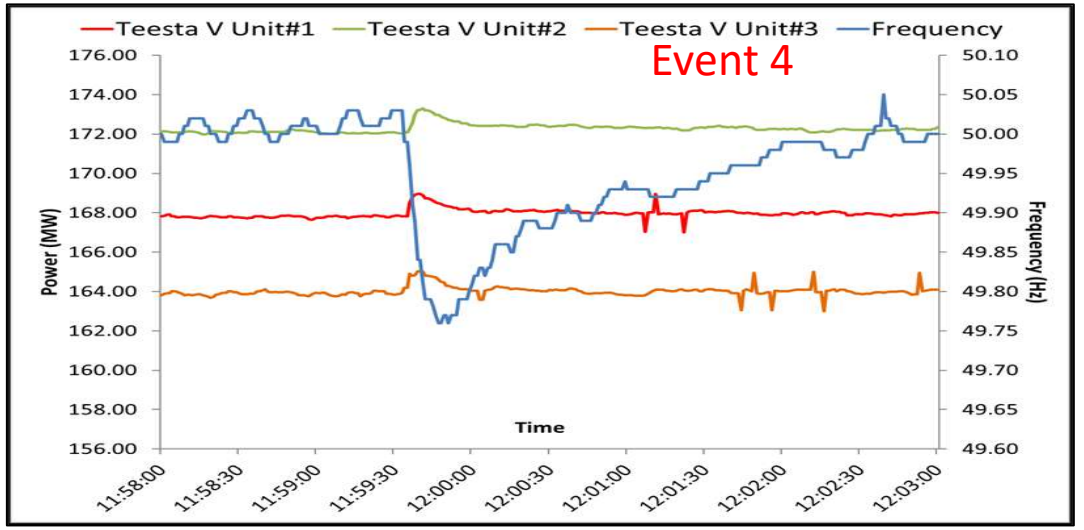
Teesta V

Event No	Response observed
01st March 2020, at 6:09 hrs	Unit was ramping up from zero generation. No response has been observed
19th March 2020, at 14:36 hrs	Unit was not in service
28th May 2020, at 17:26 hrs	Satisfactory
11th June 2020, at 11:59 hrs.	Non-satisfactory
14th July 2020, at 14:10 Hrs	Not satisfactory (as per FRC)
16th July 2020 at 16:27 Hrs,	Not satisfactory (as per FRC)

Teesta V


Event 1
Around 40 MW generation observed; unit was ramping up from zero generaion
Generation (MW)
Frequency (Hz)
Time
Teesta V
Durgapur Frequency


Teesta V Unit#1
Teesta V Unit#2
Teesta V Unit#3
Frequency
Event 3
Response from unit 3 did not last for more than 30 seconds
Power (MW)
Frequency (Hz)


Teesta V Unit#1
Teesta V Unit#2
Teesta V Unit#3
Frequency
Event 4
Power (MW)
Frequency (Hz)
Time

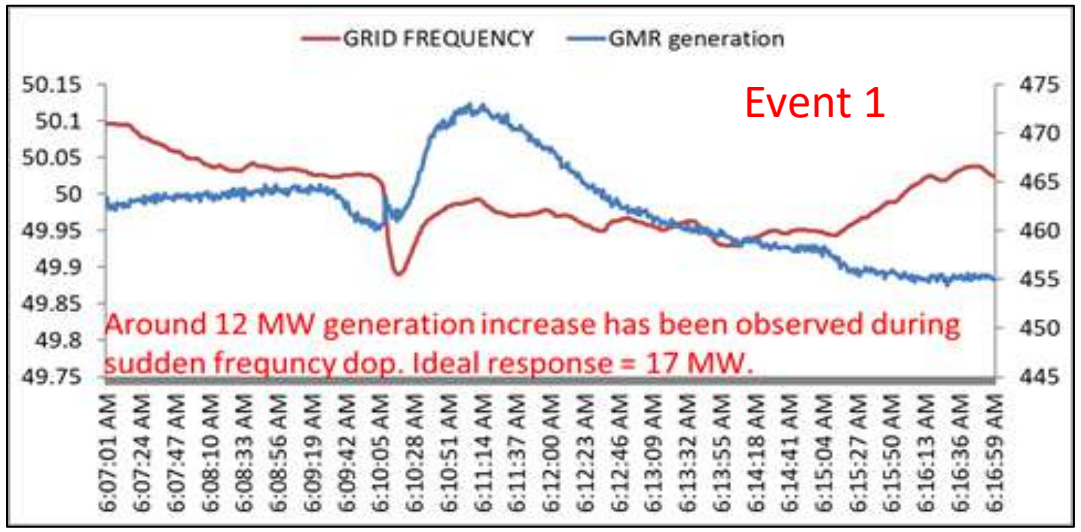
Thermal units

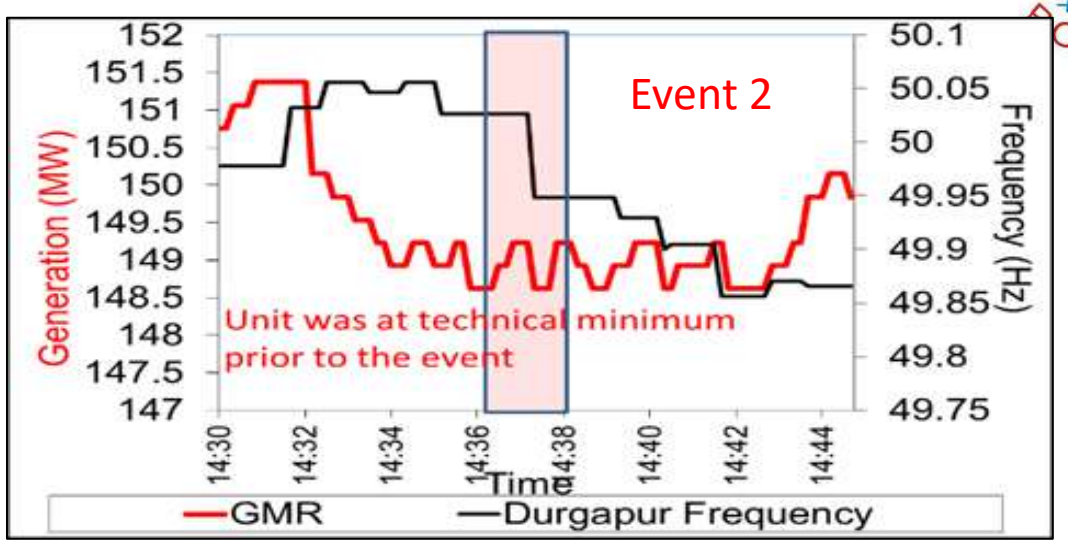
GMR

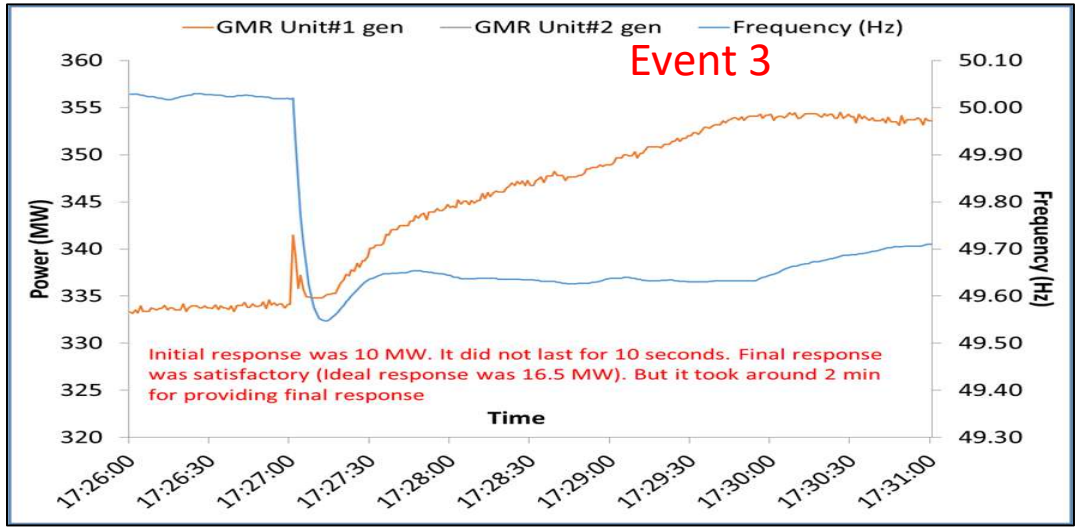
Event No	Response observed
01st March 2020, at 6:09 hrs	Satisfactory
19th March 2020, at 14:36 hrs	Not satisfactory (Unit was at technical minimum prior to the event)
28th May 2020, at 17:26 hrs	Satisfactory in term of amount of response provided. But around 2 min was taken for providing full response; (Not captured in FRC)
11th June 2020, at 11:59 hrs.	Satisfactory
14th July 2020, at 14:10 Hrs	Not satisfactory (as per FRC)
16th July 2020 at 16:27 Hrs,	Not satisfactory (as per FRC)

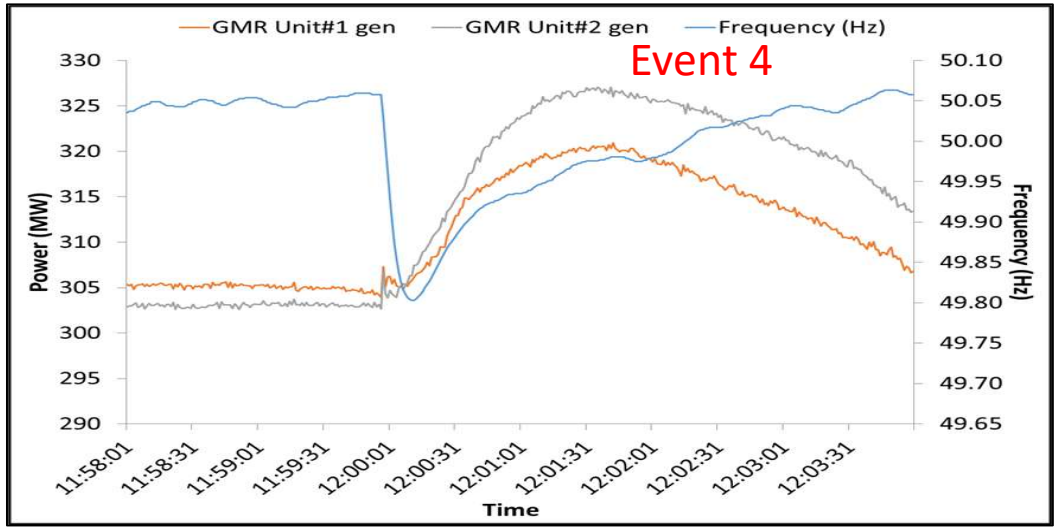
Time taken to provide full response may be reduced

GMR


GRID FREQUENCY
GMR generation
Event 1
Around 12 MW generation increase has been observed during sudden frequncy dop. Ideal response = 17 MW.


Event 2
Generation (MW)
Frequency (Hz)
Unit was at technical minimum prior to the event
Time
GMR
Durgapur Frequency

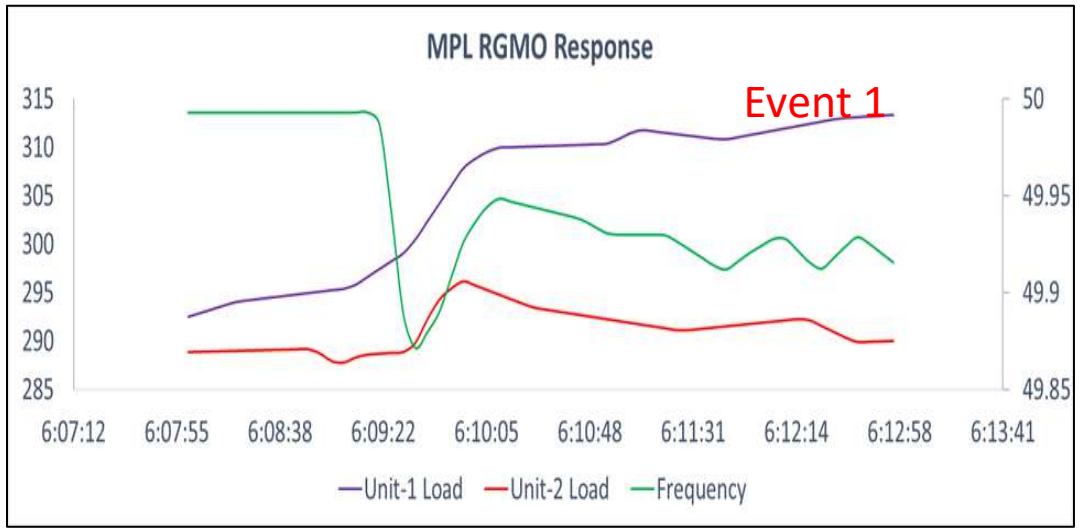

GMR Unit#1 gen
GMR Unit#2 gen
Frequency (Hz)
Event 3
Power (MW)
Frequency (Hz)
Initial response was 10 MW. It did not last for 10 seconds. Final response was satisfactory (Ideal response was 16.5 MW). But it took around 2 min for providing final response
Time

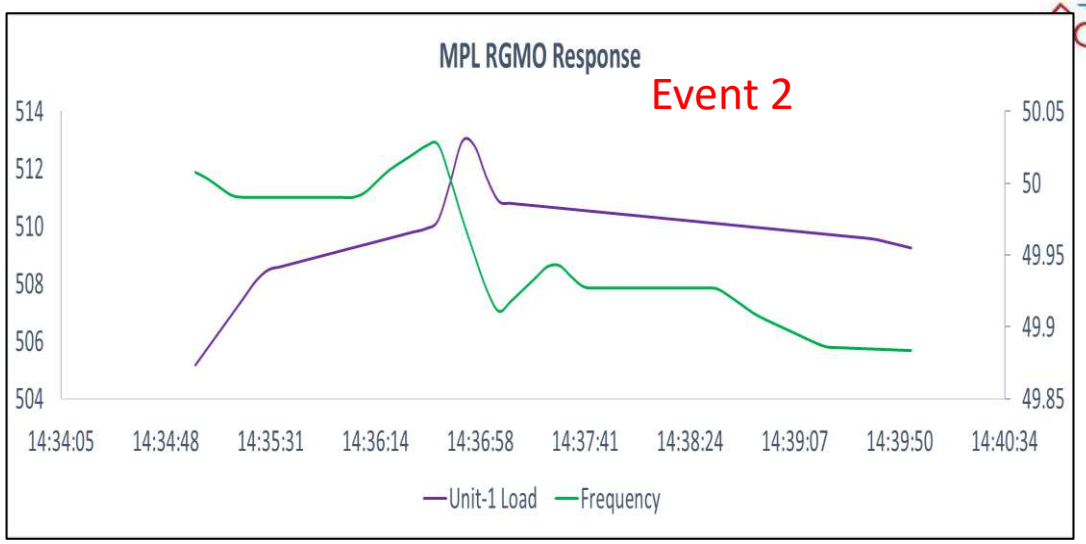

GMR Unit#1 gen
GMR Unit#2 gen
Frequency (Hz)
Event 4
Power (MW)
Frequency (Hz)
Time

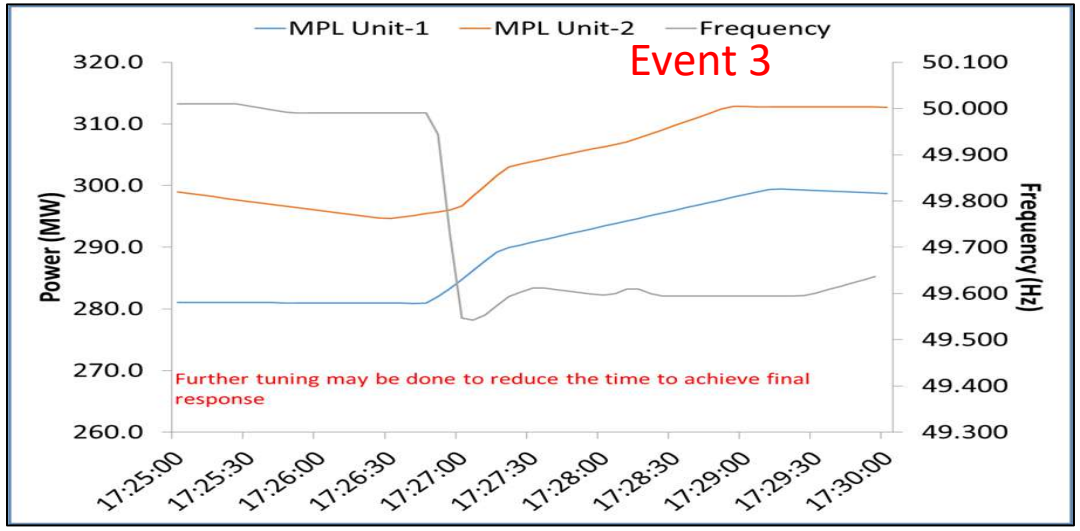
MPL

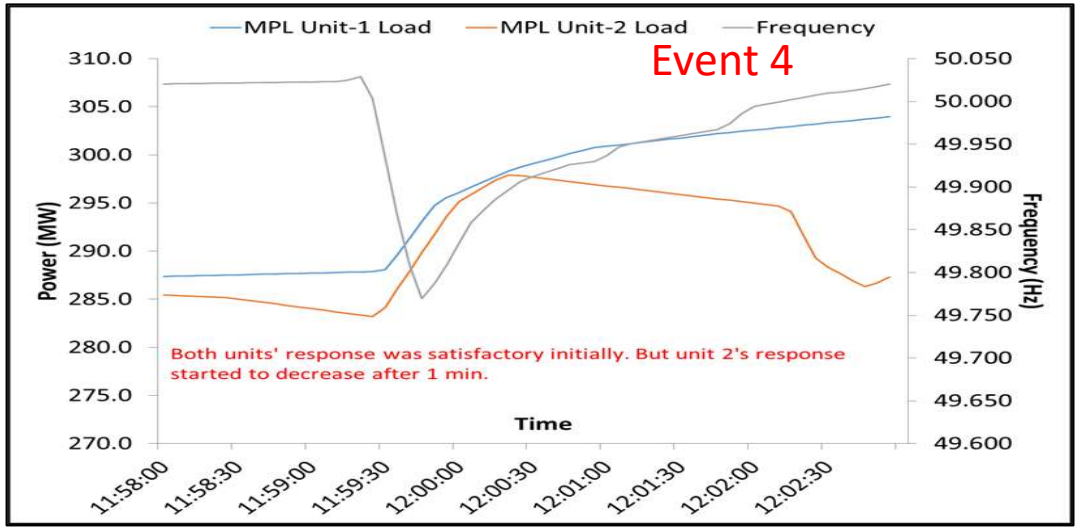
Event No	Response observed
01st March 2020, at 6:09 hrs	Satisfactory (unit 2's response decreased)
19th March 2020, at 14:36 hrs	Not satisfactory
28th May 2020, at 17:26 hrs	Satisfactory
11th June 2020, at 11:59 hrs.	Satisfactory (unit 2's response decreased)
14th July 2020, at 14:10 Hrs	Satisfactory (as per FRC)
16th July 2020 at 16:27 Hrs,	Not satisfactory (as per FRC)

MPL


MPL RGMO Response
Event 1
315
310
305
300
295
290
285
50
49.95
49.9
49.85
6:07:12
6:07:55
6:08:38
6:09:22
6:10:05
6:10:48
6:11:31
6:12:14
6:12:58
6:13:41
Unit-1 Load
Unit-2 Load
Frequency


MPL RGMO Response
Event 2
514
512
510
508
506
504
50.05
50
49.95
49.9
49.85
14:34:05
14:34:48
14:35:31
14:36:14
14:36:58
14:37:41
14:38:24
14:39:07
14:39:50
14:40:34
Unit-1 Load
Frequency

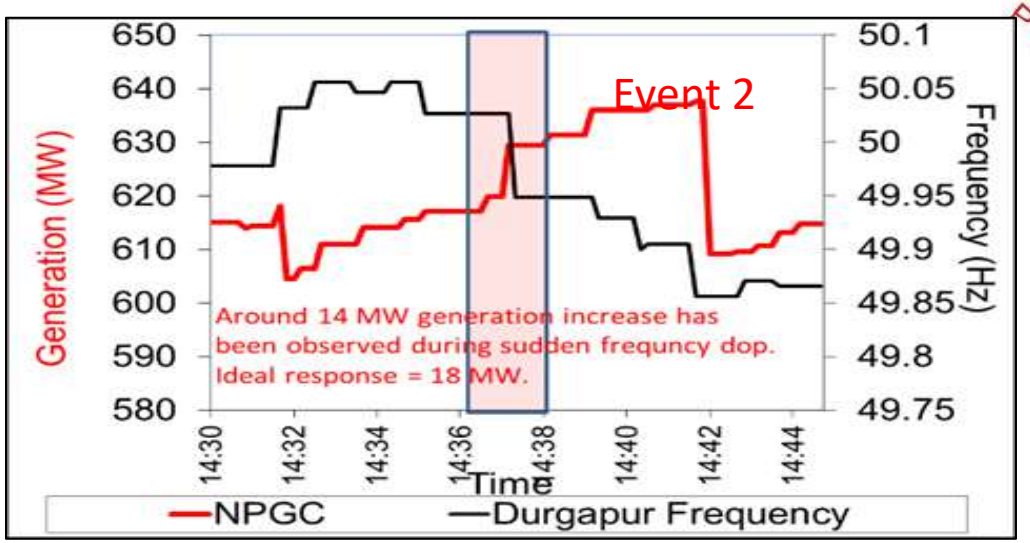

MPL Unit-1
MPL Unit-2
Frequency
Event 3
320.0
310.0
300.0
290.0
280.0
270.0
260.0
Power (MW)
50.100
50.000
49.900
49.800
49.700
49.600
49.500
49.400
49.300
Frequency (Hz)
Further tuning may be done to reduce the time to achieve final response
17:25:00
17:25:30
17:26:00
17:26:30
17:27:00
17:27:30
17:28:00
17:28:30
17:29:00
17:29:30
17:30:00

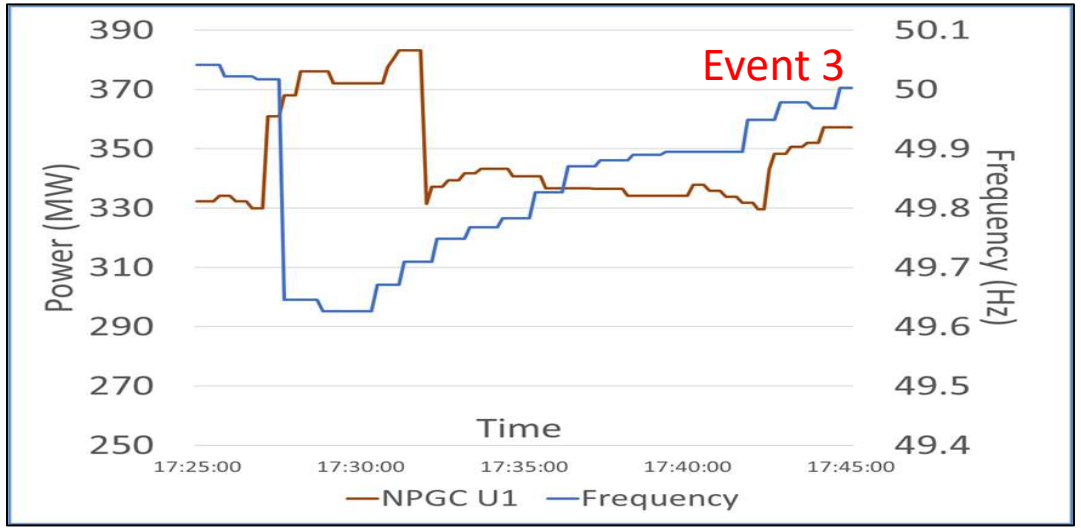

MPL Unit-1 Load
MPL Unit-2 Load
Frequency
Event 4
310.0
305.0
300.0
295.0
290.0
285.0
280.0
275.0
270.0
Power (MW)
50.050
50.000
49.950
49.900
49.850
49.800
49.750
49.700
49.650
49.600
Frequency (Hz)
Both units' response was satisfactory initially. But unit 2's response started to decrease after 1 min.
Time
11:58:00
11:58:30
11:59:00
11:59:30
12:00:00
12:00:30
12:01:00
12:01:30
12:02:00
12:02:30

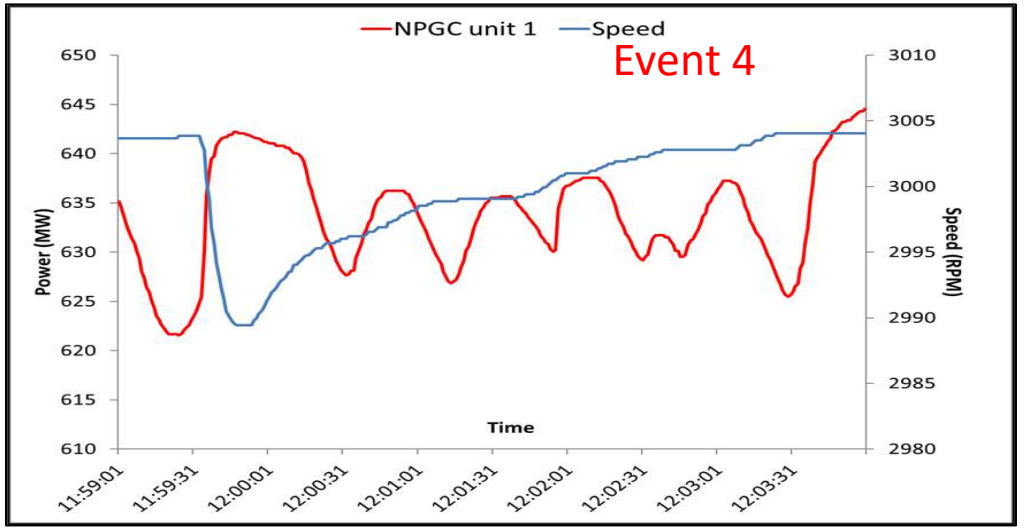
NPGC

Event No	Response observed
01st March 2020, at 6:09 hrs	No unit was available
19th March 2020, at 14:36 hrs	Satisfactory
28th May 2020, at 17:26 hrs	Satisfactory
11th June 2020, at 11:59 hrs.	Oscillatory response has been observed
14th July 2020, at 14:10 Hrs	Data were not available
16th July 2020 at 16:27 Hrs,	Below Satisfactory (as per FRC)

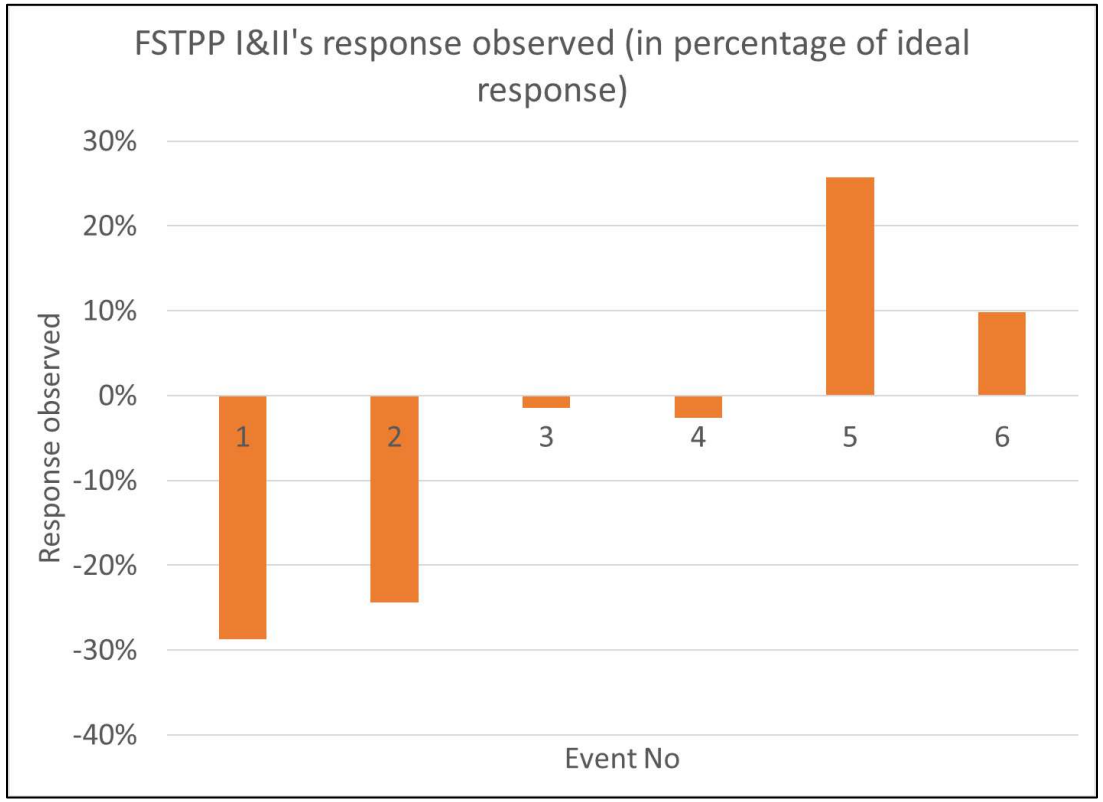
NPGC

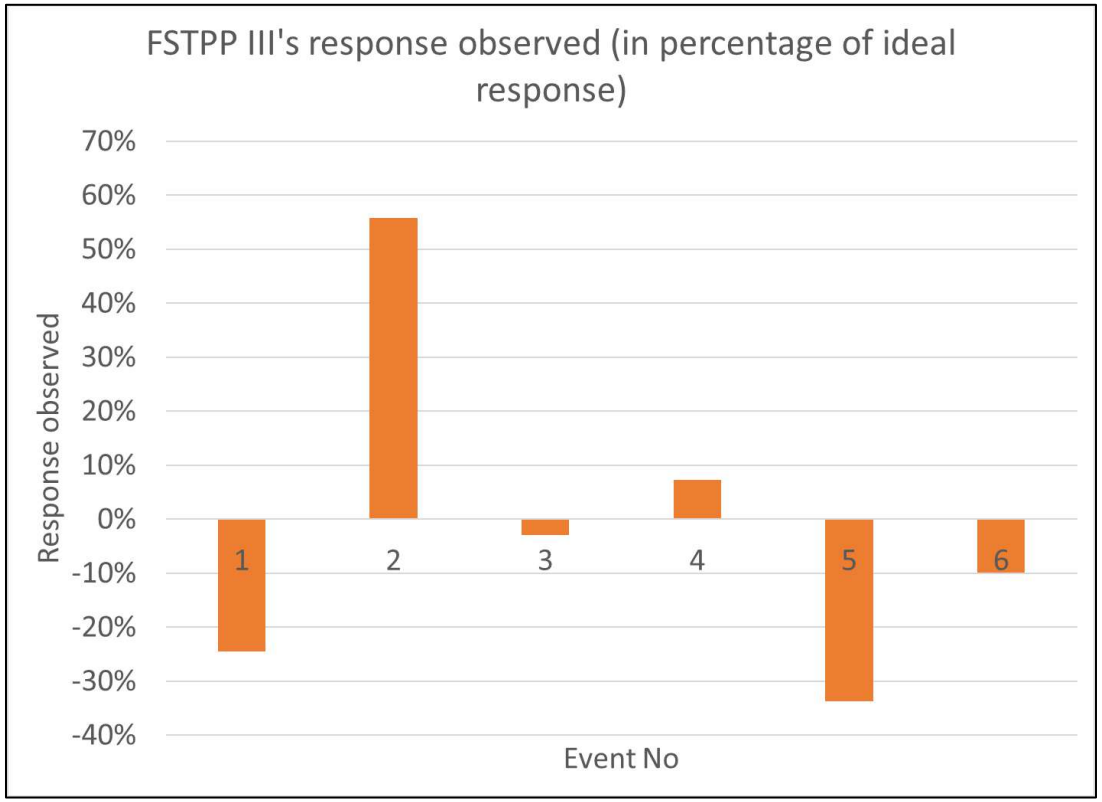

Event 2
Generation (MW)
Frequency (Hz)
650
640
630
620
610
600
590
580
50.1
50.05
50
49.95
49.9
49.85
49.8
49.75
14:30
14:32
14:34
14:36
14:38
14:40
14:42
14:44
Time
Around 14 MW generation increase has been observed during sudden frequncy dop.
Ideal response = 18 MW.
NPGC
Durgapur Frequency


Event 3
Power (MW)
Frequency (Hz)
390
370
350
330
310
290
270
250
50.1
50
49.9
49.8
49.7
49.6
49.5
49.4
Time
17:25:00
17:30:00
17:35:00
17:40:00
17:45:00
NPGC U1
Frequency


Event 4
NPGC unit 1
Speed
Power (MW)
Speed (RPM)
650
645
640
635
630
625
620
615
610
3010
3005
3000
2995
2990
2985
2980
Time
11:59:01
11:59:31
12:00:01
12:00:31
12:01:01
12:01:31
12:02:01
12:02:31
12:03:01
12:03:31

NTPC Farakka (Based on FRC)

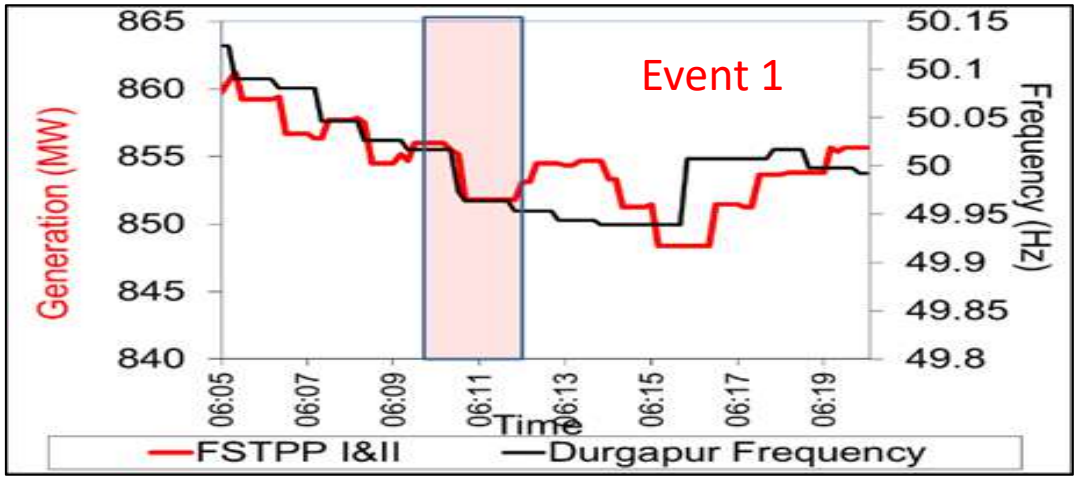


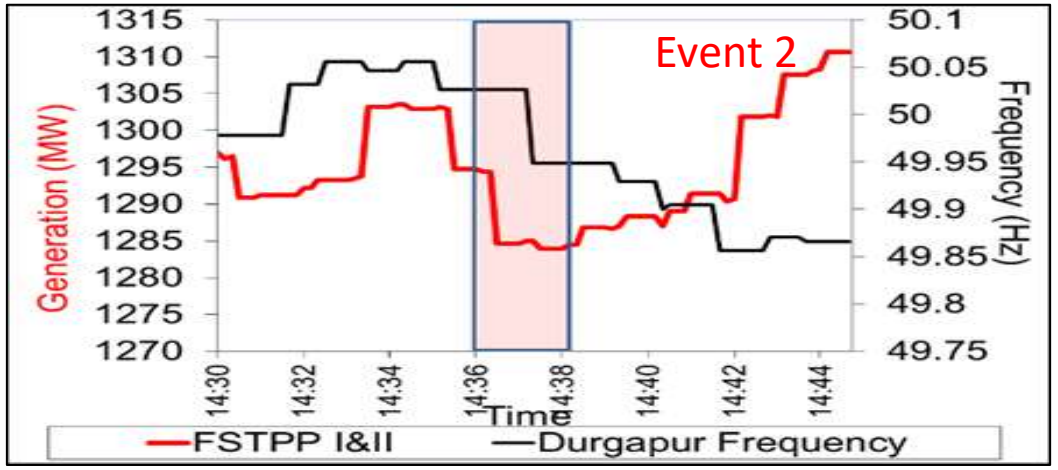


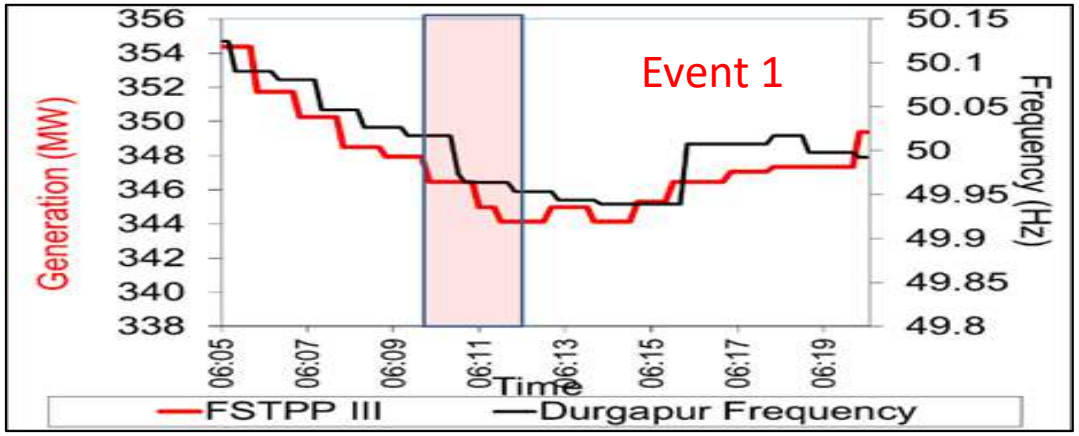
NTPC Farakka

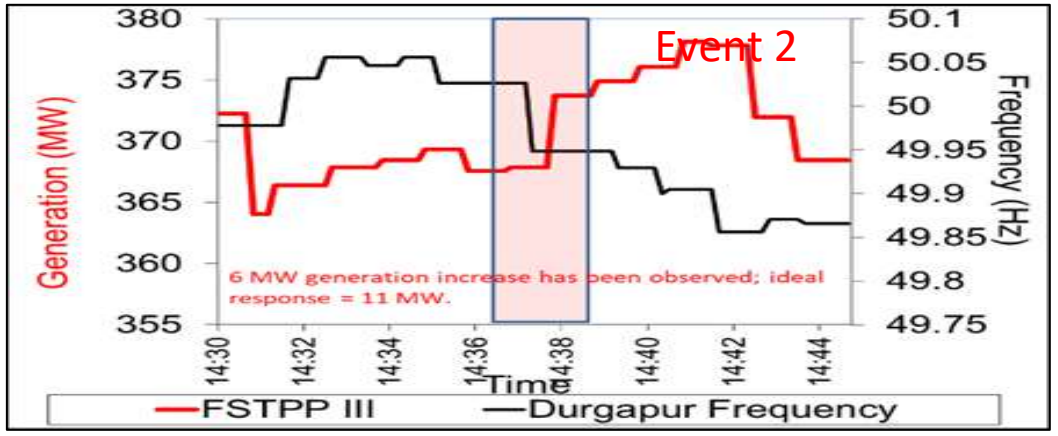
Event No	Response observed
01st March 2020, at 6:09 hrs	Not satisfactory
19th March 2020, at 14:36 hrs	Not satisfactory for unit 1 -5. Response has been observed for unit 6 (6 MW in place of ideal response of 11 MW)
28th May 2020, at 17:26 hrs	Not satisfactory
11th June 2020, at 11:59 hrs.	Not satisfactory
14th July 2020, at 14:10 Hrs	Not satisfactory (as per FRC)
16th July 2020 at 16:27 Hrs,	Not satisfactory (as per FRC)

NTPC Farakka

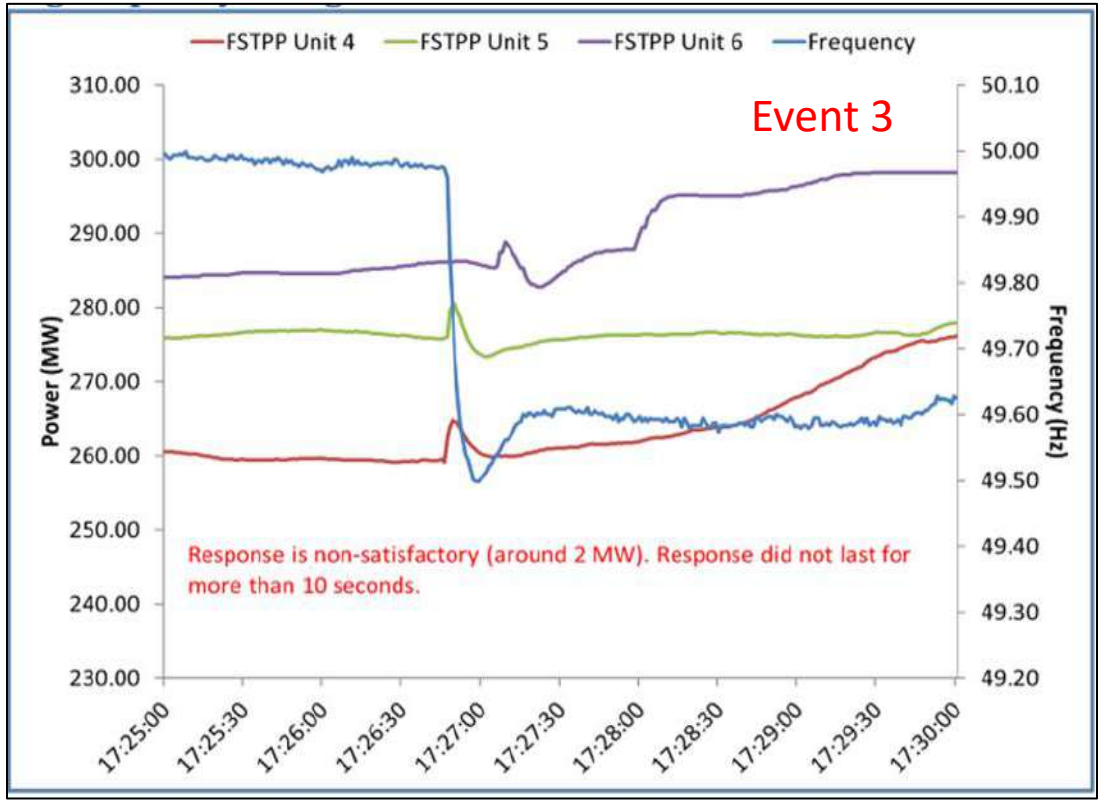


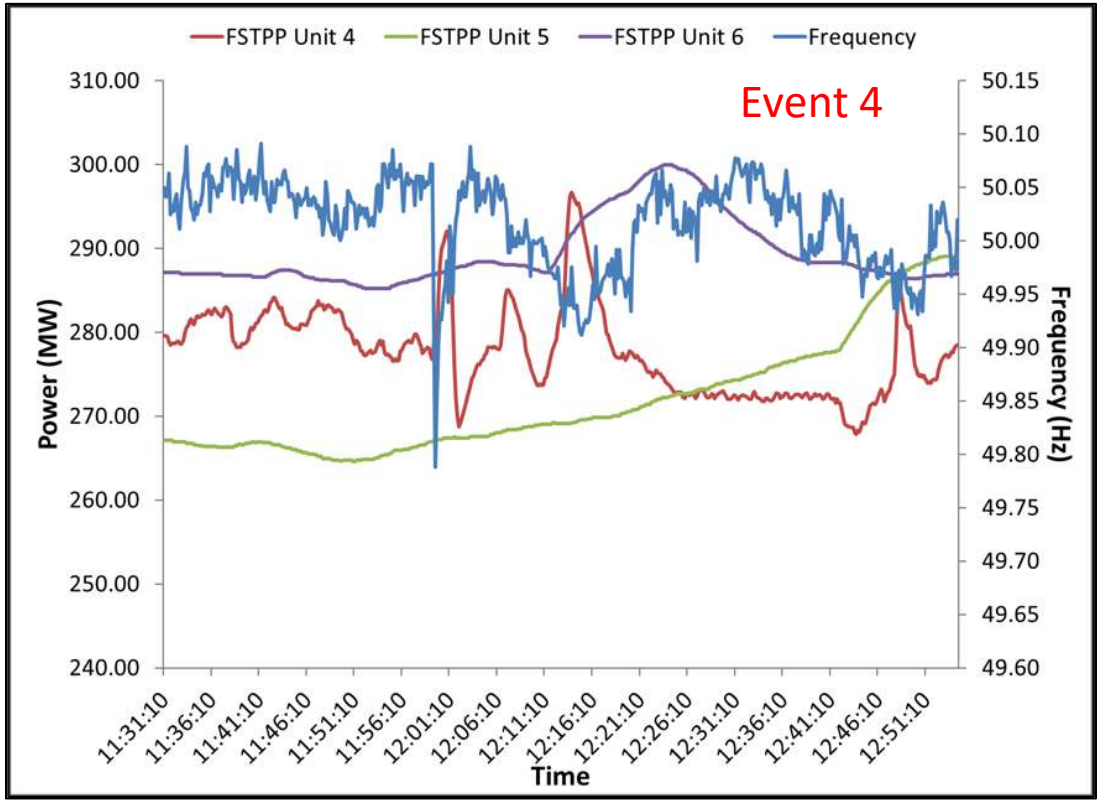




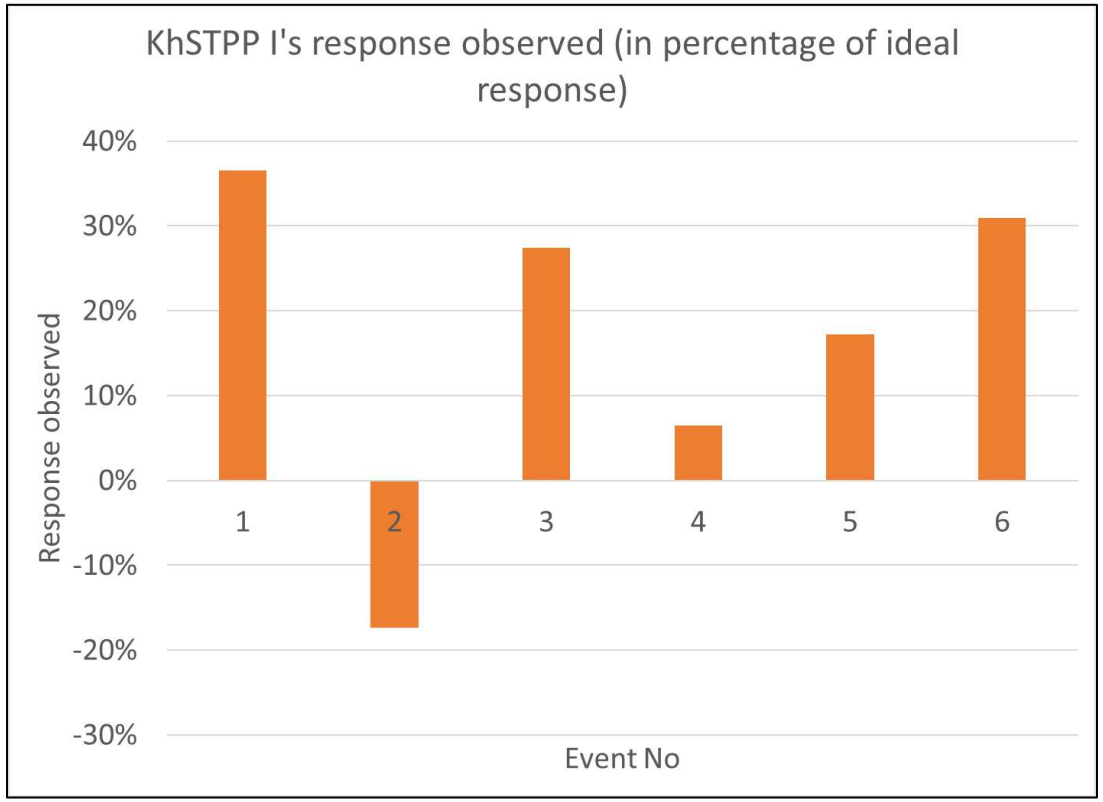


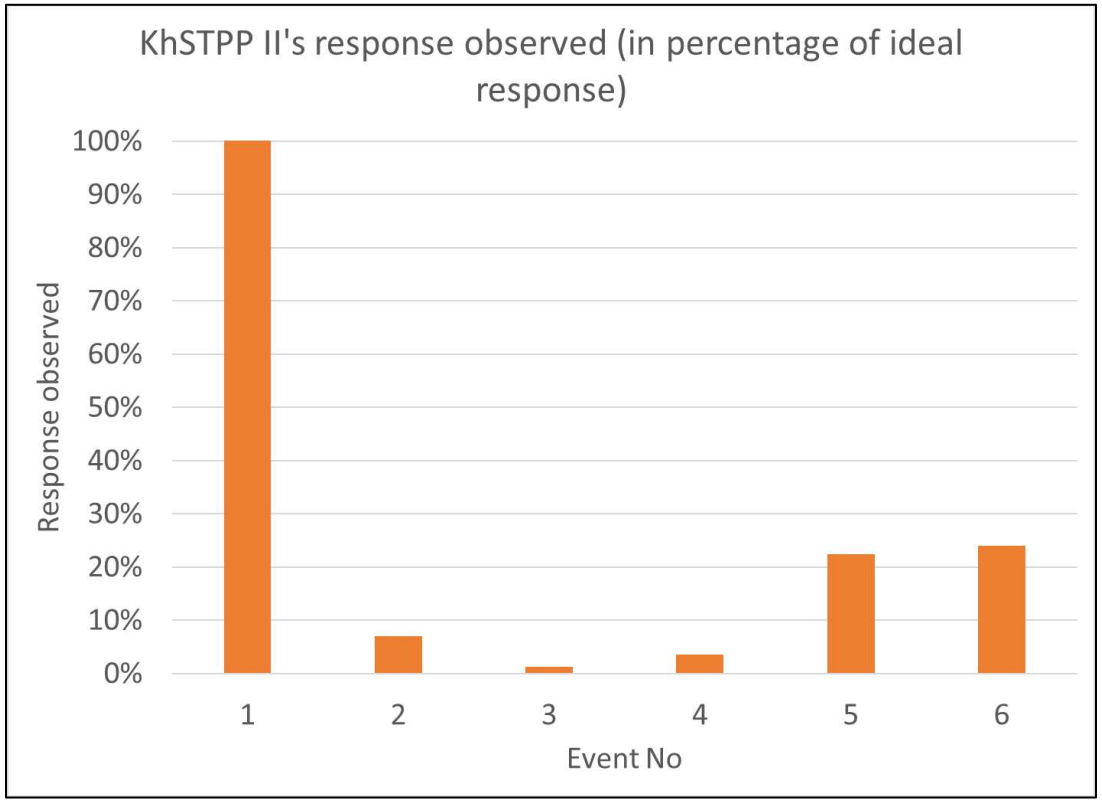
NTPC Farakka





NTPC Kahalgaon (Based on FRC)

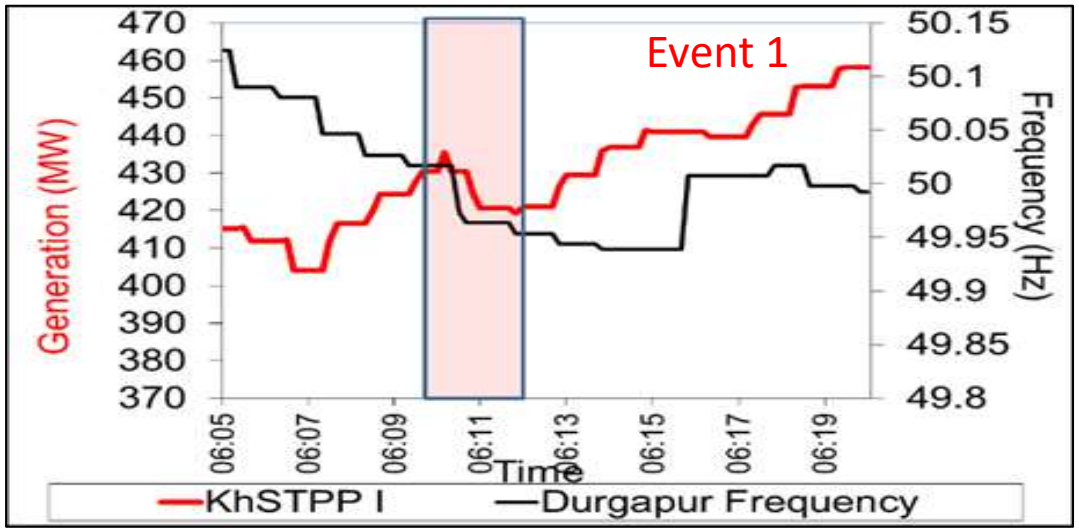


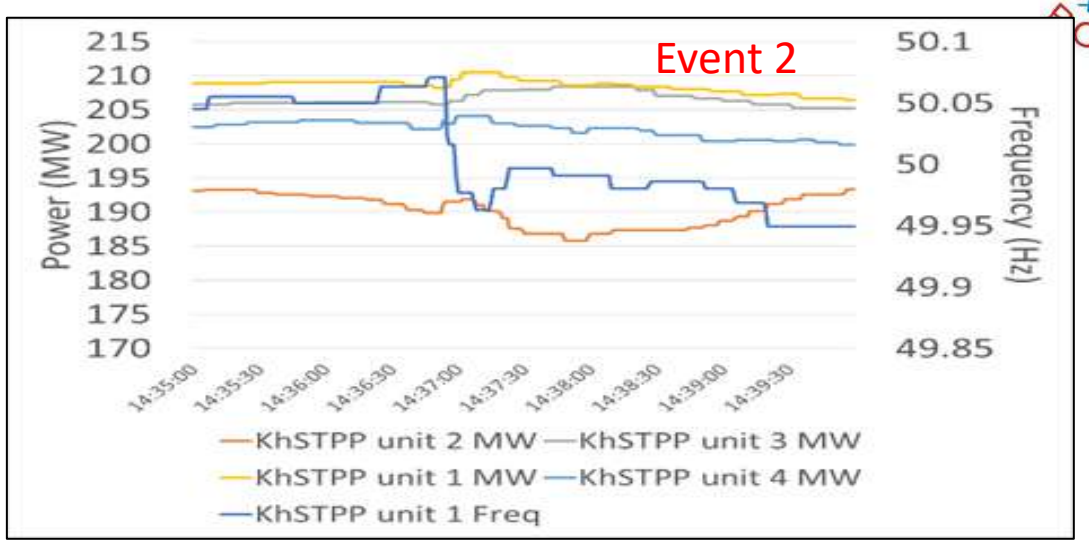


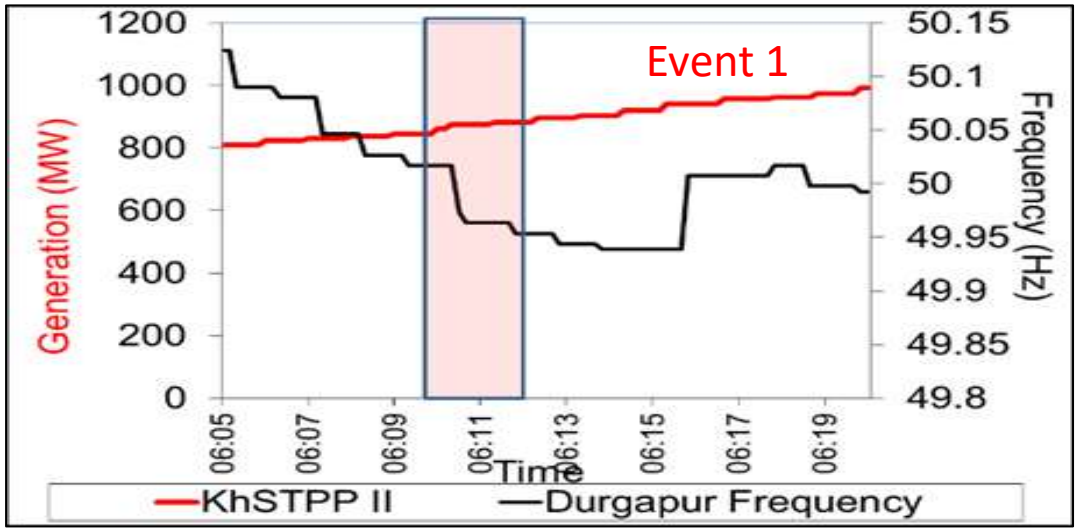
NTPC Kahalgaon

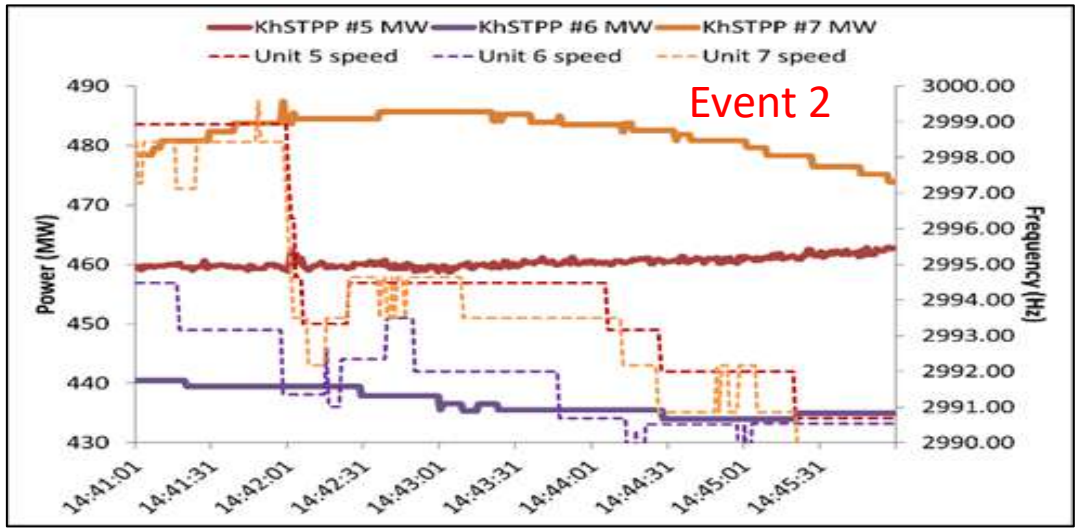
Event No	Response observed
01st March 2020, at 6:09 hrs	Not satisfactory for Stage I, Stage II generation was ramping up prior to the event
19th March 2020, at 14:36 hrs	Not satisfactory
28th May 2020, at 17:26 hrs	Initially satisfactory response has been observed. But response of unit 1, 2, 3, 4 and 6 did not last for 30 sec - 1 min.
11th June 2020, at 11:59 hrs.	Not satisfactory
14th July 2020, at 14:10 Hrs	Not satisfactory (as per FRC)
16th July 2020 at 16:27 Hrs,	Not satisfactory (as per FRC)

NTPC Kahalgaon

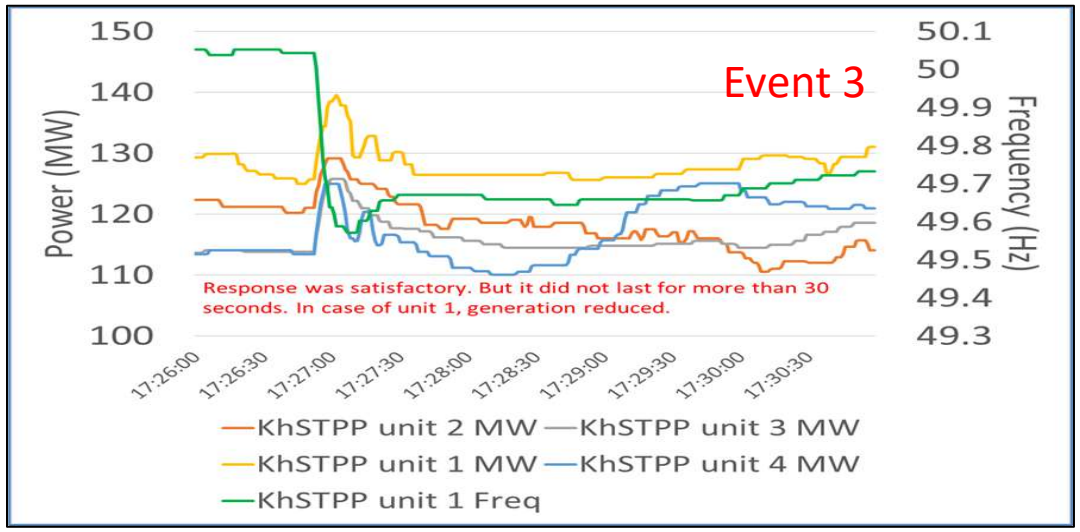


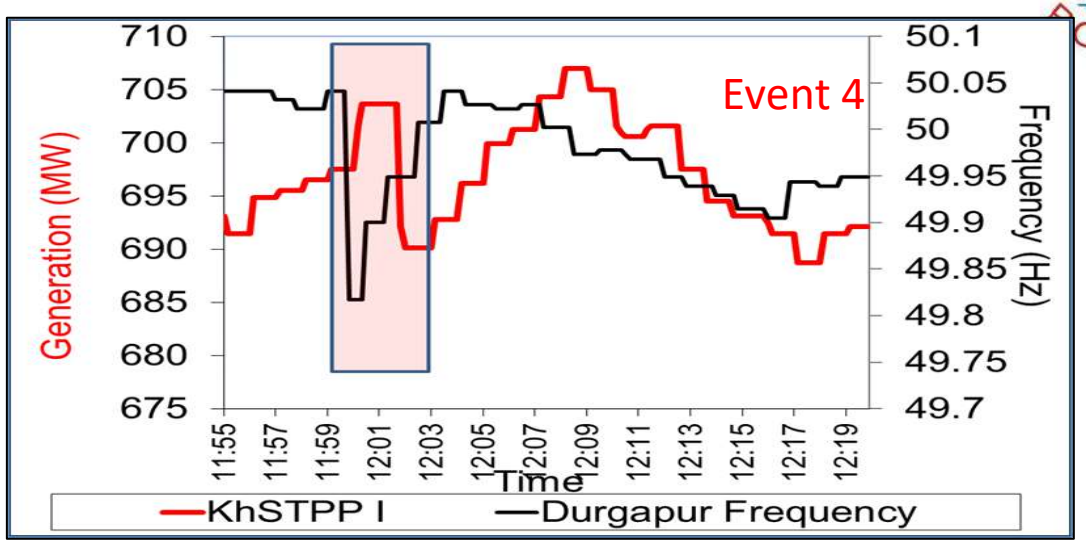


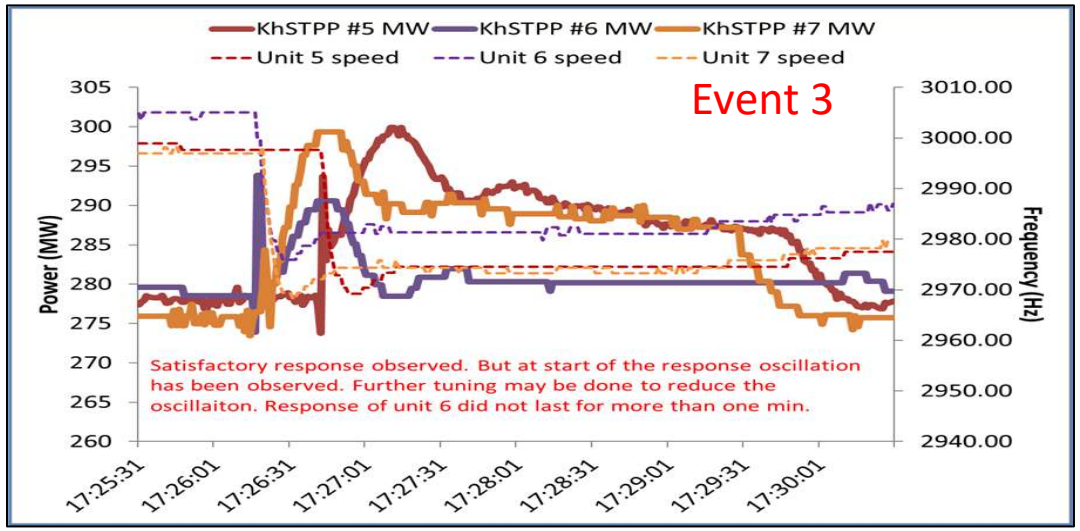


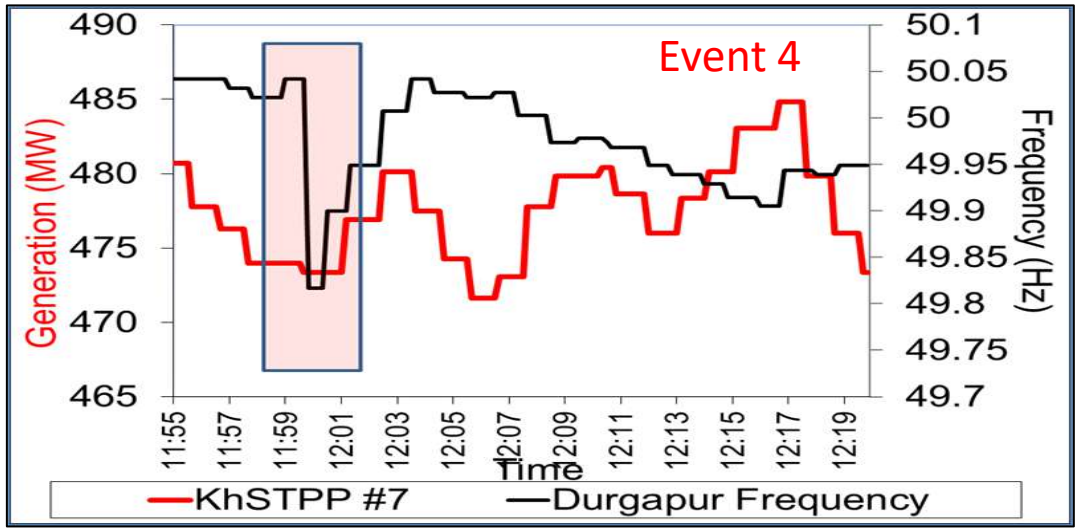


NTPC Kahalgaon

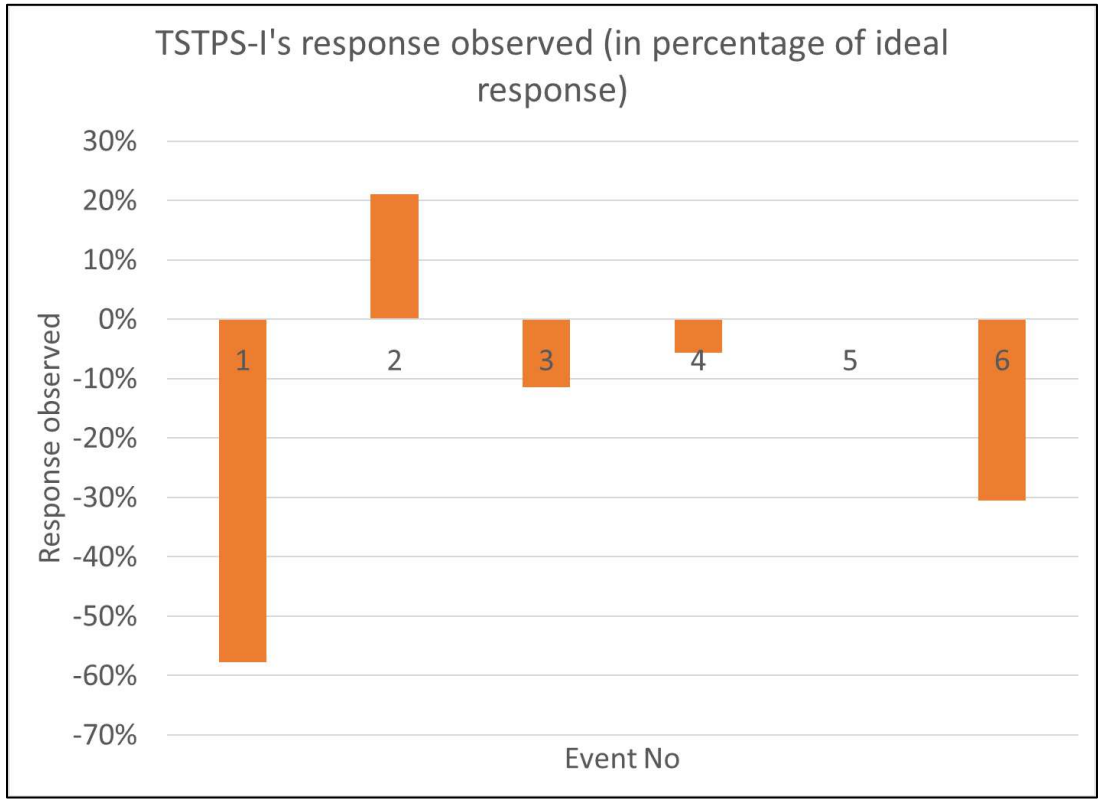


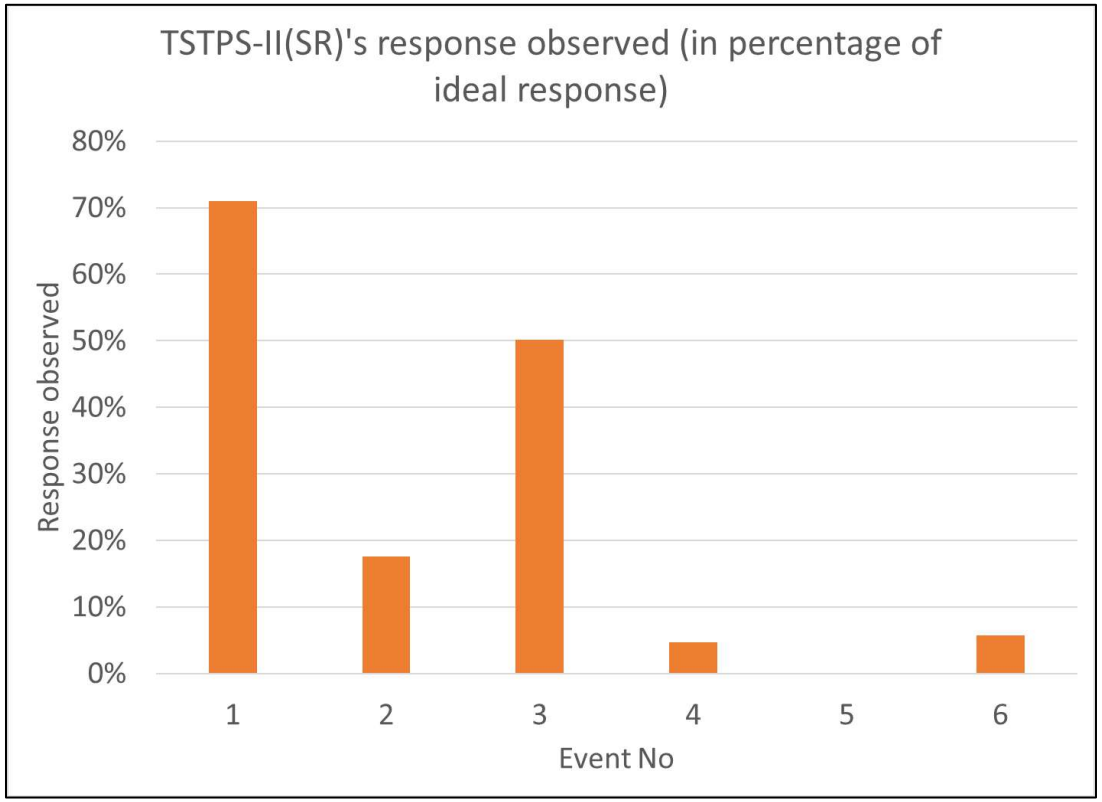






NTPC Talcher (Based on FRC)



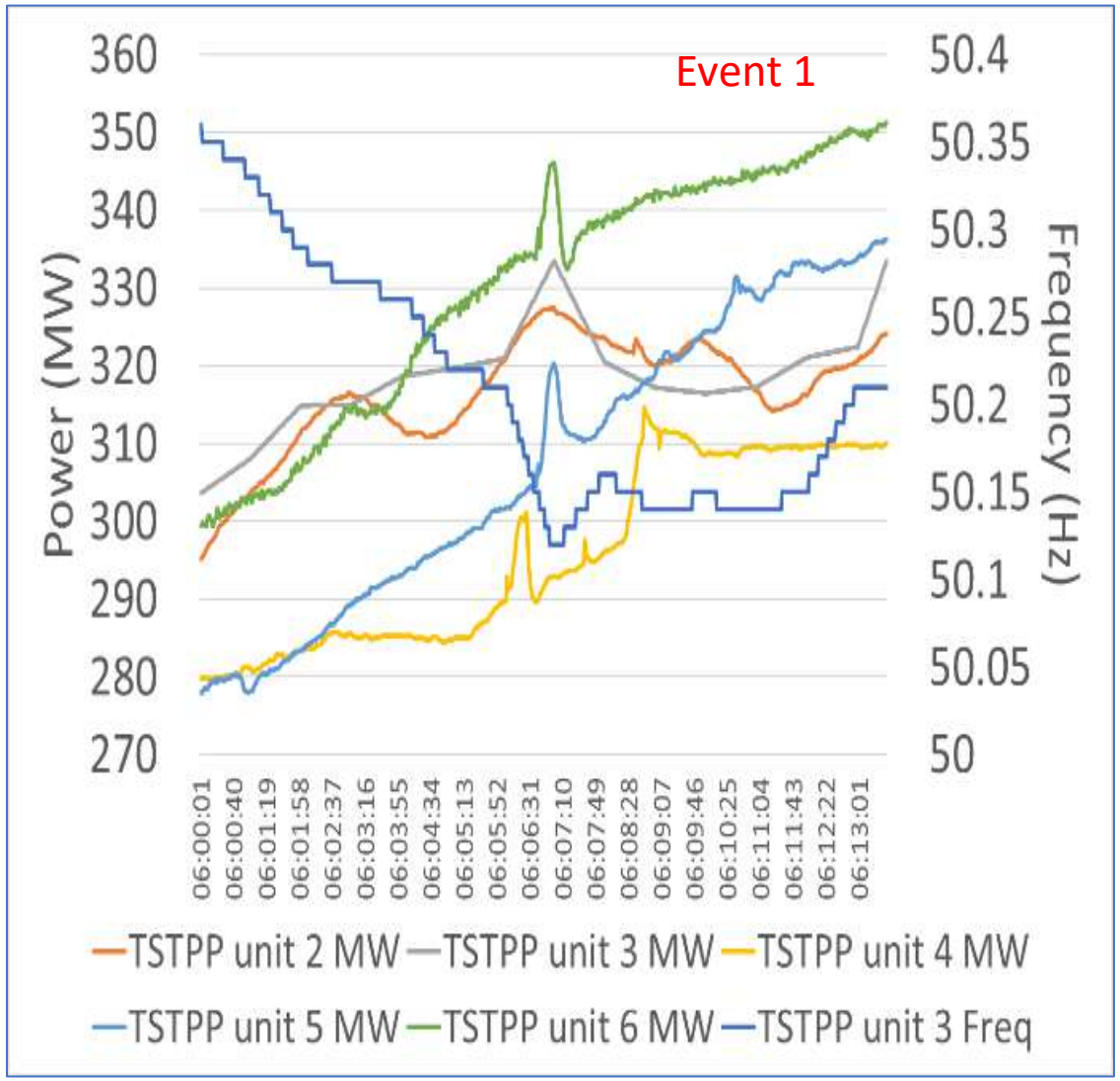


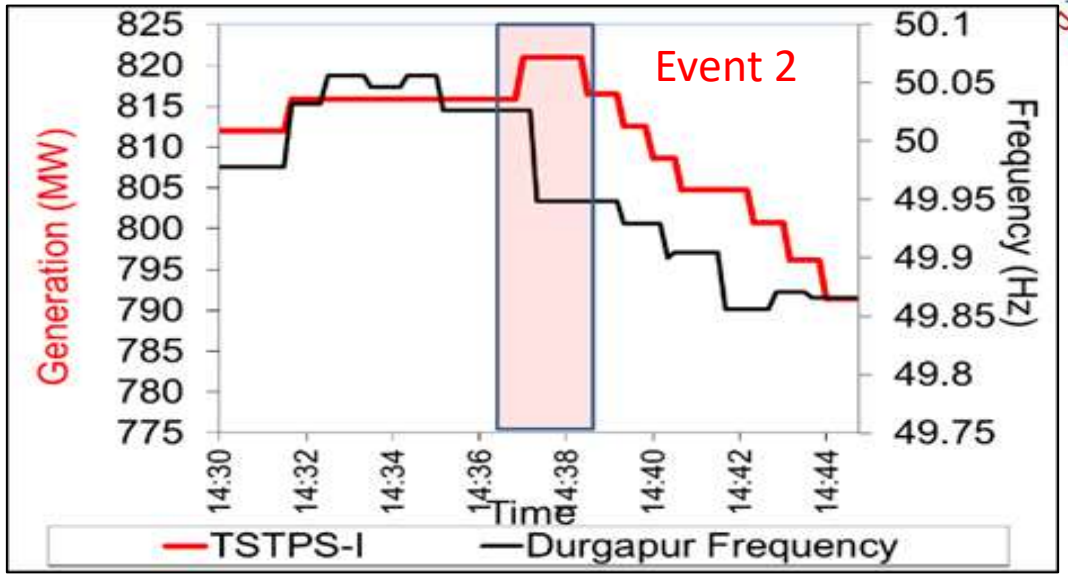
NTPC Talcher

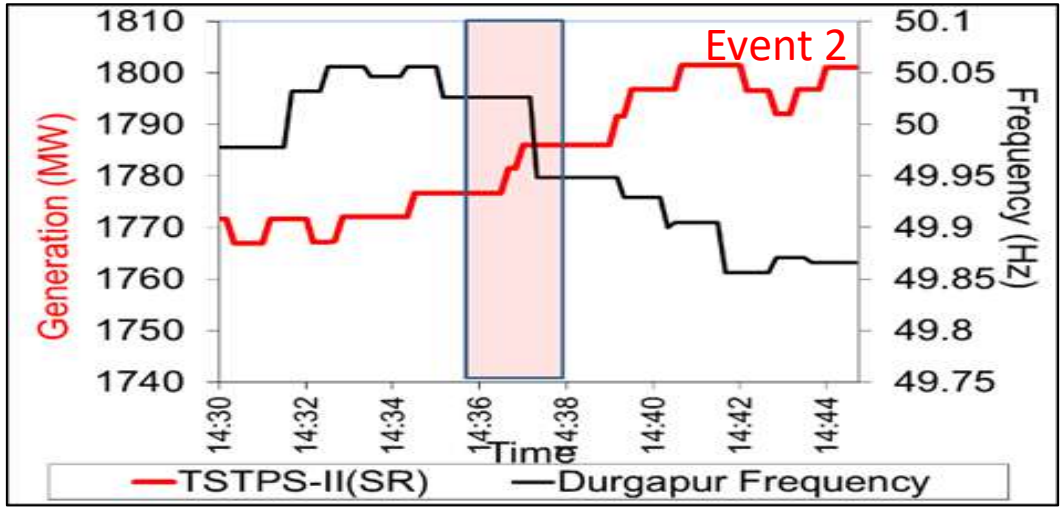
Event No	Response observed
01st March 2020, at 6:09 hrs	Stage I's response is non satisfactory. Stage II's response is satisfactory
19th March 2020, at 14:36 hrs	Not satisfactory
28th May 2020, at 17:26 hrs	Not satisfactory for Stage I Satisfactory for Stage II (But response did not last for more than 1 min)
11th June 2020, at 11:59 hrs.	Not satisfactory
14th July 2020, at 14:10 Hrs	Not satisfactory (as per FRC)
16th July 2020 at 16:27 Hrs,	Not satisfactory (as per FRC)

Resolution of data shared for stage II may be improved.

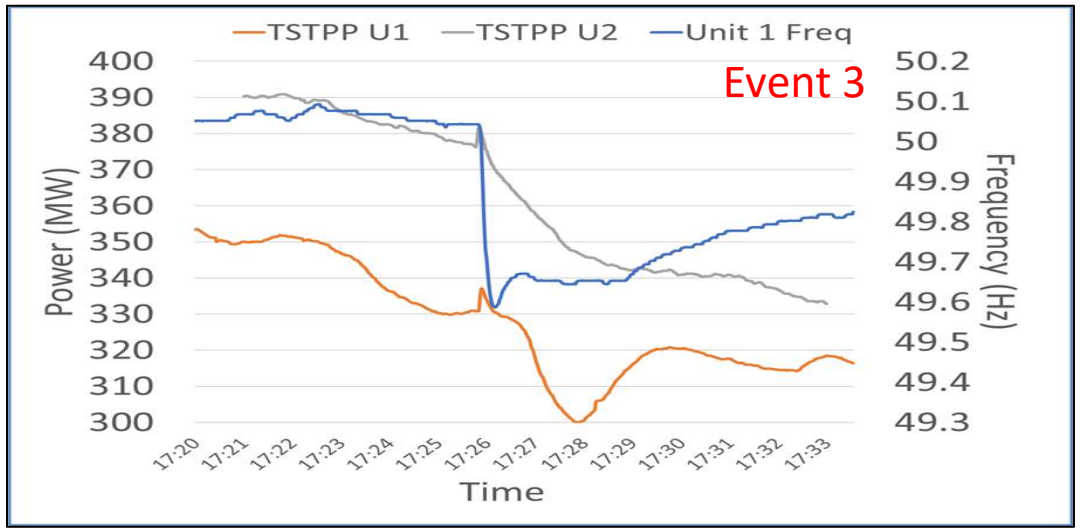
NTPC Talcher

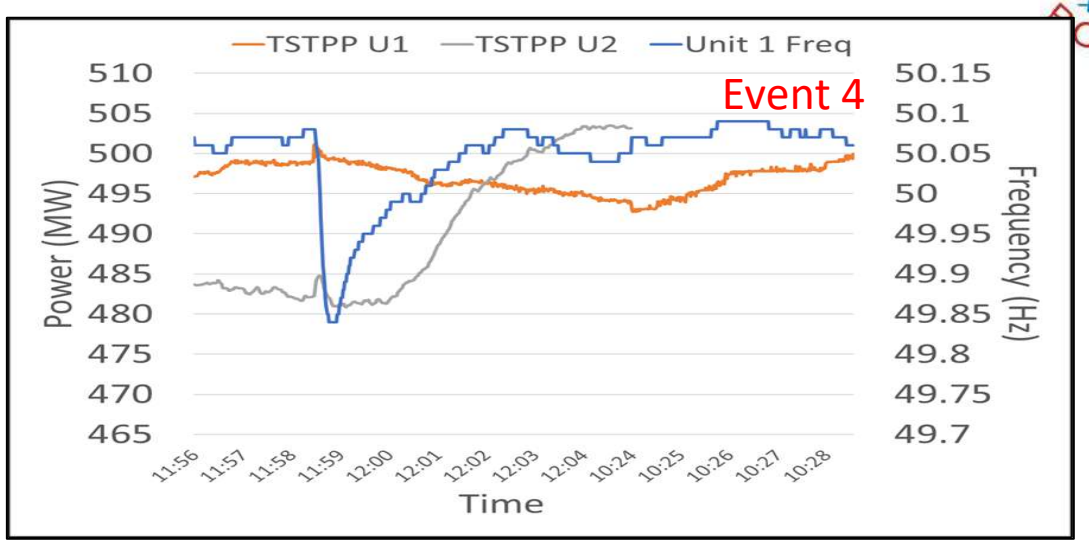


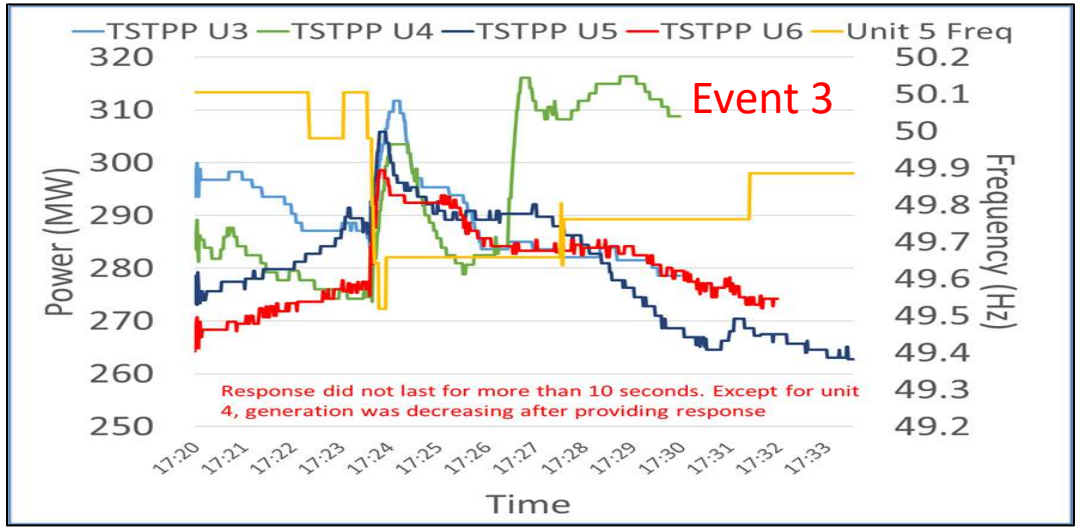


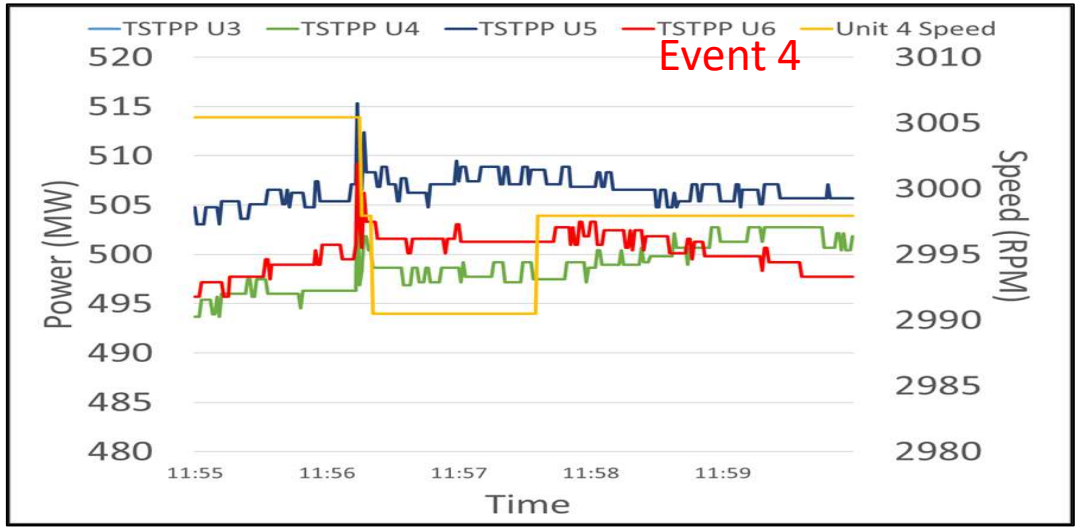


NTPC Talcher







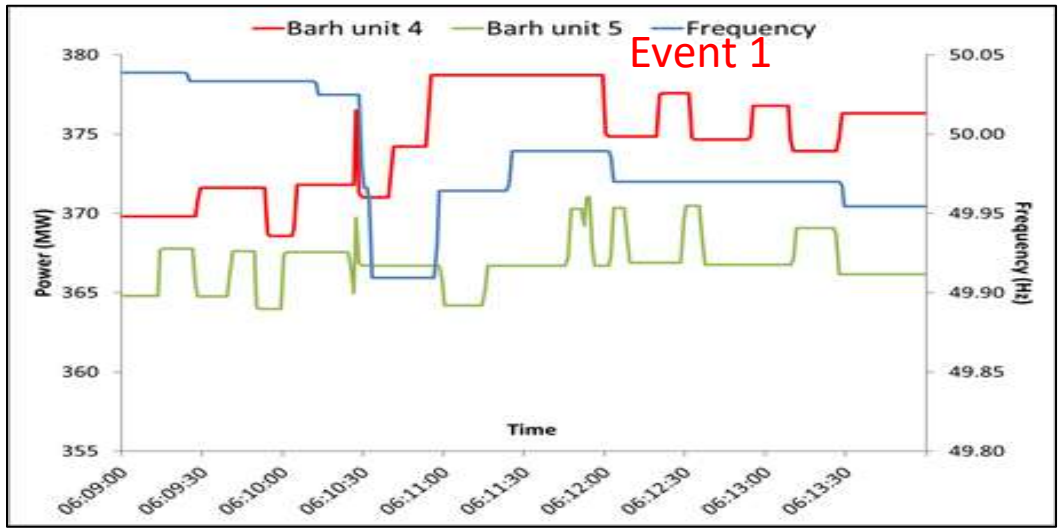


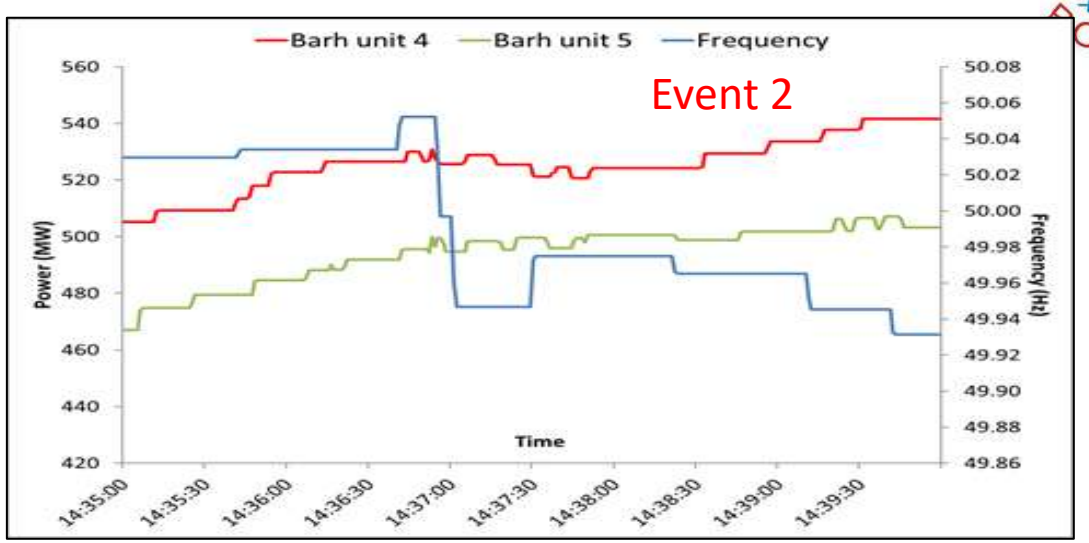
NTPC Barh

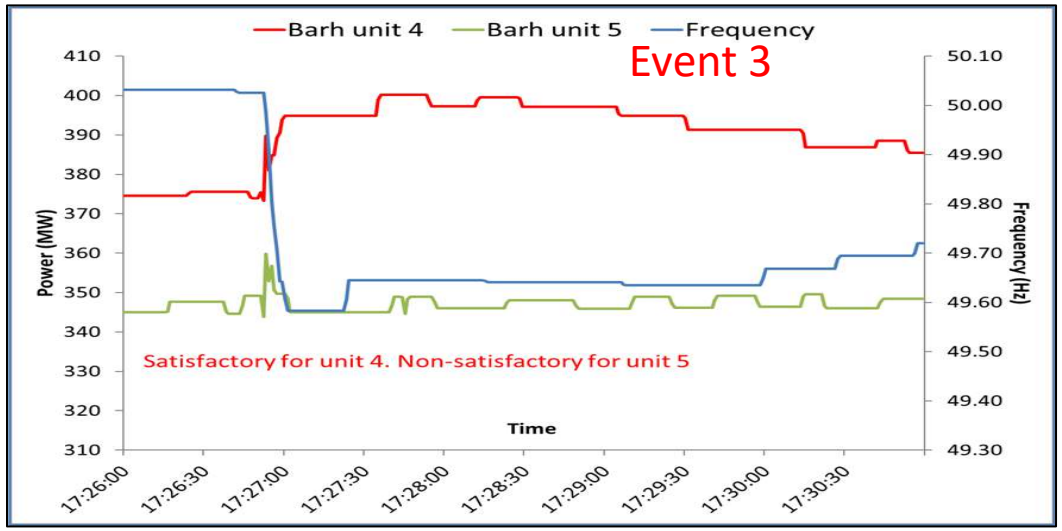
Event No	Response observed
01st March 2020, at 6:09 hrs	Not satisfactory
19th March 2020, at 14:36 hrs	Not satisfactory
28th May 2020, at 17:26 hrs	Satisfactory for unit 4, Non satisfactory for unit 5
11th June 2020, at 11:59 hrs.	Not satisfactory
14th July 2020, at 14:10 Hrs	Data are not available in FRC
16th July 2020 at 16:27 Hrs,	Not satisfactory (as per FRC)

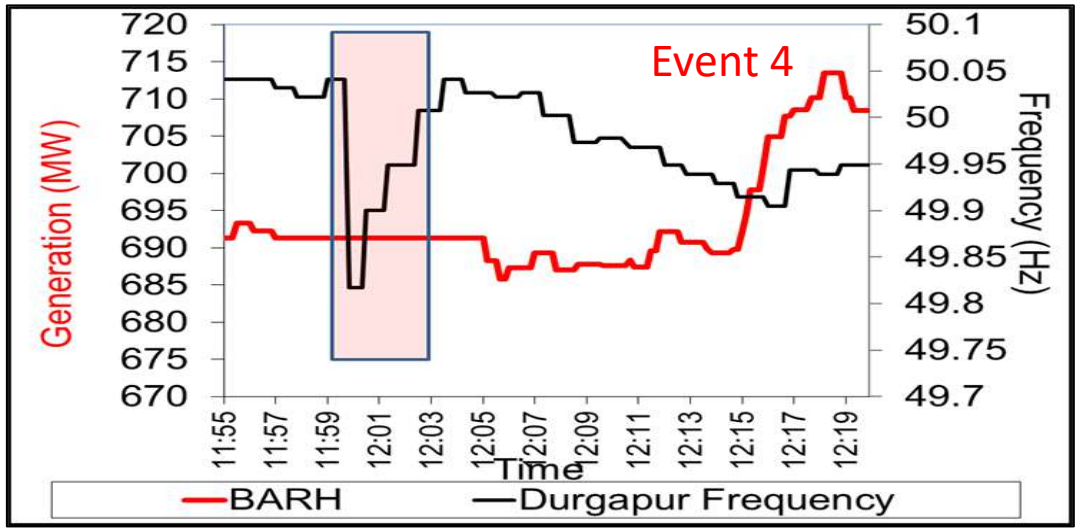
Resolution of data shared for stage II may be improved.

NTPC Barh


Barh unit 4
Barh unit 5
Frequency
Event 1
Power (MW)
Frequency (Hz)
Time


Barh unit 4
Barh unit 5
Frequency
Event 2
Power (MW)
Frequency (Hz)
Time


Barh unit 4
Barh unit 5
Frequency
Event 3
Power (MW)
Frequency (Hz)
Satisfactory for unit 4. Non-satisfactory for unit 5
Time

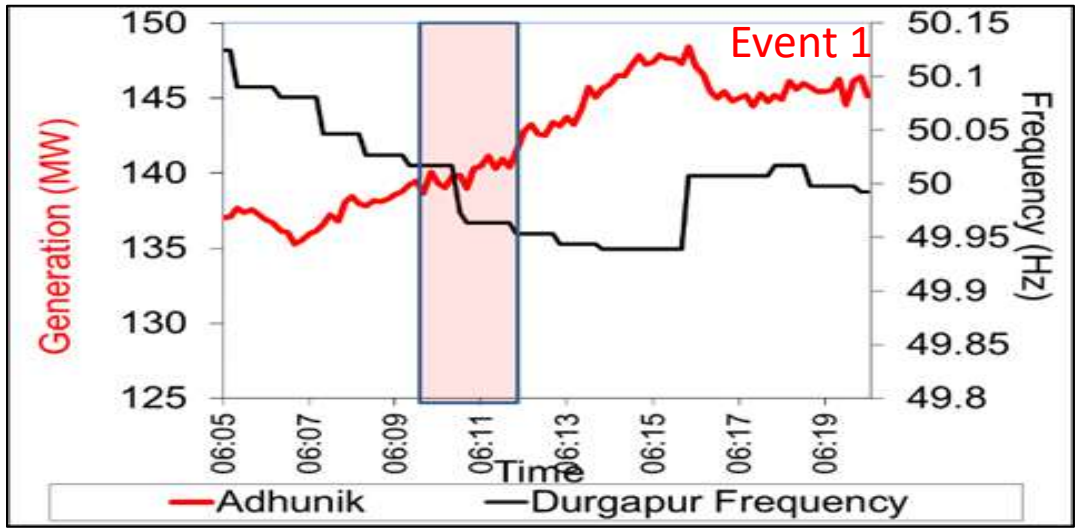

Event 4
Generation (MW)
Frequency (Hz)
Time
BARH
Durgapur Frequency

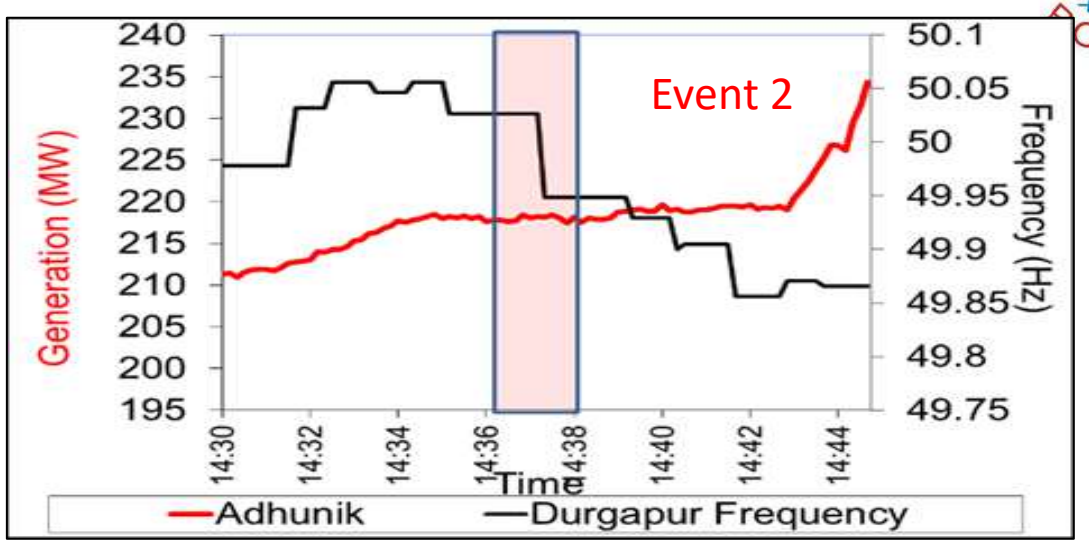
Adhunik

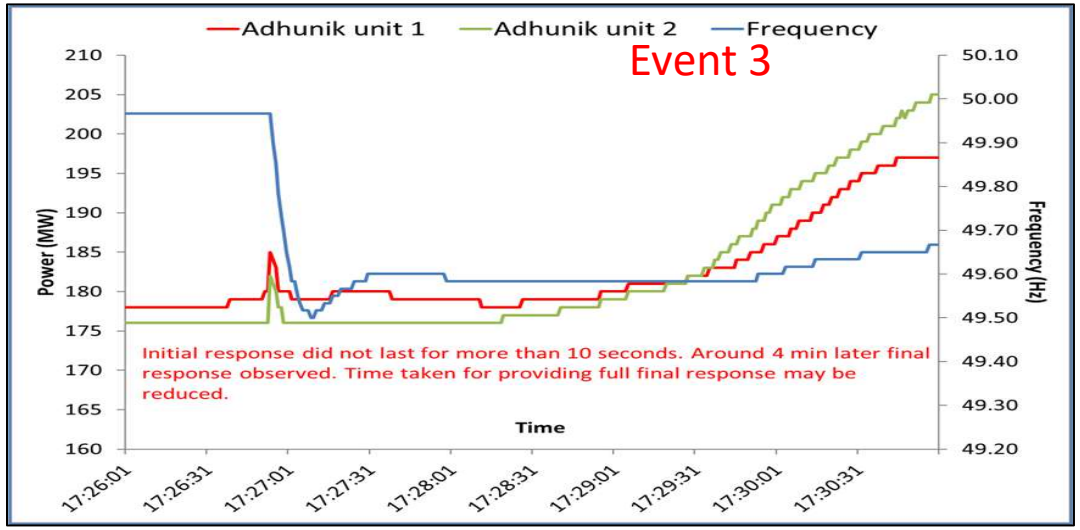
Event No	Response observed
01st March 2020, at 6:09 hrs	Satisfactory
19th March 2020, at 14:36 hrs	Not satisfactory
28th May 2020, at 17:26 hrs	Satisfactory in term of amount of response provided. But around 4 min was taken for providing full response; (Not captured in FRC)
11th June 2020, at 11:59 hrs.	Not satisfactory
14th July 2020, at 14:10 Hrs	Not satisfactory (as per FRC)
16th July 2020 at 16:27 Hrs,	Satisfactory (as per FRC)

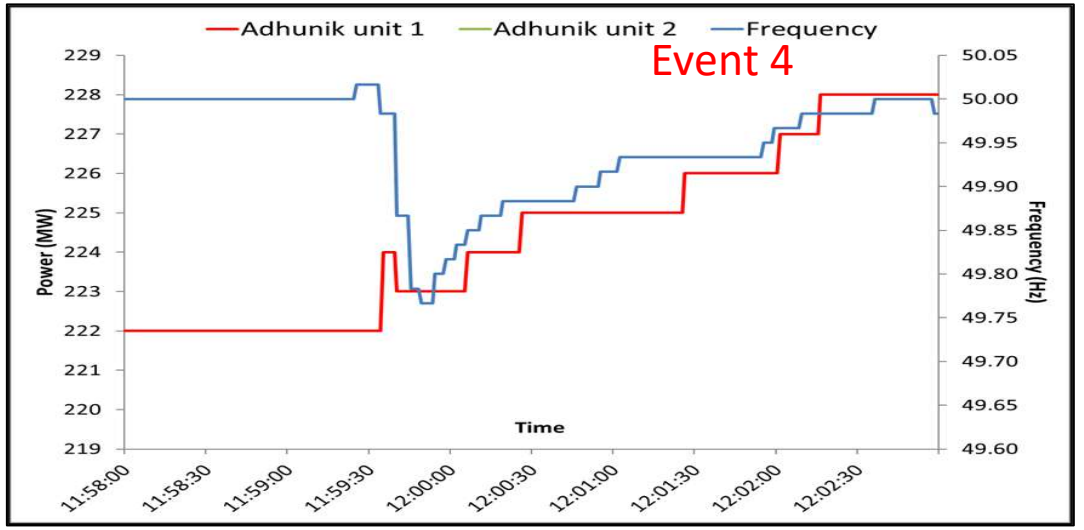
Time taken to provide full response may be reduced
Resolution of data shared may be improved

Adhunik


Event 1
Generation (MW)
Frequency (Hz)
Time
Adhunik
Durgapur Frequency


Event 2
Generation (MW)
Frequency (Hz)
Time
Adhunik
Durgapur Frequency

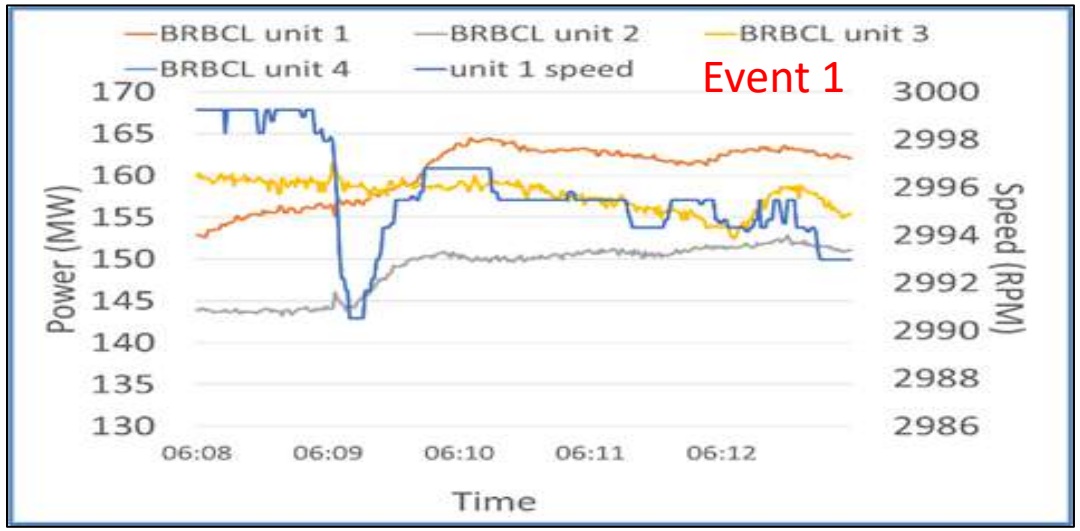

Adhunik unit 1
Adhunik unit 2
Frequency
Event 3
Power (MW)
Frequency (Hz)
Time
Initial response did not last for more than 10 seconds. Around 4 min later final response observed. Time taken for providing full final response may be reduced.

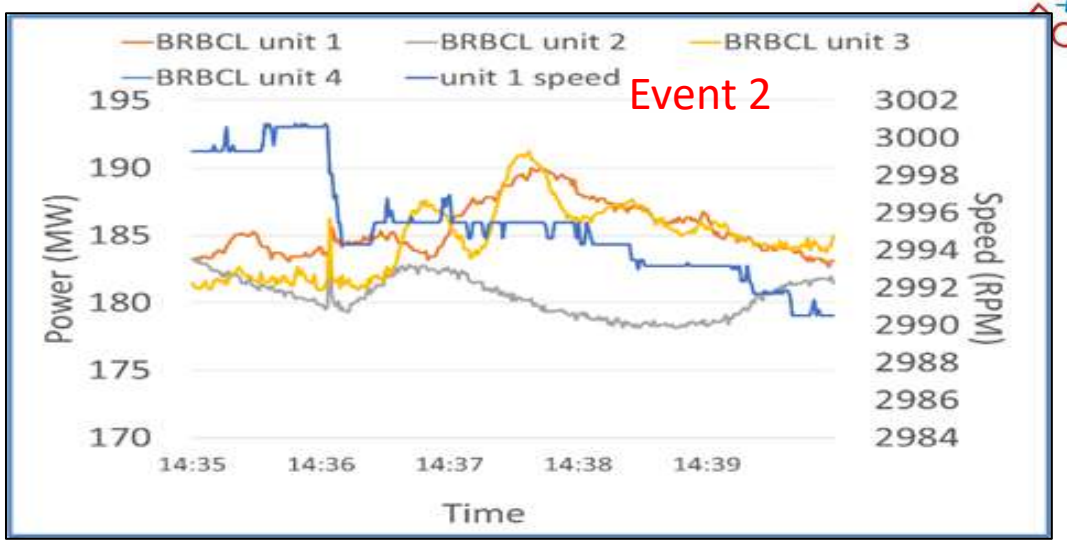

Adhunik unit 1
Adhunik unit 2
Frequency
Event 4
Power (MW)
Frequency (Hz)
Time

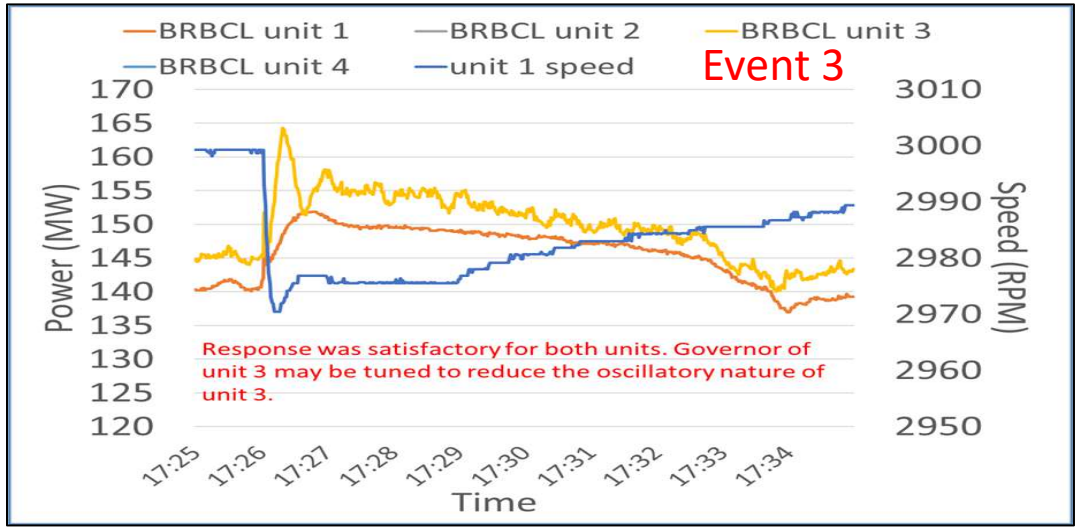
BRBCL

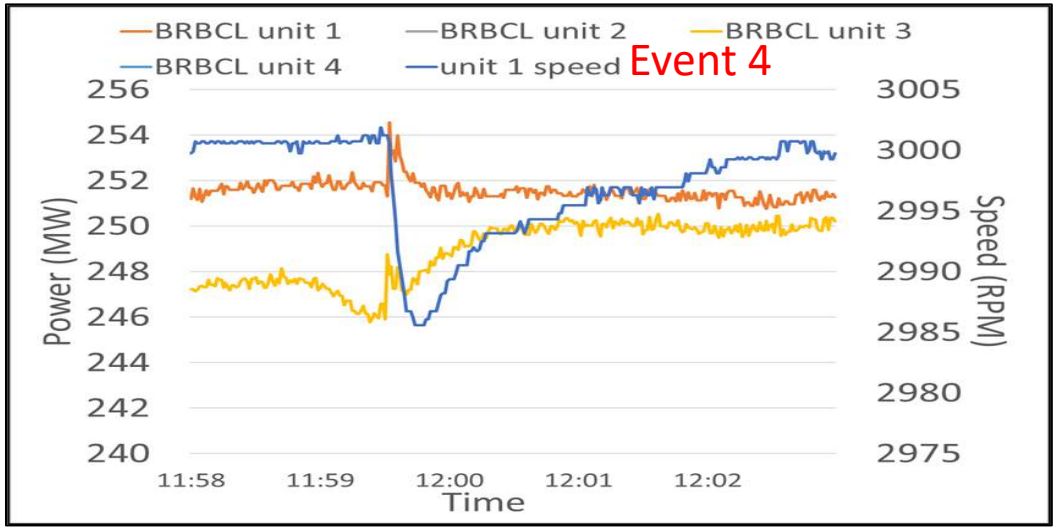
Event No	Response observed
01st March 2020, at 6:09 hrs	Satisfactory
19th March 2020, at 14:36 hrs	Non satisfactory
28th May 2020, at 17:26 hrs	Satisfactory
11th June 2020, at 11:59 hrs.	Non – satisfactory (generation was more than I/C capacity)
14th July 2020, at 14:10 Hrs	Not satisfactory (as per FRC)
16th July 2020 at 16:27 Hrs,	Satisfactory (as per FRC)

BRBCL

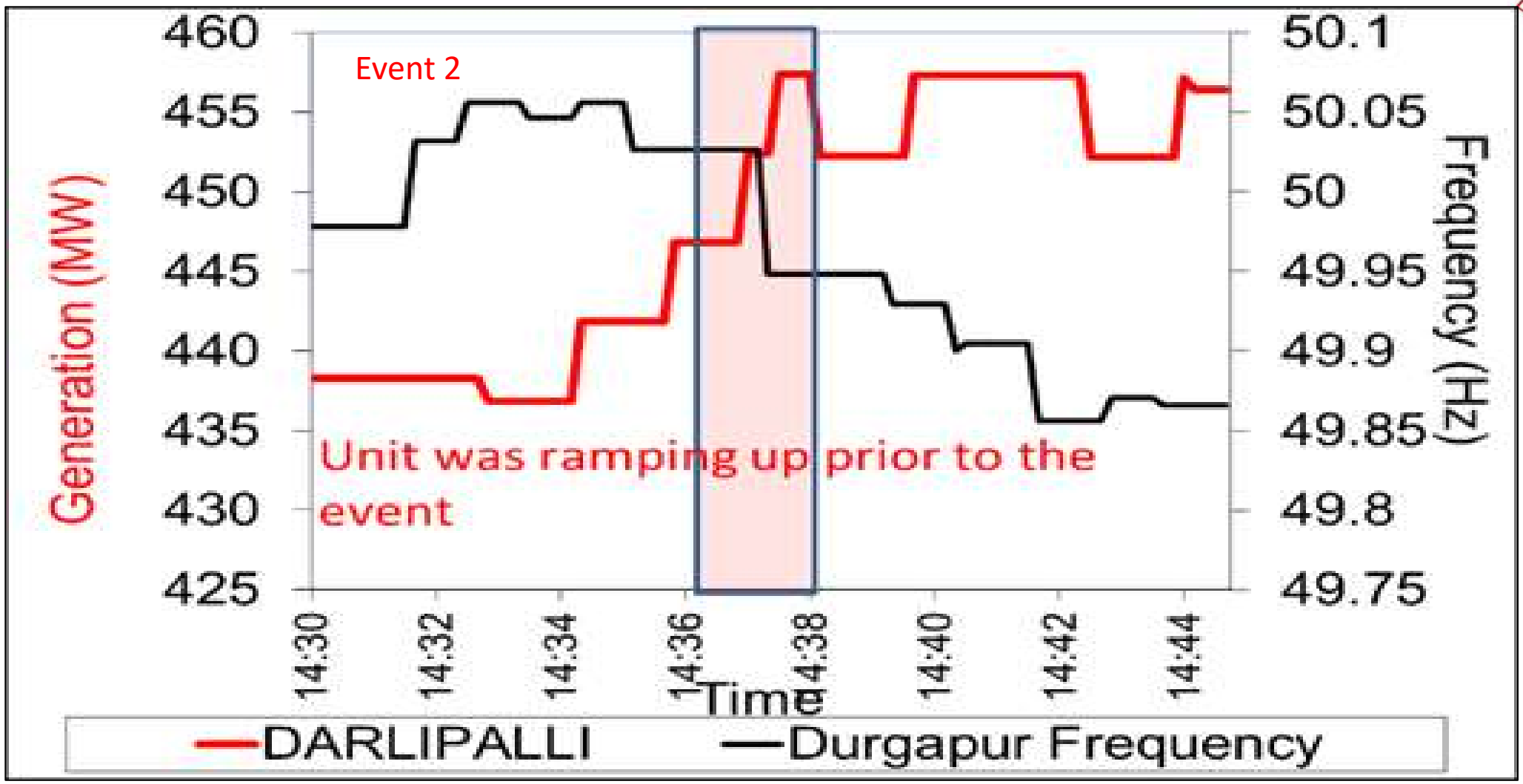

BRBCL unit 1
BRBCL unit 2
BRBCL unit 3
BRBCL unit 4
unit 1 speed
Event 1
Power (MW)
Speed (RPM)
Time
06:08
06:09
06:10
06:11
06:12


BRBCL unit 1
BRBCL unit 2
BRBCL unit 3
BRBCL unit 4
unit 1 speed
Event 2
Power (MW)
Speed (RPM)
Time
14:35
14:36
14:37
14:38
14:39


BRBCL unit 1
BRBCL unit 2
BRBCL unit 3
BRBCL unit 4
unit 1 speed
Event 3
Power (MW)
Speed (RPM)
Time
Response was satisfactory for both units. Governor of unit 3 may be tuned to reduce the oscillatory nature of unit 3.


BRBCL unit 1
BRBCL unit 2
BRBCL unit 3
BRBCL unit 4
unit 1 speed
Event 4
Power (MW)
Speed (RPM)
Time
11:58
11:59
12:00
12:01
12:02

Darlipalli

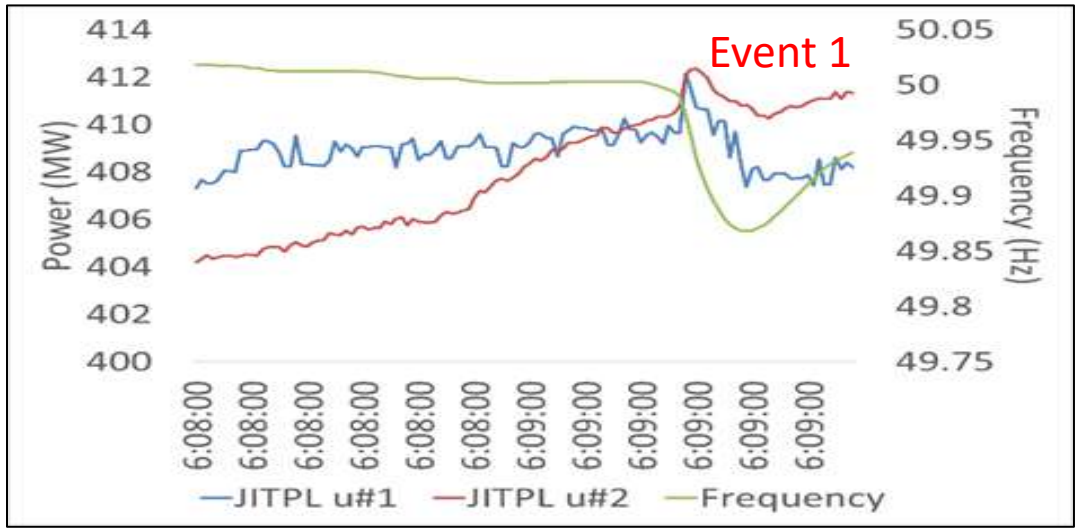

Event 2
Unit was ramping up prior to the event
Generation (MW)
460
455
450
445
440
435
430
425
50.1
50.05
50
49.95
49.9
49.85
49.8
49.75
Frequency (Hz)
14:30
14:32
14:34
14:36
14:38
14:40
14:42
14:44
Time
DARLIPALLI
Durgapur Frequency

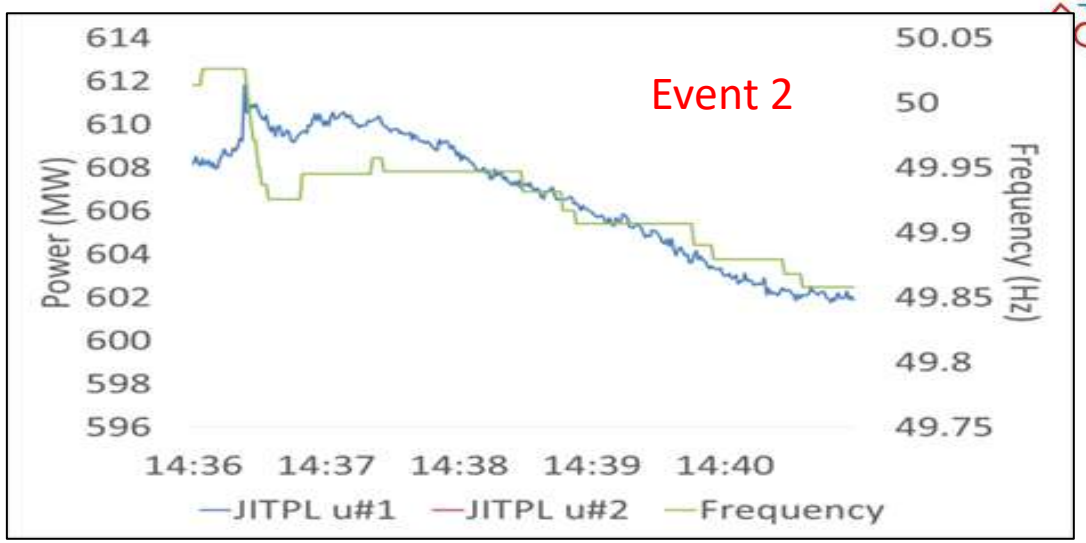
JITPL

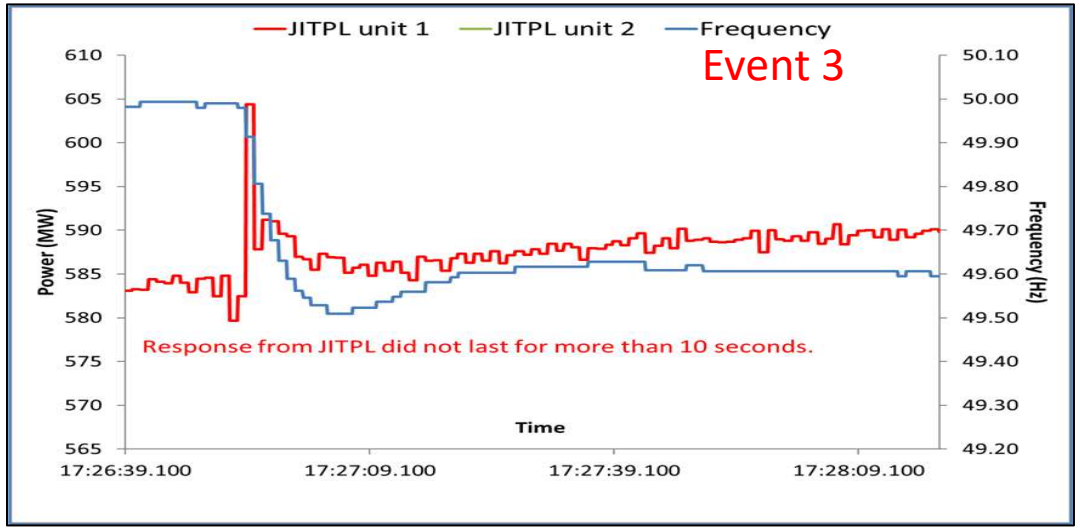
Event No	Response observed
01st March 2020, at 6:09 hrs	Non Satisfactory
19th March 2020, at 14:36 hrs	Non Satisfactory
28th May 2020, at 17:26 hrs	Non Satisfactory
11th June 2020, at 11:59 hrs.	Non Satisfactory
14th July 2020, at 14:10 Hrs	Not satisfactory (as per FRC)
16th July 2020 at 16:27 Hrs,	Not satisfactory (as per FRC)

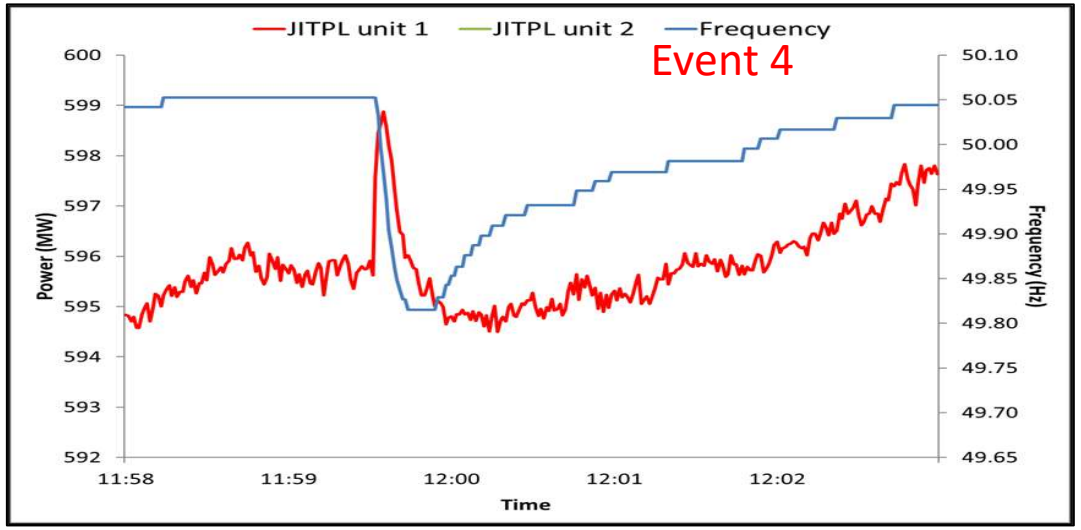
Response observed in case of 3rd and 4th event was not satisfactory in amount of response
Response provided by JITPL did not last for more than 10 seconds

JITPL


Event 1
Power (MW)
Frequency (Hz)
414
412
410
408
406
404
402
400
50.05
50
49.95
49.9
49.85
49.8
49.75
6:08:00
6:08:00
6:08:00
6:08:00
6:08:00
6:08:00
6:09:00
6:09:00
6:09:00
6:09:00
6:09:00
6:09:00
JITPL u#1
JITPL u#2
Frequency


Event 2
Power (MW)
Frequency (Hz)
614
612
610
608
606
604
602
600
598
596
50.05
50
49.95
49.9
49.85
49.8
49.75
14:36
14:37
14:38
14:39
14:40
JITPL u#1
JITPL u#2
Frequency


JITPL unit 1
JITPL unit 2
Frequency
Event 3
Power (MW)
Frequency (Hz)
610
605
600
595
590
585
580
575
570
565
50.10
50.00
49.90
49.80
49.70
49.60
49.50
49.40
49.30
49.20
Response from JITPL did not last for more than 10 seconds.
Time
17:26:39.100
17:27:09.100
17:27:39.100
17:28:09.100

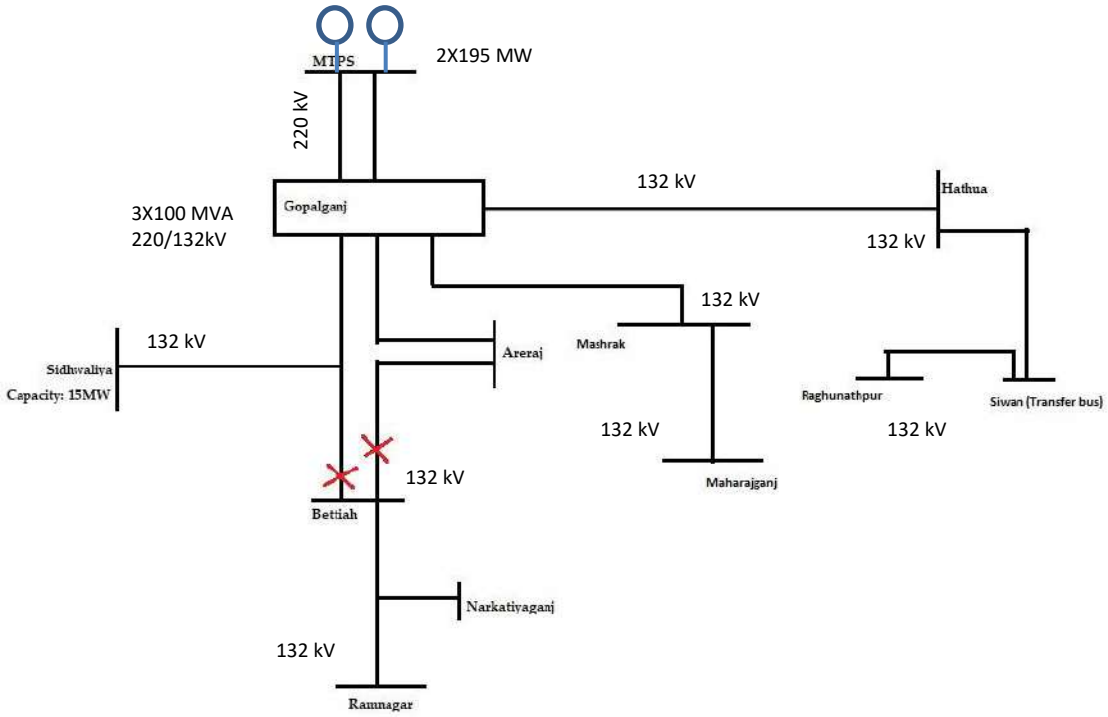

JITPL unit 1
JITPL unit 2
Frequency
Event 4
Power (MW)
Frequency (Hz)
600
599
598
597
596
595
594
593
592
50.10
50.05
50.00
49.95
49.90
49.85
49.80
49.75
49.70
49.65
Time
11:58
11:59
12:00
12:01
12:02

Thank You

Minutes of Meeting for KBUNL islanding Scheme

A meeting was held through WebEx on 22-June-2020 for discussing and finalizing islanding scheme of KBUNL St-II. Meeting was attended by participants from BSPTCL, Bihar SLDC, KBUNL (NTPC) and ERLDC.

Following was discussed during the meeting

1. In the meeting it was reconfirmed that islanding of KBUNL St-II unit(s) will be carried out with 220 kV Gopalganj substation along with load supplied radially from it.
2. Network diagram of radial connection is as follows
3. 

4. SLDC Bihar Submitted following load connected in Radial system

Sl No	Name of Substation	Peak Load (MW)	Off Peak Load (MW
1	Gopalganj (Local)	90	35
2	Areraj	20	12
3	Hathua	32	25
4	Raghunatpur	24	12
5	Mashrak & Mahrajganj	55	40
	Total	221	124

5. Further BSPTCL confirmed that no UFR is connected at any of the above substations
6. KBUNL informed that with above load it is possible to successfully island two units of Stage-II. The minimum load required for stable operation of 2 units is 200 MW. Further they informed that during last 4-5 months tripping of 220 kV KBUNL-Gopalganj D/C has reduced significantly and now these lines are very much stable.

7. ERLDC stated that in case in case it is difficult to island both the units, islanding may also be planned with only one unit of KBUNL along with UFR relay at suitable substations to match load with generation.
8. KBUNL emphasized for islanding of both the units and informed that they will simulate the impact of load generation mismatch on the unit and will reconfirm the number of units that can be islanded stably. If post islanding with 2 units, the frequency of the island shoots up, one of the units will be tripped by sensing MW & df/dt
9. After discussion it was agreed that BSPTCL and KBUNL will submit following data
    a. BSPTCL
        i. Upcoming connectivity of the substations considered under islanding to ensure proper formation of island under contingent conditions.
        ii. Present peak and Off peak MVAr loads of all substations considered in the island
        iii. Confirmation that lines within the island will not trip on encroachment of power swing in Zone-3
        iv. Reconfirm about existence and settings of UFR in the substations within the proposed island
        v. Identification of suitable LV (33 kV) feeders (10 -15 MW load each) where UFR can be installed to maintain load generation balance within island after it has formed and fine tuning of island frequency.
    b. KBUNL (NTPC)
        i. Model for excitation system of KBUNL units
        ii. Model for Governor system of KBUNL
        iii. Maximum Ramp up and Ramp down rate
        iv. Frequency band within which machine can operate stably
        v. Expected change in output with HP-LP bypass and time for same

10. Once the above information are collected ERLDC is required to simulate islanding condition using offline simulation software
11. Meeting ended with vote of thanks

Power Plant	Unit No	Type of Exciter	Exciter Model and Vendor	PSS tuned (Yes/No)	PSS in Service (Yes/No)	Last PSS Tuning Date	Whether Done in Last 3 Years	Report Submitted (Yes/No)	Whether Next to be planned	Planned Next PSS Tuning
West Bengal										
Kolaghat-WBPDCL	1	Static	BHEL	No	Yes	Long Back	No	No	Yes	that PSS tuning
Kolaghat-WBPDCL	2	Static	BHEL	No	Yes	Long Back	No	No	Yes	that PSS tuning
Kolaghat-WBPDCL	3	Static	BHEL	No	Yes	Long Back	No	No	Yes	that PSS tuning
Sagardighi-WBPDCL	2	Static	ABB Unitrol 5000	No	No	Long Back	No	No	Yes	Order to be placed
DPL	7	Static (through Carbon Brush)	Unitrol F 5000 ABB	No	No	N.A	No	Not App	Yes	
DPL	8	Brushless	WBS NO CE/0800-SH8-48-01 BHEL	No	Yes	No	No Detail	No	Yes	
PPSP	1	Thyristor type, full bridge	Digital AVRTOSATEX100, Vendor- Toshiba	No	Yes	2009	No	Not App.	Yes	
PPSP	2	Thyristor type, full bridge	Digital AVRTOSATEX100, Vendor- Toshiba	No	Yes	2009	No	Not App.	Yes	
PPSP	3	Thyristor type, full bridge	Digital AVRTOSATEX100, Vendor- Toshiba	No	Yes	2009	No	Not App.	Yes	
PPSP	4	Thyristor type, full bridge	Digital AVRTOSATEX100, Vendor- Toshiba	No	Yes	2009	No	Not App.	Yes	
TLDP III	4 x 33								Yes	
TLDP IV	4 X 44								Yes	
CESC										
Budge Budge-CESC	1	Static	R-R Industrial Controls Limited	Yes	Yes	2015	No	Yes	Yes	
Budge Budge-CESC	2	Static	R-R Industrial Controls Limited	Yes	Yes	2015	No	Yes	Yes	
DVC										
Bokaro A1	500 MW	Brushless	BHEL	No	Yes	2015	No	No	Yes	Jun-20
Bokaro B 210 MW	3						No Detail		Yes	Jun-20
Mejia-DVC	4	STATIC	BHEL	Yes	Yes	2009	No	Not App	Yes	
Raghunathpur-DVC	1	Brushless	Unitrol F 5000	No	No		No Detail	Not App	Yes	Feb-21
Raghunathpur-DVC	2	Brushless	Unitrol F 5000	No	No		No Detail	Not App	Yes	Jun-21
Koderma-DVC	1	Brushless	BHEL	Yes	Yes	2013	No	No	Yes	May-20
Waria	4	STATIC	BHEL	Yes	Yes	2008	No		Yes	Apr-20
ISGS										
Kahalgaon NTPC	3	Semi-Static	ABB 6800	Yes	Yes	2016	Yes	Yes	Yes	
Kahalgaon NTPC	4	Semi-Static	BHEL	Yes	Yes	2015	No	Yes	Yes	
Kahalgaon NTPC	6	Brushless	BHEL	Yes	Yes	2009	No	Yes	Yes	Apr-20
Farakka NTPC	4	Brushless	Siemens	Yes	Yes	2008	No	No	Yes	
Farakka NTPC	5	Brushless	Siemens	Yes	Yes	2008	No	No	Yes	
Farakka NTPC	6	Brushless	BHEL	Yes	Yes	2015	No	No	Yes	
Talcher Stage 1	1	Static	Andritz	Yes	Yes	2015	No	Yes	Yes	
Talcher Stage 1	2	Static	Andritz	Yes	Yes	2014	No	Yes	Yes	
Talcher Stage 2	3	Brushless	BHEL	Yes	Yes	2016	Yes	Yes	Yes	
Talcher Stage 2	4	Brushless	BHEL	Yes	Yes	No Details	No Details	No	Yes	
Talcher Stage 2	5	Brushless	BHEL	Yes	Yes	No Details	No Details	No	Yes	
Talcher Stage 2	6	Brushless	BHEL	Yes	Yes	2016	Yes	Yes	Yes	
Nabinagar NPGC	2						No Details		Yes	
Barh NTPC	1								Yes	Mar-20
Barh NTPC	2								Yes	Mar-20
Teesta V	1	Static	ALSPA P320 Alstom	Yes	Yes	2008	No	Yes	Yes	Mar-20
Teesta V	2	Static	ALSPA P320 Alstom	Yes	Yes	2008	No	Yes	Yes	Mar-20
Teesta V	3	Static	ALSPA P320 Alstom	Yes	Yes	2008	No	Yes	Yes	Mar-20
BRBCL	1	Brushless	BHEL	No	Yes	Vendor to Do	No		Yes	
BRBCL	2	Brushless	BHEL	Yes	Yes	2019	Yes	Yes	Yes	
BRBCL	2	Brushless	BHEL			Vendor to Do	No		Yes	
BRBCL	3	Brushless	BHEL	No	Yes	Vendor to Do	No		Yes	
KBUNL	1					2019	No		Yes	
KBUNL	2						No		Yes	
KBUNL	3						No		Yes	
KBUNL	4						No		Yes	
Rangit	3 x 20						No		Yes	

IPP										
Jorethang	1	Static	ALSPA CONTOGEN V3 P320 AVR, VENDOR - ALSTOM	Yes	Yes	2015	No	Yes	Yes	Mar-20
Jorethang	2	Static	ALSPA CONTOGEN V3 P320 AVR, VENDOR - ALSTOM	Yes	Yes	2015	No	Yes	Yes	Mar-20
Chuzachen HEP	1	Static	P320 AVR, ALSTOM	Yes	Yes	2013	No	Yes (issue with Time scale)	Yes	Mar-20
Chuzachen HEP	2	Static	P320 AVR, ALSTOM	Yes	Yes	2013	No	Yes (issue with Time scale)	Yes	Mar-20
ADHUNIK	1	Brushless	ST5B	Yes	YES	2013	No	No	Yes	Jul-20
ADHUNIK	2	Brushless	ST5B	Yes	YES	2013	No	No	Yes	Jul-20
JITPL	1	Brushless	BHEL	Yes	Yes	2016	Yes	Yes	Yes	
JITPL	2	Brushless	BHEL	Yes	Yes	2016	Yes	Yes	Yes	
GMR	1	Static	ABB-Unitrol	Yes	Yes	2013	No	Yes	Yes	Dec-20
GMR	2	Static	ABB-Unitrol	Yes	Yes	2013	No	Yes	Yes	Dec-20
GMR	3	Static	ABB-Unitrol	Yes	Yes	2013	No	Yes	Yes	Dec-20
Orissa										
IB TPS	1	Static	Model: Unitrol 5, BHEL	Yes	Yes	2011	No	No	Yes	
IB TPS	2	Static	Model: Unitrol 5, BHEL	Yes	Yes	2012	No	No	Yes	
Upper Indravati	1	Static (ST) Digital	Fuji Electric Co. Japan	Yes	No	2015	No	No	Yes	
Upper Indravati	2	Static (ST) Digital	Fuji Electric Co. Japan	Yes	No	2015	No	No	Yes	
Upper Indravati	3	Static (ST) Digital	Fuji Electric Co. Japan	Yes	No	2000	No	No	Yes	
Upper Indravati	4	Static (ST) Digital	Fuji Electric Co. Japan	Yes	No	2001	No	No	Yes	
Balimela	1 (60 MW)	Under R & M							Yes	
Balimela	2 (60 MW)	Under R & M							Yes	
Balimela	3 (60 MW)	Not Provided	Not Provided	No	No	Not tuned	No	No	Yes	
Balimela	4 (60 MW)	Not Provided	Not Provided	No	No	Not tuned	No	No	Yes	
Balimela	5 (60 MW)	Not Provided	Not Provided	No	No	Not tuned	No	No	Yes	
Balimela	6 (60 MW)	Not Provided	Not Provided	No	No	Not tuned	No	No	Yes	
Balimela	7 (75 MW)	Static	Not Provided	No	No	Not tuned	No	No	Yes	
Balimela	8 (75 MW)	Static	Not Provided	No	No	Not tuned	No	No	Yes	
Upper Kolab	1	Static	Unitrol BHEL	Yes	Yes	2007	No	No	Yes	
Upper Kolab	2	Static	Unitrol BHEL	Yes	Yes	2007	No	No	Yes	
Upper Kolab	3	Static	Unitrol BHEL	Yes	Yes	2007	No	No	Yes	
Upper Kolab	4	Digital Static	Unitrol BHEL(Max-DNA Software)	Yes	Yes	2007	No	No	Yes	
Rengali	1	Digital Static	Unitrol BHEL	Yes	Yes	Not tuned	No	No	Yes	
Rengali	2	Digital Static	Unitrol BHEL	Yes	Yes	Not tuned	No	No	Yes	
Rengali	3	Digital Static	Unitrol BHEL	Yes	Yes	Not tuned	No	No	Yes	
Rengali	4	Digital Static	Unitrol BHEL (Max-DNA Software)	Yes	Yes	Not tuned	No	No	Yes	
Rengali	5	Static	Unitrol BHEL	No	Yes	Not tuned	No	No	Yes	
Sterlite	4 X 600								Yes	
Jharkhand										
Tenughat	1	Static	Unitrol D	Yes	Yes	2017	Yes	No		
Tenughat	2	Static	Unitrol D	Yes	Yes	2017	Yes	No		
Subarnrekha	2 X 65									
Bhutan										
Tala	1	Static	ABB Unitrol (M/D)	No	Yes			No		
Tala	2	Static	ABB Unitrol (M/D)	No	Yes			No		
Tala	3	Static	ABB Unitrol (M/D)	No	Yes			No		
Tala	4	Static	ABB Unitrol (M/D)	No	Yes			No		
Tala	5	Static	ABB Unitrol (M/D)	No	Yes			No		
Tala	6	Static	ABB Unitrol (M/D)	No	Yes			No		
Chukha	1	Static	BHEL	No	Yes	2005	No	No	Yes	
Chukha	2	Static	BHEL	No	Yes	2005	No	No	Yes	
Chukha	3	Static	BHEL	No	Yes	2005	No	No	Yes	
Chukha	4	Static	BHEL	No	Yes	2005	No	No	Yes	
Mangdechu	1	Static	BHEL	No	Yes			No		
Mangdechu	2	Static	BHEL	No	Yes			No		
Mangdechu	3	Static	BHEL	No	Yes			No		
Mangdechu	4	Static	BHEL	No	Yes			No		

Observations by P&E:

The load flow study has been done by State Load Despatch Centre (SLDC) and following points are observed:

1. It was done was on the 6450 MW load of Bihar.
2. 850 MW load has been considered on Biharsharif (PG) at 220 kV voltage level including BTPS.
3. Capacity of Biharsharif (PG) : 3*315 + 1*500 (=1445 MVA)
4. CASE STUDY 5 (BUS SPLIT and N-1 contingency with 500 MVA on BUS B tripped):
    - 2*315 on BUS A hold the flow with 45% loading.
    - 1*315 on BUS B (280 MW) reaches about 90% of loading.
5. CASE STUDY 6 (BUS SPLIT and N-1 contingency with 500 + 315 MVA on BUS B tripped):
    - 2*315 on BUS A hold the flow with 60% loading.
    - 220 kV load of Fatuha and Khizirsarai will be shifted to Patna PG/ Sipara and Gaya PG, respectively.
6. Rest all CASE STUDIES hold the flow with N-1 contingency.

Comments by P&E:

1. **TIMELINES:**
    - In 11th Standing Committee Meeting held on 08.10.2010, PGCIL stated that due to accumulation of generation projects in Eastern Region and evolution of Regional Grid over the years, the Short Circuit levels (SCL) at 400 kV bus of various sub-stations has grown up to a high value. As more generation projects are being envisaged in coming years, it is likely that the Short Circuit levels of the sub-stations would exceed the permissible limits of existing switchgear capacity (i.e 40 kA) in near future. Based on the system studies carried out by PGCIL to examine the short circuit levels at various substations of Eastern Region, PGCIL suggested measures to reduce SCLs below the permissible limits considering ongoing generation projects and transmission schemes corresponding to 2011-12 condition (with DVC generation projects). Study results showed that short circuit levels at various 400 kV substations are exceeding the permissible limit of 40 kA at Maithon, Durgapur, Kahalgaon, Mathon-RB, **Biharsharif** Sub-stations.

In view of the above, Step by step splitting arrangement was proposed for the following 400kV substations to contain the short circuit level below 40 kA.

- Subsequently, in 131th and 134th and onwards OCC meeting, Powergrid stated that bus splitting at 400 kV Biharshariff S/s will be commissioned by April, 2017 and the bus splitting scheme at 400 kV Maithon & Biharshariff will be operationalized after the getting the consent from CTU.
- Further, to meet N-1 criterion at Biharsharif (PG), installation of 500 MVA power transformer was approved in 18th and 19th SCM.
- *It is clear that the Bus Split Arrangement at Biharsharif (PG) has been planned and to be implemented by PowerGrid.*

2. With Bus Split and outage of 500 MVA ICT at Bus B, load on 315 MVA ICT on Bus B becomes about 280 MW i.e., 90%. It is pertinent to mention that, Central Electricity Authority (CEA) in its planning criteria allows the planning margin of 10%.

   However, in the present scenario load on 315 MVA ICT on Bus B reaches its maximum permissible load (90% loading). As demand in Biharsharif (PG) increases, N-1 criteria will be violated for existing 315 MVA ICT on Bus B. In that case ERLDC may think of replacing 315 MVA with 500 MVA in future. OCC may also examine and accordingly suggest CTU to take necessary action.
3. Load Flow Study performed by SLDC and attached SLD documents with power flows have been examined. The loads and SLDC report are in accordance with present situation at considered load of 6450 MW.

   Moreover, Load Demand Projection may be observed by System Operation Team and accordingly, updation of power flows in PSS@E software may also be examined so that permissible/thermal loading of other ICTs may be kept under allowable margin.
4. With the increase in ICTs at Biharsharif, fault level also increases. Since, the existing switchgear has been designed for 40 kA short circuit fault level, it is necessary that fault level of ICTs after augmentation of 500 MVA should be below the permissible limit.

   In view of the above:-

   1. Bus Splitting Arrangement may be allowed at Biharsharif (PG) as approved in SCM.
   2. If the load will increase in future at Biharsharif (PG), there will be violation of N-I criteria, hence BSPTCL may recommend to replace 315 MVA transformer by 500 MVA transformer.
   3. Same may be examined by ERLDC also.

SLDC has carried out the load flow analysis by using PSSE software at 6450MW of load on Bihar(Load prediction in LGBR for the month of September submitted to ERPC by PMC) & 850MW of load at GSS Biharsharif (at 220KV Level) (As discussed with A.E.Ex TSD/Biharsharif the load on GSS Biharsharif has reached up to 850MW last year). The observations are as follows:

	400KV BUS A 400/220KV Power Transformers		**400KV BUS B 400/220KV Power Transformers**			
Cases	Loading of ICT-1 (315MVA)	Loading of ICT-2 (315MVA)	Loading of ICT-3 (315MVA)	Loading of ICT-4 (500MVA)	Total Loading	Remarks
1. Without Bus split	149.5MW	149.5MW	149.5MW	249.1MW	697.6MW	
2. With Bus Split (2X315MVA on Bus A & 1X315+1X500 MVA on Bus B)	102.4MW	102.4MW	188.4MW	314.2MW	707.4MW	
3.With Bus Split & N-1 Contingency (315MVA of Bus A off)	0	130.5MW	198.8MW	331.5MW	660.8MW	
4. With Bus split & N-1 Contingency (315MVA of Bus B off)	121.2MW	121.2MW	0	389.1MW	631.5MW	
5. With Bus split & N-1 Contingency (500 MVA of Bus B off)	139.9MW	139.9MW	277.6MW	0	557.4MW	When 1x500MVA transformer will be out then this will further lead to overloading of other 1x315MVA transformer & both of the transformers of Bus B will be out.
6. With Bus split both 1X315+1X500 MVA of Bus B off	186.2MW	186.2MW	0	0	372.4MW	1. Load of GSS Fatuha will be shifted on Sipara & Patna (PG) 2. The load of GSS Khizirsarai will be shifted on Gaya (PG)

Since, the whole system is synchronized so shifting of load occurs as per the voltage profile & availability of the source.

ANTICIPATED POWER SUPPLY POSITION FOR THE MONTH OF AUG-20

Sl.No.		P A R T I C U L A R S	PEAK DEMAND IN MW	ENERGY IN MU
1		BIHAR		
	i)	NET MAX DEMAND	5800	3790
	ii)	NET POWER AVAILABILITY- Own	400	220
	iii)	Central Sector+Bi-Lateral	1450	2754
	iv)	SURPLUS(+)/DEFICIT(-)	-2500	-816
2		JHARKHAND		
	i)	NET MAXIMUM DEMAND	1420	850
	ii)	NET POWER AVAILABILITY- Own Source	386	243
	iii)	Central Sector+Bi-Lateral+IPP	1008	697
	iv)	SURPLUS(+)/DEFICIT(-)	-26	91
3		DVC		
	i)	NET MAXIMUM DEMAND	2980	1950
	ii)	NET POWER AVAILABILITY- Own Source	5244	3399
	iii)	Central Sector+MPL	529	372
	iv)	Bi- lateral export by DVC	2000	1245
	v)	SURPLUS(+)/DEFICIT(-) AFTER EXPORT	793	576
4		ODISHA		
	i)	NET MAXIMUM DEMAND	4150	3255
	ii)	NET POWER AVAILABILITY- Own Source	3805	2504
	iii)	Central Sector	1570	1422
	iv)	SURPLUS(+)/DEFICIT(-)	1225	670
5		WEST BENGAL		
5.1		WBSEDCL		
	i)	NET MAXIMUM DEMAND	6600	4330
	ii)	IPCL DEMAND	0	62
	iii)	TOTAL WBSEDCL's Energy Requirement (incl.B'Desh+Sikkim+IPCL)	7528	4546
	iv)	NET POWER AVAILABILITY- Own Source	4352	2262
	v)	Contribution from DPL	465	334
	vi)	Central Sector+Bi-lateral+IPP&CPP+TLDP	2886	2151
	vii)	EXPORT (TO B'DESH & SIKKIM)	0	156
	viii)	SURPLUS(+)/DEFICIT(-) AFTER EXPORT	175	199
5.2		CESC		
	i)	NET MAXIMUM DEMAND	1970	1075
	ii)	NET POWER AVAILABILITY- Own Source	820	533
	iii)	FROM OTHER SOURCE (INCL. IPP/CPP-29-30 MU/M)	610	161
	iv)	IMPORT FROM HEL	540	381
	v)	TOTAL AVAILABILITY OF CESC	2000	1075
	vi)	SURPLUS(+)/DEFICIT(-)	0	0
6		WEST BENGAL (WBSEDCL+DPL+CESC) (excluding DVC's supply to WBSEDCL's command area)		
	i)	NET MAXIMUM DEMAND	9318	5467
	ii)	NET POWER AVAILABILITY- Own Source	5576	3128
	iii)	CS SHARE+BILATERAL+IPP/CPP+TLDP+HEL	4136	2693
	iv)	SURPLUS(+)/DEFICIT(-) BEFORE WBSEDCL'S EXP.	385	355
	v)	SURPLUS(+)/DEFICIT(-) AFTER WBSEDCL'S EXP.	175	199
7		SIKKIM		
	i)	NET MAXIMUM DEMAND	100	45
	ii)	NET POWER AVAILABILITY- Own Source	8	3
		- Central Sector	186	131
	iii)	SURPLUS(+)/DEFICIT(-)	94	89
8		EASTERN REGION		
	i)	NET MAXIMUM DEMAND	24841	15357
	ii)	BILATERAL EXPORT BY DVC	2000	1245
	iii)	EXPORT BY WBSEDCL	0	156
	iv)	NET TOTAL POWER AVAILABILITY OF ER (INCLUDING CS ALLOCATION +BILATERAL+IPP/CPP+HEL)	28196	17566
	v)	ENERGY SURPLUS(+)/DEFICIT(-) OF ER AFTER EXPORT (v = iv - i -ii - iii)	1355	808

Annexure D.2

ERLDC, KOLKATA									
TRANSMISSION ELEMENTS OUTAGE(BAYS ONLY) APPROVED									
		FROM		TO					
Sl No	NAME OF THE ELEMENTS	DATE	TIME	DATE	TIME	REMARKS	S.D availed BY	Reason	SUBJECT TO CONSENT FROM AGENCY
1	220 kV Main bay of 400/220kv 500MVA ICT-2 at New Purnea	01-08-2020	10:00	01-08-2020	18:00	ODB	POWERGRID ER-I	AMP work	
2	765kV Srikakulam Ckt 2 Main Bay 726 at Angul	01-08-2020	09:00	04-08-2020	18:00	OCB	ER-II/Odisha/Angul SS	Guide Valve Replacement	NLDC
3	400 KV Keonjhar Main Bay (Bay No-401) at Rengali	01-08-2020	09:00	01-08-2020	17:00	ODB	ER-II/Odisha/Rengali	For Isolator alignment work and interlock checking	
4	703 Main Bay of 765/400KV,1500MVA ICT-I at Sundergarh	01-08-2020	09:00	04-08-2020	18:00	OCB	ER-II/Odisha/Sundargarh	SIEMENS Centre guide valve modification work in Mechanism drive and AMP	NLDC
5	400KV MAIN BAY OF 400/220KV 500MVA ICT-3 AT PATNA	03-08-2020	09:30	03-08-2020	14:00	ODB	POWERGRID ER-I	DATA VALIDATION AFTER SAS UPGRADATION WORK	
6	400 KV Keonjhar- Talcher # 2 Tie Bay (Bay No-402) at Rengali	03-08-2020	09:00	03-08-2020	17:00	ODB	ER-II/Odisha/Rengali	For Isolator alignment work and interlock checking	
7	400KV PUNAT 1(JIGME INTERIM-1) Main Bay AT ALIPURDUAR	04-08-2020	08:00	04-08-2020	18:00	ODB	POWERGRID,ER-II	Bay AMP Work	
8	400KV MAIN BAY OF 125 MVAR BR-1 AT PATNA	04-08-2020	09:30	04-08-2020	14:00	ODB	POWERGRID ER-I	DATA VALIDATION AFTER SAS UPGRADATION WORK	
9	400KV MAIN BAY OF BALIA-3 AT PATNA	05-08-2020	09:30	05-08-2020	14:00	ODB	POWERGRID ER-I	DATA VALIDATION AFTER SAS UPGRADATION WORK	
10	400 kV Main bay of 125 MVAR B/R at Chaibasa	05-08-2020	09:30	05-08-2020	17:30	ODB	POWERGRID ER-I	AMP WORK	
11	204 LINE BAY at Keonjhar	05-08-2020	09:00	05-08-2020	18:00	ODB	ER-II/Odisha/Keonjhar S/s	AMP WORKS.Rectification of CB: found faulty timing. (Shutdown will taken if not avail in July)	
12	AMP of 10C06.C BAY at Talcher	05-08-2020	09:00	05-08-2020	17:00	OCB	ER-II/Odisha/HVDC Talcher	Annual maintenance of 10C06.C bay equipment.	
13	400 KV Talcher # 2 Main Bay (Bay No-403) at Rengali	05-08-2020	09:00	05-08-2020	17:00	ODB	ER-II/Odisha/Rengali	For Isolator alignment work and interlock checking	
14	400kV Sundargarh-OPGC ckt#1 (Main bay-433,Tie bay -434)	05-08-2020	09:00	05-08-2020	18:00	ODB	ER-II/Odisha/Sundargarh	AMP Line Equipment	
15	706 Main Bay of 765/400KV,1500MVA ICT-II at Sundergarh	05-08-2020	09:00	08-08-2020	18:00	OCB	ER-II/Odisha/Sundergarh	SIEMENS Centre guide valve modification work in Mechanism drive and AMP	NLDC
16	400KV PUNAT 2(JIGME INTERIM-2) main Bay AT ALIPURDUAR	06-08-2020	08:00	06-08-2020	18:00	ODB	POWERGRID,ER-II	Bay AMP Work	
17	400KV MAIN BAY OF BALIA-4 AT PATNA	06-08-2020	09:30	06-08-2020	14:00	ODB	POWERGRID ER-I	DATA VALIDATION AFTER SAS UPGRADATION WORK	
18	206 LINE BAY at Keonjhar	06-08-2020	09:00	06-08-2020	18:00	ODB	ER-II/Odisha/Keonjhar S/s	AMP WORKS.Rectification of CB: found faulty timing. (Shutdown will taken if not avail in July)	
19	Main bay 430 of 400KV Sundargarh-Raigarh ckt-1 at Sundergarh	06-08-2020	08:00	06-08-2020	18:00	ODB	ER-II/Odisha/Sundargarh	1 Yearly AMP	
20	400KV TIE BAY OF BARH-3 AND BALIA-3 AT PATNA	07-08-2020	09:30	07-08-2020	14:00	ODB	POWERGRID ER-I	DATA VALIDATION AFTER SAS UPGRADATION WORK	
21	400kv Tie bay of Convt. Trasformer and AC Filter (North side) at Sasaram	07-08-2020	09:00	07-08-2020	18:00	ODB	POWERGRID ER-I	AMP Work	
22	132KV BAY OF 220/132KV ATR-II AT DALTANGANJ	07-08-2020	09:30	07-08-2020	17:30	ODB	POWERGRID ER-I	Bay AMP	

23	207 MAIN BAY at Keonjhar	07-08-2020	09:00	07-08-2020	18:00	ODB	ER-II/Odisha/Keonjhar S/s	AMP WORKS.Rectification of CB: found faulty timing. (Shutdown will taken if not avail in July)	
24	400 Kv Talcher # 1 Main Bay (Bay No-404) at Rengali	07-08-2020	09:00	07-08-2020	17:00	ODB	ER-II/Odisha/Rengali	For Isolator alignment work and interlock checking	
25	400KV TIE BAY OF BARH-4 AND BALIA-4 AT PATNA	08-08-2020	09:30	08-08-2020	14:00	ODB	POWERGRID ER-I	DATA VALIDATION AFTER SAS UPGRADATION WORK	
26	765kV Srikakulam Ckt 2 Tie Bay 725 at Angul	08-08-2020	09:00	11-08-2020	18:00	OCB	ER-II/Odisha/Angul SS	Guide Valve Replacement	NLDC
27	108 BAY(Main bay of 132KV Baripada-Bangriposi line) at Baripada	08-08-2020	09:00	08-08-2020	17:30	ODB	ER-II/Odisha/BARIPADA S/S	AMP works	
28	400 Kv Talcher # 1 Tie Bay (Bay No-406) at Rengali	08-08-2020	09:00	08-08-2020	17:00	ODB	ER-II/Odisha/Rengali	For Isolator alignment work and interlock checking	
29	132KV BAY OF 220/132KV ATR-I AT DALTANGANJ	09-08-2020	09:30	09-08-2020	17:30	ODB	POWERGRID ER-I	Bay AMP	
30	40952- 400KV Jamshedpur line Main Bay at Baripada	09-08-2020	09:00	09-08-2020	17:30	ODB	ER-II/Odisha/BARIPADA S/S	AMP works	
31	220kV New Melli-JLHEP Line-II (Bay 206)	10-08-2020	10:00	10-08-2020	13:00	ODB	POWERGRID,ER-II	To check earth switch Mechanism box to remove earth switch(06-89AE) suspect	
32	400KV MAIN BAY OF BARH-4 AT PATNA	10-08-2020	09:30	10-08-2020	14:00	ODB	POWERGRID ER-I	DATA VALIDATION AFTER SAS UPGRADATION WORK	
33	400kv Main Bay of Kishanganj-1 at New Purnea	10-08-2020	09:00	10-08-2020	12:00	ODB	POWERGRID ER-I	CT Oil Sampling	
34	400kv Tie Bay of Kishanganj-1 & Muzaffarpur-2	10-08-2020	12:00	10-08-2020	15:00	ODB	POWERGRID ER-I	CT Oil Sampling	
35	400kv Main Bay of Muzaffarpur-2 at New Purnea	10-08-2020	15:00	10-08-2020	18:00	ODB	POWERGRID ER-I	CT Oil Sampling	
36	400 KV ICT # 1 Main Bay (Bay No-407) at Rengali	10-08-2020	09:00	10-08-2020	17:00	ODB	ER-II/Odisha/Rengali	For Isolator alignment work and interlock checking	
37	400KV PUNAT 1(JIGME INTERIM-1) & 400KV PUNAT 2(JIGME INTERIM-2) TIE Bay AT ALIPURDUAR	11-08-2020	08:00	11-08-2020	18:00	ODB	POWERGRID,ER-II	Bay AMP Work	
38	220kV New Melli-Tashiding Line (Bay 212)	11-08-2020	10:00	11-08-2020	13:00	ODB	POWERGRID,ER-II	To replace LCC Panel Contactor used for GD Compartment	
39	400kv Main Bay of Kishanganj-2 at New Purnea	11-08-2020	12:00	11-08-2020	15:00	ODB	POWERGRID ER-I	CT Oil Sampling	
40	400kv Main Bay of Muzaffarpur-1 at New Purnea	11-08-2020	15:00	11-08-2020	18:00	ODB	POWERGRID ER-I	CT Oil Sampling	
41	MAIN BAY of PATRATU CKT-I AT NEW RANCHI	11-08-2020	09:00	11-08-2020	17:00	ODB	POWERGRID ER-I	AMP	
42	132KV BAY OF Chatarpur line-1 at Daltonganj	11-08-2020	09:30	11-08-2020	17:30	ODB	POWERGRID ER-I	Bay AMP	
43	201 TBC BAY at Keonjhar	11-08-2020	09:00	11-08-2020	18:00	ODB	ER-II/Odisha/Keonjhar S/s	Re-checking of CRM (Shutdown will taken if not avail in July)	
44	Main bay 433 of 400kV Sundargarh-OPGC ckt#1 at Sundergarh	11-08-2020	08:00	11-08-2020	08:00	ODB	ER-II/Odisha/Sundargarh	1 Yearly AMP	
45	400KV Balangir-Jeypore line Main BAY (403 BAY) at Bolangir	11-08-2020	09:00	11-08-2020	18:00	ODB	ER-II/Odisha/Balangir	AMP for 403 52CB & 403 CT	
46	205 bay (220 Kv Bus Section bay) at Durgapur	12-08-2020	08:00	12-08-2020	17:30	ODB	POWERGRID,ER-II	CB spring mechanism overhauling & AMP work	
47	400kv Tie Bay of Kishanganj-2 & Muzaffarpur-1 at New Purnea	12-08-2020	09:00	12-08-2020	12:00	ODB	POWERGRID ER-I	CT Oil Sampling	

48	400kv Tie bay of Bsf-1 & Gokarna-s/c at New Purnea	12-08-2020	15:00	12-08-2020	18:00	ODB	POWERGRID ER-I	CT Oil Sampling	
49	400 kV 407 main Bay of Baripada-Duburi line at Baripada	12-08-2020	09:00	13-08-2020	17:30	OCB	ER-II/Odisha/BARIPADA S/S	Gasket replacement	
50	208 MAIN BAY at Keonjhar	12-08-2020	09:00	12-08-2020	18:00	ODB	ER-II/Odisha/Keonjhar S/s	Re-checking of CRM (Shutdown will taken if not avail in July)	
51	400 KV ICT # 1 & 2 Tie Bay (Bay No-408) at Rengali	12-08-2020	09:00	12-08-2020	17:00	ODB	ER-II/Odisha/Rengali	For Isolator alignment work and interlock checking	
52	400 KV Future ICT main bay -410 and Tie bay 411 at Pandiabili	12-08-2020	09:00:00	12-08-2020	18:00:00	ODB	ER-II/Odisha/ Pandiabili GIS	AMP of 410 bay.	
53	125MVAR BUS REACTOR- 2 alongwith Main Bay AT ALIPURDUAR	13-08-2020	08:00	13-08-2020	18:00	ODB	POWERGRID,ER-II	Bay AMP Work	
54	400kv Main Bay of 400kV Malda-2 at New Purnea	13-08-2020	09:00	13-08-2020	12:00	ODB	POWERGRID ER-I	CT Oil Sampling	
55	400kv Tie Bay of 400kV Malda-2 & Bus Reactor-1 at New Purnea	13-08-2020	12:00	13-08-2020	15:00	ODB	POWERGRID ER-I	CT Oil Sampling	
56	400kv Tie bay of Convt. Trasformer and AC Filter (East side) at Sasaram	13-08-2020	09:00	13-08-2020	18:00	ODB	POWERGRID ER-I	AMP Work	
57	132KV BAY OF Chatarpur line-II at Daltonganj	13-08-2020	09:30	13-08-2020	17:30	ODB	POWERGRID ER-I	Bay AMP	
58	713 Main Bay of 765KV Sundargarh-Angul ckt-2 at Sundergarh	13-08-2020	09:00	16-08-2020	18:00	OCB	ER-II/Odisha/Sundergarh	SIEMENS Centre guide valve modification work in Mechanism drive and AMP	NLDC
59	400kv Main Bay of 400kV Malda-1 at New Purnea	14-08-2020	09:00	14-08-2020	12:00	ODB	POWERGRID ER-I	CT Oil Sampling	
60	400kv Tie Bay of 400kV Malda-1 & Bus Reactor-2 at New Purnea	14-08-2020	12:00	14-08-2020	15:00	ODB	POWERGRID ER-I	CT Oil Sampling	
61	400 kV 408 Tie Bay of Baripada-Duburi & Baripada-Jamshedpur line at Baripada	14-08-2020	09:00	15-08-2020	17:30	OCB	ER-II/Odisha/BARIPADA S/S	Gasket replacement	
62	400 KV ICT # 2 Main Bay (Bay No-409) at Rengali	14-08-2020	09:00	14-08-2020	17:00	ODB	ER-II/Odisha/Rengali	For Isolator alignment work and interlock checking	
63	132 KV Transfer Bus coupler bay(105 bay) at Daltonganj	15-08-2020	09:30	15-08-2020	17:30	ODB	POWERGRID ER-I	Bay AMP	
64	220kV Main bay of 400/220kv 500MVA ICT-2 at New Purnea	17-08-2020	09:00	17-08-2020	12:00	ODB	POWERGRID ER-I	CT Oil Sampling	
65	400kv Tie Bay of 400kV Farakka-s/c & Biharshariff-2 at New Purnea	17-08-2020	15:00	17-08-2020	18:00	ODB	POWERGRID ER-I	CT Oil Sampling	
66	400 KV Indravati - BR # 1 Tie Bay (Bay No-411) at Rengali	17-08-2020	09:00	17-08-2020	17:00	ODB	ER-II/Odisha/Rengali	For Isolator alignment work and interlock checking	
67	716 Main Bay of 765KV Sundargarh-Angul ckt-1 at Sundergarh	17-08-2020	09:00	20-08-2020	18:00	OCB	ER-II/Odisha/Sundergarh	SIEMENS Centre guide valve modification work in Mechanism drive and AMP	NLDC
68	400 KV Haldia Line#1 Main Bay (BAY NO 416) at Subhasgram	18-08-2020	09:00	18-08-2020	17:00	ODB	POWERGRID,ER-II	AMP of 416 Bay	
69	400 kV TIE Bay of Koderma- 2 and 500MVA ICT-4 at Biharsharif	18-08-2020	10:00	18-08-2020	18:00	ODB	POWERGRID ER-I	Auto Reclose wiring	
70	132KV BAY OF Daltonganj-1(JUSSNL) at Daltonganj	18-08-2020	09:30	18-08-2020	17:30	ODB	POWERGRID ER-I	Bay AMP	
71	720 Tie Bay of 765KV Sundargarh-Dharamjayhgarh ckt-1 & 765KV NTPC Darlipalli ck-2 at Sundergarh	18-Aug-20	09:00	21-Aug-20	18:00	OCB	ER-II/Odisha/Sundergarh	SIEMENS Centre guide valve modification work in Mechanism drive and AMP	NLDC
72	400 KV Bus Coupler bay at Arambagh	18-08-2020	06:00	18-08-2020	15:00	ODB	WB	Maintenance Work	
73	400 KV Subhasgram Rajarhat line Main Bay (BAY NO 404) at Subhasgram	19-08-2020	09:00	19-08-2020	17:00	ODB	POWERGRID,ER-II	AMP of 404 Bay	
74	400 KV Indravati Main Bay (Bay No-412) at Rengali	19-08-2020	09:00	19-08-2020	17:00	ODB	ER-II/Odisha/Rengali	For Isolator alignment work and interlock checking	
75	400 KV TBC bay at Arambagh	19-08-2020	06:00	19-08-2020	15:00	ODB	WB	Maintenance Work	

76	400KV MAIN BAY OF Farakka-Berahmpore-1 (BAY-409) at BAHARAMPORE	20-08-2020	09:00	20-08-2020	17:00	ODB	POWERGRID,ER-II	Bay AMP	
77	400kv Main Bay of Allhabad at Sasaram	20-08-2020	09:00	20-08-2020	18:00	ODB	POWERGRID ER-I	AMP Work	
78	408 bay TIE bay of Sasaram 2 and Balia -2 at Biharsharif SS	20-08-2020	10:00	20-08-2020	18:00	ODB	POWERGRID ER-I	Isolator Cable Replacement	
79	400KV MAIN BAY OF SASARAM-II at Daltonganj	21-08-2020	09:30	21-08-2020	17:30	ODB	POWERGRID ER-I	Bay AMP	
80	220 KV ICT # 1 Main Bay (Bay No-201) at Rengali	21-08-2020	09:00	21-08-2020	17:00	ODB	ER-II/Odisha/Rengali	For Isolator alignment work and interlock checking	
81	220kv main bay of Dehri -s/c at Sasaram	22-08-2020	09:00	22-08-2020	18:00	ODB	POWERGRID ER-I	AMP Work	
82	400 TIE Bay of New Purnia 2 and Balia 1 at Biharsharif SS	22-08-2020	10:00	22-08-2020	18:00	ODB	POWERGRID ER-I	CB Overhauling	
83	400KV TIE BAY OF SASARAM-II at Daltonganj	23-08-2020	09:30	23-08-2020	17:30	ODB	POWERGRID ER-I	Bay AMP	
84	330 MVAR Line Reactor Bay at Sasaram	24-08-2020	09:00	24-08-2020	18:00	ODB	POWERGRID ER-I	AMP WORK.	
85	400kv Main Bay of Daltonganj-I at Sasaram	24-08-2020	09:00	24-08-2020	18:00	ODB	POWERGRID ER-I	AMP Work	
86	220 KV ICT # 2 Main Bay (Bay No-202) at Rengali	24-08-2020	09:00	24-08-2020	17:00	ODB	ER-II/Odisha/Rengali	For Isolator alignment work and interlock checking	
87	721 Main Bay of 765KV Sundargarh-Dharamjaygarh ckt-1 at Sundergarh	24-Aug-20	09:00	27-Aug-20	18:00	OCB	ER-II/Odisha/Sundergarh	SIEMENS Centre guide valve modification work in Mechanism drive and AMP	NLDC
88	400KV BUS COUPLER BAY AT CHANDWA	26-08-2020	09:00	26-08-2020	18:00	ODB	POWERGRID ER-I	AMP OF CIRCUIT BREAKER,	
89	220 KV Transfer Bus coupler Bay (Bay No-203) at Rengali	26-08-2020	09:00	26-08-2020	17:00	ODB	ER-II/Odisha/Rengali	For Isolator alignment work and interlock checking	
90	723 Tie Bay of 765KV Sundargarh-Dharamjayhgarh ckt-2 & 765KV NTPC Darlipalli ck-1 at Sundergarh	26-08-2020	09:00	29-08-2020	18:00	OCB	ER-II/Odisha/Sundergarh	SIEMENS Centre guide valve modification work in Mechanism drive and AMP	NLDC
91	220 KV Bus-coupler Bay (Bay No-204) at Rengali	28-08-2020	09:00	28-08-2020	17:00	ODB	ER-II/Odisha/Rengali	For Isolator alignment work and interlock checking	
92	724 Main Bay of 765KV Sundargarh-Dharamjaygarh ckt-2 at Sundergarh	28-08-2020	09:00	31-08-2020	18:00	OCB	ER-II/Odisha/Sundergarh	SIEMENS Centre guide valve modification work in Mechanism drive and AMP	NLDC
93	200 KV OPTCL # 1 Main Bay (Bay No-208) at Rengali	29-08-2020	09:00	29-08-2020	17:00	ODB	ER-II/Odisha/Rengali	For Isolator alignment work and interlock checking	
94	400KV MAIN BAY OF B/R -II AT BANKA	30-08-2020	09:00	30-08-2020	16:00	ODB	POWERGRID ER-I	AMP WORK	
95	200 KV OPTCL # 2 Main Bay (Bay No-207) at Rengali	31-08-2020	09:00	31-08-2020	17:00	ODB	ER-II/Odisha/Rengali	For Isolator alignment work and interlock checking	

ERLDC, KOLKATA										
TRANSMISSION ELEMENTS OUTAGE APPROVED(EXCEPT BAY)										
		FROM		TO						
SI	NAME OF THE ELEMENTS	DATE	TIME	DATE	TIME	REMARKS	S.D availing agency	Reason	SUBJECT TO CONSENT FROM AGENCY	Comments
1	220 KV Alipurduar - Salakati 1 &2	01-08-2020	06:00	02-08-2020	18:00	ODB	POWERGRID,ER-II	Replacement of earth wire between section 425-426 damaged	**Already approved in July Month. Damage due to hill shrinking???**	
2	400KV Rangpo-Teesta-v Ckt-1	01-08-2020	09:00	01-08-2020	17:00	ODB	POWERGRID,ER-II	Bay AMP Works		After high hydro
3	A/R in non-auto mode in 400KV TeestaIII-Kishanganj-I	01-08-2020	07:00	31-08-2020	18:00	ODB	POWERGRID,ER-II	For OPGW installation Work		After high hydro
4	A/R in non-auto mode in 400KV Malda-Farakka-II	01-08-2020	07:00	10-08-2020	18:00	ODB	POWERGRID,ER-II	For OPGW installation Work		
5	A/R in non-auto mode in 132KV Rangpo-Chuzachen-I & II	01-08-2020	07:00	31-08-2020	18:00	ODB	POWERGRID,ER-II	For OPGW installation Work		After high hydro
6	400KV Mejia - Jamshedpur	01-08-2020	08:00	05-08-2020	18:00	ODB	POWERGRID,ER-II	Insulator Replacement work	DVC	
7	400KV Maithon - Jamshedpur	01-08-2020	08:00	05-08-2020	18:00	ODB	POWERGRID,ER-II	To be kept in Non Auto mode during insulator replacement work		
8	765 KV Gaya - Balia -S/C	01-08-2020	08:00	13-08-2020	17:00	ODB	POWERGRID ER-I	765 KV TOWER STRENGTHENING WORKS (Total 131-Completed- 54; Balance- 77)	NLDC	Approved by NRPC
9	132 KV LAKHISARAI-JAMUI Line-1	01-08-2020	09:00	01-08-2020	13:00	ODB	POWERGRID ER-I	Replacement of Energy meter	BSEB	
10	A/R OF 400 KV BIHARSHARIF-BANKA-II	01-08-2020	07:00	31-08-2020	18:00	ODB	POWERGRID ER-I	OPGW STRINGING WORK		
11	A/R OF 400 KV BIHARSHARIF-KODERMA-II	01-08-2020	07:00	31-08-2020	18:00	ODB	POWERGRID ER-I	OPGW STRINGING WORK	DVC	
12	A/R OF 400 KV RANCHI-MAITHON(RB)-II	01-08-2020	07:00	31-08-2020	18:00	ODB	POWERGRID ER-I	OPGW STRINGING WORK		
13	A/R OF 400 KV BARH-MOTIHARI-II	01-08-2020	07:00	31-08-2020	18:00	ODB	POWERGRID ER-I	OPGW STRINGING WORK		
14	A/R OF 400 KV MOTIHARI-GORKAHPUR-II	01-08-2020	07:00	31-08-2020	18:00	ODB	POWERGRID ER-I	OPGW STRINGING WORK	NLDC	Approved by NRPC
15	A/R OF 400 KV PATNA-KISANGANJ-II	01-08-2020	07:00	31-08-2020	18:00	ODB	POWERGRID ER-I	OPGW STRINGING WORK		
16	A/R OF 400KV Sundargarh-Raigarh Ckt #1&3	01-08-2020	08:00	14-08-2020	18:00	ODB	ER-II/Odisha/Sundargarh	For PID Testing of Porcelain Insulator. Only Auto reclose	NLDC	Subject to consent of WRPC.
17	315MVA, ICT-2 Bolangir	01-08-2020	09:00	09-08-2020	18:00	OCB	ER-II/Odisha/Balangir	Internal inspection and Bushings lead connection checking due to rise in fault gases.	GRIDCO	
18	A/R of 400 kV Baripada-Duburi Line	01-08-2020	07:00	30-08-2020	18:00	ODB	ER-II/Odisha	Line Auto-reclose switch is to be kept in Non-auto mode For stringing of OPGW under "EASTERN REGION FIBRE OPTIC EXPANSION PROJECT (Additional Requirement)"	GRIDCO	
19	A/R of 400 kV Dubur-Pandiabili Line	01-08-2020	07:00	30-08-2020	18:00	ODB	ER-II/Odisha	Line Auto-reclose switch is to be kept in Non-auto mode For stringing of OPGW under "EASTERN REGION FIBRE OPTIC EXPANSION PROJECT (Additional Requirement)"		
20	A/R of 400 kV Pandiabili-Mendhasal Ckt 2	01-08-2020	07:00	10-08-2020	18:00	ODB	ER-II/Odisha	Line Auto-reclose switch is to be kept in Non-auto mode For stringing of OPGW under "EASTERN REGION FIBRE OPTIC EXPANSION PROJECT (Additional Requirement)"		
21	A/R of 765 kV Angul-Srikakulam Ckt 1	01-08-2020	07:00	30-08-2020	18:00	ODB	ER-II/Odisha	Line Auto-reclose switch is to be kept in Non-auto mode For stringing of OPGW under "EASTERN REGION FIBRE OPTIC EXPANSION PROJECT (Reliable Requirement)"	NLDC	Approved by SRPC
22	A/R of 400 kV Angul-GMR Ckt 1	01-08-2020	07:00	30-08-2020	18:00	ODB	ER-II/Odisha	Line Auto-reclose switch is to be kept in Non-auto mode For stringing of OPGW under "EASTERN REGION FIBRE OPTIC EXPANSION PROJECT (Reliable Requirement)"		
23	A/R of 400 kV Angul-JITPL Ckt 1	01-08-2020	07:00	30-08-2020	18:00	ODB	ER-II/Odisha	Line Auto-reclose switch is to be kept in Non-auto mode For stringing of OPGW under "EASTERN REGION FIBRE OPTIC EXPANSION PROJECT (Reliable Requirement)"		
24	A/R of 400k kV Angul-GMR Ckt 2	01-08-2020	07:00	10-08-2020	18:00	ODB	ER-II/Odisha	Line Auto-reclose switch is to be kept in Non-auto mode For stringing of OPGW under "EASTERN REGION FIBRE OPTIC EXPANSION PROJECT (Reliable Requirement)"		
25	A/R of 400 kV Angul-JITPL Ckt 2	01-08-2020	07:00	10-08-2020	18:00	ODB	ER-II/Odisha	Line Auto-reclose switch is to be kept in Non-auto mode For stringing of OPGW under "EASTERN REGION FIBRE OPTIC EXPANSION PROJECT (Reliable Requirement)"		
26	220 KV Birpara Binaguri Ckt-II	02-08-2020	08:00	02-08-2020	17:30	ODB	POWERGRID,ER-II	Conductor repair, rectification of VD and acring horn at various place		
27	400KV Rangpo-Kishangunj	02-08-2020	08:00	15-08-2020	17:00	OCB	POWERGRID,ER-II	For rectification of SF6 gas leakage repair work		After high hydro

28	132 KV Kahalgaon(NTPC)-Kahalgaon(BSPTCL) S/C T/L	02-08-2020	09:00	03-08-2020	17:00	OCB	BSPTCL	Reconductoring with HTLS conductor in Railway crossing section	Kahalgaon (BSPTCL) will avail power from Goradih GIS.Consent from SLDC Ranchi will be required.	JSEB Consent required at the time of load changeover from Lalamaita to Goradih, for power changeover power interruption at KH-lalmatia for 10-15 min may be required
29	400 kV Bongaigaon-Alipurduar Line-1	03-08-2020	08:00	03-08-2020	16:00	ODB	POWERGRID,ER-II	Relay Testing and Bay AMP at Bongaigaon		After high hydro
31	400kV Gokarno-Farakka-Line	03-08-2020	07:00	03-08-2020	17:00	ODB	POWERGRID,ER-II	replacement of insulator due to insulator damaged by miscrient in various locations.		
32	A/R in non auto mode in 220KV Dalkhola-Kishanganj D/C TL	03-08-2020	07:00	10-08-2020	18:00	ODB	POWERGRID,ER-II	For diamonding arrangement for earthwire in 400KV Teesta3-Kishanganj TL in the section T-312/2 to T-312/3 with 220KV Dalkhola-Kishanganj D/C TL & 220KV Siliguri-Kishanganj D/C TL		After high hydro
33	A/R in non auto mode in 220KV Siliguri-Kishanganj D/C TL	03-08-2020	07:00	10-08-2020	18:00	ODB	POWERGRID,ER-II	For diamonding arrangement for earthwire in 400KV Teesta3-Kishanganj TL in the section T-312/2 to T-312/3 with 220KV Dalkhola-Kishanganj D/C TL & 220KV Siliguri-Kishanganj D/C TL		After high hydro
34	220kV Maithon-Dhanbad-1	03-08-2020	10:00	03-08-2020	17:00	ODB	POWERGRID,ER-II	Dismantling of energy meter panel for installation of 400kv Bus Bar panel under ERSS-XX	DVC	
35	400/220kv 315 MVA ICT- 1 at Jamshedpur	03-08-2020	09:30	04-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of 220Kv side porcelain insulator string with Polymer insulator string at Jamshedpur ss switchyard due to high pollution and Static REF, Electromechnical O/c & E/F relay replacement by numerical relay at JUSNL	JSEB	Apply in 1st week only
36	220KV Kishanganj-Dalkhola-1	03-08-2020	09:00	03-08-2020	18:00	ODB	POWERGRID ER-I	AMP of GIS bay at kishanganj		
37	220kV Bus -1 at New Purnea S/s	03-08-2020	10:00	03-08-2020	18:00	ODB	POWERGRID ER-I	AMP work	BSEB	
38	765 KV BUS-I AT NEW RANCHI	03-08-2020	09:00	05-08-2020	17:00	ODB	POWERGRID ER-I	Construction of Mednipur BAY	May be approved. Reason may be elobtrated regarding works.	
39	765KV,240MVAR 3Phase bank Bus Reactor-I (BR-I) at Sundergarh	03-08-2020	08:00	03-08-2020	18:00	ODB	ER-II/Odisha/Sundergarh	AMP	May be approved	
40	3 X 166.7 MVA COUPLING TRANSFORMER at Jeypore	03-08-2020	09:00	03-08-2020	13:00	ODB	ER-II/Odisha /Jeypore	Unit change over of Coup. Transformer	GRIDCO	
41	132kV Barhi-Nalanda(L#28)	03-08-2020	09:00	04-08-2020	16:00	ODB	DVC	for line maintenance work at different locations		
42	Bus Reactor AT BARH	03-08-2020	09:30	08-08-2020	18:00	OCB	BARH NTPC	Annual maintenance of Bus Reactor		
43	400 KV Arambagh-New PPSP Ckt 1	03-08-2020	06:00	03-08-2020	15:00	ODB	WB	Maintenance Work		
44	315 MVA ICT-I at Bidhannagar	03-08-2020	07:00	06-08-2020	15:00	ODB	WB	Maintenance Work	DVC	DVC consent required as in N-1 parulia paulia may be oveloaded, some load of bidhanangar may be kept radially on Waria or be kept open, bus split at bidhanangar, study may be don to find how much load to be kept radially
45	315 MVA ICT-I at Kharagpur	03-08-2020	07:00	07-08-2020	16:00	ODB	WB	Maintenance Work		
46	132 KV Gangtok-Rangpo-II Line	04-08-2020	09:00	04-08-2020	14:00	ODB	POWERGRID,ER-II	For Annual AMP Works (CT Tan delta)	Sikkim	
47	400KV Durgapur-Bidhannagar--2	04-08-2020	08:00	04-08-2020	17:30	ODB	POWERGRID,ER-II	Line Isolator Tightening & Wave trap droper PG clamp repalce work	WB	
48	315MVA ICT#1 at Subhasgram SS	04-08-2020	09:00	04-08-2020	17:00	ODB	POWERGRID,ER-II	Retrofitting of REF Relay	WB	
49	400KV Bus# 4 at Maithon	04-08-2020	10:00	04-08-2020	18:00	ODB	POWERGRID,ER-II	Dismantling work of Bus isolator of 400kV RB-1 under ERSS-XVII project work	DVC	
50	400KV Barh Patna CKT1	04-08-2020	09:00	04-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
51	A/R of 400KV Barh Patna CKT 2	04-08-2020	09:00	04-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
52	400 kV Barh- Gorakhpur ckt -1	04-08-2020	11:00	04-08-2020	15:00	ODB	POWERGRID ER-I	REPLACEMENT OF FLASHED INSULATOR	May be approved	
53	A/R of 400 kV Barh- Motihari-II	04-08-2020	11:00	04-08-2020	15:00	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER	May be approved	
54	220kV Bus -2 at New Purnea S/s	04-08-2020	10:00	05-08-2020	18:00	ODB	POWERGRID ER-I	AMP work	BSEB	
55	400kV Koderma - Bokaro-I	04-08-2020	08:00	04-08-2020	18:00	ODB	POWERGRID, ER-1	For replacement of flashover insulator.	DVC	

56	A/R OF 400kV Koderma - Bokaro-II	04-08-2020	08:00	04-08-2020	18:00	ODB	POWERGRID, ER-1	tO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER	DVC	

57	80MVAR BR-I at Keonjhar	04-08-2020	09:00	04-08-2020	18:00	ODB	ER-II/Odisha/Keonjhar S/s	CSD tuning & AMP WORKS. (Shutdown will taken if not avail in July)		
58	765KV,240MVAR 3Phase bank Bus Reactor-II (BR-II)	04-08-2020	08:00	04-08-2020	18:00	ODB	ER-II/Odisha/Sundargarh	AMP	NLDC	
59	765KV Sundargarh-Angul Ckt #3	04-08-2020	08:00	06-08-2020	18:00	OCB	ER-II/Odisha/Sundargarh	Rectification of clearance issue & TP Tower Maintenance work	May be approved on Daily basis. May avail L/R shutdown also.	
60	220 KV DMTCL(Darbhanga)-Darbhanga ckt 1	04-08-2020	09:00	05-08-2020	17:00	ODB	BSPTCL	For bay swapping work with Mushari bay	Darbhanga will avail power from alternate source.	Details of Bay swapping may be furnished
61	315MVA ICT-II at Mendhasal	04-08-2020	09:00	05-08-2020	18:00	ODB	GRIDCO	Condition monitoring	315MVA ICT-I & III will remain in service	
62	400 KV Arambagh-New PPSP Ckt 2	04-08-2020	06:00	04-08-2020	15:00	ODB	WB	Maintenance Work		
63	315 MVA ICT-I at Jeerat	04-08-2020	07:00	04-08-2020	15:00	ODB	WB	Maintenance Work		
64	315 MVA ICT-II at Bidhannagar	04-08-2020	07:00	06-08-2020	15:00	ODB	WB	Maintenance Work		
65	315 MVA ICT-III at Kharagpur	04-08-2020	07:00	07-08-2020	16:00	ODB	WB	Maintenance Work		
66	220 KV STPS-Chandil Tie Ckt	04-08-2020	08:00	05-08-2020	17:00	ODB	WB	Maintenance Work		
67	220KV TSTPS-Meramunduli 1	05-08-2020	08:00	06-08-2020	17:00	OCB	TSTPP	Autoreclosure testing and AMP job	GRIDCO	
68	125 MVAR Bus Reactor#1 at Binaguri	05-08-2020	10:00	05-08-2020	15:00	ODB	POWERGRID,ER-II	AMP works		
69	400/220 KV 315 MVA ICT-V at Malda	05-08-2020	08:00	11-08-2020	17:00	OCB	POWERGRID,ER-II	Tertiary Y-ph Bushing replacement owing to high tan-delta value and rectification of ICT -V's 89B isolator defect i.r.o 400KV BUS-I S/D.	WB	
70	400kV Gokarno-New Purnea line	05-08-2020	07:00	05-08-2020	17:00	ODB	POWERGRID,ER-II	replacement of insulator due to insulator damaged by miscrient in various locations.	WB	WB consent required, may be cosidered after commissioning of Sagardigi-Gokarno line
71	315MVA ICT#2 at Subhasgram SS	05-08-2020	09:00	05-08-2020	17:00	ODB	POWERGRID,ER-II	Retrofitting of REF Relay	WB	
72	500MVA ICT-1 at Maithon	05-08-2020	08:00	05-08-2020	18:00	ODB	POWERGRID,ER-II	onload testing of CSD	DVC	
73	220 KV D/C Arambag - Medinipur TL (WBSETCL)	05-08-2020	08:00	06-08-2020	17:00	ODB	POWERGRID,ER-II	Stringing b/w AP 22/0 to 23/0 of 765 KV D/C Medinipur-Jeerat TL Over existing 220 KV D/C Arambag - Medinipur TL	WB	
74	400KV Barh Patna CKT 2	05-08-2020	09:00	05-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
75	A/R of 400KV Barh Patna CKT1	05-08-2020	09:00	05-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
76	400/220kv 315 MVA ICT- 2 at Jamshedpur	05-08-2020	09:30	06-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of 220Kv side porcelain insulator string with Polymer insulator string at Jamshedpur ss switchyard due to high pollution and Static REF, Electromechnical O/c & E/F relay replacement by numerical relay at JUSNL	JSEB	Apply in 1st week only
77	132 kV Ara- Dumraon-S/C	05-08-2020	09:00	05-08-2020	17:30	ODB	POWERGRID ER-I	AMP at Ara SS	BSEB	After new Dumra commissioning & Jseb onsent
78	500MVA ICT-2 at Sasaram	05-08-2020	07:00	05-08-2020	15:00	ODB	POWERGRID ER-I	Calibration of WTI & OTI sensor under construction package	any load restriction on sahupuri-pusauli line??	To be completed by 15 hrs, NLDC consent required in case of Sahupuri load restriction, BSEB may intimate where it proposes to loop break, Subject to BSEB consent
79	400kV Koderma - Bokaro-II	05-08-2020	08:00	05-08-2020	18:00	ODB	POWERGRID, ER-1	For replacement of flashover insulator .	DVC	
80	A/R OF 400kV Koderma - Bokaro-I	05-08-2020	08:00	05-08-2020	18:00	ODB	POWERGRID, ER-1	tO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER	DVC	
81	ICT-I (3x 105 MVA) at Jeypore	05-08-2020	08:00:00	05-08-2020	16:00:00	ODB	ER-II/Odisha /Jeypore	For changing ICT-I combination form Unit-I,II, IV to Unit-I , III & IV for charging Unit-III & Retrofitting works of Overcurrent, REF, Earth Fault Relay	GRIDCO	
82	220kV Kalyaneswari-Maithon PG Ckt#2	05-08-2020	09:00	05-08-2020	17:00	ODB	DVC	for replacement of damaged bottom conductor between Dead End T ower to Gantry of the said line at PGCIL Maithon end		

83	220 KV Gaya(PG)-Sonenagar ckt 1	05-08-2020	09:00	07-08-2020	16:00	ODB	BSPTCL	For line maintenance work	Sonenagar will avail power from alternate sources.	
84	220 KV DMTCL(Darbhanga)-Ujayarpur S/C T/L	05-08-2020	09:00	07-08-2020	17:00	ODB	BSPTCL	For line maintenance work	Ujayarpur will avail power from alternate sources.	
85	400kV Meramundali-JSPL ckt-II	05-08-2020	07:00	05-08-2020	17:00	ODB	GRIDCO	Replacement of B-phase arm of 89TB tie isolator at Meramundali	400kV Meramundali-JSPL ckt I will remain in service	
86	400 KV Kharagpur-Baripada Ckt	05-08-2020	06:00	05-08-2020	16:00	ODB	WB	Maintenance Work		
87	400 KV Arambagh-BKTPP Ckt	05-08-2020	06:00	05-08-2020	15:00	ODB	WB	Maintenance Work		
88	220 KV STPS-Chandil Tie Ckt	05-08-2020	08:00	05-08-2020	17:00	ODB	WB	Maintenance Work	JSEB	
89	400KV Rangpo-Teesta-v Ckt-2	06-08-2020	08:00	13-08-2020	17:00	OCB	POWERGRID,ER-II	For rectification of SF6 gas leakage repair work		After high hydro
90	400KV BUS-II at Malda	06-08-2020	08:00	07-08-2020	17:00	OCB	POWERGRID,ER-II	ERSS-XVII-B Constructional work (400KV TBC)	WB	WB consent required
91	400KV Durgapur-Bidhannagar--1	06-08-2020	08:00	06-08-2020	17:30	ODB	POWERGRID,ER-II	Line & bay Isolator finger replacement & alignment work	WB	

92	315MVA ICT#3 at Subhasgram	06-08-2020	09:00	06-08-2020	17:00	ODB	POWERGRID,ER-II	Rectification of low oil level in prismatic guage	WB	
93	400KV Maithon - Jamshedpur	06-08-2020	08:00	10-08-2020	18:00	ODB	POWERGRID,ER-II	Insulator Replacement work		
94	400KV Maithon - Mejia 3	06-08-2020	08:00	08-08-2020	18:00	ODB	POWERGRID,ER-II	To be kept in Non Auto mode during insulator replacement work	DVC	
95	400KV Barh Patna CKT1	06-08-2020	09:00	06-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
96	A/R of 400KV Barh Patna CKT 2	06-08-2020	09:00	06-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
97	765 KV BUS-II AT NEW RANCHI	06-08-2020	09:00	08-08-2020	17:00	ODB	POWERGRID ER-I	Construction of Mednipur BAY	May be approved. Reason may be elobtrated regarding works.	
98	125MVAR Bus Reactor at Indravati	06-08-2020	09:00	06-08-2020	18:00	ODB	ER-II/Odisha/Indravati	AMP works of 125MVAR Bus Reactor		
99	315 MVA ICT#1 at Rourkela	06-08-2020	10:00	06-08-2020	18:00	ODB	ER-II/ODISHA/ROURKELA	Fire Fighting Renovation work (Gasket replacemnt in Pipes, Nozzle replacement/cleaning, Spray tesing etc...)	GRIDCO	
100	220kV Jamshedpur-Joda Tie	06-08-2020	09:00	06-08-2020	18:00	ODB	DVC	for replacement of L.As at DVC Jamshedpur sub-station under PSDF project.		
101	220 KV DMTCL(Darbhanga)-Laukahi D/C T/L	06-08-2020	08:00	14-08-2020	17:00	ODB	BSPTCL	For line maintenance work	Laukahi will avail power from alternate sources	
102	400 kV Kh- Farakka #3	06-08-2020	09:00	07-08-2020	18:00	OCB	KHSTPP	Bay maintenance & testing		
103	315MVA ICT-I at Mendhasal	06-08-2020	07:00	06-08-2020	17:00	ODB	GRIDCO	Condition monitoring	315MVA ICT-II & III will remain in service	
104	220kV Meramundali-Kaniha ckt-I	06-08-2020	07:00	06-08-2020	17:00	ODB	GRIDCO	1.Replacement of Analog Display Meters (Ammeter, Voltmeter, Wattmeter, VAR Meter) with Digital Meters at Meramundali 2- Replacement of Pad to Pipe clamp of B-Phase Breaker at Meramundali	220kV Meramundali-Kaniha ckt-II will remain in service	
105	400 KV Kharagpur- Baripada Ckt	06-08-2020	06:00	06-08-2020	16:00	ODB	WB	Maintenance Work		
106	400 KV Arambagh-New Chanditala Ckt	06-08-2020	06:00	06-08-2020	15:00	ODB	WB	Maintenance Work		
107	315 MVA ICT-II at Jeerat	06-08-2020	07:00	06-08-2020	15:00	ODB	WB	Maintenance Work		
108	400 KV Kharagpur-Chaibasa Ckt 2	06-08-2020	07:00	06-08-2020	16:00	ODB	WB	Maintenance Work		
109	400 KV Main Bus-I at Kharagpur	06-08-2020	07:00	06-08-2020	16:00	ODB	WB	Maintenance Work		
110	400 KV Binaguri Bongaigaon Ckt I	07-08-2020	06:00	08-08-2020	18:00	ODB	POWERGRID,ER-II	Due to hill shrinking required Conductor adjustment in between loc 235 - 236, conductor repair in between 349/350.	NLDC	Approved in July , but not availed. Reason metioned in earlier OCC was only condutcor repairing. Damage due to hill shrinking???
111	125 MVAR Bus Reactor#2 at Binaguri	07-08-2020	10:00	07-08-2020	15:00	ODB	POWERGRID,ER-II	AMP works		
112	66 KV Gangtok-Tadong Line	07-08-2020	09:00	07-08-2020	14:00	ODB	POWERGRID,ER-II	For Annual AMP Works (CT Tan delta, CB DCRM and Timing)	Sikkim	
113	315MVA ICT#4 at Subhasgram	07-08-2020	09:00	07-08-2020	17:00	ODB	POWERGRID,ER-II	Rectification of low oil level in prismatic guage	WB	
114	125MVAR Bus Reactor-1 at Maithon	07-08-2020	08:00	08-08-2020	18:00	OCB	POWERGRID,ER-II	Replacement of radiator bank for leakage arresting work		
115	400KV Barh Patna CKT 2	07-08-2020	09:00	07-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
116	A/R of 400KV Barh Patna CKT1	07-08-2020	09:00	07-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
117	400KV TSTPS Rourkela 1	07-08-2020	08:00	07-08-2020	17:00	ODB	TSTPP	Autoreclosure testing		
118	765kv/400KV , 1500MVA ICT-3 at Sundergarh	07-08-2020	09:00	07-08-2020	12:30	ODB	ER-II/Odisha/Sundergarh	To remove spare from the ICT-3 and takink R-ph into service.	May be approved	May be approved
119	765KV Sundargarh-Angul Ckt #4	07-08-2020	08:00	09-08-2020	08:00	OCB	ER-II/Odisha/Sundargarh	Rectification of clearance issue & TP Tower Maintenance work	NLDC	May be approved on Daily basis. May avail L/R shutdown also.
120	500 MVA ICT-2 at Pandiabili	07-08-2020	09:00:00	07-08-2020	18:00:00	ODB	ER-II/Odisha/ Pandiabili GIS	For AMP of 400kv Ict-2 main bay (407 bay)and 220 kv side of ICT-2 (202 bay)	GRIDCO	
121	400kV Meramundali-Kaniha ckt-II	07-08-2020	07:00	07-08-2020	17:00	ODB	GRIDCO	Replacement of Y & B-phase CVT at Meramundali	400kV Meramundali-Kaniha ckt-I will remain in service	After 10.08.2020 when SRPC meeting will be finished.
122	400 KV Arambagh-KTPP Ckt	07-08-2020	06:00	07-08-2020	15:00	ODB	WB	Maintenance Work		

123	400 KV Kharagpur-Chaibasa Ckt 2	07-08-2020	07:00	07-08-2020	15:00	ODB	WB	Maintenance Work		
124	400 KV Main Bus-II at Kharagpur	07-08-2020	07:00	07-08-2020	15:00	ODB	WB	Maintenance Work		
125	500 MVA ICT-1 at Pandiabili	08-08-2020	09:00:00	08-08-2020	18:00:00	ODB	ER-II/Odisha/ Pandiabili GIS	For AMP of 400kv Ict-1 main bay (406 bay)and 220 kv side of ICT-1 (207 bay)	GRIDCO	
126	132KV Rangit-Rammam Line	08-08-2020	09:30	08-08-2020	16:30	ODB	POWERGRID,ER-II	Due to hill shrinking conductor sag adjustment required in span loc 21-22.	WB	
127	400kV Sagardighi-Jeerat Line	08-08-2020	07:00	08-08-2020	17:00	ODB	POWERGRID,ER-II	A/R relay Retrofitting and Testing in 400 KV Jeerat Sagardighi Line at Jeerat end.	WB	
128	500 MVA ICT#5 at Subhasgram	08-08-2020	09:00	08-08-2020	17:00	ODB	POWERGRID,ER-II	Buchholz Canopy Installation and and AMP of ICT#5	WB	
129	400KV Barh Patna CKT1	08-08-2020	09:00	08-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
130	A/R of 400KV Barh Patna CKT 2	08-08-2020	09:00	08-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
131	HVDC AGRA-BNC POLE 4	08-08-2020	08:00	09-08-2020	17:00	OCB	NR-3	FOR VERIFICATION OF HUMIDITY CONTROL BY VALVE HALL VENTILATION SYSTEM AS AGREED IN NEA HVDC PROJECT CLOSING MEETING		After high hydro
132	315 MVA ICT#2 at Rourkela	08-08-2020	10:00	08-08-2020	18:00	ODB	ER-II/ODISHA/ROURKELA	Fire Fighting Renovation work (Gasket replacemnt in Pipes, Nozzle replacement/cleaning ,Spray tesing etc...)	GRIDCO	
133	220 KV Gaya(PG)-Sonenagar ckt 2	08-08-2020	09:00	10-08-2020	16:00	ODB	BSPTCL	For line maintenance work	Sonenagar will avail power from alternate sources.	
134	400KV Alipurduar - New Siliguri D/C (QUAD) Line	09-08-2020	06:00	12-08-2020	18:00	ODB	POWERGRID,ER-II	Stringing at crossing between Loc. No. 13/0 - 14/0 of Jigmeling line and loc. No. 292-293 of Sterlite Line	NLDC	Same was approved in Previous OCC. May avail in September after hydro reduction.
135	400KV Mejia - Jamshedpur	09-08-2020	08:00	10-08-2020	18:00	ODB	POWERGRID,ER-II	To be kept in Non Auto mode during insulator replacement work	DVC	
136	400KV Barh Patna CKT 2	09-08-2020	09:00	09-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
137	A/R of 400KV Barh Patna CKT1	09-08-2020	09:00	09-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
138	132 KV Siliguri-Kursoeng line	10-08-2020	09:00	10-08-2020	17:00	ODB	POWERGRID,ER-II	Due to hill shrinking conductor sag adjustment required in span loc 252-253.	WB	
139	132KV Rangit-Rammam Line	10-08-2020	09:30	10-08-2020	16:00	ODB	POWERGRID,ER-II	To repair conductor damaged at loc 84-85 due to land slide	WB	
140	50MVA ICT-I at Gangtok	10-08-2020	09:00	10-08-2020	14:00	ODB	POWERGRID,ER-II	Relay Retrofitting	Sikkim	
141	400KV BUS-I at Malda	10-08-2020	08:00	11-08-2020	17:00	OCB	POWERGRID,ER-II	ERSS-XVII-B Constructional work (400KV TBC)	WB	
142	100 MVAR Bus Reactor at 400/220/132 KV WBSETCL Jeerat	10-08-2020	09:00	10-08-2020	17:00	ODB	POWERGRID,ER-II	AMP of 100 MVAR Bus Reactor	WB	
143	400KV Barh Patna CKT1	10-08-2020	09:00	10-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
144	A/R of 400KV Barh Patna CKT 2	10-08-2020	09:00	10-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
145	132 KV Bus 1 AT MOTIHARI	10-08-2020	08:00	11-08-2020	18:00	OCB	POWERGRID ER-I	Interconnection of Extension Bus (By POWERGRID)to existing Bus (DMTCL)	BSEB	
146	400/132KV 315 MVA ICT -III AT LAKHISARAI	10-08-2020	07:00	10-08-2020	15:00	ODB	POWERGRID ER-I	Final tuning of Main bay CSD under ERSS_XX	BSEB	To be completed by 15 hrs
147	400KV BIHARSHARIF- LAKHISARAI CKT-II	10-08-2020	08:00	10-08-2020	18:00	ODB	POWERGRID ER-I	Flashed insulator replacement		
148	A/R OF 400KV BIHARSHARIF- LAKHISARAI CKT-I	10-08-2020	08:00	10-08-2020	18:00	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
149	400 KV KAHAGAON-LAKHISARAI-I	10-08-2020	08:00	10-08-2020	18:00	ODB	POWERGRID ER-I	Replacement of flashed over Insulator		
150	A/R OF 400 KV KAHAGAON-LAKHISARAI-II	10-08-2020	08:00	10-08-2020	18:00	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
151	400KV TSTPS Rourkela 2	10-08-2020	08:00	10-08-2020	17:00	ODB	TSTPP	Autoreclosure testing		
152	400kV Sundergarh-Raigarh Ckt I	10-08-2020	08:00	10-08-2020	18:00	ODB	ER-II/Odisha/Sundergarh	TL Maintenance work and Jumper Repairing.	NLDC	
153	765kv/400KV , 1500MVA ICT-4 at Sundergarh	10-08-2020	09:00	10-08-2020	18:00	ODB	ER-II/Odisha/Sundergarh	Spare changeover & Stool arrangement for LA under construction head		May be approved
154	132kV Barhi-Rajgir(L#29)	10-08-2020	09:00	11-08-2020	16:00	ODB	DVC	for line maintenance work at different locations		
155	220 KV Muzafferpur(PG) -Hazipur D/C T/L	10-08-2020	10:30	10-08-2020	14:30	ODB	BSPTCL	For stringing work of 220 KV Muz(PG)-Gorul D/C T/L	Hajipur will avail restricted power from BTPS	
156	315 MVA ICT-I at Arambagh	10-08-2020	06:00	10-08-2020	15:00	ODB	WB	Maintenance Work		
157	220KV BUS-II at Birpara	11-08-2020	08:00	11-08-2020	17:30	ODB	POWERGRID,ER-II	Replacement of BUS-II to Isolator Jumper along with Connector in 220 KV BRP-CHP Feeder-II and CB AMP activities in 220 KV Bus Coupler	NLDC	

158	220 KV Bus Coupler at Birpara	11-08-2020	08:00	11-08-2020	17:30	ODB	POWERGRID,ER-II	Replacement of BUS-II to Isolator Jumper along with Connector in 220 KV BRP-CHP Feeder-II and CB AMP activities in 220 KV Bus Coupler		
159	132 KV Kursoeng-Rangit line	11-08-2020	09:00	11-08-2020	17:00	ODB	POWERGRID,ER-II	Due to hill shrinking conductor sag adjustment required in span loc 74-75.	WB	
160	132 KV Ragit-Rangpo Line	11-08-2020	09:30	11-08-2020	16:30	ODB	POWERGRID,ER-II	To rectification of jumper at location 30 due to land slide.	Sikkim	
161	400 kV S/C FARAKKA-PURNEA TL	11-08-2020	09:00	11-08-2020	17:00	ODB	POWERGRID,ER-II	replacement of insulator due to insulator damaged by miscrient in various locations.		
162	400KV Farakka-Sagardighi-1	11-08-2020	07:00	11-08-2020	17:00	ODB	POWERGRID,ER-II	replacement of insulator due to insulator damaged by miscrient in various locations.	WB	
163	50 MVAR Sagardighi Line Reactor at Subhasgram	11-08-2020	09:00	11-08-2020	17:00	ODB	POWERGRID,ER-II	Retrofitting of REF Relay.	WB	
164	400KV Maithon - Mejia 3	11-08-2020	08:00	15-08-2020	18:00	ODB	POWERGRID,ER-II	Insulator Replacement work	DVC	
165	400KV Maithon - Jamshedpur	11-08-2020	08:00	15-08-2020	18:00	ODB	POWERGRID,ER-II	To be kept in Non Auto mode during insulator replacement work		
166	400 KV S/C Sagardighi - Jeerat TL (PGCIL)	11-08-2020	08:00	12-08-2020	17:00	ODB	POWERGRID,ER-II	Stringing b/w AP 138/0 to AP139/0 of 765 KV D/C Medinipur-Jeerat TL Over existing 400 KV S/C Berhampore - Jeerat TL	WB	WB consent required, may be cosidered after commissioning of Sagardigi-Gokarno line
167	400KV Barh Patna CKT 2	11-08-2020	09:00	11-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
168	A/R of 400KV Barh Patna CKT1	11-08-2020	09:00	11-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
169	400kV PATNA-NAVINAGAR-I	11-08-2020	09:30	11-08-2020	14:00	ODB	POWERGRID ER-I	CLEANING OF INSULATORS POLLUTED BY BIRD DROPPINGS		
170	A/R OF 400kV PATNA-NAVINAGAR-II	11-08-2020	09:30	11-08-2020	14:00	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
171	400kv Switchable L/R of Muzaffarpur-2 at New Purnea	11-08-2020	09:00	11-08-2020	12:00	ODB	POWERGRID ER-I	CT Oil Sampling		
172	400/132KV 315 MVA ICT -III AT LAKHISARAI	11-08-2020	07:00	11-08-2020	15:00	ODB	POWERGRID ER-I	Final tuning of Main bay CSD under ERSS_XX	BSEB	To be completed by 15 hrs
173	400KV 315 MVA ICT-1 AT RANCHI	11-08-2020	09:30	11-08-2020	17:00	OCB	POWERGRID ER-I	Installation and commissioning of Backup Impedence Protection Relay in ICT-I	JSEB	
174	400 KV MAITHON-KAHALGAON-I	11-08-2020	09:00	11-08-2020	17:00	ODB	POWERGRID ER-I	For flashover insulator string replacement		
175	A/R OF 400 KV MAITHON-KAHALGAON-II	11-08-2020	09:00	11-08-2020	17:00	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
176	400KV CHAIBASA LINE REACTOR-2 (409LR) at Rourkela	11-08-2020	10:00	11-08-2020	18:00	ODB	ER-II/ODISHA/ROURKELA	Fire Fighting Renovation work (Gasket replacemnt in Pipes, Nozzle replacement/cleaning , Spray tesing etc...)		
177	400KV Sundargarh-Rourkela Ckt #2	11-08-2020	08:00	11-08-2020	18:00	ODB	ER-II/Odisha/Sundargarh	TL Maint work		
178	220 KV Gaya(PG)-Bodhgaya ckt 1	11-08-2020	09:00	12-08-2020	16:00	ODB	BSPTCL	For line maintenance work	Bodhgaya will avail power from alternate sources.	
179	400KV Barh PATNA Line # 1	11-08-2020	09:30	12-08-2020	18:00	OCB	BARH NTPC	For Auto Reclose relay testing & Other testing and Annual maint of Bay equipments		
180	400 kV Kh- Maithon #2	11-08-2020	09:00	12-08-2020	18:00	OCB	KHSTPP	Bay maintenance & testing		
181	315 MVA ICT-II at Arambagh	11-08-2020	06:00	11-08-2020	15:00	ODB	WB	Maintenance Work		
182	132 KV Bus Coupler at Birpara	12-08-2020	08:00	12-08-2020	17:00	ODB	POWERGRID,ER-II	CB AMP Activities	WB	
183	132 KV Siliguri-Melli line	12-08-2020	09:00	13-08-2020	17:00	ODB	POWERGRID,ER-II	Due to hill shrinking conductor sag adjustment required in span loc 96-97.	Sikkim	
184	400kV Sagardighi-Subhashgram Line	12-08-2020	07:00	12-08-2020	17:00	ODB	POWERGRID,ER-II	For termination of Jumper for LILO work of Subhashgram-Sagardighi line at Jeerat- Construction purpose under ERSS-XV.	WB	
185	220 KV D/C Arambag - Damjur TL (WBSETCL)	12-08-2020	08:00	14-08-2020	17:00	ODB	POWERGRID,ER-II	Stringing b/w AP 35/0 to 36/0 of 765 KV D/C Medinipur-Jeerat TL Over existing 220 KV D/C Arambag - Damjur TL	WB	
186	220 KV S/C Arambag - Rishra TL (WBSETCL)	12-08-2020	08:00	14-08-2020	17:00	ODB	POWERGRID,ER-II	Stringing b/w AP 36/0 to 37/0 of 765 KV D/C Medinipur-Jeerat TL Over existing 220 KV S/C Arambag - Rishra TL	WB	
187	400KV Barh Patna CKT1	12-08-2020	09:00	12-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
188	A/R of 400KV Barh Patna CKT 2	12-08-2020	09:00	12-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
189	400kV PATNA-NAVINAGAR-II	12-08-2020	09:30	12-08-2020	14:00	ODB	POWERGRID ER-I	CLEANING OF INSULATORS POLLUTED BY BIRD DROPPINGS		
190	A/R OF 400kV PATNA-NAVINAGAR-I	12-08-2020	09:30	12-08-2020	14:00	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		

215	400KV Talchar_Meramundali Ckt 2	13-08-2020	08:00	13-08-2020	18:00	ODB	ER-II/Odisha/Angul TL	Line shutdown defects maintenance work	Any restrcition on HVDC Power order??	Contingency study considering HVDC Bipole tripping may be done, For changing SPS 450 NLDC consent may be required, may be applied after 10th after SRPC meeting
216	400 kV Talcher 2 (407L) at Rourkela	13-08-2020	09:00	13-08-2020	18:00	ODB	ER-II/ODISHA/ROURKELA	Line Bay AMP		
217	400KV BUS-I & III at Sundergarh	13-08-2020	09:00	13-08-2020	18:00	ODB	ER-II/Odisha/Sundergarh	AMP & cable shifting works		
218	220 KV Gaya(PG)-Bodhgaya ckt 2	13-08-2020	09:00	14-08-2020	16:00	ODB	BSPTCL	For line maintenance work	Bodhgaya will avail power from alternate sources.	
219	220kV Meramundali-Kaniha ckt-II	13-08-2020	07:00	13-08-2020	17:00	ODB	GRIDCO	To attend tightness of CT Pad clamp and allignment of Line isolator at Meramundali	220kV Meramundali-Kaniha ckt-I will remain in service	
220	400 kV Farakka-Sagardighi#1	13-08-2020	07:00	14-08-2020	17:00	OCB	FSTPP	Annual testing of CB,CT	WB	
221	315 MVA ICT-IV at Arambagh	13-08-2020	06:00	13-08-2020	15:00	ODB	WB	Maintenance Work		
222	160MVA ICT-II at Birpara	14-08-2020	08:00	14-08-2020	17:00	ODB	POWERGRID,ER-II	132KV CB AMP Activities	WB	
223	400KV Rangpo-Kishangunj line	14-08-2020	09:00	14-08-2020	17:00	ODB	POWERGRID,ER-II	Bay AMP Works		After high hydro
224	400 KV Bus-I at Durgapur	14-08-2020	08:00	14-08-2020	17:30	ODB	POWERGRID,ER-II	Bus side Isolator alignment works and tightness of Bus.	DVC	
225	400KV Barh Patna CKT1	14-08-2020	09:00	14-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
226	A/R of 400KV Barh Patna CKT 2	14-08-2020	09:00	14-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
227	400kV BUS-I at Patna	14-08-2020	10:00	14-08-2020	18:00	ODB	POWERGRID ER-I	AMP Work	BSEB	
228	400 KV MAITHON-KAHALGAON-II	14-08-2020	09:00	14-08-2020	17:00	ODB	POWERGRID ER-I	For flashover insulator string replacement		
229	A/R OF 400 KV MAITHON-KAHALGAON-I	14-08-2020	09:00	14-08-2020	17:00	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
230	400kV Bus-I at Meramundali	14-08-2020	07:00	14-08-2020	17:00	ODB	GRIDCO	To attend Bus drop of different feeders as founded high temperature when thermoscan done.	400kV Bus-II will remain in service	
231	50 MVAR Bus Reactor at Arambagh	14-08-2020	06:00	14-08-2020	15:00	ODB	WB	Maintenance Work		
232	160MVA ICT-I at Birpara	15-08-2020	08:00	15-08-2020	17:00	ODB	POWERGRID,ER-II	132KV CB AMP Activities	WB	
233	132kV Gangtok Ckt-I - Rangpo Line	16-08-2020	08:00	19-08-2020	17:00	OCB	MBPCL	Transmission line Stringing from Loc -25 to 26	Sikkim	
234	400KV Mejia - Jamshedpur	16-08-2020	08:00	19-08-2020	18:00	ODB	POWERGRID,ER-II	Insulator Replacement work	DVC	
235	400KV Maithon - Mejia - 3	16-08-2020	08:00	19-08-2020	18:00	ODB	POWERGRID,ER-II	To be kept in Non Auto mode during insulator repalcement work	DVC	
236	400KV BUS-II & IV at Sundergarh	16-08-2020	09:00	16-08-2020	18:00	ODB	ER-II/Odisha/Sundergarh	AMP & cable shifting works		
237	A/R OF 400KV Sundargarh-Raigarh Ckt #2&4	16-08-2020	08:00	31-08-2020	18:00	ODB	ER-II/Odisha/Sundargarh	For PID Testing of Porcelain Insulator. Only Auto reclose	NLDC	Subject to WRPC approval
238	220 KV Gaya(PG)-Dehri ckt 1	16-08-2020	09:00	17-08-2020	16:00	ODB	BSPTCL	For line maintenance work	Dehri will avail power from alternate sources.	
239	220 KV Alipurduar - Birpara Ckt I	17-08-2020	06:00	18-08-2020	18:00	ODB	POWERGRID,ER-II	Due to hill shrinking conductor sag adjustment required in span loc 140-141.		
240	66 KV Gangtok-Bulbulay Line	17-08-2020	09:00	17-08-2020	14:00	ODB	POWERGRID,ER-II	For Annual AMP Works	Sikkim	
241	220KV Dalkhola-Kishanganj-I	17-08-2020	10:00	17-08-2020	15:00	ODB	POWERGRID,ER-II	replacement of insulator due to insulator damaged by miscrient in various locations.		After high hydro
242	400 KV Farakka-Sagardighi-2	17-08-2020	07:00	17-08-2020	17:00	ODB	POWERGRID,ER-II	replacement of insulator due to insulator damaged by miscrient in various locations.	WB	
243	315 MVA ICT-3 at Durgapur	17-08-2020	08:00	19-08-2020	17:30	OCB	POWERGRID,ER-II	Oil Flow Pump replacement works with oil drain & oil filtration.	DVC	

244	400KV Barh Patna CKT 2	17-08-2020	09:00	17-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
245	A/R of 400KV Barh Patna CKT1	17-08-2020	09:00	17-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
246	400 KV Bus 1 AT DARBHANGA	17-08-2020	08:00	18-08-2020	18:00	OCB	POWERGRID ER-I	Interconnection of Extension Bus (By POWERGRID)to existing Bus (DMTCL & ATL)	BSEB	
247	400kV 400 KV BIHARSHARIFF-BALLIA (PG) CKT-1	17-08-2020	09:00	17-08-2020	18:00	ODB	POWERGRID ER-I	REPLACEMENT OF FLASHED OVER INSULATOR	NLDC	Approved by NRPC
248	A/R OF 400kV 400 KV BIHARSHARIFF-BALLIA (PG) CKT-2	17-08-2020	09:00	17-08-2020	18:00	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER	NLDC	Approved by NRPC
249	765 kV BUS-I at Gaya	17-08-2020	09:00	17-08-2020	17:00	ODB	POWERGRID ER-I	For Annual Mantenance		May be approved
250	132KV DEHRI-KUDRA-/C	17-08-2020	09:00	17-08-2020	18:00	ODB	POWERGRID ER-I	Relay Retrofitting at Dehri End	BSEB	
251	400KV Muzzaferpur -Biharsharif -2	17-08-2020	10:00	17-08-2020	18:00	ODB	POWERGRID ER-I	Flashed insulator replacement		
252	A/R OF 400KV Muzzaferpur -Biharsharif -1	17-08-2020	10:00	17-08-2020	18:00	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
253	400 KV RANCHI-SIPAT-2	17-08-2020	09:30	17-08-2020	17:00	ODB	POWERGRID ER-I	Replacement of flashed insulator	NLDC	Subject to WRPC approval and FSC may be taken into service .
254	A/R of 400 KV RANCHI-SIPAT-1	17-08-2020	09:30	17-08-2020	17:00	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER	NLDC	
255	400 KV KAHALGAON-BANKA CKT 2	17-08-2020	08:00	17-08-2020	18:00	ODB	POWERGRID ER-I	Replacement of flashed over Insulator		
256	A/R OF 400 KV KAHALGAON-BANKA CKT-1	17-08-2020	08:00	17-08-2020	18:00	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
257	400 KV ROURKELA- SUNDARGARH#2 LINE	17-08-2020	09:00	17-08-2020	18:00	ODB	ER-II/ODISHA/ROURKELA	LINE MAINTENANCE WORKS		
258	765kv/400KV , 1500MVA ICT-1 at Sundergarh	17-08-2020	09:00	17-08-2020	12:30	ODB	ER-II/Odisha/Sundergarh	To make R Ph out of service to attend in oil leakage and spare ICT changeover in place of R Ph		May be approved
259	315 MVA ICT-2 at Jeypore	17-08-2020	08:00:00	22-08-2020	18:00:00	ODB	ER-II/Odisha /Jeypore	For LA erection of New ICT-4 under SPML Package near ICT-2 area due to low clearance between new Gantry & existing 220kV Jumper of ICT-2 (Outage to be booked under Construction Head)	GRIDCO	
260	125 MVAR Bus Reactor at Arambagh	17-08-2020	06:00	17-08-2020	15:00	ODB	WB	Maintenance Work		
261	400 KV Jeerat-New Chanditala Ckt	17-08-2020	07:00	17-08-2020	15:00	ODB	WB	Maintenance Work		
262	400 kV S/C FARAKKA-DURGAPUR I TL	18-08-2020	09:00	18-08-2020	17:00	ODB	POWERGRID,ER-II	replacement of insulator due to insulator damaged by miscrient in various locations.		
263	400 KV Berhampore-Bheramara-1	18-08-2020	07:00	18-08-2020	17:00	ODB	POWERGRID,ER-II	replacement of insulator due to insulator damaged by miscrient in various locations.	NLDC	Location details & Subject to Bangladesh consent.
264	400 KV S/C Arambag - Durgapur TL (WBSETCL)	18-08-2020	08:00	19-08-2020	17:00	ODB	POWERGRID,ER-II	Stringing b/w AP 33/0 to 34/0 of 765 KV D/C Medinipur-Jeerat TL Over existing 400 KV S/C Arambag - Durgapur TL	WB	
265	400KV Barh Patna CKT1	18-08-2020	09:00	18-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
266	A/R of 400KV Barh Patna CKT 2	18-08-2020	09:00	18-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
267	400kV 400 KV BIHARSHARIFF-BALLIA (PG) CKT-2	18-08-2020	08:00	18-08-2020	18:00	ODB	POWERGRID ER-I	REPLACEMENT OF FLASHED OVER INSULATOR	NLDC	
268	A/R OF 400kV 400 KV BIHARSHARIFF-BALLIA (PG) CKT-1	18-08-2020	08:00	18-08-2020	18:00	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER	NLDC	
269	400kv switchable L/R of Allahabad at Sasaram	18-08-2020	09:00	18-08-2020	18:00	ODB	POWERGRID ER-I	AMP Work	NLDC	
270	132KV MOHANIA-KARAMNASA/SC	18-08-2020	09:00	18-08-2020	18:00	ODB	POWERGRID ER-I	Relay Retroffiting at Karmanasa End	BSEB	
271	400 kV (50+125) MVAR B/R-1& IV at Biharsharif	18-08-2020	10:00	18-08-2020	18:00	ODB	POWERGRID ER-I	Electromachanical relay retrofitment		
272	400/220kV 500MVA ICT-4 at Biharhsraif SS	18-08-2020	07:00	19-08-2020	15:00	ODB	POWERGRID ER-I	NTAMC Singnal Integration and CSD Commissioning work under project head ERSS-XX	BSEB	To be completed by 15 hrs
273	220 KV RANCHI - CHANDIL-s/c	18-08-2020	09:00	18-08-2020	17:00	ODB	POWERGRID ER-I	FLASHOVER INSULATOR REPLACEMENT	JSEB	
274	400 KV MAITHON(RB)-RANCHI-II	18-08-2020	09:00	18-08-2020	17:00	ODB	POWERGRID ER-I	For flashover insulator string replacement		
275	A/R OF 400 KV MAITHON(RB)-RANCHI-I	18-08-2020	09:00	18-08-2020	17:00	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		

276	50MVAR Line Reactor at Indravati	18-08-2020	09:00	21-08-2020	18:00	OCB	ER-II/Odisha/Indravati	For Replacement of R-ph Bushing of 50MVAR LR, Leakage arresting, Filteration of oil, Settlement of oil & Testing.		
277	400 KV ROURKELA-SUNDARGARH#4 LINE	18-08-2020	09:00	18-08-2020	18:00	ODB	ER-II/ODISHA/ROURKELA	LINE MAINTENANCE WORKS		
278	765kV Sundargarh-Dharamjaygarh Ckt #3	18-08-2020	08:00	18-08-2020	18:00	ODB	ER-II/Odisha/Sundargarh	TL Maint work	NLDC	Subject to WRPC consent
279	400kV RTPS-Ranchi PG Ckt#3	18-08-2020	09:00	18-08-2020	18:00	ODB	DVC	For hardware and jumper checking and tightening and earthing checking at loc.No. 426 to 434 .		
280	220 KV Gaya(PG)-Dehri ckt 2	18-08-2020	09:00	19-08-2020	16:00	ODB	BSPTCL	For line maintenance work	Dehri will avail power from alternate sources.	
281	220 KV Alipurduar - Birpara Ckt II	19-08-2020	06:00	20-08-2020	18:00	ODB	POWERGRID,ER-II	Due to hill shrinking conductor sag adjustment required in span loc 140-141.		
282	400 KV Berhampore-Bheramara-2	19-08-2020	07:00	19-08-2020	17:00	ODB	POWERGRID,ER-II	replacement of insulator due to insulator damaged by miscrient in various locations.	NLDC	
283	400KV Barh Patna CKT 2	19-08-2020	09:00	19-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
284	A/R of 400KV Barh Patna CKT1	19-08-2020	09:00	19-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
285	400KV 125MVAR B/R-I AT CHANDWA	19-08-2020	09:00	19-08-2020	18:00	ODB	POWERGRID ER-I	AMP OF BUS REACTOR, AMP OF CIRCUIT BREAKER,		
286	400 KV BUS 2 AT DARBHANGA	19-08-2020	08:00	20-08-2020	18:00	OCB	POWERGRID ER-I	Interconnection of Extension Bus (By POWERGRID)to existing Bus (DMTCL & ATL)	BSEB	
287	400 KV Muzaffarpur- Darbhanga line-2	19-08-2020	08:00	21-08-2020	19:00	ODB	POWERGRID ER-I	STRINING OF ONE SPAN OF 400 KV MUZAFFARPUR-DHALKEBAR LINE & LINE BAY AMP WORK.		
288	765 kV BUS-II at Gaya	19-08-2020	09:00	19-08-2020	17:00	ODB	POWERGRID ER-I	For Annual Mantenance	NLDC	
289	400 KV NEW PURNIA-FARAKKA-S/C	19-08-2020	08:00	19-08-2020	18:00	ODB	POWERGRID ER-I	Replacement of flashed Insulator		
290	A/R OF 400 KV NEW PURNIA - GOKARNA S/C	19-08-2020	08:00	19-08-2020	18:00	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER	WB	
291	400 KV ROURKELA-SUNDARGARH#1 LINE	19-08-2020	09:00	19-08-2020	18:00	ODB	ER-II/ODISHA/ROURKELA	LINE MAINTENANCE WORKS		
292	765kV Sundargarh-Dharamjaygarh Ckt #4	19-08-2020	08:00	19-08-2020	18:00	ODB	ER-II/Odisha/Sundargarh	TL Maint work	NLDC	
293	400kV RTPS-Ranchi PG Ckt#2	19-08-2020	09:00	19-08-2020	18:00	ODB	DVC	For hardware and jumper checking and tightening and earthing checking at location No. 428 to 434.		
294	132 KV Banka(PG)-Sultanganj ckt 1	19-08-2020	09:00	20-08-2020	16:00	ODB	BSPTCL	For line maintenance work	Sultanganj will avail power from alternate sources.	
295	132 KV Banka(PG)-Sultanganj ckt 2	19-08-2020	09:00	20-08-2020	16:00	ODB	BSPTCL	For line maintenance work	Sultanganj will avail power from alternate sources.	
296	400kV Bus-II at Meramundali	19-08-2020	07:00	19-08-2020	17:00	ODB	GRIDCO	To attend Bus drop of different feeders.	400kV Bus-I will remain in service	
297	220KV Birpara-Chukha Ckt-I	20-08-2020	08:00	20-08-2020	17:30	ODB	POWERGRID,ER-II	Retrofitting of Numerical Distance Relay	As per earlier communication revceived from Bhutan any line outage other than emergency may be planned after High Hyro season.	After high hydro
298	66 KV Gangtok-Lagyap (LLHP) Line	20-08-2020	09:00	20-08-2020	14:00	ODB	POWERGRID,ER-II	For Annual AMP Works	Sikkim	
299	400 kV S/C FARAKKA-DURGAPUR II TL	20-08-2020	09:00	20-08-2020	17:00	ODB	POWERGRID,ER-II	replacement of insulator due to insulator damaged by miscrient in various locations.		
300	400KV Maithon - Mejia 3	20-08-2020	08:00	23-08-2020	18:00	ODB	POWERGRID,ER-II	Insulator Replacement work	DVC	
301	400KV Mejia - Jamshedpur	20-08-2020	08:00	23-08-2020	18:00	ODB	POWERGRID,ER-II	To be kept in Non Auto mode during insulator replacement work	DVC	
302	400 KV S/C Sagardighi - Jeerat TL (PGCIL)	20-08-2020	08:00	21-08-2020	17:00	ODB	POWERGRID,ER-II	Stringing b/w AP 149/0 to AP150/0 of 765 KV D/C Medinipur-Jeerat TL Over existing 400 KV S/C Sagardighi - Jeerat TL	WB	
303	400KV Barh Patna CKT1	20-08-2020	09:00	20-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
304	A/R of 400KV Barh Patna CKT 2	20-08-2020	09:00	20-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
305	400/220KV 500MVA ICT-2 AT PATNA	20-08-2020	07:00	20-08-2020	15:00	ODB	POWERGRID ER-I	Online DGA installation under construction package	BSEB	To be completed by 15 hrs
306	400 KV Maithon- Gaya Ckt-2	20-08-2020	10:00	25-08-2020	17:00	ODB	POWERGRID ER-I	To faciliate shutdown of GAYA KODERMA CKT-I for insulator replacement in multicircuit portion		
307	A/R of 400 KV Gaya-Koderma Ckt-2	20-08-2020	10:00	25-08-2020	17:00	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER(MULTI CKT TOWER)		

308	A/R of 400 KV Maithon- Gaya Ckt-1	20-08-2020	10:00	25-08-2020	17:00	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER(MULTI CKT TOWER)		
309	400 KV ROURKELA-SUNDARGARH#3 LINE	20-08-2020	09:00	20-08-2020	18:00	ODB	ER-II/ODISHA/ROURKELA	LINE MAINTENANCE WORKS		
310	220KV Bus-I at Baripada	20-08-2020	09:00	20-08-2020	17:30	ODB	ER-II/Odisha/BARIPADA S/S	Isolator allignment work	GRIDCO	
311	400KV Sundargarh Sterlite ckt-1	20-08-2020	09:00	20-08-2020	18:00	ODB	ER-II/Odisha/Sundergarh	AMP	GRIDCO	
312	400KV Barh PATNA Line # 2	20-08-2020	09:30	21-08-2020	18:00	OCB	BARH NTPC	For operation testing Auto Reclose relay testing & Other testing and Annual maint of Bay equipments.		
313	400 kV Farakka-Durgapur#1	20-08-2020	07:00	21-08-2020	17:00	OCB	FSTPP	Annual testing of CB,CT		
314	400KV BUS SECTIONALISER-2 AT ALIPURDUAR AT ALIPURDUAR	21-08-2020	08:00	21-08-2020	18:00	ODB	POWERGRID,ER-II	Bay AMP Work		
315	220KV Birpara-Chukha Ckt-II	21-08-2020	08:00	21-08-2020	17:30	ODB	POWERGRID,ER-II	Retrofitting of Numerical Distance Relay	As per earlier communication revceived from Bhutan any line outage other than emergency may be planned after High Hyro season.	After High Hydro
316	400 KV Sagardighi-Berhampore-1	21-08-2020	07:00	21-08-2020	17:00	ODB	POWERGRID,ER-II	replacement of insulator due to insulator damaged by miscrient in various locations.	WB	
317	400KV Barh Patna CKT 2	21-08-2020	09:00	21-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
318	A/R of 400KV Barh Patna CKT1	21-08-2020	09:00	21-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
319	400/220KV 500MVA ICT-1 AT PATNA	21-08-2020	07:00	21-08-2020	15:00	ODB	POWERGRID ER-I	Commissioning of Backup Impedance Relay	BSEB	To be completed by 15 hrs
320	400KV 125MVAR B/R-II AT CHANDWA	21-08-2020	09:00	21-08-2020	18:00	ODB	POWERGRID ER-I	AMP OF BUS REACTOR, AMP OF CIRCUIT BREAKER,		
321	400kv North Bus-2 at Sasaram	21-08-2020	09:00	21-08-2020	18:00	ODB	POWERGRID ER-I	AMP Work	NLDC	
322	400KV Muzzaferpur -Biharsharif -1	21-08-2020	10:00	21-08-2020	18:00	ODB	POWERGRID ER-I	Flashed insulator replacement		
323	A/R OF 400KV Muzzaferpur -Biharsharif -2	21-08-2020	10:00	21-08-2020	18:00	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
324	220KV Bus-II at Baripada	21-08-2020	09:00	21-08-2020	17:30	ODB	ER-II/Odisha/BARIPADA S/S	Isolator allignment work	GRIDCO	
325	400KV Sundargarh Sterlite ckt-2	21-08-2020	09:00	21-08-2020	18:00	ODB	ER-II/Odisha/Sundergarh	AMP	GRIDCO	
326	400KV Sagardighi-Berhampore-2	22-08-2020	07:00	22-08-2020	17:00	ODB	POWERGRID,ER-II	replacement of insulator due to insulator damaged by miscrient in various locations.	WB	
327	400KV Barh Patna CKT1	22-08-2020	09:00	22-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
328	A/R of 400KV Barh Patna CKT 2	22-08-2020	09:00	22-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
329	400 kV BUS-II at Gaya	22-08-2020	09:00	22-08-2020	17:00	ODB	POWERGRID ER-I	For Annual Mantenance		After high hydro
330	400KV Main Bus-II at Baripada	22-08-2020	09:00	22-08-2020	17:30	ODB	ER-II/Odisha/BARIPADA S/S	GIS Bus Duct and Bus isolator/earthswitch AMP works	GRIDCO	
331	220kv bus-1 at Pandiabili	22-08-2020	09:00:00	22-08-2020	18:00:00	ODB	ER-II/Odisha/ Pandiabili GIS	AMP WORK of bus coupler 206 bay(DCRM test)	GRIDCO	
332	400KV Barh Patna CKT 2	23-08-2020	09:00	23-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
333	A/R of 400KV Barh Patna CKT1	23-08-2020	09:00	23-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
334	220/132 kV 100 MVA ICT -1 at Rangpo	24-08-2020	08:00	28-08-2020	17:00	OCB	POWERGRID,ER-II	For rectification of SF6 gas leakage repair work		
335	400 KV SAGARDIGHI-DURGAPUR-1	24-08-2020	07:00	24-08-2020	17:00	ODB	POWERGRID,ER-II	replacement of insulator due to insulator damaged by miscrient in various locations.	WB	
336	315 MVA ICT-2 at Durgapur	24-08-2020	08:00	26-08-2020	17:30	OCB	POWERGRID,ER-II	Oil Flow Pump replacement works with oil drain & oil filtration.	DVC	
337	400 KV Jeerat Sagardighi Line	24-08-2020	09:00	24-08-2020	17:00	ODB	POWERGRID,ER-II	A/R relay Retrofitting and Testing in 400 KV Jeerat Sagardighi Line at Jeerat end.	WB	
338	400KV Maithon - Right Bank # I	24-08-2020	09:00	24-08-2020	17:00	ODB	POWERGRID,ER-II	Insulator Replacement damaged by miscreants		
339	A/R OF 400KV Maithon - Right Bank # II	24-08-2020	09:00	24-08-2020	17:00	ODB	POWERGRID,ER-II	To be kept in Non Auto mode during insulator replacement work		
340	400KV Barh Patna CKT1	24-08-2020	09:00	24-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
341	A/R of 400KV Barh Patna CKT 2	24-08-2020	09:00	24-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		

342	400 KV Bus 1 AT MOTIHARI	24-08-2020	08:00	25-08-2020	18:00	OCB	POWERGRID ER-I	Interconnection of Extension Bus (By POWERGRID)to existing Bus (DMTCL)	BSEB	
343	400kv Switchable L/R of Muzaffarpur-2 at New Purnea	24-08-2020	09:30	26-08-2020	18:00	OCB	POWERGRID ER-I	CB MECHANISM BOX OVERHAULING		
344	400KV Baripada-Keonjhar line	24-08-2020	09:00	25-08-2020	17:30	ODB	ER-II/Odisha/BARIPADA S/S	Replacement of porcelain insulator into polymer insulator in Tr. line for line crossing		
345	400 KV Kharagpur-KTPP Ckt 1	24-08-2020	07:00	24-08-2020	15:00	ODB	WB	Maintenance Work		
346	400 KV SAGARDIGHI-DURGAPUR-1	25-08-2020	07:00	25-08-2020	17:00	ODB	POWERGRID,ER-II	replacement of insulator due to insulator damaged by miscrient in various locations.	WB	
347	400KV Maithon - Mejia 2	25-08-2020	09:00	25-08-2020	17:00	ODB	POWERGRID,ER-II	Insulator Replacement damaged by miscreants	DVC	
348	400KV Bus# 3 at Maithon	25-08-2020	10:00	25-08-2020	19:00	ODB	POWERGRID,ER-II	Dismantling work of Bus isolator of 400kV RB-2 under ERSS-XVII project work	DVC	
349	400 KV D/C Arambag - Kolaghat, Arambag - Durgapur TL (WBSETCL)	25-08-2020	08:00	26-08-2020	17:00	ODB	POWERGRID,ER-II	Stringing b/w AP 31/0 to 32/0 of 765 KV D/C Medinipur-Jeerat TL Over existing 400 KV D/C Arambag - Kolaghat, Arambag - Durgapur TL	WB	
350	400KV Barh Patna CKT 2	25-08-2020	09:00	25-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
351	A/R of 400KV Barh Patna CKT1	25-08-2020	09:00	25-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
352	400 KV NEW PURNIA - GOKARNA -S/C	25-08-2020	08:00	25-08-2020	18:00	ODB	POWERGRID ER-I	Replacement of flashed Insulator with	WB	
353	A/R OF 400 KV NEW PURNIA-FARAKKA-S/C	25-08-2020	08:00	25-08-2020	18:00	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
354	220KV Bus-I at Dalkhola	26-08-2020	10:00	26-08-2020	18:00	ODB	POWERGRID,ER-II	Bus side Dropper replacement on DLK-KNE-I , DLK-Gazol-I, DLK PRN-I & Bus-I CVT and rectification of M1 isolator alignment	WB	
355	400KV Maithon - Mejia 3	26-08-2020	09:00	26-08-2020	17:00	ODB	POWERGRID,ER-II	Insulator Replacement damaged by miscreants	DVC	
356	400KV Maithon-Kahalgaon#2 Line	26-08-2020	09:00	27-08-2020	18:00	ODB	POWERGRID,ER-II	Replacement of line CT .		
357	400KV Barh Patna CKT1	26-08-2020	09:00	26-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
358	A/R of 400KV Barh Patna CKT 2	26-08-2020	09:00	26-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
359	400 KV BUS 2 AT MOTIHARI	26-08-2020	08:00	27-08-2020	18:00	OCB	POWERGRID ER-I	Interconnection of Extension Bus (By POWERGRID)to existing Bus (DMTCL)	BSEB	
360	400KV Baripada-Kharagpur line	26-08-2020	09:00	28-08-2020	17:30	ODB	ER-II/Odisha/BARIPADA S/S	Replacement of porcelain insulator into polymer insulator in Tr. line for line crossing	WB	
361	400KV Maithon - Durgapur 2	27-08-2020	09:00	27-08-2020	17:00	ODB	POWERGRID,ER-II	Insulator Replacement damaged by miscreants		
362	400KV Barh Patna CKT 2	27-08-2020	09:00	27-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
363	A/R of 400KV Barh Patna CKT1	27-08-2020	09:00	27-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
364	500MW HVDC (B/B) at Sasaram	27-08-2020	09:00	30-08-2020	18:00	OCB	POWERGRID ER-I	Shifting of 315 MVA Spare ICT under east side bus towards the designated storage location .	NLDC	Subject to confirmation/ consent of ERLDC. (NRPC comments)
365	765kV Sundragarh- Angul ckt#2 along with LR	27-08-2020	09:00	27-08-2020	18:00	ODB	ER-II/Odisha/Sundergarh	TL Maintenance work.		May be approved on Daily basis
366	400 kV Farakka-Durgapur#2	27-08-2020	07:00	28-08-2020	17:00	OCB	FSTPP	Annual testing of CB,CT		
367	400 KV Kharagpur-Baripada Ckt	27-08-2020	06:00	27-08-2020	16:00	ODB	WB	Maintenance Work		
368	220KV Bus-II at Dalkhola	28-08-2020	10:00	28-08-2020	18:00	ODB	POWERGRID,ER-II	Rectification of M2 Isolator alignment of DLK-KNE-II & DLK-PRN-II and Dropper replacement on Bus-II CVT	WB	
369	400 KV Rajarhat Jeerat Line	28-08-2020	09:00	28-08-2020	17:00	ODB	POWERGRID,ER-II	Main-1 Distance Relay Replacement at Jeerat end.	WB	
370	400KV Bus #1 at Maithon	28-08-2020	09:00	28-08-2020	17:00	ODB	POWERGRID,ER-II	Replacement of Bus CVT.	DVC	
371	400KV Barh Patna CKT1	28-08-2020	09:00	28-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
372	A/R of 400KV Barh Patna CKT 2	28-08-2020	09:00	28-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
373	400 KV Kharagpur- Baripada Ckt	28-08-2020	06:00	28-08-2020	16:00	ODB	WB	Maintenance Work		
374	125MVAR BUS REACTOR AT BERHAMPORE	29-08-2020	09:00	29-08-2020	17:00	ODB	POWERGRID,ER-II	Balance Construction Works		
375	400kV Maithon-Durgapur-2 line	29-08-2020	08:00	30-08-2020	14:00	ODB	POWERGRID,ER-II	Internal inspection/Overhauling of interrupter of 400kV CB of Main Bay.		
376	400KV Barh Patna CKT 2	29-08-2020	09:00	29-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
377	A/R of 400KV Barh Patna CKT1	29-08-2020	09:00	29-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		

378	400kv New Purnea -Kishanganj-1	29-08-2020	10:00	29-08-2020	18:00	ODB	POWERGRID ER-I	AMP & Relay retrofitting works IN 63MVAR L/R at New Purnea.		After high hydro
379	400KV Baripada-Pandiabilli line	29-08-2020	09:00	30-08-2020	17:30	ODB	ER-II/Odisha/BARIPADA S/S	Replacement of porcelain insulator into polymer insulator in Tr. line for line crossing		
380	400KV Barh Patna CKT1	30-08-2020	09:00	28-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
381	A/R of 400KV Barh Patna CKT 2	30-08-2020	09:00	28-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
382	400kv 125MVAR Bus Reactor-1 at New Purnea	30-08-2020	10:00	30-08-2020	18:00	ODB	POWERGRID ER-I	Relay retrofitting works IN 125MVAR Bus Reactor-1		
383	400KV Barh Patna CKT 2	31-08-2020	09:00	29-08-2020	17:30	ODB	POWERGRID ER-I	Replacement of Polymer Insulator in ROAD/POWERLINE/RAILWAY /RIVER Crossing		
384	A/R of 400KV Barh Patna CKT1	31-08-2020	09:00	29-08-2020	17:30	ODB	POWERGRID ER-I	TO FACILITATE THE S/D OF OTHER CKT ON THE SAME TOWER		
385	400kv 125MVAR Bus Reactor-2 at New Purnea	31-08-2020	10:00	31-08-2020	18:00	ODB	POWERGRID ER-I	Relay retrofitting works IN 125MVAR Bus Reactor-2		