



# **AGENDA FOR 174<sup>th</sup> OCC MEETING**

**Date: 21.12.2020  
Eastern Regional Power Committee  
14, Golf Club Road, Tollygunge  
Kolkata: 700033**

## **Eastern Regional Power Committee**

### **Agenda for 174<sup>th</sup> OCC Meeting to be held on 21<sup>st</sup> December 2020**

#### **PART A**

##### **Item No. A.1: Confirmation of minutes of 173<sup>rd</sup> OCC meeting of ERPC held on 24.11.2020.**

The minutes of 173<sup>rd</sup> OCC meeting were uploaded in ERPC website and circulated vide letter dated 10.12.2020 to all the constituents.

**Members may confirm the minutes of 173<sup>rd</sup> OCC meeting.**

#### **PART B: ITEMS FOR DISCUSSION**

##### **Item No. B.1 Review of System Protection Scheme (SPS) of HVDC Talcher-Kolar Bipole—NLDC.**

NLDC vide letter dated 21<sup>st</sup> October 2020 informed that the SPS associated with HVDC Talcher-Kolar Bipole was implemented long back in the year 2003 as per system requirements at that time. The addition of high-capacity AC lines in the corridor parallel to this HVDC link have strengthened the ER-SR & WR-SR corridors for exchange of power to/from southern region (SR). The newly commissioned HVDC Raigarh-Pugalur Pole-I has also been commissioned recently. Presently, in cases of HVDC Talcher-Kolar Pole blocking, SPS as per design operates with load disconnection in SR and generation backing down/outage in ER.

In view of strengthening of transmission system as stated above, the scheme has been reviewed in consultation with RLDC's. NLDC requested for ER constituent's view for finalization of the SPS scheme.

*In the 173<sup>rd</sup> OCC Meeting, NLDC explained the revised SPS scheme in details and pointed the out followings:*

- GMR and JITPL thermal power plants are radially connected to 765/400 kV Angul pooling station and 765/400 kV Angul station is strongly connected to western region and southern region through 765 kV lines. The tripping of HVDC Talcher-Kolar does not cause any constraint in evacuation of GMR and JITPL. Therefore, the SPS for 600 MW generation backing down at these stations would not be required and the same may be disabled.*
- During the study, it was observed that 400 kV Talcher-Meramundali D/C Lines are getting heavily loaded (beyond 874 MW) after the tripping of HVDC Talcher-Kolar in some cases. Therefore, the loading of 400 kV Talcher-Meramundali lines may also be included in the SPS logic (SPS 1000 and SPS 450) installed at Talcher STPS, NTPC. The proposed revised SPS logic in brief is as follows:*

*The flow on 400 kV Talcher-Meramundali-1 (or) 400 kV Talcher-Meramundali- 2 is more than 874 MW*

*(and)*

*SPS 1000 triggered (or) SPS 450 triggered*

*NTPC Talcher informed that, as per the existing SPS logic 800 MW generation backing down is happening by tripping one of the running unit and unloading two units by 150 MW each, when both*

*the poles are getting blocked. NTPC requested to consider generation backing down of the generating units instead of tripping of the units.*

*NLDC explained that immediate response might not be achieved by generation backing down which would lead to cascade tripping of the transmission lines. Therefore, they have considered unit tripping instead of generation backing down for successful operation of SPS. NLDC further informed that since 400 kV Talcher-Meramundali Line loading has also been included in the SPS logic, chances of meeting the SPS criterion and its operation would be exceedingly rare.*

*SLDC Odisha informed that 400/220 kV ICTs at Meramundali S/s may get overloaded before increase in the loading of 400 kV Talcher-Meramundali Line. SLDC, Odisha requested to verify the ICT loading at Meramundali.*

*NLDC informed that according to the studies done for various scenarios, it was observed that the 400kV Talcher-Meramundali lines are getting overloaded first before the ICT loading. NLDC agreed to share the study details to SLDC, Odisha.*

*ERLDC informed that there is an issue with PLC logic which is supposed to generate the ground return mode of pole 2 at HVDC, Talcher. As a result, the SPS is not operating as per the logic.*

*After detailed deliberation OCC decided the following:*

- The SPS logic for 600 MW generation backing down at JITPL and GMR shall be disabled at JITPL and GMR.*
- All the concerned constituents shall go through SPS logic given at Annexure-B1 of 173<sup>rd</sup> OCC Minutes document and submit their comments, if any to ERPC and ERLDC within 15 days. The issues shall be placed for discussion in next OCC meeting.*
- Powergrid and NTPC Talcher shall rectify the issue of PLC logic related to generation of ground return mode of pole 2 during the HVDC shutdown.*

It was informed vide mail dated 15<sup>th</sup> Dec 2020 that the SPS logic at GMR and JITPL has been bypassed.

NLDC mentioned that the simulation study for proposed SPS have been carried out for high demand and low generation scenarios for Odisha and loading of 400/220 kV Meramundali ICTs have been found to be within limits. In addition to this, worst case scenario for Odisha internal network has also been studied and results for both the scenarios are given in **Annexure B1**.

**Members may discuss.**

#### **Item No. B.2 Review of System Protection Scheme (SPS) designed for NEW-SR grid integration: - NLDC.**

The existing SPS on NEW-SR corridor (for 765 kV Solapur-Raichur lines) were implemented during the synchronization of SR grid with NEW grid in the year 2014. Over the years, SR grid has been integrated with NEW grid through many inter-regional lines apart from 765 kV Solapur-Raichur. The newly commissioned HVDC Raigarh (WR)-Puglur (SR) Bipole is very soon expected to be in operation which will further strengthen the network connecting Southern Region.

In view of above NLDC vide their letter dated 9<sup>th</sup> December 2020 proposed to review the existing SPS. Letter along with the proposal is attached in **Annexure-B2**.

**Members may discuss.**

### **Item No. B.3 Data for preparation of National Electricity Plan (NEP) 2022-27 and 2027-32.**

Sub-committee 8 on "Transmission Planning" was constituted by the Committee for preparation of National Electricity Plan (NEP) 2022-27. The first meeting of the sub-Committee was held on 27.10.2020 wherein CEA requested STUs/Discoms to furnish the relevant data pertaining to their state within 30 days as per the format enclosed at Annexure-B2 of 173<sup>rd</sup> OCC Agenda document.

All states are requested to submit the relevant details to CEA with a copy to ERPC for preparation of the transmission planning. The relevant details as per the format may be send to the following mail addresses:

- [cea-pspal@gov.in](mailto:cea-pspal@gov.in)
- [mserpc-power@nic.in](mailto:mserpc-power@nic.in)

*In the 173<sup>rd</sup> OCC Meeting, OCC advised all the STU's and Discoms to submit the data as per the format enclosed at Annexure-B2 of 173<sup>rd</sup> OCC Minutes document to CEA and ERPC within 15 days.*

CESC has submitted the relevant details for preparation of NEP for 2022-27 and 2027-32.

WBSETCL has submitted the details for preparation of NEP for 2022-27.

**Respective STUs and Discoms may update.**

### **Item No. B.4 Outage of important transmission system.**

#### **1. 400 kV Barh-Motihari D/C and 400 kV Motihari -Gorakhpur D/C lines.**

In the 171<sup>st</sup> OCC Meeting, ERLDC requested DMTCL to bring one more circuit of 400kV Barh-Motihari so that reliable supply could be maintained at Motihari S/s.

DMTCL informed that they require 10 working days to restore the 2<sup>nd</sup> circuit of 400kV Barh-Motihari but because of heavy water in the river they are unable to start the work. DMTCL added that the line would be restored within 10 days as and when they get the opportunity to work.

DMTCL further informed that permanent restoration of 400 kV D/C Barh-Motihari-Gorakhpur Lines would take 5 months from the date of start of work after receding of the water level.

OCC advised DMTCL to put out all efforts to restore the line on permanent towers at the earliest.

DMTCL in a mail dated 9<sup>th</sup> Oct 2020 updated the progress of restoration work of the Barh-Motihari and Motihari-Gorakhpur line.

In the 172<sup>nd</sup> OCC Meeting, DMTCL informed that as of now there is no progress in restoration work of 400kV Barh-Motihari line-2 and 400kV Motihari-Gorakhpur lines. They are continuously monitoring the site condition and they would start the restoration work as soon as the water level recedes to working conditions.

OCC advised Sekura to start the permanent restoration work at the earliest and provide a tentative schedule for completion of work.

ERLDC also informed that SCADA data of NTPC Barh is not reporting to ERLDC.

OCC advised NTPC Barh to extend necessary help to DMTCL for providing the data to ERLDC latest by 30<sup>th</sup> Oct 2020.

NTPC agreed.

DMTCL vide mail dated 19<sup>th</sup> November 2020 updated the progress of Barh-Motihari and Barh-Gorakhpur D/C line which is given in the Annexure B4.1 of 173<sup>rd</sup> OCC Agenda document.

*In the 173<sup>rd</sup> OCC Meeting, DMTCL informed that they had resumed the work and they are planning to bring one circuit of 400kV Gorakhpur-Motihari line on ERS by 10<sup>th</sup> December 2020. DMTCL added that they are putting out all efforts for permanent restoration of all the four circuits by 31<sup>st</sup> Mar 2021.*

*Regarding the issue of SCADA data of NTPC Barh, DMTCL informed that ABB engineer would visit the site on 26<sup>th</sup> Nov 2020 to resolve the issue.*

DMTCL vide dated 17<sup>th</sup> Dec 2020 updated the progress of Barh-Motihari and Barh-Gorakhpur D/C lines which is given in **Annexure B4.1**.

**DMTCL may update.**

## **2. 400KV/220KV 315 MVA ICT-1 AT INDRAVATI.**

400KV/220KV 315 MVA ICT-1 AT INDRAVATI is out from 20.02.2020 09:17 hrs. for replacement of SF6 CB.

*In the 173<sup>rd</sup> OCC Meeting, OHPC informed that all the related works of 315 MVA ICT-1 have been completed. The ICT would be charged after getting clearance from electrical inspector.*

*ERLDC requested OHPC to share the status of all breakers, isolators of 220kV and 400kV dia.*

*OCC advised OHPC to share the details to ERLDC.*

**SLDC Odisha and OHPC may update.**

## **3. 400KV NEW PURNEA-GOKARNA & 400KVNEW PURNEA-FSTPP.**

400KV-NEW PURNEA-GOKARNA & 400KV-NEW PURNEA-FSTPP is out since 04/09/2020 on tower collapse due to flood in the river Ganga at tower loc no 1103. The line was charged as 400 kV Farakka – Gokarna w.e.f 09/09/2020 to increase power supply reliability to Gokarna.

Powergrid vide mail dated 26<sup>th</sup> October 2020 forwarded the restoration plan for 400KV new Purnea Gokarna and 400KV new Purnea Farakka transmission lines which is given in Annexure B4.3 of 173<sup>rd</sup> OCC Agenda document.

*In the 173<sup>rd</sup> OCC Meeting, Powergrid informed that the work has already been started and the line would be temporarily restored on ERS by 15<sup>th</sup> Dec 2020 and permanent restoration of lines is expected by June 2021.*

**Powergrid may update the status of restoration of line on ERS.**

## **4. 132kV Sagbari – Melli.**

132 kV Melli-Sagabari-S/C was under outage since last 2 & half years due to breaker issue at Sagabari end. In absence of the said line, Melli is connected through 132 kV Siliguri – Melli and 132 kV Rangpo – Melli single ckts. However, during shutdown of 132 kV Rangit – Rangpo and 132 kV Rangit – Gangtok -2 due to damage in Multi circuit tower, the above two lines are reconfigured as 132 kV Rangit – Gangtok direct circuit and 132 kV Rangpo – Melli was kept open at Rangpo end on reliability issue. Thus, during above mentioned shutdown period Melli is fed from single source either from Siliguri or Rangpo depending upon the system condition. So, for reliable power supply to Melli restoration of 132 kV Sagbari - Melli is very much required.

**Sikkim may update.**

**5. 400KV tie bay of (GMR AND JSPL II) at Meramundali.**

The tie bay was taken out of service for replacement of damaged R-Phase 408 Dia 89TB tie isolator arm at Meramundali on 27/05/20. The element remains out of service.

**GRIDCO may update.**

**6. Main bay of Dikchu ICT.**

Main Bay 405 connecting Dikchu ICT to Main Bus-2 remains out of service from 19th Feb' 20.

**Dikchu may update.**

**7. 400 KV main bay of Patna-1 at Kishenganj.**

The said bay remains out of service due to problem in Y-ph CB mechanism from 10/04/20.

**POWERGRID may update.**

**Item No. B.5 Short Term and Long-Term Transmission Plan for Intra state Constraints in Orissa--ERLDC**

Based on January 2020-2021 Base case and real-time data, the following constraints have been observed in the State network which does not satisfy N-1 reliability criteria. The details are given below:

Transmission Lines having N-1 Reliability Issue	Present Actual Loading Observed (MW)	Loading observed in Simulation (MW)	Sensitivity of N-1 on Parallel Element	Action Plan by STU and SLDC	Remarks and Details from SLDC/STU
220 kV Rourkela-Tarkera D/C (Loading is low in Real time with High Injection by Vedanta)	24	120	80 %	OPTCL	
220 kV Vedanta-Buddhipadar D/C (High Loading in Injection by Vedanta)	155-160	0	100%	OPTCL	
220 kV Buddhipadar-Lapanga D/C (High loading in injection by Vedanta)	120-140	16	67 %	OPTCL	

*In the 173<sup>rd</sup> OCC Meeting, OCC advised Odisha to study the loading and share their action plan to ERPC and ERLDC.*

**Members may update.**

**Item No. B.6 Shutdown proposal of generating units for the month of January 2021.**

Generator shutdown for January 2021 is given below:

Proposed Maintenance Schedule of Thermal Generating Units of ER during 2020-21 in the month of Jan 21 (as finalised in LGBR meeting for 2020-21 held)								
System	Station	Unit	Capacity (MW)	Period		No. of Days	Reason	Revised Schedule (As given by system)
				From	To			
TVNL	Tenughat TPS	1	210	20.01.21	24.02.21	12	AOH	
DVC	CTPS	8	250	08.12.20	12.01.21	40	COH	01.01.21-09.02.21
	RTPS	2	600	22.01.21	21.02.21	30	AOH	
ODISHA	Talcher TPS	6	110	05.01.21	29.01.21	25	AOH	
	IB TPS	1	210	10.11.20	30.11.20	21	AOH	1 <sup>st</sup> Jan 21
WBPDCCL	Kolaghat TPS	3	210	02.01.21	15.02.21	14	AOH/BOH	
DPL	DPPS	7	300	01.01.21	10.01.21	10	Tit bit maintenance	
HEL	Haldia Energy Limited	2	300	06.01.21	19.02.21	45	AOH	
NTPC	Farakka	1	500	27.12.20	09.02.21	45	BOH	
IPP	GMR	2	350	06.01.21	04.02.21	30	Turbine OH	
IPP	MPL	1	525	15.12.20	30.01.21	45	COH	11.01.21-24.02.21

MPL vide mail informed that Unit-1 AOH is planned in the 2nd week of Jan-2021 after getting confirmation date from Siemens Engineer-Germany. The dates of AOH ( from 11th Jan-2021 to 24th Feb-2021).

NTPC Farakka informed that the R&M work of ESP of unit-5 has been completed and needs to be charged to check the effectiveness of the work. For this the unit needs shutdown of 3 days. For this purpose, the shutdown of unit-5 is required to be taken and the power requirement of beneficiaries can be fulfilled by unit-1 which is currently under reserve shutdown.

**Members may update.****a) Outage of Multiple units at Kahalgaon.**

Unit 3, 4, 5 & 7 and Unit 6 of Kahalgaon STPP were desynchronized from grid on 7<sup>th</sup> November and 4<sup>th</sup> November respectively due to Ash dyke problem. Only Unit 7 revived on 13<sup>th</sup> November 2020 and rests of the units are still under outage.

*In the 173<sup>rd</sup> OCC Meeting, NTPC informed that because of non-availability of space for ash disposal all the units were de-synchronized from the grid. On 23<sup>rd</sup> Nov 2020, unit-6 was synchronized with the grid. The remaining units would be synchronized subsequently in about one and half month.*

**NTPC may update the status of remaining units.****Item No. B.7 Transmission elements outage for December 2020.****1. Reconductoring work of 400 kV Rangpo-Binaguri D/C lines.**

In 167<sup>th</sup> OCC, Powergrid updated that reconductoring work of 38 km of both the circuits out of 110 km line had been completed and the line is in service.

Powergrid requested for shutdown of the line from 1<sup>st</sup> November 2020.

In the 172<sup>nd</sup> OCC Meeting, ERLDC requested Powergrid to complete the reconductoring work of one circuit at least before Monsoon for safe evacuation of hydro generation in Sikkim.

*In the 173<sup>rd</sup> OCC meeting, Powergrid gave a presentation regarding progress of reconductoring work of 400 kV Rangpo-Binaguri D/C lines.*

*Powergrid was advised to prepare the shutdown list required for the line crossing and submit in advance to ERPC & ERLDC so that it could be discussed with concerned constituents.*

ERLDC vide mail dated 2<sup>nd</sup> Dec 2020 informed that Powergrid ER-II had proposed to carry out the reconductoring work of 400KV D/C Rangpo - Binaguri TL in Sikkim portion from 07-12-20 to 12-12-20 (07-16 Hrs) ODB basis.

DANS Energy vide mail dated 3<sup>rd</sup> Dec 2020 requested to re-schedule the shutdown of 220 kV D/C Jorethang – New Melli lines in last week of January or first Week of February from 11:00 Hrs. to 16:30 Hrs. as during this particular time period Generation from 2 X 48 MW Jorethang Loop HEP will be Zero / Nil.

**Members may discuss.**

## **2. Shutdown request by Adani Power limited.**

The revised shutdown list submitted by Adani power is enclosed at **Annexure-B7.2.**

**Members may discuss.**

### **Item No. B.8 Additional Agenda by NTPC Talcher---NTPC.**

- 1) Schedule was changed for the running block after lapsing of 4 to 5 mins (block no.89 on 25.11.2020, block no. 83 on 25.11.2020).
- 2) Reduction of DC was not allowed in peak hours even DC revision was punched before 14:00 hrs. In case of equipment failure, procedure for DC revision for peak hrs. may be looked into.
- 3) CDM certification of our Solar Plant is kept in abeyance because of pending calibration of energy-meters since last year. We have received the new energy meters, but calibration certificates are pending. If allowed, Station will calibrate the meters from NABL accredited lab.

**Members may discuss.**

### **Item No. B.9 Submission of end-wise reliability indices–ERLDC.**

ERLDC informed that as per CERC (Standards of Performance of inter-State transmission licensees) Regulations, 2012 all the inter-State transmission licensees are to furnish data for computation of reliability indices to POSOCO. Based on data shared by transmission licensees, POSOCO are to compute reliability indices and furnish to CERC. Vide mail dated 13<sup>th</sup> August 2020 and 2<sup>nd</sup> September 2020, ERLDC requested all inter-State transmission licensees to share reliability indices indicating status of correct operation protection system and auto-reclose operation at both ends.

For computation of reliability indices of whole line, status of operation of protection system and auto-reclose operation at both ends of the line are extremely important and needed to be explicitly mentioned by all inter-State transmission licensees. Based on the both end protection operation as shared by the transmission licensee, Reliability indices of the line shall be computed. Thus, Owner of the transmission line need to submit both end data (irrespective of the owner of the bay) to ERLDC



for calculation and onward submission of reliability indices to CERC as per the existing regulation  
The format for data submission for reliability indices is provided below.

Sr. no	Element Name	Trip date and Time	Restoration Date & time	Reason and Remarks	End 1*			End 2*			Reliability indices of whole line		
					N <sub>c</sub>	N <sub>u</sub>	N <sub>f</sub>	N <sub>c</sub>	N <sub>u</sub>	N <sub>f</sub>	N <sub>c</sub>	N <sub>u</sub>	N <sub>f</sub>

\* End 1 and End 2 indices are also to be explicitly mentioned by all transmission utilities (not being shared for any inter-state transmission line)

**In case of End 1 and 2,**

- N<sub>c</sub> = 1 for correct operation of protection system and auto-reclose operation at respective end
- N<sub>u</sub> = 1 for Unwanted operation of protection system and auto-reclose operation at respective end
- N<sub>f</sub> = 1 for Failure of protection system and auto-reclose operation at respective end

**In case of reliability indices for whole line,**

N<sub>c</sub> = 1 for N<sub>c</sub> = 1 at both end 1 and end 2

N<sub>u</sub> = 1 for N<sub>u</sub> = 1 at either end 1 or end 2

N<sub>f</sub> = 1 for N<sub>f</sub> = 1 at either end 1 or end 2

Hence all the inter-State transmission licensees are requested to share reliability indices as per following format so that that same may be shared to CERC.

**Members may note.**

## **PART C: ITEMS FOR UPDATE**

**Item No. C.1: Status of UFRs healthiness installed in Eastern Region.**

UFRs healthiness status have been received from CESC, Jharkhand and DVC.

**Members may update.**

**Item No. C.2: Status of Islanding Schemes healthiness installed in Eastern Region.**

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

Details received from the constituents is as follows:

Sl. No	Name of Islanding Scheme	Confirmation from Generator utility	Confirmation from Transmission and load utility
1	CESC as a whole Islanding	Healthy	Healthy
2	BkTPS Islanding Scheme	Healthy	Healthy
3	Tata Power Islanding Scheme, Haldia	Healthy	Healthy
4	Chandrapura TPS Islanding Scheme, DVC	Not in service	
5	Farakka Islanding Scheme, NTPC		
6	Bandel Islanding Scheme, WBPDC	Healthy	Healthy

**Members may update.**

### **Item No. C.3: Primary Frequency Response Testing of Generating Units—POSOCO.**

In the 173<sup>rd</sup> OCC Meeting, NTPC informed that Farakka has already planned to carry out the test on 1<sup>st</sup> of Feb 2021. Kahalgaon is planning to carry out test after 15<sup>th</sup> Jan 2021 and BRBCL is planning to carry out the test after Dec 2020.

MPL informed that they have placed the order with Siemens and the dates for testing would be finalized in coordination with ERLDC and Siemens.

OCC further, advised all the other Generators, especially the Hydro-Electric Plants to plan the Primary Frequency Response Testing in the winter season.

A presentation on Primary Frequency Response Testing was given by M/s Siemens on 11.12.2020.

NTPC Kahalgaon informed that they had already placed the PO with M/s Solvina for Primary Frequency Response Testing and it is expected that the testing will be done in the second fortnight of Jan-2021 as confirmed by the agency.

**Members may update.**

### **Item No. C.4: Testing of primary frequency response of state generating units by third party agency--ERLDC**

In the 171<sup>st</sup> OCC Meeting, OCC advised all the SLDC's to prepare the action plan for their state generators and submit the details to ERPC and ERLDC at the earliest.

DVC in a mail dated 6<sup>th</sup> Oct 2020 informed that the Primary Frequency Response Testing may be carried out for the following generating units:

Sl. No.	Name of the Units	Capacity (MW)
1	BTPS-A	500
2	CTPS Unit #7&8	2X250
3	DSTPS Unit#1&2	2X500
4	KTPS Unit # 1&2	2X500
5	MTPS Unit # 3 to 8	2 X 210 MW +2 X 250 MW + 2X 500 MW
6	RTPS Unit # 1 & 2	2 X 600 MW

However, at present the Primary Frequency Response Testing may not be possible for the following units of DVC:

Sl. No.	Name of the Units	Capacity (MW)	Remarks
1	BTPS-B U#3	210	The Governing system is of the Hydro-mechanical type and the Control system is a Solid-state Hardware/Relay based system.
2	DTPS U#4	210	The Governing system is of the Hydro-mechanical type and the Control system is a Solid-state Hardware/Relay based system
3	MTPS Unit # 1&2	2X210	C & I system of Unit 1 & 2 are originally supplied with a Solid-state Hardware-based system for SG & TG Package which is lacking in scalability and flexibility and the BOP Package is supplied with a primitive DCS system.

*In the 173<sup>rd</sup> OCC Meeting, OPGC informed that for unit # 3 & 4, the order has been placed with M/s Siemens and approval is in process.*

*OHPC informed that in concurrence to a meeting held with SLDC Odisha, they have planned to carry out the test at one unit of Indravati.*

*West Bengal informed that they are in discussion with their generators to carry out the primary Frequency response Testing.*

DVC informed that both the agencies M/s Siemens & M/s Solvina have agreed to carry out the testing at pre agreed rates, terms & conditions.

**Members may update.**

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

Latest status of State ATC/TTC declared by states for the month of February-2021:

SL. No	State/Utility	TTC (MW)		RM(MW)		ATC Import (MW)		Remark
		Import	Export	Import	Export	Import	Export	
1	BSPTCL	5150	--	103	--	5047	--	Feb-21
2	JUSNL	1569	--	51	--	1518	--	Mar-21
3	DVC	1355	2995	65	51	1290	2944	Feb-20
4	OPTCL	2251	1432	74	54	2177	1378	Dec-20
5	WBSETCL	4960	--	400	--	4646	--	Jan-21
6	Sikkim	315	--	2.44	--	315.56	--	Feb-21

**Members may update.**

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

Mock black start date for financial year 2020-21 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 Oct 2020		Second Week of Feb 2021	
2	Balimela	Second week of Nov 2020		First Week of March 2021	
3	Rengali	Second week of Nov 2020	<i>Done on 23<sup>rd</sup> Nov 2020</i>	First Week of March 2021	
4	Burla	Second week of Nov 2020		First Week of March 2021	
5	U. Indravati	Last week of Oct 2020		Second Week of Feb 2021	
6	Maithon	Third Week of Nov 2020		First Week of March 2021	
7	TLDP-III	Second week of Nov 2020		Second Week of Feb 2021	
8	TLDP-IV	Third Week of Nov 2020		First Week of March 2021	
9	Subarnarekha	Second week of Nov 2020		Second Week of Feb 2021	
10	Teesta-V	Third Week of Nov 2020		Third Week of March 2021	
11	Chuzachen	Second week of Nov 2020		First Week of March 2021	
12	Teesta-III	Third Week of Nov 2020		First Week of March 2021	
13	Jorethang	Third Week of Nov 2020		First Week of March 2021	
14	Tasheding	Second week of Nov 2020		First Week of March 2021	
15	Dikchu	Second week of Nov 2020		Second Week of Feb 2021	

**Members may update.**

**Item No. C.7: Multiple outages of Isolators& Circuit Breakers at Ramchanderpur S/S (JUSNL)—ERLDC.**

In the 172<sup>nd</sup> OCC Meeting, JUSNL informed that work related to main bus-2 and transformer breaker of 220KV system is pending and work of 132KV line has been completed. By end of Nov 2020, they would be able to complete the work related to 220KV system.

OCC advised JUSNL to complete the work at the earliest.

*In the 173<sup>rd</sup> OCC Meeting, JUSNL informed that they would complete the work related to 220KV system by the end of December 2020.*

*OCC advised JUSNL to complete the work at the earliest.*

**JUSNL may update.**

**Item No. C.8: Operationalizing Bus splitting at Bihar Shariff—ERLDC.**

In the 172<sup>nd</sup> OCC Meeting, OCC advised Bihar to share the plan for load trimming scheme with ERLDC at the earliest.

OCC decided to put the Bihar Shariff bus splitting scheme in service on 12<sup>th</sup> Nov 2020.

*In the 173<sup>rd</sup> OCC Meeting, ERLDC informed that bus splitting scheme was put in operation on 18<sup>th</sup> November 2020 and the bus coupler was closed on 19<sup>th</sup> November 2020.*

*Bihar informed that uneven power flow through the ICTs was observed and they are in process of implementation of load trimming scheme.*

*OCC advised Bihar to send their queries, if any to ERPC and ERLDC within a week. OCC also advised Bihar to implement the load trimming scheme to avoid unwanted tripping of the transformers on overload.*

Thereafter, BSPTCL submitted the following Load trimming Scheme based on internal discussion:

(A) By using a Bay Control Unit(BCU) to make logical tripping command by using Digital Input and Digital Output. This will be more technical and sophisticated way of implementation.

(B) By extending the tripping command to 220 KV Double Circuit Bihar Shariff-Fathua transmission line along with tripping of 500 MVA TRF-04 at Bihar Shariff (PG). Fathua will avail power from Patna(PG) and Gaurichak without any load restriction.

In implementation of scheme under option (A) will take significant time (At least 18 Months), as such decision has been taken to implement option (B). Apart from implementation of scheme under option (B) following 132/33 KV GSS shall be shifted on other GSS which are having power source other than Bihar Shariff GSS.

(1) Hathidah GSS shall be shifted on Lakhisarai GSS.

(2) Wazirganj GSS shall be shifted on Khizirsarai GSS

**Based on the inputs some queries were raised by ERLDC which are provided below for discussion:**

1. BCU based SPS logic implementation may need more explanation. In general, multiple element input and status based SPS require PLC based SPS scheme as implemented in most of the schemes.
2. Present option B proposes 500 MVA ICT 4 tripping based SPS rather than 315 MVA ICT 2 (ICT which can overload in certain loading condition) which is the prime objective. The SPS logic of overloading of ICT 2 above 315 MVA would be more apt as it will consider the criteria and will also avoid any unnecessary tripping of 220 kV Bihar Shariff -Fathua D/C with 500 MVA ICT 4 tripping when its outage is not causing any overload on ICT 2 as per demand scenario. BSPTCL is advised to review the scheme.
3. Bihar SLDC may share the impact of the 132 kV load shifting and their sensitivity on the ICT loading after split bus condition to ensure their impact.
4. Whether the issue of simultaneous 400/220 kV ICT 1 and 3 tripping on 400 kV line faults observed in the past due to wiring /old relay issue has been resolved by BSPTCL?
5. Any plan by STU for controlling 220 kV Fault level Bihar Shariff also need to be submitted.

**BSPTCL may respond**

**Item No. C.9: ER Grid performance during November 2020.**

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

Average Consumption (Mu)	Maximum Consumption(mu)/ Date	Maximum Demand (MW)	Minimum Demand (MW)	Schedule Export (Mu)	Actual Export (Mu)
		Date/Time	Date/Time		
355.5	410MU 02-11-2020	20848 MW 01-11-2020 19:00	11374 MW 23-11-2020 03:26	3497.3	3214

**ERLDC may present Performance of Eastern Regional Grid.**

**Item No. C.10: PSS tuning of Generators in Eastern Region. –ERLDC.**

The PSS tuning activity is mandatory in line with IEGC and CEA regulations. The Procedure of PSS tuning for helping utilities in getting this activity carried out has been approved in 171<sup>st</sup> OCC Meeting and shared with all concerned utilities. List of units where PSS tuning activities is pending is given at **Annexure C10**.

**Members may update.**

**Item No. C.11: Performance primary frequency response of generating stations in Eastern Region for the event in the month of November 2020. –ERLDC.**

Frequency response characteristics (FRC) have been analyzed pan India for one event of sudden frequency change that occurred in November 2020. The details of this event and the overall response of the Eastern region have been summarized in following table.

Event	Frequency Change	ER FRC
<b>Event 1: On 29<sup>th</sup> November 2020 at 13:16:30 hrs., around 1614 MW generation loss occurred in NR.</b>	<b>50.016 Hz to 49.927 Hz.</b> Later stabilized at 50.001 Hz followed by another dip of 0.05 Hz in frequency.	<b>16 %</b>

Generation end data (generation output in MW and frequency/speed measured at generator end) and FRCs are yet to be received from few regional generating stations (ISGS and IPP) and SLDCs respectively. List of such regional generating stations/SLDCs are shown below (as per status on 12<sup>th</sup> December 2020).

- NTPC Kahalgaon
- NTPC Talcher
- NTPC Barh
- NTPC Darlipalli
- BRBCL
- JITPL
- Bihar SLDC
- Jharkhand SLDC
- WB SLDC

**Members may explain.**

## **PART D: OPERATIONAL PLANNING**

### **Item No. D.1: Anticipated power supply position during January 2021.**

The abstract of peak demand (MW) vis-à-vis availability and energy requirement vis-à-vis availability (MU) for the month of January 2021 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**.

*In the 173<sup>rd</sup> OCC Meeting, OCC advised all the state utilities to submit the load and generation details of CPPs in their control area to ERPC and ERLDC within a week.*

**Members may update.**

### **Item No. D.2: Major Generating Units/Transmission Element outages/shutdown in ER Grid (as on 13.12.2020).**

SL. No	Station	State	Agency	Unit No	Capacity (MW)	Reason(s)	Outage Date
1	NABINAGAR(BRBCL)	BIHAR	NTPC	3	250	Annual overhauling	23-Nov-2020
2	DSTPS	DVC	DVC	2	500	ANNUAL OVERHAULING	14-Nov-2020
3	KOLAGHAT	WEST BENGAL	WBPDC	1	210	POLLUTION PROBLEM	10-May-2018
4	KOLAGHAT	WEST BENGAL	WBPDC	2	210	ESP FIELD MAINTENANCE	26-Dec-2019
5	MEJIA TPS	DVC	DVC	4	210	CAPITAL OVERHAULING	19-Nov-2020
6	FSTPP	WEST BENGAL	NTPC	2	200	GENERATOR ELECTRICAL PROTECTION	14-Sep-2020
7	JITPL	ODISHA	JITPL	2	600	GENERATOR ELECTRICAL PROTECTION	25-Sep-2020
8	KHSTPP	BIHAR	NTPC	3	210	Ash dyke problem	07-Dec-2020
9	KHSTPP	BIHAR	NTPC	4	210	Ash dyke problem	07-Nov-2020
10	KHSTPP	BIHAR	NTPC	5	500	Ash dyke problem	07-Nov-2020
11	BANDEL TPS	WEST BENGAL	WBPDC	5	210	ANNUAL OVERHAULING	10-Dec-2020
12	BARAUNI TPS	BIHAR	BSPHCL	6	110	ROTOR FAULT	09-Nov-2020
13	BUDGE-BUDGE	WEST BENGAL	CESC	3	250	ANNUAL SURVEYING	07-Dec-2020
14	SAGARDIGHI	WEST BENGAL	WBPDC	2	300	AUXILLARY SUPPLY FAILED	18-Mar-2020

All Generating stations are requested to update expected restoration time and outage reason to ERLDC/ERPC on weekly basis in case of any change at their end.

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

## **Major Generating stations Out on Reserve Shutdown due to low system demand**

SL. No	Station	State	Agency	Unit No	Capacity MW	Reason(s)	Outage Date
1	FSTPP	WEST BENGAL	NTPC	1	200	RSD	12-Dec-2020
2	BARAUNI TPS	BIHAR	BSPHCL	7	110	RSD/ LOW SYSTEM DEMAND	28-May-2020
3	BARAUNI TPS	BIHAR	BSPHCL	8	250	RSD/LOW SYSTEM DEMAND	28-Oct-2020
4	DPL	WEST BENGAL	WBDCL	7	300	RSD/LOW SYSTEM DEMAND	27-Nov-2020
5	KOLAGHAT	WEST BENGAL	WBDCL	3	210	RSD/LOW SYSTEM DEMAND	13-Jun-2020
6	KOLAGHAT	WEST BENGAL	WBDCL	4	210	RSD/ LOW SYSTEM DEMAND	15-Jul-2020
7	KOLAGHAT	WEST BENGAL	WBDCL	6	210	RSD/LOW SYSTEM DEMAND	16-Jan-2020
8	MUZAFFARPUR TPS	BIHAR	BSPHCL	1	110	INITIALLY BTL LATER OUT DUE TO RSD/ LOW SYSTEM DEMAND	10-Aug-2020
9	MUZAFFARPUR TPS	BIHAR	BSPHCL	2	110	INITIALLY BTL LATER OUT DUE TO RSD/ LOW SYSTEM DEMAND	15-Aug-2020

## **Hydro Unit Outage report:**

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

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.

## **Line Long Outage Report:**

SL NO	Transmission Element / ICT	Agency	Outage DATE	Reasons for Outage
1	400 KV IBEUL JHARSUGUDA D/C	IBEUL	29-04-2018	TOWER COLLAPSE AT LOC 44,45
2	220/132 KV 100 MVA ICT I AT LALMATIA	FSTPP/JU SNL	22-01-2019	Failure of HV side breaker
3	400KV/220KV 315 MVA ICT-1 AT INDRAVATI	OPTCL	20-02-2020	REPLACEMENT OF SF-6 CB



4	220 KV PANDIABILI - SAMANGARA D/C	OPTCL	03-05-2019	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.presently charged from Pandiabili end (loc 156) to loc 58
5	400 KV MOTIHARI(DMTCL)-GORAKHPUR-I	POWERGR ID/DMTCL	13-08-2019	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 MOTIHARI(DMTCL)-GORAKHPUR-II	POWERGR ID/DMTCL	13-08-2019	Earlier reconfigured Barh - Gorokpur # II again LILOED back at Motihari and the portion beyond Motihari shall be termed as 400 KV MOTIHARI(DMTCL)-GORAKHPUR-II
7	400 KV BARH- MOTIHARI(DMTCL) -I	POWERGR ID/DMTCL	04-09-2019	TOWER COLLAPSE AT LOCATION 26/0 AND 25/5. 400KV BARH -GORAKHPUR 2 CHARGED AT 10:06 HRS ON 31.01.20 AS INTERIM ARRANGEMENT BYPASSING LILO PORTION OF MOTIHARI.  400KV BARH -GORAKHPUR 1 CHARGED AT 18:57 HRS ON 05.02.20 AS INTERIM ARRANGEMENT BYPASSING LILO PORTION OF MOTIHARI.
8	220/132 KV 100 MVA ICT 3 at Chandil	JUSNL	30-04-2020	ICT BURST AND DAMAGED AFTER FIRE REPORTED
9	132 KV NEW KISHANGANJ - BARSOI S/C	BSPTCL	02-07-2020	Out due to heavy soil erosion atloc no 140 and 141 by river Kankai. line charged as 132 KV Purnea (PG) - Barsoiw.e.f 21.07.20 at 19:05 Hrs temporarily by suitable jumper arrngement at the crossing point of 132 kV Kisanganj(New) - Barsoi and 132 kV Purnea(PG) - Kisanganj (old).
10	132KV-PURNEA (PG)-KISHANGANJ(OLD) S/C	BSPTCL	02-07-2020	
11	220kV Barauni-Hajipur Ckt-1	BSPTCL	28-09-2019	Tower collapse at location 38 & 39. Ckt-2 is on ERS since 13.01.2020.
12	400KV-NEW PURNEA-GOKARNA	PGCIL	04-09-2020	To attend and avoid tower collapse situation due to continuous erosion due to flood in the river Ganga at tower loc no 1103
13	400KV-NEW PURNEA-FSTPP	PGCIL	04-09-2020	
14	400KV-BINAGURI-RANGPO-1	PGCIL	01-11-2020	Re-conductoring work from twin moose to HTLS.
15	400KV-BINAGURI-RANGPO-2	PGCIL	01-11-2020	
16	400KV-BINAGURI-TALA-1	PGCIL/BH UTAN	18-11-2020	Line initially switched off for Overvoltage mitigation, later taken shutdown on 23.11.20 11:01Hrs.

Transmission licensees/ Utilities are requested to update expected restoration date & work progress regarding restoration regularly to ERLDC/ERPC on monthly basis by 5<sup>th</sup> of each month so that status of restoration can be reviewed in OCC. Utilities are also requested to update outage of any elements within their substation premises like isolator/breaker to ERLDC/ERPC regularly.  
(Reported as per Clause 5.2(e) of IEGC)

**Members may update.**

**Item No. D.3 Commissioning of new units and transmission elements in Eastern Grid in the month of November 2020.**

The details of new units/transmission elements commissioned in the month of November-2020 based on the inputs received from beneficiaries:

SL NO	Element Name	Owner	Charging Date	Charging Time	Remarks
1	400kV Muzafarpur-Dhalkebar-I	CBTP	11-11-2020	22:44	Upgradation from 220kV to 400kV
2	400kV Muzafarpur-Dhalkebar-II	CBTP	11-11-2020	20:15	

**Members may update.**

**Item No. D.4 UFR operation during the month of November 2020.**

Frequency profile for the month is as follows:

Month	Max	Min	% Less IEGC Band	% Within IEGC Band	% More IEGC Band
	(Date/Time)	(Date/Time)			
November, 2020	50.27, 16-11-2020 04:30	49.68 05-11-2020 17:20	4.46	79.81	50.72

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

**Members may update.**

\*\*\*\*\*

# Annexure B1

## **Observations of POSOCO on Queries raised by Odisha SLDC on HVDC Talcher – Kolar SPS**

### **Review in 173<sup>rd</sup> ERPC (OCC) Meeting**

- In the 173<sup>rd</sup> ERPC (OCC) meeting held 24<sup>th</sup> Nov 2020, the existing SPS for HVDC Talcher – Kolar was reviewed and proposed modifications by NLDC/ERLDC were deliberated.
- During the review, the issue of overloading of 400/220 kV Meramundali ICT (2X 315 MVA) under certain scenarios was highlighted by Odisha SLDC and it was requested to share the simulation based study for proposed SPS with ERPC and Odisha SLDC.
- In this regard, it is to inform that the simulation study for proposed SPS has been carried out for high demand and low generation scenario for Odisha and loading of 400/220 kV Meramundali ICTs have been found to be within limits. In addition to this, worst case scenario for Odisha internal network has also been studied and results for both the scenarios are given below.
- **Case-I: SPS Case**

#### **Study Assumptions and Results**

- Odisha Demand in study case – 5134 MW
- Odisha Generation in study case - 3470 MW
- Talcher Generation – 2x480 + 4x480 MW
- TTPS – 415 MW
- JSPL – 82 MW, OPGC (STU) – 425 MW, Sterlite – 415 MW, GMR (connected with Odisha network) – 0 MW

S. No.	HVDC Talcher - Kolar Power Order	400 kV Talcher - Meramundali (short line)	400 kV Talcher - Meramundali (long line)	400 kV Talcher - Meramundali under N-1 of other (long) line	400/220 kV Meramundali ICT (2x315MVA) loading	220 kV TSTPP - Meramundali D/C	400/220 kV Meramundali ICT (2x315MVA) loading under outage of 220 kV TSTPP - Meramundali D/C	400/220 kV Meramundali ICT (2x315MVA) loading under outage of TTPS (2x110 MW + 4x60 MW) generation
1.	2000	459	237	597	2X38	2x79	2x58	2x96
2.	1000	688	356	895	2x32	2x96	2x57	2x90
3.	500	802	415	1044	2x29	2x104	2x56.5	2x87
4.	250	859	445	1118	2x28	2x108	2x56.2	2x85.5
5.	X	916	474	1193	2x26	2x112	2x56	2x84

- **Case-II: Worst Case Scenario for Odisha internal network**

**Study Assumptions and Results**

- Odisha Demand in study case – 5134 MW
- Odisha Generation in study case - 4465 MW
- Talcher Generation – 2x480 + 4x480 MW
- TTPS – 0 MW
- JSPL – 800 MW, OPGC (STU) – 630 MW, Sterlite – 570 MW, GMR (connected with Odisha network) – 330 MW

S. No.	HVDC Talcher - Kolar Power Order	400 kV Talcher - Meramundali (short line)	400 kV Talcher - Meramundali (long line)	400 kV Talcher - Meramundali under N-1 of other (long) line	400/220 kV Meramundali ICT (2x315MVA) loading	220 kV TSTPP - Meramundali D/C	400/220 kV Meramundali ICT (2x315MVA) loading under N-1 of other ICT	400/220 kV Meramundali ICT (2x315MVA) loading under outage of 220 kV TSTPP - Meramundali D/C
1.	2000	218	113	284	2x145	2x90	187	2x168
2.	1000	447	231	581	2x139	2x105	180	2x167
3.	500	562	291	730	2x136.5	2x113	176	2x166
4.	250	619	320	805	2x135	2x117	174	2x166
5.	X	676	350	<b>879</b>	2x134	2x122	172	2x165

- From the study results of both the scenarios, it is evident that loading of 400/220 kV ICTs at Meramundali and other internal network in Odisha is within limits under normal as well as contingency scenarios. Further, additional load of 100 MW at Duburi and Bhanjnagar was also considered in Case:2 and loading were still observed to be within limits.
- Following are some major observations on network loading based on study results:-
  - Sensitivity of HVDC Talcher – Kolar on loading of 400/220 kV Meramundali ICTs – **0.5-0.6% on each ICT**
  - Sensitivity of HVDC Talcher – Kolar on loading of 220 kV TSTPP -Meramundali D/C – (-) **1.6% on each ckt**
  - Sensitivity of one ckt 220 kV TSTPP –Meramundali line on other ckt – **27%**
  - Sensitivity of generation in the vicinity on loading of 400/220 kV Meramundali ICTs (% sensitivity on each ICT)
    - GMR – 4.5%
    - JSPL - 4.5%
    - OPGC – 0.5%
    - Sterlite – 0.6%
    - TTPS (2x110MW) – (-) 15%

- It is to mention that the tripping or reduction in power order of HVDC Talcher – Kolar actually relieves the loading of 400/220 kV Meramundali ICTs. Also, there is very less sensitivity of HVDC on 220 kV TSTPP -Meramundali D/C as well as other internal elements in Odisha network. Further, the loading of ICTs is also highly sensitive to some of the generation in the vicinity.
- It is pertinent to mention that, if the loading of any element in Odisha internal network is already on the higher side then also very minor change would occur on Odisha state control area internal elements due to tripping of HVDC Talcher-Kolar. Therefore, Talcher-Kolar tripping would have impact on 400 kV Talcher - Meramundli line first and very minor impact on 400/220 kV transformers at Meramundli and thus 220 kV system of Odisha. Thus, the proposed SPS modification would suffice for.

पावर सिस्टम ऑपरेशन कॉर्पोरेशन लिमिटेड

(भारत सरकार का उद्यम)

**POWER SYSTEM OPERATION CORPORATION LIMITED**

(A Govt. of India Enterprise)



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 CIN : U40105DL2009GOI188682, Website : www.posoco.in, E-mail : posococc@posoco.in, Tel.: 011- 40234672

संदर्भ: POSOCO/NLDC/SO/SPS/12/ 54

दिनांक: 09<sup>th</sup> Dec 2020

सेवा में,

Member Secretary	Member Secretary	Member Secretary
Southern Regional Power Committee, Central Electricity Authority, No. 29 Race Course Cross Road Bangalore-560 009	Eastern Regional Power Committee 14, Golf Club Road Tollygunje Kolkata-700033	Western Regional Power Committee F-3, MIDC Area, Marol, Central Road, Mumbai - 400 093

**विषय: Review of System Protection Scheme(SPS) designed for NEW-SR interconnection**

महोदय,

The existing Special Protection Scheme (SPS) on NEW-SR corridor [namely for 765kV Solapur-Raichur lines] were implemented after the synchronization of SR grid with NEW grid in the year 2014. Over the years, SR grid has been integrated with NEW grid through the many inter-regional lines apart from 765 kV Solapur-Raichur, which are given below:

- 765kV Angul-Srikakulam D/c
- 765kV Wardha-Nizamabad D/C
- 765kV Kolhapur-Kudgi D/c (presently charged at 400kV level)
- HVDC Raigarh-Pugalur Pole-1


The newly commissioned HVDC Raigarh-Pugalur Bipole is very soon expected to be in operation which would further strengthen the network connecting Southern Region with other regions. With the commission of above transmission lines, TTC/ATC towards SR has also been increased gradually. The last revision in this SPS settings was carried out after assessment during Dec 2017. There are four conditions and actions under this SPS scheme which are still in service and the list of existing SPS schemes is enclosed as Annexe-1.

The existing SPS schemes for NEW-SR interconnection have been reviewed and the summary of observations alongwith load flow study is enclosed as Annexe-2. Based on these studies, it could be seen that these SPS schemes can be dispensed with and suggestions from NLDC and RLDCs are enclosed at Annexe-2.

It is requested that suggestions from NLDC/RLDCs regarding the System Protection Schemes may please be deliberated and agreed by the appropriate Regional Power Committees (RPCs) expeditiously and be implemented at the earliest accordingly.

सधन्यवाद,

भवदीय

  
(देबाशिस दे) 09/12/2020

कार्यपालक-निदेशक-रा०भा०प्रे०के०

प्रतिलिपि सूचनार्थः

1. Member (Power Systems), CEA, New Delhi
2. Chief Engineer (NPC), CEA, New Delhi
3. COO-CTU, POWERGRID, Gurugram
4. Executive Director, WRLDC/SRLDC/ERLDC



**Annexe-I**  
**System Protection Schemes (SPS) on NEW-SR corridor**

1)

Item	Information
Reporting Party	NLDC, POSOCO
Scheme's Name	SPS for tripping of 765 kV Wardha-Nizamabad D/C
Classification	SPS Related to overloading / loss of Critical Line/Corridor
Reference No.	SPS-1A & SPS-1B
Operating Procedure	Not specified
Design Objectives	To Relieve impact of tripping of 765 kV Wardha-Nizamabad D/C on 765 kV Solapur – Raichur D/C and 765/400 kV, 2x1500 MVA ICTs at Vemagiri.
Operation	Load Shedding in SR
Modelling	<p><u>SPS-1A (3000 MW):</u> If total flow on 2*765kV Solapur-Raichur S/C lines crosses a pre-set value of 3000 MW in Solapur to Raichur direction and remains above 3000 MW for 5 seconds, then</p> <ol style="list-style-type: none"> <li>RS2 load shall be shed immediately</li> <li>After RS2 load shedding, if the flow remains above 3000 MW for 2.5 sec, RS3 load shall be shed.</li> </ol> <p><u>SPS-1B (3500 MW):</u> If total flow on 2*765kV Solapur-Raichur S/C lines crosses a pre-set value of 3500 MW in Solapur to Raichur direction and remains above 3500 MW for 2.5 seconds, then</p> <ol style="list-style-type: none"> <li>RS1, RS2 &amp; RS3 load shall be shed immediately</li> </ol>
Original In-Service Year	2014
Recent Assessment Group	NLDC, POSOCO
Recent Assessment Dates	March 2016, Dec 2017

2)

Item	Information
Reporting Party	NLDC, POSOCO
Scheme's Name	SPS for tripping of 765 kV Raichur-Solapur D/C
Classification	SPS Related to overloading / loss of Critical Line/Corridor
Reference No.	SPS-3
Operating Procedure	Not specified
Design Objectives	To Relieve impact of tripping of 765 kV Raichur-Solapur D/C on 765/400 kV 2x1500 MVA ICTs at Vemagiri and 765 kV Wardha-Nizamabad D/C.
Operation	Load Shedding in SR
Modelling	<p><u>SPS-3:</u></p> <p>If there happens a loss of 765 kV Solapur – Raichur D/C lines carrying more than 1500 MW towards SR, then</p> <ol style="list-style-type: none"> <li>Reduction of import of SR by immediately shedding loads in Groups RS1, RS2 and RS3.</li> </ol>
Original In-Service Year	2014
Recent Assessment Group	NLDC, POSOCO
Recent Assessment Dates	March 2016, Dec 2017

3)

Item	Information
Reporting Party	NLDC, POSOCO
Scheme's Name	SPS for tripping of 765 kV Aurangabad – Solapur D/C lines
Classification	SPS Related to loss of Critical Line/Corridor
Reference No.	SPS-8
Operating Procedure	Not Specified
Design Objectives	To Relieve impact of tripping of 765 kV Aurangabad – Solapur D/C (When flow exceeds 2000 MW on these lines) on 765/400 kV 2x1500 MVA ICTs at Vemagiri and to improve voltage profile near 400 kV Parli(PG), 400 kV Pune(PG), 765 kV Pune(PG) and 765 kV Solapur.
Operation	Load Shedding in SR
Modeling	<p>If there is loss of 765 kV Aurangabad-Solapur D/C lines and loss of import at Sholapur is greater than 2000 MW, then</p> <p>i. Reduction of import of SR by immediately shedding loads in Groups RS1, RS2 and RS3.</p>
Original In-Service Year	2016
Recent Assessment Group	NLDC, POSOCO
Recent Assessment Dates	March 2016, Dec 2017

**Load Grouping for System Protection Schemes for Raichur-Sholapur SPS#1  
(RS-1)/ 765kV Aurangabad-Solapur lines**

Sl No.	Tamilnadu		Telangana		Group Total
	Load	Planned Load (MW)	Load	Planned Load (MW)	
1	230kV Madurai ----- 230kV Chekannoorani ----- 230kV Nallamanaikanpatty #NN Patty TR 230kV Aunuppankulam # Rajapalayam & Thullukapatty TR	23	400kV Ramagundam SS		
2	230kV Tirchy --- 110kV Kallakudi #Perambalur TR 230kV Echangadu #Pennadam TR	31	220kV Ramagundam #220kV Vemannur #220kV Jagityal	165	
3	230kV Tiruvarur ----- 230kV NT Kudi #Thanjavur TR 230kV Karaikudi # Devakottai TR 230kV Pudukottai #Atahnkotai TR	82	220kV Durshed #220kV Siddipet1&2 # 132kV Ellanthakunta # 132kV Shanigram	150	
			220kV Bheemgal #220/132kV Bheemgal TR	44	
TOTAL		136		359	495

**Load Grouping for System Protection Schemes for Raichur-Sholapur SPS (RS-3)/ 765kV  
Aurangabad-Solapur lines**

Sl No.	Tamilnadu		Karnataka		Telangana		Group Total
	Load	Planned Load (MW)	Load	Planned Load (MW)	Load	Planned Load (MW)	
1	400kV K R Thoppur [Salem] (PGCIL)-- 400kV K R Thoppur [Salem] (TNEB)		400kV Nelamangala SS		400kV Gajwel SS		
	230 kV Salem #Sakagiri, Rasipuram & GC TR	113	220kV H.N.Pura #66kV C.R.Patna # 66kV Mysore-1&2	37	220kV Medchal # 132kV Manoharabad #132kV Tuniki Bollaram # 132kV Tukkapur # 132kV Chegunta	159	
	230kv Ujanani #Paruhipally TR	2	220kV T.K.Halli # 66kV Akkurmole	25	220kV Kamareddy #Kamareddy TR 1&2 132kv Redypet 132kV Domakonda # 132kV Kamareddy 1&2	73	
	230kV Pudhansandai # Link, K.N.Patty, Namakkal, Namagiripet & Valayapatty TR	117	220kV C.R. Nagar #66kV Honalli	12			
	230kV Deviakuruchi #Vilupuram, Thalaivasal & Thampatty TR	72	220kV Kadakola # 66kV D.K.Maidan # 66kV R.K.Nagar	23			
TOTAL		304		97		232	633

### Load Grouping for System Protection Schemes for Raichur-Sholapur SPS (RS-2)

Sl No.	Karnataka		Tamilnadu		Telangana		Kerala		Group Total
			Load	Planned Load (MW)	Load	Planned Load (MW)	Load	Planned Load (MW)	
1	400kV Nelamangala SS		230kV Arasur SS #110kV Karuvalur #110kV Karamadai fdr2	115	400kV Velloor SS (Mehboobnagar) 220kV Waddakothapally		400kV Madakathara SS # 220kV Orkaterry	64	
2	220kV CR Patna 66kV Mattanavile # 66kV S.Belagola	# 40	230kV Arasur SS 230kV Gobi #Anthiyur TR	38	220kV Bhootpur # 132kV Puttapahad-1&2 # 132kV Khilaghanpur # 132kV Kothakota	54			
3	220kV Hootagalli # 66kV Bogadhi # 66kV Elwala	31	230kV Arasur SS 230kV Gobi 230kV Pallakkapalayam #Thevur & Sankagiri TR	45	220kV Wanaparthy # 220/132kV TR	127			
4	220kV Tubinakere #66kV Ukkada	10	230kV Arasur SS 230kV Thudiyalur SS #GC & Karamadai TR	65					
5	220kV K.R.Pet # 66kV Madeshpura	20							
	<b>TOTAL</b>	<b>101</b>		<b>263</b>		<b>181</b>			<b>545</b>

## **Annexe-II**

### **Observations of NLDC/RLDCs on existing SPS schemes for NEW-SR interconnection**

1. The existing SPS schemes for NEW-SR interconnection after last review during Dec 2017 are given below:

#### **Present SPS settings**

SPS-1A (3000 MW)	<ol style="list-style-type: none"><li>i. If total flow on 2*765kV Solapur-Raichur S/C lines crosses a pre-set value of 3000 MW in Solapur to Raichur direction and remains above 3000 MW for 5 seconds, then<ul style="list-style-type: none"><li>o RS2 load shall be shed immediately</li></ul></li><li>ii. After RS2 load shedding, if the flow remains above 3000 MW for 2.5 sec,<ul style="list-style-type: none"><li>o RS3 load shall be shed.</li></ul></li></ol>
SPS-1B (3500 MW)	<ol style="list-style-type: none"><li>ii. If total flow on 2*765kV Solapur-Raichur S/C lines crosses a pre-set value of 3500 MW in Solapur to Raichur direction and remains above 3500 MW for 2.5 seconds, then<ul style="list-style-type: none"><li>o RS1, RS2 &amp; RS3 load shall be shed immediately</li></ul></li></ol>
SPS-3	<p>If there happens a loss of 765 kV Solapur – Raichur D/C lines carrying more than 1500 MW towards SR, then</p> <ul style="list-style-type: none"><li>o Reduction of import of SR by immediately shedding loads in Groups RS1, RS2 and RS3.</li></ul>
SPS-8	<p>If there is loss of 765 kV Aurangabad-Solapur D/C lines and loss of import at Sholapur is greater than 2000 MW, then</p> <ul style="list-style-type: none"><li>o Reduction of import of SR by immediately shedding loads in Groups RS1, RS2 and RS3.</li></ul>

2. The simulation-based study has been carried out for review of SPS and results are enclosed as Annexe-2A
3. The SPS-1A and SPS-1B which is based on the power flow of 765 kV Solapur-Raichur-1 & 2 crossing certain value is analysed with the help of simulation-based studies considering SR import of 13900 MW. The design objective of the scheme was to avoid overloading of 765 kV Solapur-Raichur-1 & 2 and 765/400 kV Vemagiri ICTs after tripping of 765 kV Wardha-Nizamabad-D/c. It is observed that after tripping of 765 kV Wardha-Nizamabad-D/c, the flow of 765 kV Solapur-Raichur-1 & 2 reaches to 2150 MW each circuit and thus remains below the Surge Impedance Loading value of 2194 MW each circuit. The constraint of 765/400 kV Vemagiri ICTs has been relieved after commissioning of 765 kV Vemagiri-C'peta-D/c lines.

4. The SPS-3 which is based on the condition of tripping of carrying more than 1500 MW flow is studied with the help of simulation-based studies considering SR import of 13900 MW. The design objective of the scheme was to avoid overloading of 765 kV Solapur-Raichur-1 & 2 and 765/400 kV Vemagiri ICTs after tripping of 765 kV Wardha-Nizamabad-D/c. It is observed that after tripping of 765 kV Wardha-Nizamabad-D/c, the power flow on 765 kV Solapur-Raichur-1 & 2 reaches to around 2200 MW which is below the limit of 2750 MW considered for 765 kV lines.
5. The SPS-8 which is based on the condition of tripping of 765 kV Aurangabad-Solapur-D/c (with loss of import of 2000 MW at Solapur). The design objective of this SPS was to relieve impact of tripping of 765 kV Aurangabad-Solapur D/C (When flow exceeds 2000 MW on these lines) on 765/400 kV 2x1500 MVA ICTs at Vemagiri and to improve voltage profile near 400 kV Parli(PG), 400 kV Pune(PG), 765 kV Pune(PG) and 765 kV Solapur. It is pertinent to mention that after commissioning of 765 kV Warora-Parli-Solapur-D/c, the impact of tripping of 765 kV Aurangabad-Solapur D/C has reduced. The voltage profile of 400 kV stations have also improved and the low voltage at these stations is also unlikely after tripping of 765 kV Aurangabad-Solapur D/C.
6. The 765 kV Angul-Srikakulam-D/c is carrying 1583 MW each circuit in the limiting case with 13900 MW of import in SR. The line length is 276 kM and under high loading the angular separation between two buses may reach more than 25 degrees. Under N-1 scenario of tripping of one circuit of 765 kV Angul-Srikakulam-D/c, it is observed that loading on other circuit reaches 2606 MW. In case the double circuit line trips ( a highly probable contingency since line crosses through the terrain near to Eastern Coast of India bordering Bay of Bengal which is prone to tropical cyclones with high speeds), the Standing Phase Angle ( SPA) between Angul and Srikakulam station would become high. The high SPA would cause the delay in restoration and many a times would make it impossible for the smooth synchronisation of line. Therefore an Standard Operating Procedure need to be developed to tackle the issue and to minimise the possible delays in restoration.
7. Therefore, SPS 1A, 1B, 3 and 8 could be dispensed with and Standard Operating Procedure (SoP) need to be prepared for controlling Standing Phase Angle (SPA) for the contingency of 765 kV Angul- Srikakulam D/C outage.
8. The SoP mentioned at S.No. 7 may be drafted by considering following points:



- i. The power order on inter-regional HVDC between East to South as well as West-South maximised towards Southern Region
- ii. In Eastern Region, the generation reduction near Angul station may be considered, the reduction of hydro generation in Odisha may also help.
- iii. In Southern Region, generation increase in nearby areas of Srikakulam may be carried out. The hydro generation in Southern Region can be maximised to contain the import of Southern Region.

## Annexe-2A

- **Simulation Results:** Studies were carried out on SR import case of 13900 MW. The results are tabulated below:

i. **Study Results for Review of SPS 1A,1B and SPS-3**

S. No.	Name of the transmission lines	Base-case	Case-1: Basecase+Tripping of 765kV Wardha- Nizamabad-1	Case-2: Basecase+Tripping of 765kV Wardha- Nizamabad-D/C	Case-3: Basecase+765kV Angul-Srikakulam- 1	Case-4: Basecase+Tripping of 765kV Angul- Srikakulam-D/C
1	765kV Wardha-Nizamabad-1	1645	0	0	1765	2303
2	765kV Wardha-Nizamabad-2	1645	2556	0	1765	2303
3	765kV Sholapur-Raichur-1	1145	1357	2105	1284	1939
4	765kV Sholapur-Raichur-2	1145	1357	2105	1284	1939
5	400kV Kolhapur-Kudgi-1	12	29	175	15	143
6	400kV Kolhapur-Kudgi-2	12	29	175	15	143
7	765kV Angul-Srikakulam-1	1583	1710	2143	0	0
8	765kV Angul-Srikakulam-2	1583	1710	2143	2606	0
9	Talcher-kolar HVDC	2000	2000	2000	2000	2000
10	Raigarh-Pugalur HVDC	1500	1500	1500	1500	1500
11	Gazuwaka HVDC	650	650	650	650	650
12	Bhadrawati HVDC	1000	1000	1000	1000	1000
13	765/400kV Nizamabad ICT-1	909	725	103	973	1264
14	765/400kV Nizamabad ICT-2	909	725	103	973	1264
15	765/400kV RAICHR ICT-1	486	565	841	519	676
16	765/400kV RAICHR ICT-2	486	565	841	519	676

S. No.	Name of the transmission lines	Case-5: Basecase+Tripping of Talcher-Kolar Bipole	Case-6: Basecase+765kV Raichur-Sholapur-1	Case-7: Basecase+Tripping of Raichur-Sholapur-D/C	Case-8: Basecase+Tripping of 765/400kV Nizamabad ICT-1
1	765kV Wardha-Nizamabad-1	1881	1756	2198	1577
2	765kV Wardha-Nizamabad-2	1881	1756	2198	1577
3	765kV Sholapur-Raichur-1	1534	0	0	1183
4	765kV Sholapur-Raichur-2	1534	1831	0	1183
5	400kV Kolhapur-Kudgi-1	104	41	255	-4
6	400kV Kolhapur-Kudgi-2	104	41	255	-4
7	765kV Angul-Srikakulam-1	1846	1658	1958	1609
8	765kV Angul-Srikakulam-2	1846	1658	1958	1609
9	Talcher-kolar HVDC	0	2000	2000	2000
10	Raigarh-Pugalur HVDC	1500	1500	1500	1500
11	Gazuwaka HVDC	650	650	650	650
12	Bhadrawati HVDC	1000	1000	1000	1000
13	765/400kV Nizamabad ICT-1	1020	960	1164	0
14	765/400kV Nizamabad ICT-2	1020	960	1164	1500
15	765/400kV RAICHR ICT-1	652	400	59	497
16	765/400kV RAICHR ICT-2	652	400	59	497

- ii. **Study for Review of SPS-8** : If there is loss of 765 kV Aurangabad-Solapur D/C lines and loss of import at Sholapur is greater than 2000 MW

The possibility of 2000 MW on 765 kV Aurangabad-Pune or 765 kV Aurangabad Solapur D/C in present scenario is very rare and is possible only when some of the important elements in vicinity are under outage. In Limiting case, flow on 765 kV Aurangabad-Pune is 900 MW & 765 kV Aurangabad Solapur D/C is 786 MW only. Under this scenario, if 765 kV Aurangabad Solapur-D/C trips, power would re-route to Solapur via 765 kV Aurangabad-Pune-Solapur, 765 kV Aurangabad-Phadghe-Pune-Solapur & 765 kV Warora-Parli-Solapur-D/c section. Sensitivity of important elements are as follows:

Name of the Element	Limiting case flow	Under Outgae of 765 kV Aurangabad Solapur D/C	Sensitivity
765 kV Aurangabad Solapur D/C	393x2	0	
765 kV Aurangabad Pune	901	1067	-21%
765 kV Pune-Solapur	-303	94	-51%
765 kV Warora-New parli D/C	1417x2	1503x2	-22%
765 kV New Parli-Solapur D/C	1086x2	1227x2	-36%
765 kV Pune Phadghe	-4	-75	9%
765 kV Raichur-Solapur D/C	1111x2	1029x2	10%
765 kV Wardha-Aurangabad-1	867	786	10%
765 kV Aurangabad Phadghe	703	785	-10%
400 kV Aurangabad-Pune D/C	140x2	159x2	-5%
765 kV Pune Voltage	772.1	768	4.1
765 kV New Parli (PG) Voltage	779.2	773.9	5.3
765 kV Solapur(PG) Voltage	776.4	770.4	6
400 kV Pune Voltage	400.3	398.7	1.6
400 kV Parli (PG) Voltage	405.2	403.8	1.4
400 kV Solapur(PG) Voltage	403.8	403.5	0.3

In case of 765 kV Angul-Srikakulam D/C outage, angular difference between Angul and Srikakulam buses would reach to 56 degree instantly from 11 degree without any curtailment in TTC/ATC towards WR-SR side. If TTC/ATC of import of SR corridor is curtailed by 3700 MW to make the system further N-1 compliant, this angular difference reduces to 38-39 degree. Limiting constraint would be overloading of 765/400 kV, 1500 MVA Nizamabad ICT under outage of the other ICT.

Outage of complete 765 kV Solapur S/s does not create overloading issue instantly though any further N-1 would create overloading issue on 765 kV Wardha-Nizamabad & 765 kV Angul-Srikakulam section.

Weekly update (11<sup>th</sup> to 17<sup>th</sup> December 2020)

- **Current status of Temporary arrangement** – Power flow upto ~360 MW to North Bihar region through temporary restored Barh-Motihari line
- **Status of Permanent restoration**
  - Piling activity is in progress at loc 26/0, liner placement is done for one more pile, for pile cap steel binding and stub setting is in progress. At location 26/3 one more pile completed, and further boring work is in progress (site pics attached in slide 5-7 for loc 26/0 and 26/3 for reference). Tower erection at location 27/3 of Motihari-Gorakhpur line is completed and erection at loc 26/1 is in progress, tower erection status - 7/12 completed (site pictures attached in slide 8 for reference). Final stringing activity has commenced in one of the patches of Motihari- Gorakhpur line at Areraj side of river.
  - For providing redundancy to the Barh-Motihari line (single ckt single conductor) charged through tower 27/0, required work have been completed (for charging Motihari-Gorakhpur line through single conductor single ckt), further testing (Signature analysis) is in progress. After testing report will be shared with authorities for required approval for line charging.
  - Pandemic remains a concern in the Bihar region (Newspaper coverage in slide 4 for reference). Looking at the increasing no. of covid-19 cases across country MHA has issued guidelines for surveillance, containment and caution which is going to be in force upto 31.12.2020.
  - All efforts are being made to expedite the work progress and to complete the balance restoration/strengthening work as soon as possible

# Current status of restoration work

Tower No.	Current Status	Remarks
<b>Barh-Motihari Line</b>		
25/1 (G)	Completed	.....
25/2 (G)	Completed	.....
25/3 (G)	Completed	.....
<b>26/0 (G)</b>	Moved from river to land	2 piles completed further piling work in progress; Pile cap PCC done, bar binding in progress
26/3 (A)	All 16 piles and 4 pile cap completed	Tower erection and stringing after charging of Motihari Gorakhpur Circuit
26/4 (A)	All 4 legs completed	Same as above
<b>Motihari-Gorakhpur Line</b>		
26/1 (G)	All 16 piles, 4 Pile cap and chimney completed	Erection work in progress
26/2 (G)	Completed	.....
<b>26/3 (G)</b>	Moved from river to land; 13/17 piles completed	Two piles completed, further liner work completed for one more pile and boring work is in progress
27/0 (R)	Completed	----
27/3 (A)	All 16 piles completed; 4 Pile cap completed	Tower erection completed
27/4 (A)	Completed	----

Annexure B7.2

SHUT DOWN PROPOSAL FOR DISCUSSION IN 173 th OCC MEETING.

WE PROPOSE THE FOLLOWING SHUT DOWN OF OUR INTER-REGIONAL LINES FOR DISCUSSION AND CLEARANCE IN THE FORTHCOMING 173TH OCC MEETING TO BE HELD ON ....11.20 AT ERPC / KOLKATA.

SL. NO.	NAME OF THE ELEMENTS	FROM DATE	FROM TIME (HRS)	TO DATE	TO TIME (HRS)	REMARKS	S/D AVAILED BY	OUTAGE OF ELEMENT (Bay/ Line/ ICT/Reactor)	POWER INTERRUPTION	REASON OF OUTAGE
1	132 kV D/C PAKUR-RAJMAHAL TRANSMISSION LINE	20.12.2020	09:00	20.12.2020	17:00	ODB	ADANI POWER (JHARKHAND) LTD	LINE	YES	OVER HEAD CROSSING
2	LILO OF 400 KV D/C RAJARHAT -PURNEA TRANSMISSION LINE AT FARAKKA	25.12.2020	09:00	25.12.2020	17:00	ODB	ADANI POWER (JHARKHAND) LTD	LINE	YES	OVER HEAD CROSSING
3	400 KV D/C KAHALGAON-MAITHAN TRANSMISSION LINE	28.12.2020	09:00	28.12.2020	17:00	ODB	ADANI POWER (JHARKHAND) LTD	LINE	YES	OVER HEAD CROSSING
4	400 KV D/C RAJARHAT -PURNEA TRANSMISSION LINE	28.12.2020	09:00	29.12.2020	17:00	ODB	ADANI POWER (JHARKHAND) LTD	LINE	NO	UNDER CROSSING
5	132KV D/C LILO - JUSNL (DHARACHUK - MOTIA POWER PLANT TRANSMISSION LINE)	15.01.2021 (TENTATIVE)	09:00	15.01.2021 (TENTATIVE)	17:00	ODB	ADANI POWER (JHARKHAND) LTD	LINE	YES	OVER HEAD CROSSING
6	400kV D/C FARAKKA-BERHAMPORE TRANSMISSION LINE	10.01.2021 (TENTATIVE)	09:00	10.01.2021 (TENTATIVE)	17:00	ODB	ADANI POWER (JHARKHAND) LTD	LINE	YES	OVER HEAD CROSSING
7	400KV S/C FARAKKA-DURGAPUR CKT 1	20.01.2021 (TENTATIVE)	09:00	20.01.2021 (TENTATIVE)	17:00	ODB	ADANI POWER (JHARKHAND) LTD	LINE	YES	OVER HEAD CROSSING
8	400KV S/C FARAKKA-DURGAPUR CKT 2	20.01.2021 (TENTATIVE)	09:00	20.01.2021 (TENTATIVE)	17:00	ODB	ADANI POWER (JHARKHAND) LTD	LINE	YES	OVER HEAD CROSSING
9	400KV S/C FARAKKA - SAGARDIGHI TRANSMISSION LINE 2	28.01.2021 (TENTATIVE)	09:00	28.01.2021 (TENTATIVE)	17:00	ODB	ADANI POWER (JHARKHAND) LTD	LINE	YES	OVER HEAD CROSSING
10	400KV S/C FARAKKA - SAGARDIGHI TRANSMISSION LINE 1	01.02.2021 (TENTATIVE)	09:00	01.02.2021 (TENTATIVE)	17:00	ODB	ADANI POWER (JHARKHAND) LTD	LINE	YES	OVER HEAD CROSSING
11	132KV D/C FARAKKA-DHULIAN TRANSMISSION LINE	10.02.2021 (TENTATIVE)	09:00	10.02.2021 (TENTATIVE)	17:00	ODB	ADANI POWER (JHARKHAND) LTD	LINE	YES	OVER HEAD CROSSING

# Annexure C10

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
<b>West Bengal</b>										
Kolaghat-WBPDCL	1	Static	BHEL	No	Yes	Long Back	No	No	Yes	DAVR Order Place for repalcement after that PSS tuning
Kolaghat-WBPDCL	2	Static	BHEL	No	Yes	Long Back	No	No	Yes	DAVR Order Place for repalcement after that PSS tuning
Kolaghat-WBPDCL	3	Static	BHEL	No	Yes	Long Back	No	No	Yes	DAVR Order Place for repalcement after 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	
<b>CESC</b>										
Budge Budge-CESC	1	Static	R-R Industrial Controls Limited	Yes	Yes	2015	No	Yes	Yes	2021-22
Budge Budge-CESC	2	Static	R-R Industrial Controls Limited	Yes	Yes	2015	No	Yes	Yes	2021-22
<b>DVC</b>										
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
<b>ISGS</b>										
Kahalgaon NTPC	1	Semi-Static	ABB 6800	Yes	Yes	Dual	Yes	Yes	Yes	Submitted plot does not show damping clearly so Retuning is suggested
Kahalgaon NTPC	2	Semi-Static	ABB 6800	Yes	Yes	Dual	Yes	Yes	Yes	Submitted plot does not show damping clearly so Retuning is suggested
Kahalgaon NTPC	3	Semi-Static	ABB 6800	Yes	Yes	2016	Yes	Yes	Yes	Submitted plot does not show damping

										clearly so Retuning is suggested
Kahalgaon NTPC	4	Semi-Static	BHEL	Yes	Yes	2015	No	Yes	Yes	Submitted plot does not show damping clearly so Retuning is suggested
Kahalgaon NTPC	6	Brushless	BHEL	Yes	Yes	2009	No	Yes	Yes	Apr-20
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	
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	Submitted plot does not show damping clearly so Retuning is suggested
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	
<b>IPP</b>										
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	Dec-20
Chuzachen HEP	2	Static	P320 AVR, ALSTOM	Yes	Yes	2013	No	Yes (issue with Time scale)	Yes	Dec-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
<b>Orissa</b>										
IB TPS	1	Static	Model: Unitrol 5, BHEL	Yes	Yes	2011	No	No	Yes	Mar'2021
IB TPS	2	Static	Model: Unitrol 5, BHEL	Yes	Yes	2012	No	No	Yes	Mar'2021
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	Static	Not Provided	No	No	Not	No	No	Yes	

[illegible]

BTPS	6 (110)									
BTPS	7 (110)									
BTPS	8									
BTPS	9									
<b>Bhutan</b>										
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		

ANTICIPATED POWER SUPPLY POSITION FOR THE MONTH OF JAN-21			
SL.NO	PARTICULARS	PEAK DEMAND IN MW	ENERGY IN MU
1	BIHAR		
i)	NET MAX DEMAND	5100	2820
ii)	NET POWER AVAILABILITY- Own	645	224
iii)	Central Sector+Bi-Lateral	4845	2489
iv)	SURPLUS(+)/DEFICIT(-)	390	-107
2	JHARKHAND		
i)	NET MAXIMUM DEMAND	1450	850
ii)	NET POWER AVAILABILITY- Own Source	283	151
iii)	Central Sector+Bi-Lateral+IPP	973	513
iv)	SURPLUS(+)/DEFICIT(-)	-194	-185
3	DVC		
i)	NET MAXIMUM DEMAND	3150	2065
ii)	NET POWER AVAILABILITY- Own Source	5247	2964
iii)	Central Sector+MPL	487	262
iv)	Bi- lateral export by DVC	2103	1565
v)	SURPLUS(+)/DEFICIT(-) AFTER EXPORT	481	-404
4	ODISHA		
i)	NET MAXIMUM DEMAND	3650	2306
ii)	NET POWER AVAILABILITY- Own Source	3472	1701
iii)	Central Sector	2033	888
iv)	SURPLUS(+)/DEFICIT(-)	1854	283
5	WEST BENGAL		
5.1	WBSEDCL		
i)	NET MAXIMUM DEMAND	6015	3015
ii)	IPCL DEMAND	79	59
iii)	TOTAL WBSEDCL's Energy Requirement (incl.B'Desh+Sikkim+IPCL)	6094	3078
iv)	NET POWER AVAILABILITY- Own Source	4604	1967
v)	Contribution from DPL	396	172
vi)	Central Sector+Bi-lateral+IPP&CPP+TLDP	2410	1251
vii)	EXPORT (TO B'DESH & SIKKIM)	5	4
viii)	SURPLUS(+)/DEFICIT(-) AFTER EXPORT	1311	313
5.2	CESC		
i)	NET MAXIMUM DEMAND	1360	685
ii)	NET POWER AVAILABILITY- Own Source	750	438
iii)	FROM OTHER SOURCE (INCL. IPP/CPP-29-30 MU/M)	340	70
iv)	IMPORT FROM HEL	270	177
v)	TOTAL AVAILABILITY OF CESC	1360	685
vi)	SURPLUS(+)/DEFICIT(-)	0	0
6	WEST BENGAL (WBSEDCL+DPL+CESC) (excluding DVC's supply to WBSEDCL's command area)		
i)	NET MAXIMUM DEMAND	7454	3759
ii)	NET POWER AVAILABILITY- Own Source	5750	2578
iii)	CS SHARE+BILATERAL+IPP/CPP+TLDP+HEL	3020	1498
iv)	SURPLUS(+)/DEFICIT(-) BEFORE WBSEDCL'S EXP.	1316	317
v)	SURPLUS(+)/DEFICIT(-) AFTER WBSEDCL'S EXP.	1311	313
7	SIKKIM		
i)	NET MAXIMUM DEMAND	127	63
ii)	NET POWER AVAILABILITY- Own Source	2	1
	- Central Sector	162	74
iii)	SURPLUS(+)/DEFICIT(-)	37	12
8	EASTERN REGION		
i)	NET MAXIMUM DEMAND	20521	11864
ii)	BILATERAL EXPORT BY DVC	2103	1565
iii)	EXPORT BY WBSEDCL	5	4
iv)	NET TOTAL POWER AVAILABILITY OF ER (INCLUDING CS ALLOCATION +BILATERAL+IPP/CPP+HEL)	26918	13344
v)	ENERGY SURPLUS(+)/DEFICIT(-) OF ER AFTER EXPORT (v = iv - i -ii - iii)	4290	-89