AGENDA

FOR

173rd OCC MEETING

Date: 24.11.2020
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700033

Eastern Regional Power Committee

Agenda for 173rd OCC Meeting to be held on 24th November 2020

PART A

Item No. A.1: Confirmation of minutes of 172nd OCC meeting of ERPC held on 19.10.2020.

The minutes of 172nd OCC meeting were uploaded in ERPC website and circulated vide letter dated 05.11.2020 to all the constituents.

Members may confirm the minutes of 172nd 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 21st 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. The observations and the revisions proposed in SPS scheme are enclosed as **Annexure-B1**.

NLDC requested for ER constituent's view for finalization of the SPS scheme.

Members may discuss.

Item No. B.2 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**.

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-pspa1@gov.in
- mserpc-power@nic.in

Members may note and comply.

Item No. B.3 Renewal of Maintenance & Support services of PSSE license and exchange of old sentinel dongles with new Cm dongles.

The Maintenance & Support (M&S) services of the PSS®E Software which was supplied by SIEMENS Ltd. & handed over in the year 2012 has immensely facilitated sharing of information & data related to transmission system planning under ISTS as well under Intra-STS and has also helped in capacity building of the personnel involved. For continued facilitation for coordination in sharing the data for transmission system planning, POWERGRID has renewed the M&S services of PSS®E license by SIEMENS Ltd. for further 5 years starting from August, 2020 for CERC, RPCs, CEA & STUs and POWERGRID shall bear the cost of above renewal.

As per the M&S agreement, SIEMENS needs to supply new Cm dongles as an exchange to the old sentinel dongles of PSS®E, as old dongles would not work with updated PSS®E Version 35. However, new Cm dongle would work with PSS®E V34 & V33.12. A communication in this regard from SIEMENS including the details of the dongle licenses covered under the agreement is enclosed as Annexure B3 of 172nd OCC agenda document.

It is requested to provide following details to SIEMENS directly **with a copy to Powergrid** so that SIEMENS can start the dongle exchange process & supply of **PSS®E V35**.

Entity name:
Dispatch Address:
Primary contact:
Secondary contact:
Email Id:
Mobile Number:

The details of SIEMENS representatives who would be involved in the PSS®E dongle exchange process is given below:

1. Vikas Chaturvedi Mobile: +91 9654841659 Email: vikas.chaturvedi@siemens.com	Siemens Limited RC-IN SI DG SW S Plot 6A, Sector 18 Gurugram 122 015 Tel.: +91 124 6246 680 Fax: +91 124 2846 620 Mobile: +91 96548 41659
2. Hitesh Chauhan Mobile: +91 9560727765 Email: hitesh.chauhan@siemens.com	

For any further clarifications in the matter you may write to Powergrid at anilsehra@powergridindia.com & i.anupamk@powergridindia.com or may also contact directly to SIEMENS on the details provided.

In the 172nd OCC Meeting, OCC advised all the state utilities to provide the relevant details to SIEMENS with a copy to Powergrid so that they can get the new Cm dongles through courier along with the detailed procedure to return the old Cm dongles to SIEMENS.

SLDC Odisha and Bihar informed that licenses of SLDCs were not included in the list only transmission utility licenses were included in the list.

In this regard, SLDC, Odisha has already taken up the issue with CTU. Thereafter CTU vide letter 09.10.2020 informed that CTU has renewed the licenses of CERC, RPCs, CEA & STUs and POWERGRID without any liability on POSOCO.

GRIDCO vide letter dated 02.11.2020 informed that they have provided the relevant details to SIEMENS with a copy to Powergrid.

Members may discuss.

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 171st 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 2nd 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 all out efforts to restore the line on permanent towers at the earliest.

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

In the 172nd 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 30th Oct 2020.

NTPC agreed.

DMTCL vide mail dated 19th November 2020 updated the progress of Barh-Motihari and Barh-Gorakhpur D/C line which is given in the **Annexure B4.1**.

DMTCL, Powergrid and NTPC 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.

GRIDCO may update the status of restoration of ICT-1.

3. 400KV NEW PURNEA-GOKARNA & 400KV NEW 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 26th 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**.

POWERGRID may update.

Item No. B.5 Short Term and Long-Term Transmission Plan for Intra state Constraints in Bihar, Orissa, West-Bengal and DVC.

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 BTPS-Begusarai D/C	102-110	118	100 %	BSPTCL	
220 kV Bihar Sharif-Khijesarai D/C	Kept out	116	90 %	BSPTCL	
220 kV Bokaro-Ramgarh D/C	104-110	113	80 %	DVC	**Following lines are under implementation by DVC:** 1. 220 kV S/C MTPS – Ramgarh (203 Km: AAAC Zebra) 2. 220KV S/C Ranchi (PG) – Ramgarh (91 Km: AAAC Zebra) 3. 220KV S/C MTPS – Ranchi (PG) (224 Km: AAAC Zebra) These may facilitate power inflow to 220KV Ramgarh bus, which in turn reduce the flow of 220KV D/C BTPS – Ramgarh line & BTPS ICTs.
400/220 kV Bokaro ICT 1 & 2	114 (Bokaro 500 MW Unit is out)	227	50 %	DVC	
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	
220 kV Bakreshwar-Sadaipur D/C	115-155	116	90 %	WBSETCL	220 kV Bakreshwar-Sadaipur D/C has been upgraded to HTLS by WBSETCL.

					In addition, with commissioning of 400 kV Gokarno-Sagardighi D/C, loading has now reduced to 50-60 MW per circuit.
220 kV Shubhasgram-Lakshmikantpur D/C	115-120	115	100%	WBSETCL	WBSETCL intimated that Baruipur 220 kV substation was planned and now is in WIP stage, which is likely to be commissioned by October 2020.

Members may update.

Item No. B.6 Data for preparation Load Generation Balance Report (LGBR) of ER for the year 2021-22.

As per the IEGC, RPC Secretariat is responsible for finalization of the Annual Load Generation Balance Report (LGBR) for Peak as well as Off-peak scenarios and the annual outage plan for the respective region

To facilitate the preparation of LGBR of Eastern Region by ERPC Secretariat within the schedule period, the following data/information for the year **2021-22** in respect of the constituents/utilities of Eastern Region is urgently required:

i) The unit wise and station wise monthly energy generation proposed from existing units during 2021-22 (thermal/hydro/RES).
ii) Annual maintenance program for each of the generating units (thermal and hydro both).
iii) Generating units under R&M / long outage indicating date of outage and reasons of outage and expected date of return (thermal and hydro both).
iv) Partial and forced outage figures (in %) of generating units for the last 3 years.
v) Month wise peak demand (MW) – restricted and unrestricted peak demand.
vi) Month wise off-peak demand (MW).
vii) Month wise energy requirement (in MU).
viii) Month wise & source wise power (both MU & MW) purchase and/or sale plan.
ix) Schedule of commissioning of new generating units during 2021-22 and unit-wise monthly generation program (in MU).
x) Allocation of power from new generating units.
xi) Month wise and annual planned outage of transmission system (Transmission lines 220kV and above / ICTs / Reactors/ other elements.

Information may please also be submitted in the form of soft copy through email (mail ID: mserpc-power@nic.in **/ ereb_cea@yahoo.co.in**).

In the 171st OCC Meeting, OCC advised all the constituents to provide the relevant data as mentioned in the agenda to ERPC Secretariat through email (mail ID: mserpc-power@nic.in / ereb_cea@yahoo.co.in) latest by 31st Oct 2020.

LGBR data for 2021-22 has been received from WBPDCL, Bihar and MPL.

In the 172nd OCC Meeting, OCC advised all the stakeholders to submit the LGBR data for the FY

2021-22 by 31st Oct 2020 to ERPC Secretariat.

JUSNL, NTPC ER-I (Farakka, Kahalgaon, Barh, Barauni), NPGCL, KBUNL, BRBCL, OHPC have forwarded the LGBR data to ERPC Secretariat.

Remaining stakeholders may update the LGBR data for the FY 2021-22.

Item No. B.7 Shutdown proposal of generating units for the month of December 2020.

Generator shutdown for December 2020 is given below:

Proposed Maintenance Schedule of Thermal Generating Units of ER during 2020-21 in the month of Dec 20 (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			
DVC	CTPS	8	250	08.12.20	12.01.21	36	COH	01.01.21-09.02.21
	Mejia TPS	5	250	06.12.20	31.12.20	26	BOH & Gen	01.03.21-25.03.21
ODISHA	IB TPS	1	210	01.12.20	31.12.20	30	AOH	
WBPDCL	Bandel TPS	5	215	06.12.20	24.12.20	19	AOH/BOH	
	Santaldih TPS	5	250	01.12.20	10.12.20	10	Boiler License Renewal	
CESC	Budge-Budge	2	250	08.12.20	14.12.20	7	Not Specified	
	Budge-Budge	3	250	16.12.20	04.01.21	20	Not Specified	
	Titagarh	3	60	11.12.20	14.12.20	4	Not Specified	
	Titagarh	4	60	16.12.20	30.12.20	15	Not Specified	
DPL	DPPS	8	250	01.12.20	10.12.20	10	Tit bit maintenance	
IPP	MPL	1	525	15.12.20	30.01.21	45	COH	

In the 172nd OCC Meeting, ERPC Secretariat advised all the Generating utilities to plan the overhauling of the units from December 2020 to February 2021 in view of expected increase in demand from March 2021. It was also advised to take the unit shutdown in this financial year to avoid the shortfall in 2021-22.

OCC advised all the generators to take the consent from the all the beneficiaries before taking the shutdown in case of any deviation from the schedule prepared in LGBR.

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 7th November and 4th November respectively due to Ash dyke problem. Only Unit 7 revived on 13th November 2020 and rests of the units are still under outage.

Members may update.

Item No. B.8 Transmission elements outage for December 2020.

1. Reconductoring work of 400 kV Rangpo-Binaguri D/C lines.

In 167th 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 1st November 2020.

In the 172nd OCC Meeting, Powergrid informed that they have postponed the shutdown of 400kV Rangpo-Dikchu and 400kV Rangpo-Kishenganj lines. Shutdown of 400kV Rangpo-Binaguri D/C

lines would be taken from 1st Nov 2020.

ERLDC requested Powergrid to complete the reconductoring work of one circuit at least before Monsoon for safe evacuation of hydro generation in Sikkim.

OCC advised Powergrid to submit the work plan to ERPC and ERLDC. OCC also advised Powergrid to put the SPS in service in coordination with ERLDC before taking the shutdown.

Powergrid informed that OEM is visiting Rangpo S/s on 28th Oct 2020 and they are planning to test the SPS scheme on 29th Oct 2020. Powergrid requested to test the receipt of SPS signal at generator end during the testing.

OCC advised ERLDC to coordinate with Powergrid and concerned generating utilities to conduct the testing of SPS on 29th Oct 2020.

Powergrid vide mail dated 29th Oct 2020 informed that they have successfully carried out the SPS testing at Rangpo S/s. At present the SPS is kept disabled and on 1st Dec 2020 during proposed shutdown of 400KV Rangpo-Binaguri D/C, the same shall be put in service after due consent from ERLDC. The details of the SPS testing are given in **Annexure B8**.

Powergrid also shared the status of work completed and the schedule of work to be taken gang wise for Nov 20:

Status of completed work as on: -

TOTAL LINE LENGTH (IN RKM)	110	41 RKM COMPLETED
IN PLAINS (IN RKM)	32	10 RKM COMPLETED
IN HILLS (IN RKM)	78	31 RKM COMPLETED

Schedule of work to be taken gang wise for November-20:

GANG	Nov-20	
PLAINS- SILIGURI	4	LOC- 288 TO 301
MIRIK- DARJELING HILLS	1.3	LOC-203 TO 198
SUKHIA -DARJELING HILLS	1.2	LOC- 139 TO 144
SUKHIA -DARJELING HILLS	1.2	LOC- 178 TO 174
GOKE- DARJELING HILLS	1.5	LOC -100 TO 103
SIKKIM HILLS-1	1.3	LOC- 40 TO 44
SIKKIM HILLS-2	1.2	LOC- 64 TO 67
SIKKIM HILLS-3	1.2	LOC- 69 TO 73

Powergrid may update.

2. Shutdown request by Adani Power limited.

SL. NO.	NAME OF THE ELEMENTS	FROM DATE	FROM TIME (HRS)	TO DATE	TO TIME (HRS)	REMARKS	S/D AVAILED BY
1	400 KV RAJARHAT – PURNIA, LILO at FARAKKA TRANSMISSION LINE	15.12.2020	09:00	15.12.2020	17:00	ODB	ADANI POWER (JHARKHAND) LTD, for line crossing of 400 kV D/C TL dedicated APJL

							(Godda) – Bangladesh border.
2	400 KV D/C KAHALGAON-MAITHAN TRANSMISSION LINE	23.12.2020	09:00	23.12.2020	17:00	ODB	ADANI POWER (JHARKHAND) LTD, for line crossing of 400 kV D/C TL dedicated APJL (Godda) – Bangladesh border.

3. **Shutdown request by WBPDCL for carrying maintenance works at 400kV Sagardighi S/s**
4. **Any other shutdown requests as discussed in the shutdown meeting held on 18th November 2020**

Members may discuss and approve.

5. **Submission of transmission elements outage requests for approval of OCC.**

All the constituents are requested to submit the transmission elements outage requests and outage related issues to the following new mail id of ERPC Secretariat with a copy to ERLDC:

- **outage.erpc@gov.in**

Members may note.

Item No. B.9 Preparedness for upcoming winter season. ---ERLDC

During the winter season Eastern Region witness a different set of problem of high voltage throughout the network, caused by fall in demand as well as reduction of fault level due to outage of powerplants.

The following measures are suggested to maintain the reliability of the Grid:

1) Transmission licenses
   a) May carry out pre-winter maintenance of their respective transmission lines on urgent basis & if necessary, wash the insulators of their lines passing through N. Bihar, Jharkhand, N. Bengal, which are prone to fog / smog.
   b) Maintenance of bus/line rectors and STATCOM s may be avoided.

2) Generating Station
   a) Absorb MVAr up to it capability limit, to ensure that terminal voltage remain close to rated voltage
   b) GT Tap may be changed to maximize MVAr absorption
   c) Submit unit-wise MVAR (GT primary side) values at 30 minutes resolution ON DAILY BASIS to ERLDC, so that we are able to monitor their performances without any ambiguity.

3) SLDC

a) To switch off shunt capacitors in their respective systems, wherever installed, or maintain minimum capacitor in service, depending upon the local MW & MVAR demand.
b) In case any intrastate line is switched off to control the high voltage, list of same to be sent to ERLDC on daily basis
c) In case when more than one line is available between two substation and one line is switched off to control high voltage. The line may be swapped at regular interval (not more than 7 days) to ensure the healthiness of lines.
d) Do Tap optimization of all intrastate ATRs for proper VAr distribution

Members may discuss.

Item No. B.10 Submission of Transmission System Availability Factor (TAFPn) by transmission companies. –ERLDC.

ERLDC vide letter no: ERLDC/SO/2019/173/1270 dtd. 28/09/2020 advised all ISTS licensees of Eastern Region to provide Transmission System Availability Factor (TAFPn) of each AC & HVDC elements separately along with the monthly outage file, as mandated by Para-1 of Appendix-II of CERC Terms & Conditions of tariff regulation 2019-24. However, no ISTS licensee has sent the same with outage file of September and October -2020. The mentioned para of CERC Terms & Conditions of tariff regulation 2019-24 is as follows:

> *"Transmission system availability factor for nth calendar month ("TAFPn") shall be calculated by the respective transmission licensee, got verified by the concerned Regional Load Dispatch Centre (RLDC) and certified by the Member-Secretary, Regional Power Committee of the region concerned, separately for each AC and HVDC transmission system and grouped according to sharing of transmission charges."*

Powergrid, Powerlink, CBPTCL, ATL, ENICL, PKTCL, OGPTL, DMTCL & TPTL may please explain.

Item No. B.11 Submission of end-wise reliability indices –ERLDC.

ERLDC by email dtd. 13.08.2020 advised all ISTS licensees of Eastern Region to provide end-wise reliability-indices in place of the prevalent practice of line-wise reliability indices, as ERLDC is facing problem in calculating various indices in absence of both end data. However, no ISTS licensee has sent the same for September and october-2020.

Powergrid, Powerlink, CBPTCL, ATL, ENICL, PKTCL, OGPTL, DMTCL & TPTL may explain.

PART C: ITEMS FOR UPDATE

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

In the 172nd OCC Meeting, OCC advised all the constituents to update the status of UFR healthiness data on monthly basis by 7th of every month.

Jharkhand, DVC, West Bengal and Bihar forwarded the UFR status for the month of Oct 2020.

Members may update.

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

In 108th 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
3	Tata Power Islanding Scheme, Haldia		Healthy
4	Chandrapura TPS Islanding Scheme, DVC	Not in service	
5	Farakka Islanding Scheme, NTPC		
6	Bandel Islanding Scheme, WBPDCL		Healthy

Members may update.

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

NLDC vide letter dated 10th August 2020, communicated a procedure to be considered for Commercial Settlement during onsite testing of generators for Primary Response of regional generating units.

On 10th Sep 2020, a meeting was held between ERPC, ERLDC, SLDC's and all regional generating stations wherein M/S Solvina gave a presentation on the details of Primary frequency response testing and the steps to be followed in the procedure.

Further all the members clarified their doubts, and it was decided that the remaining generators who have not placed their LOA with M/S Solvina should place it at the earliest.

In the 171st OCC Meeting, it was informed that M/s Solvina gave a presentation on 10th Sep 2020 and explained the procedure. The presentation has been shared with the constituents.

It was also informed that this issue of commercial settlement mechanism has been discussed and finalized in the Commercial Committee Meeting held on 21st September 2020.
Further ERLDC informed that they have communicated to NTPC, Adhunik and BRBCL regarding placement of LOA with M/s Solvina.

ERLDC informed that LOA with M/s Solvina from BRBCL and Teesta-III and LOA with M/s Siemens from GMR is still pending from Eastern Region.

In the 172nd OCC Meeting, OCC advised all the generators to submit their testing plan well in advance to ERLDC so that they could check the feasibility of the testing.

Respective generators may update.

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

The Hon'ble Central Electricity Regulatory Commission (CERC), vide notification dated 12th April 2017, had notified Indian Electricity Grid Code (Fifth Amendment) Regulations, 2017. As per this notification, following provision has been added at the end of Regulation 5.2 (g) of Part 5 of the Principal Indian Electricity Grid Code (IEGC) Regulations: "Provided that periodic checkups by third party should be conducted at regular interval once in two years through independent agencies selected by RLDCs or SLDCs as the case may be. The cost of such tests shall be recovered by the RLDCs or SLDCs from the Generators. If deemed necessary by RLDCs/SLDCs, the test may be conducted more than once in two years."

In compliance of IEGC, process of testing of primary frequency response of regional generating units (eligible for RGMO as per IEGC section 5.2 (f)) has been started by POSOCO.

In the 170th OCC Meeting, ERLDC informed that as per the regulation, testing of primary frequency response of state generators by a third party is required to be undertaken by the respective SLDC's. Thereafter, SLDC Odisha informed that they have not finalized a plan yet, but they will communicate the detailed plan to ERPC by 15th Sep 2020.

OCC then advised all the SLDC's to prepare an action plan for their state generators having capacity of 200 MW or more and submit the details to ERLDC and ERPC within a week.

In the 171st 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 6th 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 172nd OCC Meeting, ERLDC requested DVC to submit a detail explanation on inability to

conduct the testing of BTPS-B unit # 3, DTPS U#4 and MTPS U # 1 & 2.

SLDC Odisha informed that they would contact OPGC and submit a plan to ERPC and ERLDC at the earliest.

WBPDCL informed that they have contacted with SLDC West Bengal regarding preparation of plan and submission to ERPC and ERLDC.

ERLDC also informed that nomination of nodal person regarding RGMO and tripping analysis has also not been received from SLDC West Bengal.

Representative from SLDC, West Bengal was not present in the meeting.

DVC O&S may update. Other SLDC's may place their plan.

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

Latest status of State ATC/TTC declared by states for the month of January-2021.

SL. No	State/Utility	TTC (MW)		RM(MW)		ATC Import (MW)		Remark
		Import	Export	Import	Export	Import	Export	
1	BSPTCL	5100	--	102	--	4998	--	Jan-21
2	JUSNL	1493	--	52	--	1441	--	Jan-20
3	DVC	1464	2870	63	50	1410	2820	Dec-20
4	OPTCL	2251	1432	74	54	2177	1378	Jan-20
5	WBSETCL	4851	--	400	--	4451	--	Nov-20
6	Sikkim	266	--	2.5	--	263.4	--	Dec-20

Declaration of TTC on Website:

Sl. No	State/Utility	Declared on Website	Website Link	Constraint Available on Website
1	BSPTCL	Yes	http://www.bsptcl.in/ViewATCTTCWeb.aspx?GL=12&PL=10	Yes
2	JUSNL	Yes	http://www.jusnl.in/pdf/download/ttc_atc_nov_2020.pdf	Yes
3	DVC	Yes	https://application.dvc.gov.in/CLD/atcttcmenu.jsp#	Yes
4	OPTCL	Yes	https://www.sldcorissa.org.in/TTC_ATC.aspx	Yes
5	WBSETCL	Till Feb 20	Website Down	No
6	Sikkim	No	—	No

Members may update.

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 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		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	

In 172nd OCC Meeting, OHPC informed that they have interacted with SLDC Odisha and are planning to start the mock black exercise after rainy season. For Balimela HPS, black start exercise would be conducted on 20th Oct 2020. OCC advised OHPC to inform ERPC and ERLDC regarding their plan for conduct of black start exercise.

SLDC Odisha vide mail dated 18th Nov 2020 informed that the mock black start exercise at Rengali P.H. is going to be conducted on 23rd Nov 2020.

Members may update.

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

In the 172nd 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.
JUSNL may update.

Item No. C.8: Monthly Data on Category-wise consumption of electricity in States/UTs---CEA.

CEA vide mail informed that Hon'ble MoSP(IC) has desired the month-wise category-wise consumption data in the various States/UTs from April,2019 to July 2020. CEA requested all the concerned utilities of States to furnish the data at the earliest.

Details are yet to be received from West Bengal, Jharkhand and Sikkim.

Members may update.

Item No. C.9: Operationalizing Bus splitting at Biharshariff—ERLDC.

Bus split arrangement at Biharshariff 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 169th OCC Meeting, ERLDC informed that Bihar had submitted a report wherein Bihar agreed for the implementation of bus-split arrangement.

Further, 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.

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

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

In the 170th OCC Meeting, Powergrid informed that they have computed the protection settings for split mode operation and forwarded to their corporate office for review and comments. Powergrid added that they will update status as soon as they receive the information from their corporate office.

In the 171st OCC Meeting, ERLDC informed that Powergrid had confirmed that there is no requirement of putting a group-II settings for this bus splitting at the remote end substations of Powergrid.

ERLDC added that Bihar has to make a load shedding scheme to avoid the tripping of 315 MVA ICT on overload during tripping of 500 MVA ICT.
OCC advised SLDC, Bihar to prepare a plan for the load shedding scheme to avoid unwanted tripping of 315 MVA ICT and submit to ERPC and ERLDC. The scheme would be discussed in the upcoming PCC meeting.
OCC advised ERLDC to interact with Powergrid and finalize a date for implementation of the bus splitting scheme.

ERLDC mentioned that even after reminders and communication in OCC/PCC meeting, it is observed that no load trimming scheme has been shared by Bihar SLDC and BSPTCL so far. It may kindly be seen that any equipment damage at Bihar sharif due to high fault level will be attributable to delays from respective utility end due to non-implementation of bus-split scheme SLDC.

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

OCC decided to put the Biharsariff bus splitting scheme in service on 12th Nov 2020.

Members may update.

Item No. C.10: ER Grid performance during October 2020.

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

Average Consumption (Mu)	**Maximum Consumption(mu)/ Date**	**Maximum Demand (MW)**	**Minimum Demand (MW)**	**Schedule Export**	**Actual Export**
		Date/Time	**Date/Time**	**(Mu)**	**(Mu)**
445.6	490 MU 17-10-2020	23242 MW 20-10-2020 18:29	13270 MW 26-10-2020 16:05	3497.3	3370.8

ERLDC may present Performance of Eastern Regional Grid.

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

Frequency response characteristics (FRC) have been analyzed pan India for one event of sudden frequency change that occurred in October 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**
Event 1: On 12th October 2020 at 10:05:04.280 hrs, 2600MW load loss and 1060 MW generation loss (Net load loss 1540) occurred at Mumbai in WR.	**50.054 Hz to 50.277 Hz**. Later stabilized at 50.155 Hz.	**18 %**

Summary of the response of regional generating stations/SLDCs are given in following table.

Generating Station/ SLDC	**Response observed**
NTPC Farakka	Unit 4 and 5 were running at Technical Minimum. Unit 6's output was being ramped down prior to the event.
NTPC Kahalgaon	Response of unit 3 was Satisfactory; Unit 1 & 6 were under shutdown. **Response of unit 2, 4, 5 & 7 are non-satisfactory**
NTPC Talcher	**Non-Satisfactory**.
NTPC Barh	**Satisfactory** (as per FRC calculated from ERLDC SCADA data)
NTPC Darlipalli	**Non-Satisfactory** (as per FRC calculated from ERLDC SCADA data)
BRBCL	**Non-Satisfactory**.
NPGC Nabinagar	**Satisfactory**
GMR	**Non-Satisfactory**.
JITPL	**Non-Satisfactory**.
MPL	**Non-Satisfactory**. Unit 2 was being run at technical minimum. Unit 1 was being run at VWO.
Adhunik	**Non-Satisfactory**

Generating Station/ SLDC	Response observed
Teesta V HEP	**Non-Satisfactory** (as per FRC calculated from ERLDC SCADA data)
Teesta III HEP	**Non-Satisfactory** (as per FRC calculated from ERLDC SCADA data)
Dikchu HEP	**Satisfactory**
Bihar SLDC	**Non-Satisfactory** (as per FRC calculated from ERLDC SCADA data)
Jharkhand SLDC	**Satisfactory**
DVC SLDC	**Non satisfactory**
GRIDCO SLDC	**Non satisfactory**
WB SLDC	**Non-Satisfactory** (as per FRC calculated from ERLDC SCADA data)

Reason for non-satisfactory response may be explained.

Generator end data/FRC are yet to be received from following generating stations/SLDCs

1. NTPC Barh
2. NTPC Darlipalli
3. Teesta V
4. Teesta III
5. Bihar SLDC
6. WB SLDC

Reason for non-sharing of generator end data/FRC may be shared.

PART D: OPERATIONAL PLANNING

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

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

Item No. D.2: **Major Generating Units/Transmission Element outages/shutdown in ER Grid (as on 16.11.2020).**

SL. No	Station	State	Agency	Unit No	Capacity MW	Reason(s)	Outage Date
1	BAKRESHWAR	WEST BENGAL	WBPDCL	3	210	FOR OVER HAULING JOB	04-11-20
2	BUDGE-BUDGE	WEST BENGAL	CESC	2	250	annual survey	16-11-20
3	CHANDRAPURA TPS	DVC	DVC	3	130	TURBINE BLADE DAMAGE	30-07-17
4	KOLAGHAT	WEST BENGAL	WBPDCL	1	210	POLLUTION PROBLEM	10-05-18
5	KOLAGHAT	WEST BENGAL	WBPDCL	2	210	ESP FIELD MAINTENANCE	26-12-19

6	ADHUNIK	JHARKHAND	APNRL	1	270	ASH EVACUATION PROBLEM AND ESP HOPPER LEVEL HIGH	27-10-20
7	FSTPP	WEST BENGAL	NTPC	2	200	GENERATOR ELECTRICAL PROTECTION	14-09-20
8	JITPL	ODISHA	JITPL	2	600	GENERATOR ELECTRICAL PROTECTION	25-09-20
9	KHSTPP	BIHAR	NTPC	3	210	Ash dyke problem	07-11-20
10	KHSTPP	BIHAR	NTPC	4	210	Ash dyke problem	07-11-20
11	KHSTPP	BIHAR	NTPC	5	500	Ash dyke problem	07-11-20
12	KHSTPP	BIHAR	NTPC	6	500	Ash dyke problem	04-10-20
13	NABINAGAR(NPGC)	BIHAR	NPGC	1	660	Suspected Condenser Tube Leakage	15-11-20
14	DPL	WEST BENGAL	WBPDCL	8	250	NON-AVAILABILITY OF ASH BOWSER AND HIGH ASH SILO LEVEL	24-10-20
15	DSTPS	DVC	DVC	2	500	Annual Overhauling	14-11-20
16	OPGC3	ODISHA	OPGC	3	660	ASH EVACUATION PROBLEM	05-09-20
17	SAGARDIGHI	WEST BENGAL	WBPDCL	2	300	AUXILLARY SUPPLY FAILED	18-03-20
18	SAGARDIGHI	WEST BENGAL	WBPDCL	3	500	Turbine Vibration Very High	15-11-20

All Generating stations are requested to update expected restoration time and reason outage if any change. Same need to be informed ERLDC/ERPC on weekly basis also**.**

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

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

SL. No	Station	State	Agency	Unit No	Capacity MW	Reason(s)	Outage Date
1	FSTPP	WEST BENGAL	NTPC	1	200	LOW SYSTEM DEMAND/RSD	23-10-20
2	BARAUNI TPS	BIHAR	BSPHCL	7	110	RSD/ LOW SYSTEM DEMAND	28-05-20
3	BARAUNI TPS	BIHAR	BSPHCL	8	250	RSD/LOW SYSTEM DEMAND	28-10-20
4	KOLAGHAT	WEST BENGAL	WBPDCL	3	210	RSD/LOW SYSTEM DEMAND	13-06-20
5	KOLAGHAT	WEST BENGAL	WBPDCL	4	210	RSD/ LOW SYSTEM DEMAND	15-07-20
6	KOLAGHAT	WEST BENGAL	WBPDCL	6	210	RSD/LOW SYSTEM DEMAND	16-01-20
7	MEJIA TPS	DVC	DVC	3	210	RSD/LOW SYSTEM DEMAND	08-11-20
8	MUZAFFARPUR TPS	BIHAR	BSPHCL	1	110	INITIALLY BTL LATER OUT DUE TO RSD/ LOW SYSTEM DEMAND	10-08-20
9	MUZAFFARPUR TPS	BIHAR	BSPHCL	2	110	INITIALLY BTL LATER OUT DUE TO RSD/ LOW SYSTEM DEMAND	15-08-20

Hydro Unit Outage report:

SL. No	Station	State	Agency	Unit No	Capacity MW	Reason(s)	Outage Date	Expected Restoration date
1	BALIMELA HPS	ODISHA	OHPC	1	60	R & M WORK	05-08-16	27.01.2021

2	BALIMELA HPS	ODISHA	OHPC	2	60	R & M WORK	20-11-17	31.01.2021
3	BURLA HPS/HIRAKUD I	ODISHA	OHPC	1	49.5	R & M WORK	14-03-18	31.12.2020
4	BURLA HPS/HIRAKUD I	ODISHA	OHPC	5	37.5	R & M WORK	25-10-16	31.05.2021
5	BURLA HPS/HIRAKUD I	ODISHA	OHPC	6	37.5	R & M WORK	16-10-15	31.05.2021
6	BURLA HPS/HIRAKUD I	ODISHA	OHPC	7	37.5	ANNUAL MAINTENANCE	06-12-19	31.12.2020
7	BALIMELA HPS	ODISHA	OHPC	4	60	SPARKING IN PMG	02-03-20	-
8	U. KOLAB	ODISHA	OHPC	3	80	GUIDE BEARING TEMPERATURE HIGH	07-01-20	-

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/JUSNL	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 Pandiabilli end (loc 156) to loc 58
5	400 KV MOTIHARI(DMTCL)-GORAKHPUR-I	POWERGRID/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	POWERGRID/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	POWERGRID/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 at loc no 140 and 141 by river Kankai. line charged as 132 KV Purnea (PG) - Barsoi w.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 collpase 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	220kV HAJIPUR-AMNOUR-1	BSPTCL	05-08-2020	220/132/33KV Amnour GIS substation of BGCL under SLDC Bihar was switched off at 02:19 hrs on 05.08.20 due to Flood by opening both the 220 kV lines.
15	400KV-BINAGURI-TALA-4	PGCIL/BHUTAN	02-11-2020	To replace old porcelain insulator of tower TPS-06;TPS-07;TPS-18 & TPS-19.
16	400KV-TALA-MALBASE	PGCIL/BHUTAN	27-10-2020	AMP Work by Bhutan upto 27/11/2020
17	765 KV ANGUL-JHARSUGUDA III	PGCIL	17-11-2020	Voltage Regulation
18	400KV-BINAGURI-RANGPO-1	PGCIL	01-11-2020	Re-conductoring work from twin moose to HTLS.
19	400KV-BINAGURI-RANGPO-2	PGCIL	01-11-2020	
20	800KV HVDC ALIPURDUAR-AGRA-POLE-III	PGCIL	05-11-2020	Voltage Regulation, 423/423 KV, OPENING CODE OF NLDC/372, NRLDC/932
21	400KV-BINAGURI-MALBASE	PGCIL/BHUTAN	09-11-2020	Bus testing works at Malbase BY BHUTAN UPTO 24.11.20
22	765KV-JHARSUGUDA-RAIPUR PS (DURG)-2	PGCIL	12-11-2020	Voltage Regulation
23	400KV/220KV 315 MVA ICT 5 AT MALDA	PGCIL	16-11-2020	Replacement of 52 kV Y-Ph Bushing on account of Tandelta Violation at Malda

As per long outage list, most of the important grid elements, inter-state as well as intra-state, are under outage for long time due to tower collapse and other issues.

Transmission licensees/ Utilities are requested to update expected restoration date & work progress regarding restoration regularly to ERLDC/ERPC on monthly basis by 5th 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 October 2020.

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

SL. No	Element Name	Owner	Charging Date	Charging Time	Remarks
1	400kV Sagardighi – Gokarna-I	WBSETCL	27-10-2020	00:40	
2	400kV Sagardighi – Gokarna- II	WBSETCL	28-10-2020	18:09	

3	Anti-theft charge of 765kV New Ranchi-Medinipur Ckt 2 with LR	PMJTL	24-10-2020	18:42	Upto 18.9kM from New Ranchi end
4	Anti-theft charge of 765kV New Ranchi-Medinipur Ckt 1 with LR	PMJTL	28-10-2020	16:13	Upto 118.9kM from New Ranchi end

Members may update.

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

Frequency profile for the month is as follows:

Month	Max (Date/Time)	Min (Date/Time)	% Less IEGC Band	% Within IEGC Band	% More IEGC Band
October, 2020	50.27, 12-10-2020 10:05	49.70 28-10-2020 18:14	3.93	81.87	14.20

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

Members may update.

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Annexure B1

पावर सिस्टम ऑपरेशन कॉर्पोरेशन लिमिटेड
(भारत सरकार का उद्यम)
POWER SYSTEM OPERATION CORPORATION LIMITED
(A Govt. of India Enterprise)

केन्द्रीय कार्यालय : 61, आई एफ सी आई टावर, 7,8 एवं 9वीं मंजिल, नेहरु प्लेस, नई दिल्ली -110019
Corporate Office : 61, IFCI Tower, 7,8 & 9th Floor, Nehru Place, New Delhi- 110019
CIN : U40105DL2009GOI188682, Website : www.posoco.in, E-mail : posococc@posoco.in, Tel.: 011- 40234672

संदर्भ: POSOCO/NLDC/SO/HVDC/10/ **दिनांक:** 21st Oct 2020

सेवा मे,

Member Secretary
Southern Regional Power Committee,
Central Electricity Authority,
No. 29 Race Course Cross Road
Bangalore-560 009

Member Secretary
Eastern Regional Power Committee
14, Golf Club Road
Tollygunje
Kolkata-700033

Member Secretary
Western Regional Power Committee
F-3, MIDC Area, Marol,
Central Road,
Mumbai - 400 093

विषय: Review of System Protection Scheme (SPS) of HVDC Talcher-Kolar Bipole

महोदय,

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-1 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. The existing SPS scheme is enclosed as Annexe-1. In view of strengthening of transmission system as stated above, the scheme has been reviewed in consultation with RLDCs. The observations and the revisions proposed in SPS scheme are enclosed as Annexe-2.

It is requested that proposed revisions in System Protection Scheme may please be deliberated and agreed by the appropriate Regional Power Committees (RPCs) expeditiously so that same may be implemented at the earliest.

सधन्यवाद,

संलग्न: उपरोक्तानुसार

भवदीय

(देबाशिस दे) 21/10/2020

कार्यपालक-निदेशक-रा॰भा॰प्रे॰कें॰

प्रतिलिपि सूचनार्थ:

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

पंजीकृत कार्यालय : प्रथम तल, बी-9, कुतुब इंस्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली - 110016
Registered Office : First Floor, B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi -110016

Existing SPS scheme for HVDC Talcher-Kolar Bipole

ER Side

Succesive modifications in the scheme on Eastern Region side :

a) SPS 450:

This scheme was originally implemented with a view to limit the sudden injection of power to Eastern and Western Region from TSTPS-2 to 450 MW; in the event of tripping of one pole or both poles of HVDC Talcher-Kolar. In this scheme, the generation at Talcher stage II is to be shed to restrict power flow from stage 2 to ER grid within 450 MW. This scheme of SPS at Talcher-Kolar is seldom in operation since establishment of strong synchronous connection of SR grid with NEW grid. It is enabled with due coordination of NLDC only under any critical outage condition in the rest of the NEW Grid.

Case 1: One pole blocking:

One pole trips and total power injected by TSTPS-2 generators is more than 1700 MW:

- Trip Unit 6 instantly.

Case 2: Both poles blocking:

Both poles trip and total power injected by TSTPS-2 generators is more than 1100 MW:

- Trip Units 6 and 3; and
- If total power injected by the TSTPS-2 generators is still more than 550 MW for more than 250 ms trip Unit 4.
- Net Generation of Talcher Stage 2 > 550 MW after 500 ms delay, then Trip one more Unit of stage 2

b) SPS 1000:

Post formation of the NEW Grid this scheme was subsequently envisaged in order to minimise shedding of generation at Talcher STPP. The basic philosophy of this scheme is to limit the net injection from TSTPS-2 to NEW grid to 1000 MW, on pole tripping. However, as one of the prerequisites for arming this scheme, Eastern Regional operator (ERLDC) has to ensure that sufficient evacuation margin (approx. 1000 MW) is available at the AC evacuation system of TSTPP which is at present connected to ER grid with six no. of 400 kV twin moose lines.

Case 1: One pole blocking:

i. HVDC flow is more than 1600 MW and one pole is blocked with remaining pole on ground return mode:
   - Trip Unit 6; and
   - Unload Unit 5 by 150 MW.

ii. HVDC flow is between 1450 MW and 1600 MW and one pole is blocked with remaining pole on ground return mode:
   - Fast Unload Unit 6 by 150 MW; and
   - Fast Unload Unit 5 by 150 MW; and
   - Fast Unload Unit 4 by 150 MW.

iii. HVDC flow is between 1300 MW and 1450 MW and one pole is blocked with remaining pole on ground return mode:
   - Fast Unload Unit 6 by 150 MW; and
   - Fast Unload Unit 4 by 150 MW.

iv. HVDC flow is between 1150 MW and 1300 MW and one pole is blocked with remaining pole on ground return mode:
   - Fast Unload Unit 6 by 150 MW.

v. HVDC flow is between 1000 MW and 1150 MW and one pole is blocked with remaining pole on ground return mode:
   - No SPS action (Control of network loading by manual action).

Case 2: Both poles blocking:

i. HVDC flow is more than 1600 MW and both poles are blocked:
   - Trip Unit 6; and
   - Fast Unload Unit 5 by 150 MW; and
   - Fast Unload Unit 4 by 150 MW.

ii. HVDC flow is between 1450 MW and 1600 MW and both poles are blocked:
   - Trip Unit 6; and
   - Fast Unload Unit 5 by 150 MW.

iii. HVDC flow is between 1300 MW and 1450 MW and both poles are blocked:
   - Fast Unload Unit 6 by 150 MW; and
   - Fast Unload Unit 5 by 150 MW; and
   - Fast Unload Unit 4 by 150 MW.

iv. HVDC flow is between 1150 MW and 1300 MW and both poles are blocked:
   - Fast Unload Unit 6 by 150 MW; and
   - Fast Unload Unit 4 by 150 MW.

v. HVDC flow is between 1000 MW and 1150 MW and both poles are blocked:
   - Fast Unload Unit 6 by 150 MW

c) <u>SPS introduced at time of NEW grid SR grid Synchronization</u>

Fast Reduction of 600 MW generation Reduction at GMR, JITPL and Sterlite for any pole tripping of HVDC Talcher-Kolar bipole was implemented then. Later Sterlite was removed from this due to change in network configuration. So at present signal is only sent to GMR and JITPL for reduction of 200 MW at each location.

SR Side:

The SPS scheme for load shedding in southern region is given as :

a) Trip Signal 1 (for load shedding):

- Loss of flow on the HVDC link at any instant is between 500 MW and 1000 MW compared with 2 s earlier flow; or
- Block one of the HVDC poles on a line fault and the flow on the HVDC link just prior to that instant was between 1000 MW and 1500 MW; or
- Trip signal 2 is generated; or
- Trip signal 3 is generated:

Action: Shed around 800 MW load (Karnataka: 250 MW, Andhra Pradesh: 230 MW, and Tamilnadu: 395 MW).

b) Trip Signal 2 (for load shedding):

- Loss of flow on the HVDC link at any instant is more than 1000 MW compared with 2 s earlier flow; or
- Block one of the HVDC poles on a line fault and the flow on the HVDC link just prior to that instant is more than 1500 MW; or
- Trip signal 3 is generated:

Action: Shed around 800 MW load (Karnataka: 200 MW, Andhra Pradesh: 240 MW, Kerala: 170 MW, and Tamilnadu: 170 MW).

c) Trip Signal 3 (for load shedding):

- Loss of flow on the HVDC link at any instant is more than 2000 MW compared with 2 s earlier flow; or
- Block one of the HVDC poles on a line fault and the flow on the HVDC link just prior to that instant is more than 2000 MW:

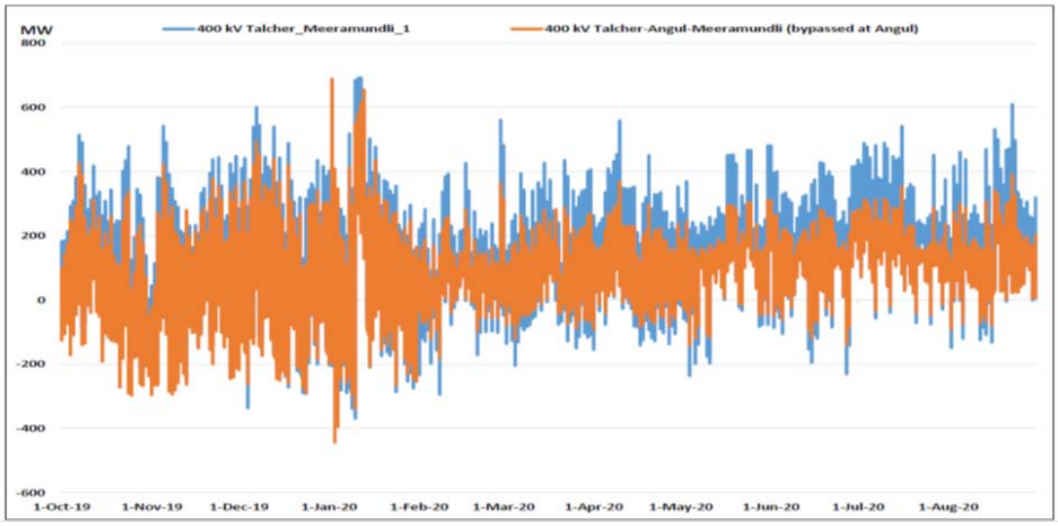
Action: Shed 500 MW load (Karnataka: 104 MW, Andhra Pradesh: 125 MW, Kerala: 125 MW, and Tamilnadu: 146 MW).

NLDC review on HVDC Talcher-Kolar SPS

i. The synchronization of NEW-SR grid has strengthened all India power system. The addition of high capacity AC lines in the corridor parallel to this HVDC link has also strengthened the ER-SR &WR-SR corridors for exchange of power to/from southern region (SR).

ii. There has been no addition of transmission line for immediate evacuation of Talcher generation. There are still six number of twin moose AC lines in addition to HVDC lines for immediate evacuation of Talcher generation.

iii. A flexible switching scheme at 400 kV Angul for by-passing is already in operation. With Angul station bypassed, the two circuits of 400kV Talcher-Meramundali have different line lengths (400 kV Talcher-Meramundali-1 is 51 km and 400 kV Talcher-Meramundali-2 is 119 km) and therefore they have different line loadings while in operation. The power flow on these lines since Oct 2019 is given as Fig 1 below. It can be observed that loading on shorter line 400 kV Talcher-Meramundali-1 is approx. 1.8 times the longer line 400 kV Talcher-Meramundali-2.



iv. The most severe N-1 contingency in HVDC Talcher-Kolar is with bipole operation at maximum rated capacity (2500 MW) and one pole trips and other pole goes into Ground Return path (limited to 150 MW). This may cause additional 2350 MW to be evacuated through AC lines from Talcher.

v. **Existing SPS (ER side) :**

a. Backing down/Tripping of generation in Talcher upto 1500 MW & 800 MW in case of SPS 450 & SPS 1000 respectively for blocking of HVDC Talcher-Kolar one or both poles.

b. Backing down of generation in GMR/JITPL/Sterlite upto 600 MW in case of SPS 1000 & SPS 450 for blocking of HVDC Talcher-Kolar one or both poles.

vi. <u>Proposed SPS (ER side) :</u>

a. GMR and JITPL are radially connected to 765/400 kV Angul pooling station. 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/JITPL/Sterlite. Therefore, the generation backing down at these units is not required in present condition. GMR Unit-1 &2 is connected to Angul and Unit-3 to Meramundali and there is a bus split. **Thus the SPS action at JITPL and GMR may be disabled.**

b. Under some conditions, even after tripping of HVDC Talcher-Kolar, loading on 400 kV Talcher-Mermundali Lines may remain within limits. The generation backing down may be removed for such conditions.

c. In some conditions, the 400 kV Talcher-Mermandali Lines may get heavily loaded (beyond 874 MW) after the tripping of HVDC Talcher-Kolar. Therefore it is important to consider the loading of 400 kV Talcher-Mermandali Lines in the SPS logic.

d. High loading of 400 kV Talcher-Mermandali (shorter ckt) appears to be the bottle neck in evacuation of power from Talcher complex in event of outage of HVDC poles. The line is twin moose with thermal capacity of 874 MW and the line is generally loaded around 400 MW. The thermal loading threshold shall be factored based on the CEA manual on Transmission Planning Criteria for different ambient temperatures.

e. The next possible contingency after outage of 400 kV Talcher-Mermandali (shorter line) is 400 kV Talcher-Mermandali (longer line). Thus SPS needs to be modified to include the loading of these lines as an additional input. Therefore existing SPS logic need to be AND ed with the flow of each of the 400 kV Talcher-Mermandali Lines. The load flow study carried out in this respect is enclosed as Annexe-1.

f. Similarly in case of faults in DC line, the converters are designed to attempt three auto-restarts and the recovery time, for transient faults, is approx. 1 second. Therefore, any SPS designed need to operate with a delay time of more than 1 second.

g. In case of line flow based SPS, in order to ensure non operation during transient conditions, it is further required that SPS logic considers the power flow after the transient and therefore a minimum of 2 second stabilisation time has to be considered for continuously measuring the post-contingency power flow. Therefore, a net delay of 2 seconds may be kept for any SPS action [1 sec for HVDC operation and additional 1 sec].

h. In order to ensure operation of SPS during actual requirement, it is further desired that line flow need to be measured after 4 seconds of SPS 450/1000 signal generation [total 5 sec delay]. Thus, if the loading on any of the 400 kV Talcher-Mermandali Lines

is above 874 MW, then SPS action would take place instantly. [HVDC fault recovery time and ac line flow setting time are concurrent, so not to be added].

i. The SPS scheme based on current input of line can be easier to implement and robust in operation. The current value corresponding to 874 MW shall be used in SPS logic. The possible delays due to voltage input and its transducer can be avoided, the similar current based SPS schemes are in operation at various locations across the grid.

j. The annual temperature of Talcher for normal calendar year was analysed and found that yearly temperature can be divided into three time periods. Therefore, three values of ampacity can be considered for different seasons. The ampacity for the twin moose 400 kV Talcher-Meramundali-1 & 2 can be obtained as per CEA Manual on transmission planning criteria. The table extracted from CEA Manual on transmission planning criteria is given below. The maximum conductor temperature has been taken as 75 degree Celsius (shall be confirmed from the line owner) and values of current in table are for single moose which need to be multiplied by two to obtain the value for twin moose line which need to be used in proposed SPS logic. It is proposed to use the values as per Table-2 below.

Thermal Loading Limits for ACSR Moose equivalent Conductors

Conductor Type (metallic area) and Dimension	Ambient Temperature (deg C)	AMPACITY FOR Maximum Conductor Temperature (deg C)					
		65	75	85	95	120	150
ACSR Moose (597 Sq.mm) Dia:31.77mm	40	528	728	874	NA	NA	NA
	45	378	631	798	NA	NA	NA
	48	247	565	749	NA	NA	NA
	50	83	516	714	NA	NA	NA

Table-1

S.No.	Months	Ambient Temperature consideration (^{0}Celsius)	Ampacity for 75 ^{0}Celsius conductor temperature	Line Loading (MW) (=1.73X400X2XA)/1000
1	November-February	40	728	1008
2	March-June	50	516	714
3	July-October	45	631	874

Table-2

k. The steps are given for clarity of sequence:

a) **HVDC Talcher Kolar Trips and SPS 1000 signal is generated**

b) **The flow on 400 kV Talcher-Meramundali-1 OR 400 kV Talcher-Meramundali- 2 is more than 874 MW* continuously for a duration of 2 seconds**

c) **SPS 1000 would act at Talcher generation**

d) **If condition in "b" above is not satisfied, SPS 1000 will not act and remain high**

e) **If condition in "b" above is satisfied after 4 seconds, SPS 1000 will act.**

The similar steps would be applicable for SPS 450 if that is in operation prior to the incident.

* 874 MW is default value however table-2 may be referred

vii. <u>Existing SPS (SR side) :</u>

a. The SPS action causes load shedding in the states of Tamilnadu, Kerala, Andhra Pradesh and Karnataka. The load shedding of upto 2000 MW takes place due to SPS action after tripping of HVDC Talcher-Kolar one pole or both.

viii. <u>Proposed SPS (SR side) :</u>

a. The connectivity of Southern Region with the rest of grid after commissioning of high power transmission corridors has strengthened. The need of load shedding in SR post tripping of HVDC Talcher-Kolar therefore needs to be reviewed.
b. The load shedding after tripping of HVDC Talcher-Kolar can be reviewed as no line loading constraints except low voltages at different nodes around kolar are observed after tripping of HVDC Talcher-Kolar one pole or bipole.
c. The voltages around Bengaluru area is observed to be on lower side during high demand season of southern region. The removal of load shedding post tripping of HVDC bipole may further aggravate the problem of low voltages around the Bengaluru area.
d. The load flow study shows reduction of voltages by 10-15 kV at important nodes in Southern Region. The study is enclosed as Annexe-2. Therefore, load shedding of approx. 800 MW shall be carried out in Southern Region for such HVDC outage. The shedding of upto 800 MW could be achieved through Under Voltage Load Shedding based SPS for improving voltages around Bengaluru area.

ix. The trip signals in SR (designed for existing Talcher-Kolar HVDC) for load shedding may be retained for use in SPS scheme of HVDC Raigarh-Pugalur. The load shedding identified for HVDC Kolar (Trip Signals:TK-1, TK-2, TK-2) SPS may be gradually shifted to the HVDC Raigarh-Pugalur SPS as and when the same is ready. Once the shifting of loads is completed and HVDC Raigarh-Pugalur Poles are stabilised, load shedding for HVDC Kolar SPS may be disabled at an appropriate time.

x. The observation of proposed SPS indicates that on implementation of SPS action for most severe contingency there can be simultaneous load loss of approx. upto 800 MW and generation tripping/backing down of up to 1500 MW. Therefore, the net imbalance in the grid would be approx. up to 700 MW which is less than N-1 contingency in the grid. This is considering N-1 of one unit of Kudankulam generating unit and therefore interregional links would have margin.

---------x--------

Study Results - SPS									
S. No.	HVDC Talcher - Kolar Power Order	400 kV Talcher - Meramundli (short line)	400 kV Talcher - Meramundli (long line)	400/220 kV ICTs at Talcher (2x315 MVA)	400 kV Talcher - Rourkela D/C	400 kV Talcher - Rengali D/C	400 kV Talcher - Meramundli under N-1 of other (long) line	400/220 kV ICT loading under N-1-1 of 400 kV Talcher - Meramundli lines	Stage-II -I Interconnector flow
1	2000	459	237	2x96	2x(-)123	2x114	**597**	2x181	(-)90
2	1750	516	267	2x105	2x(-)74	2x138	**672**	2x201	162
3	1500	573	297	2x115	2x(-)25	2x162	**746**	2x221	414
4	1250	631	326	2x125	2x24	2x185	**821**	2x241	665
5	1000	688	356	2x134	2x73	2x209	**895**	2x261	915
6	750	745	385	2x144	2x122	2x232	**970**	2x281	1167
7	500	802	415	2x153	2x171	2x256	**1044**	**2x301***	1419
8	250	**859**	445	2x163	2x220	2x279	**1118**	**2x321**	1670
9	X	**916**	474	2x173	2x269	2x303	**1193**	**2x342**	1920

a) Sensitivity of 400 kV Talcher - Meramundli long line over short one - 59%

b) Sensitivity of Talcher generation on loading of 400 kV Talcher - Meramundli (short) line - 29% (when long line is out) & 22.5% (when long line is in service)

All figures are in MW

** Loading of 220 kV Talcher - Meramundli crosses 200 MW each*

Assumptions:

a) Study has been carried out on limiting case for Odisha shared by ERLDC. Odisha Demand - 5134 MW, Generation - 3470 MW

b) HVDC Flows:-
Talcher - Kolar - 2000 MW (in base case)
G'waka - 625 MW

c) Talcher Generation - 4x480 MW + 2x480 MW

SPS Logic		
S. No.	Line Loading	Generation Reduction (MW)
1	<850 MW	0
2	850 MW to 900 MW	200
3	900 MW to 950 MW	450
4	950 MW to 1000 MW	650
5	1000 MW to 1050 MW	900
6	1050 MW to 1100 MW	1100
7	1100 MW to 1150 MW	1300
8	1150 MW to 1200 MW	1550

Study on review of SPS scheme for HVDC Talcher-Kolar

During the meeting held on 20th July 2020 between ERLDC, SRLDC and NLDC, it was suggested to study & analysis SPS scheme for HVDC Talcher-Kolar. Accordingly, studies have been carried out at SRLDC to review SPS scheme of Talcher-Kolar HVDC from SR point of view for SR import of 12900 MW and with 2000 MW on Talcher-Kolar HVDC.

The simulations have been carried out for two cases i.e., with and without bypass of 400kV Cuddapa-Kolar at 400kV NP Kunta. Study results are both the cases are given below:

(1) With 400kV Cuddapa-NP Kunta-Kolar S/c

- 400kV lines in SR where change in flow is more than 200 MW

From Bus Number	From Bus Name	From Bus Voltage	To Bus Number	To Bus Name	To Bus Voltage	CKT ID	Basecase	Case-1: Outage of Talcher-Kolar HVDC carrying 2000 MW	Change in MW
337004	SOLAPUR-PG	765	437001	RAICHUR-PG	765	B1	1368.1	1743.7	375.6
337004	SOLAPUR-PG	765	437001	RAICHUR-PG	765	B2	1368.1	1743.7	375.6
414037	NP KUNTA	400	434010	KOLAR	400	T1	323.7	647.9	324.2
434003	HOODY	400	434010	KOLAR	400	B1	-413.5	-98.2	315.3
434003	HOODY	400	434010	KOLAR	400	B2	-413.5	-98.2	315.3
257001	ANGUL7	765	417003	SRIKAKULAM	765	H1	1477.8	1750.3	272.5
257001	ANGUL7	765	417003	SRIKAKULAM	765	H2	1477.8	1750.3	272.5
337003	WARDHA-PG	765	427001	NIZAMABAD	765	H1	1636	1879.1	243.1
337003	WARDHA-PG	765	427001	NIZAMABAD	765	H2	1636	1879.1	243.1
434005	SOMANAHALLI	400	434010	KOLAR	400	T1	-226.9	10.5	237.4
417003	SRIKAKULAM	765	417004	VEMAGIRI_PG	765	H2	1036.5	1234.9	198.4
417003	SRIKAKULAM	765	417004	VEMAGIRI_PG	765	H1	1036.6	1234.9	198.3
434010	KOLAR	400	444006	HOSUR	400	T1	374.9	169	-205.9
434010	KOLAR	400	444006	HOSUR	400	T2	374.9	169	-205.9
417001	KURNOOL-PG	765	437001	RAICHUR-PG	765	B1	-780	-988.7	-208.7
417001	KURNOOL-PG	765	437001	RAICHUR-PG	765	B2	-793.6	-1005.9	-212.3
434010	KOLAR	400	444024	TIRUVALAM-PG	400	T1	-28.7	-295	-266.3
434003	HOODY	400	434022	YELAHANKA	400	T1	9.5	-257.6	-267.1
434003	HOODY	400	434004	NELAMANGALA	400	T1	56.6	-274.8	-331.4

- 400kV buses in SR where change in voltage is more than 8kV

Bus Number	Bus Name	Voltage level (kV)	Basecase	Case-1: Outage of Talcher-Kolar HVDC carrying 2000 MW	Change in Voltage (kV)	Case-2: Case-1+ 800 MW load shedding in SR	Change in Voltage (case-2 w.r.to case-1)
434010	KOLAR	400	414	400	-14	403	3
434003	HOODY	400	409	397	-12	400	3
434022	YELAHANKA	400	408	398	-10	401	3
434004	NELAMANGALA	400	410	400	-10	402	3
444006	HOSUR	400	413	404	-9	406	2
434007	BIDADI	400	410	401	-9	404	3
454008	KOZHIKODE	400	422	412	-9	416	4
434005	SOMANAHALLI	400	410	401	-9	404	3
434020	MYSORE	400	418	409	-9	412	3
434008	TUMKUR	400	415	406	-9	408	2
434026	PAVAGADA	400	416	408	-8	412	4

(2) With 400kV Cuddapa-NP Kunta-Kolar S/c

- 400kV lines in SR where change in flow is more than 200 MW

From Bus Number	From Bus Name	From Bus Voltage	To Bus Number	To Bus Name	To Bus Voltage	CKT ID	Basecase	Case-1: Outage of Talcher-Kolar HVDC carrying 2000 MW	Change in MW
337004	[SOLAPUR-PG	765.00]	437001	[RAICHUR-PG	765.00]	B1	1369	1745	376
337004	[SOLAPUR-PG	765.00]	437001	[RAICHUR-PG	765.00]	B2	1369	1745	376
434003	[HOODY	400.00]	434010	[KOLAR	400.00]	B1	-397	-68	329
434003	[HOODY	400.00]	434010	[KOLAR	400.00]	B2	-397	-68	329
257001	[ANGUL7	765.00]	417003	[SRIKAKULAM	765.00]	H1	1478	1751	273
257001	[ANGUL7	765.00]	417003	[SRIKAKULAM	765.00]	H2	1478	1751	273
414004	[CHINAKMPALLI	400.00]	434010	[KOLAR	400.00]	T1	242	494	252
434005	[SOMANAHALLI	400.00]	434010	[KOLAR	400.00]	T1	-215	34	248
337003	[WARDHA-PG	765.00]	427001	[NIZAMABAD	765.00]	H1	1634	1876	242
337003	[WARDHA-PG	765.00]	427001	[NIZAMABAD	765.00]	H2	1634	1876	242
417003	[SRIKAKULAM	765.00]	417004	[VEMAGIRI_PG	765.00]	H1	1037	1235	199
417003	[SRIKAKULAM	765.00]	417004	[VEMAGIRI_PG	765.00]	H2	1037	1235	199

From Bus Number	From Bus Name	From Bus Voltage	To Bus Number	To Bus Name	To Bus Voltage	CKT ID	Basecase	Case-1: Outage of Talcher-Kolar HVDC carrying 2000 MW	Change in MW
417001	[KURNOOL-PG	765.00]	437001	[RAICHUR-PG	765.00]	B1	-778	-985	-207
417001	[KURNOOL-PG	765.00]	437001	[RAICHUR-PG	765.00]	B2	-792	-1003	-211
434010	[KOLAR	400.00]	444006	[HOSUR	400.00]	T1	365	149	-216
434010	[KOLAR	400.00]	444006	[HOSUR	400.00]	T2	365	149	-216
434010	[KOLAR	400.00]	444024	[TIRUVALAM-PG400.00]	400.00]	T1	-43	-322	-278
434003	[HOODY	400.00]	434022	[YELAHANKA	400.00]	T1	-5	-284	-279
434003	[HOODY	400.00]	434004	[NELAMANGALA	400.00]	T1	39	-307	-346

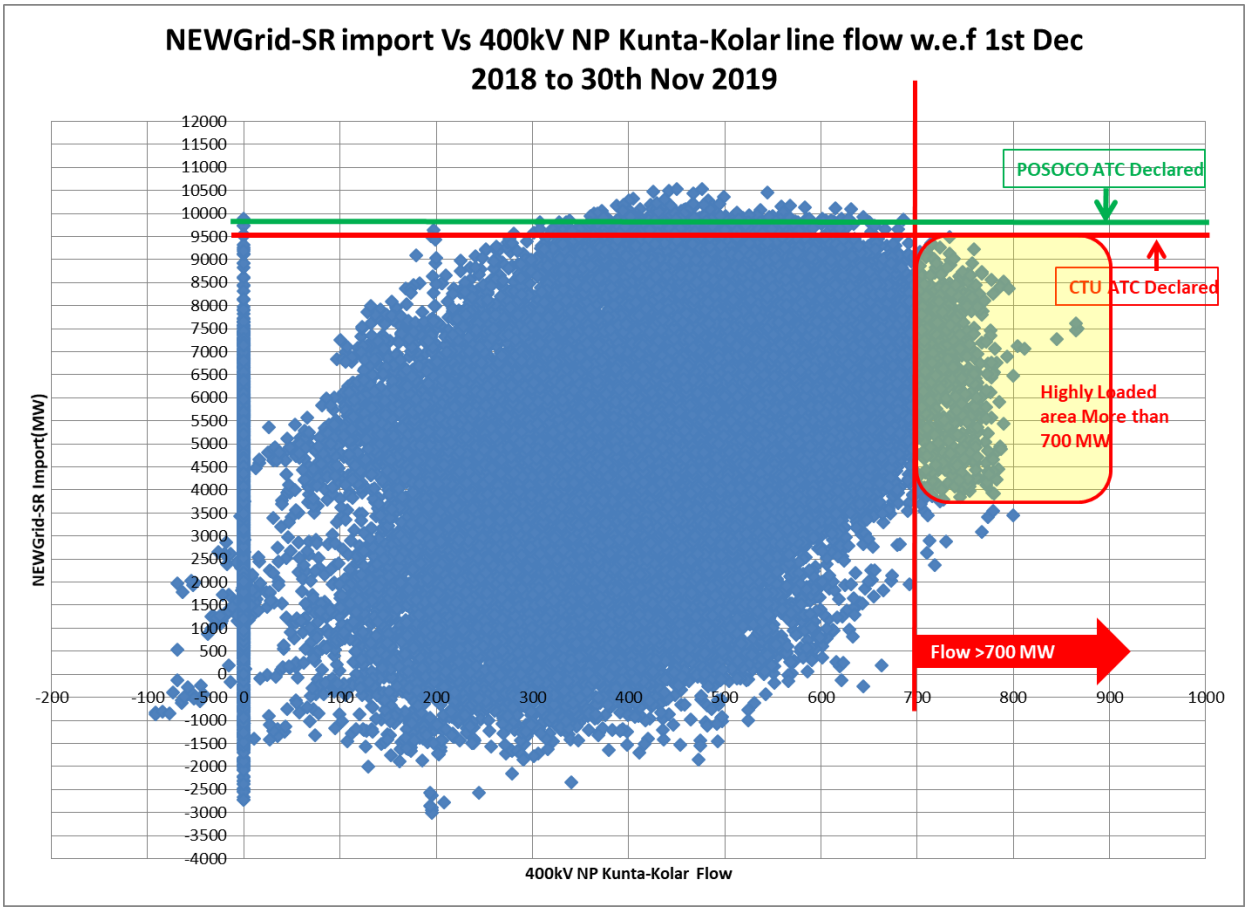
- 400kV buses in SR where change in voltage is more than 8kV

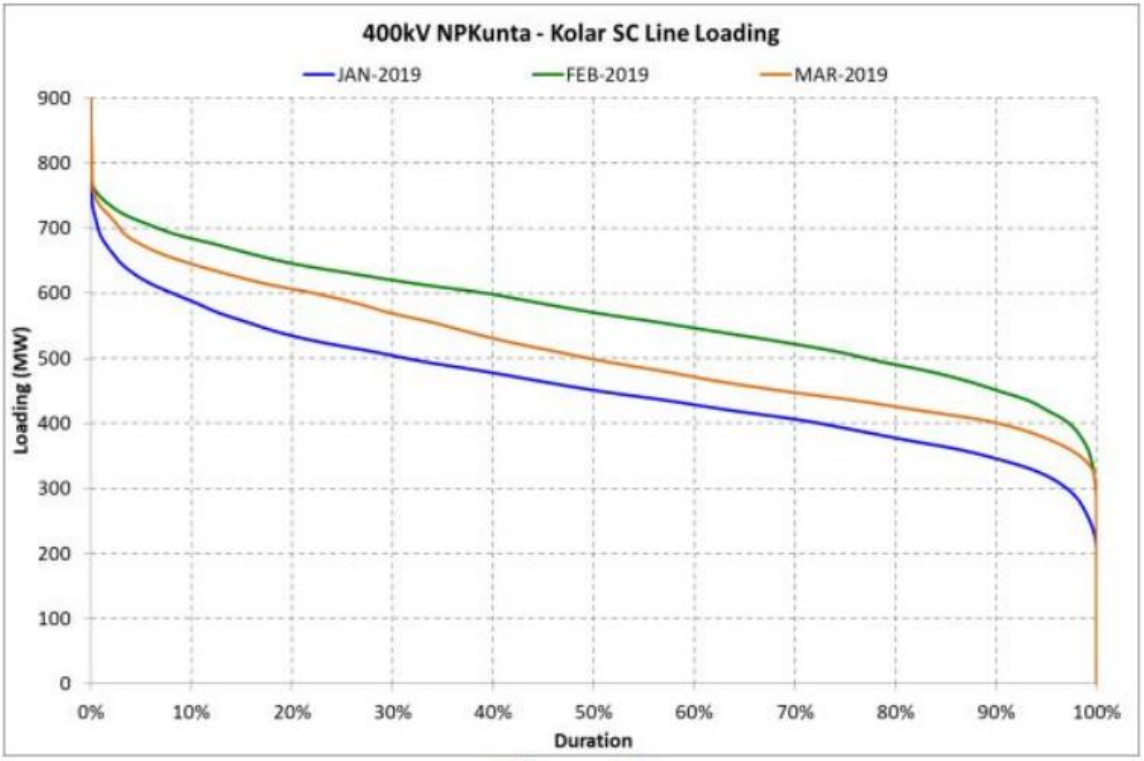
Bus Number	Bus Name	Voltage level (kV)	Basecase	Case-1: Outage of Talcher-Kolar HVDC carrying 2000 MW	Change in Voltage (kV)	Case-2: Case-1+ 800 MW load shedding in SR	Change in Voltage (case-2 w.r.to case-1)
434010	[KOLAR	400.00]	414	399	-15	402	3
434003	[HOODY	400.00]	409	396	-13	400	3
434022	[YELAHANKA	400.00]	408	397	-11	400	3
434004	[NELAMANGALA	400.00]	410	399	-11	402	3
444006	[HOSUR	400.00]	413	403	-10	406	3
434007	[BIDADI	400.00]	410	400	-10	403	3
434005	[SOMANAHALLI	400.00]	410	400	-10	403	3
454008	[KOZHIKODE	400.00]	422	412	-10	416	4
434020	[MYSORE	400.00]	418	408	-10	412	4
434008	[TUMKUR	400.00]	415	405	-9	408	3
434026	[PAVAGADA	400.00]	416	407	-9	410	3
434019	[HIRIYUR	400.00]	415	406	-8	410	4
434013	[HASSAN	400.00]	421	412	-8	415	3

Observations:

1. Outage of Talcher-Kolar HVDC carrying 2000 MW doesn't lead to overloading of 400kV lines in SR normally. However, with outage of HVDC, the flow on 400kV NP Kunta-Kolar s/c may breach thermal limit if pre-contingency flow on 400kV NP Kunta-Kolar is high.

2. It may be noted that the flow on 400kV NP Kunta-Kolar goes very high during the day time and this has been taken up in the feedback to planner and the duration curve of 400kV NP Kunta-Kolar is given below.





This issue has been taken up in 1st meeting of Southern Region Power Committee on Transmission Planning. Subsequently, it was also discussed in joint study committee meeting of SR held in Nov'19. The study committee agreed for delinking of 400kV Cuddapa-NP Kunta-Kolar line at N.P. Kunta to make direct line from 400kV Cuddapah to 400kV Kolar.

3. The voltage in Bengaluru and Mysore area is going to reduce by 10-15 kV with the outage of T-K HVDC carrying 2000 MW with & without bypassing of NP Kunta. Under Voltage Load Shedding Scheme (UVLS) is available with 150 MW in Bengaluru & Mysore area. However, there would be a need to enhance this UVLS in the absence of SPS. This would be taken up at the appropriate forum at OCC & PCC and this would be a generic scheme.

Considering the above points, it is suggested that to keep Talcher-Kolar SPS until the following actions are taken:

- 400kV Cuddappa-Kolar straightening by bypassing at 400kV Cuddapa-NP Kunta-Kolar at 400kV NP Kunta
- Commissioning of Raigarh-Pugalur HVDC one Pole.
- Identification of loads and commissioning of UVLS in Bengaluru, Mysore & Kozhikode area.

It may be noted that Talcher-Kolar SPS is quite reliable and mock testing of the same is carried in regular intervals. Hence, Talcher-Kolar SPS loads could be shifted to Raigarh-Pugalur SPS instead of disabling or removing the Talcher-Kolar SPS as suggested by SRPC.

Sensitivity in case of Talcher Kolar bipole outage & line loading just after tripping of Bipole is presented below:

Annexe-3 of Annexe-2

Talcher Kolar Sensitivity on SR inter-regional lines				
Name of the Element	**Loading in Limiting case**	**Loading under Talcher Kolar Bipole Outage**	***Sensitivity**	**sensitivity in case other parallel element goes out**
765 kV Angul Srikakulam S/C	1643	1915	-14%	65%
765 kV Raichur Solapur S/C	1391	1788	-20%	61%
765 kV Wardha Nizamabad S/C	1737	1962	-11%	55%
400 kV Kudgi Kolhapur S/C	156	35	6%	57%
765/400 kV Nizamabd ICT	846	941	-5%	63%
765/400 kV Maheshwaram ICT	867	989	-6%	64%

** positive sign indicates element loading increases with increase in HVDC power order*

** negative sign means loading increases even though HVDC power order decreases*

In order to make the system further N-1 compliant, SR import TTC has to be reduced by 2200 MW. Limiting constraint in this scenario would be overloading of 765 kV Angul-Srikakulam under outage of other circuit.

Annexure B2

Details of RE Generation Projects							
Name of generation project	**Name of potential RE Zone**	**Location (State, district)**	**Type (Wind, Solar, hybrid, Wind/ Solar with Storage, Small Hydro, Biomass etc.)**	**Total Capacity (MW) tied up /commissioned till 31.03.2020**	**Capacity (MW) tied-up /commissioned /to be commissioned during 2020-21 to 2026-27**	**Sub-station at which the RE generator is planned to be connected**	**Identified beneficiaries along with quantum of power, if any**
Name of generation project	**Name of potential RE Zone**	**Location (State, district)**	**Type (Wind, Solar, hybrid, Wind/ Solar with Storage, Small Hydro, Biomass etc.)**	**Total Capacity (MW) proposed to be commissioned during 2026-27 to 2031-32**	**Sub-station at which the RE generator is planned to be connected**	**Identified beneficiaries along with quantum of power, if any**	

Annexure B2

Details of Thermal/Hydro generation projects								
Name of Generation Project	**Location (State, district)**	**Type (Coal/Lignite/Gas/Hydro etc.)**	**Unit Size (MW) (e.g. 200/210/500/660 etc. or any other size in MW)**	**Capacity Commissioned (MW) till 31.03.2020**	**Total Capacity (MW) commissioned/ likely to be commissioned during 2020-21 to 2026-27**	**Total Capacity (MW) to be commissioned during 2026-27 to 2031-32**	**Sub-station at which the generator is planned to be connected**	**Identified beneficiaries along with quantum of power, if any**

Annexure B2

SI no.	Name of Substation	Type of Load (Domestic, commercial, Agriculture, Industrial etc.)	Maximum load in 2019-20 (MW)	Likely Maximum load in 2021-22 (MW)	Likely Maximum load in 2026-27 (MW)	Likely Maximum load in 2031-32 (MW)
1						
2						
3						

Annexure B2

Details of intra-state transmission lines to be commissioned between 2021-22 to 2026-27						
SI. No	**From**	**To**	**Voltage Level (kV)**	**Length**	**Circuit (S/C or D/C)**	**Type of conductor**
Details of intra-state transmission lines to be commissioned between 2026-27 to 2031-32						
SI. No	**From**	**To**	**Voltage Level (kV)**	**Length**	**Circuit (S/C or D/C)**	**Type of conductor**
Details of Intra state lCT to be commissioned between 2021-22 to 2026-27						
SI. No	**Name of Substation**	**Volatge ratio**	**Capacity**			
Details of Intra state lCT between to be commissioned between 2026-27 to 2031-32						
SI. No	**Name of Substation**	**Volatge ratio**	**Capacity**			

Annexure B2

RPO obligation of State/ UT			
	Solar	Non-solar	Total
2019-20			
2021-22			
2026-27			
2031-32			

Weekly update (13th – 19th November 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**

  - Mobilization of manpower and material for the balance piling activity is in progress at site. Bentonite tank construction is completed at loc 26/0, liner placement is done for one pile, further boring work has started *(Site pictures in slide 6-7 for reference).* Although the other location 26/3 where piling is balance is still in water *(pic in slide 8 for reference),* we are trying to commence the piling work at this location. Tower erection activity at location 27/4 of Motihari-Gorakhpur line is progressing well *(site pictures attached in slide 9 for reference)*

  - Pandemic situation remains a concern due to no. of Covid cases in the region *(Newspaper coverage in slide 4-5 for reference)* and all the guidelines issued by Ministry of Home Affairs (MHA) via order dated 30.09.2020 will remain enforce upto 30.11.2020

  - 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
Barh-Motihari Line		
25/1 (G)	Completed	…..
25/2 (G)	Completed	…..
25/3 (G)	Completed	…..
26/0 (G)	Moved from river to land; 16/20 piles completed	Balance piling work in progress; one pile liner placement done, boring is 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
Motihari-Gorakhpur Line		
26/1 (G)	All 16 piles, 4 Pile cap and chimney completed	No work progress
26/2 (G)	Completed	…..
26/3 (G)	Moved from river to land; 11 piles completed	No work progress
27/0 (R)	Completed	----
27/3 (A)	All 16 piles completed; 4 Pile cap completed	No work progress
27/4 (A)	Foundation completed	Tower erection in progress

पावरग्रिड
POWERGRID

Type text here

पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)

Ref. No.: ER-I/PAT/AM(ER-I)/ **Date : 26.10.2020**

To,
Member Secretary,
Eastern Regional Power Committee,
14, Golf Club Road, Tollygunj, Kolkata-700033

Sub: Regarding collapse of tower no. 1103 (DD+0) i.r.o. 400 kV Purnea Farakka and 400 kV Purnea Gokarna lines – restoration plan thereof.

Ref: i) Our email dtd. 05.09.2020
ii) Letter Ref. No. ER-I/PAT/AM(ER-I)/ dtd. 11.09.2020

Dear Sir,

This is in reference to our earlier correspondences mentioned above regarding collapse of tower no. 1103 (DD+0) of 400 kV New Purnea-Farakka and New Purnea-Gokarna Lines due to encroachment of river Ganga. The site conditions are still not workable and approach to this location is not feasible as per the current scenario in that area. Some photographs of local site condition and approach road taken on 23.10.2020 is enclosed as Anx-I for reference. However, we have planned to restore 400 kV New Purnea-Farakka and New Purnea-Gokarna Lines as per following:

a) **Temporary restoration:** After workable condition at site (expected by end of November, 2020) two numbers of ERS towers (one in each ckt.) shall be utilized for bypassing the tower no. 1103 in Ganga section (Scheme enclosed) by 15.12.2020.

b) **Permanent Restoration:** Permanent restoration by providing 02 Nos. Pile Foundation and 01 No. open cast foundation in Ganga section is expected to be completed by end of **June 2021**.

This is for your kind information and record please.

Yours faithfully,

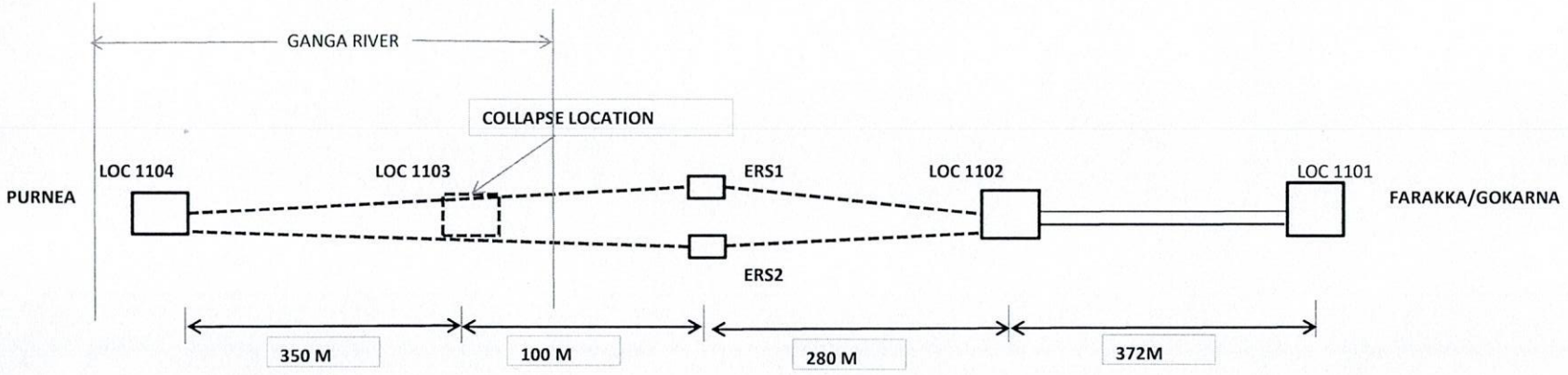
26/X/2020

(S.K.Singh)
CGM (AM)/ER-I

Encl: Photographs of site condition and ERS scheme arrangement

Copy to : ED (ERLDC)

TEMPORARY RESTORATION PLAN OF 400KV NEW PURNEA FARAKKA AND NEW PURNEA GOKARNA ON ERS ARRANGEMENT



Conductor used in existing Line: Triple snowbird

Conductor proposed in ERS Section: HTLS / BERSIMIS / MOOSE/SNOWBIRD

SPS Testing at Rangpo on 29.10.2020

Logic 1			Logic 2		
Rangpo	14:57:36:170		Rangpo	15:24:53:780	
Name of Generating unit	**Time**	**Difference of transmission time from Rangpo to respective end (in ms)**	**Name of Generating unit**	**Time**	**Difference of transmission time from Rangpo to respective end (in ms)**
Jorethang	14:57:37:117	947	Jorethang	15:24:54:389	609
Tashiding	14:57:37:539	1369	Tashiding	15:24:54:833	1053
Teesta-3	14:57:36:222	52	Teesta-3	15:24:53:833	53
Dikchu	14:57:36:884	714	Dikchu	15:24:55:169	1389
Teesta-V	14:57:36:217	47	Teesta-V	15:24:53:827	47
Chuzachen	14:58:10:463	34 secs 241 msec	Chuzachen	15:24:28:073	34 secs 293 msec

ANNEXURE D1

ANTICIPATED POWER SUPPLY POSITION FOR THE MONTH OF DEC-20

SL.NO		PARTICULARS	PEAK DEMAND IN MW	ENERGY IN MU
1		BIHAR		
	i)	NET MAX DEMAND	4850	2570
	ii)	NET POWER AVAILABILITY- Own	590	214
	iii)	Central Sector+Bi-Lateral	4613	2187
	iv)	SURPLUS(+)/DEFICIT(-)	353	-169
2		JHARKHAND		
	i)	NET MAXIMUM DEMAND	1450	840
	ii)	NET POWER AVAILABILITY- Own Source	341	186
	iii)	Central Sector+Bi-Lateral+IPP	923	471
	iv)	SURPLUS(+)/DEFICIT(-)	-186	-184
3		DVC		
	i)	NET MAXIMUM DEMAND	3000	2000
	ii)	NET POWER AVAILABILITY- Own Source	5159	2931
	iii)	Central Sector+MPL	494	285
	iv)	Bi- lateral export by DVC	1632	1215
	v)	SURPLUS(+)/DEFICIT(-) AFTER EXPORT	1021	1
4		ODISHA		
	i)	NET MAXIMUM DEMAND	3700	2306
	ii)	NET POWER AVAILABILITY- Own Source	3539	1718
	iii)	Central Sector	1915	778
	iv)	SURPLUS(+)/DEFICIT(-)	1755	190
5		WEST BENGAL		
5.1		WBSEDCL		
	i)	NET MAXIMUM DEMAND	6085	2730
	ii)	IPCL DEMAND	79	59
	iii)	TOTAL WBSEDCL's Energy Requirement (incl.B'Desh+Sikkim+IPCL)	6174	2796
	iv)	NET POWER AVAILABILITY- Own Source	4503	1808
	v)	Contribution from DPL	407	175
	vi)	Central Sector+Bi-lateral+IPP&CPP+TLDP	2281	1213
	vii)	EXPORT (TO B'DESH & SIKKIM)	10	7
	viii)	SURPLUS(+)/DEFICIT(-) AFTER EXPORT	1017	401
5.2		CESC		
	i)	NET MAXIMUM DEMAND	1450	695
	ii)	NET POWER AVAILABILITY- Own Source	500	324
	iii)	FROM OTHER SOURCE (INCL. IPP/CPP-29-30 MU/M)	410	59
	iv)	IMPORT FROM HEL	540	312
	v)	TOTAL AVAILABILITY OF CESC	1450	695
	vi)	SURPLUS(+)/DEFICIT(-)	0	0
6		WEST BENGAL (WBSEDCL+DPL+CESC) (excluding DVC's supply to WBSEDCL's command area)		
	i)	NET MAXIMUM DEMAND	7614	3484
	ii)	NET POWER AVAILABILITY- Own Source	5411	2307
	iii)	CS SHARE+BILATERAL+IPP/CPP+TLDP+HEL	3231	1584
	iv)	SURPLUS(+)/DEFICIT(-) BEFORE WBSEDCL'S EXP.	1027	408
	v)	SURPLUS(+)/DEFICIT(-) AFTER WBSEDCL'S EXP.	1017	401
7		SIKKIM		
	i)	NET MAXIMUM DEMAND	128	62
	ii)	NET POWER AVAILABILITY- Own Source	2	1
		- Central Sector	151	67
	iii)	SURPLUS(+)/DEFICIT(-)	25	5
8		EASTERN REGION		
	i)	NET MAXIMUM DEMAND	20335	11262
	ii)	BILATERAL EXPORT BY DVC	1632	1215
	iii)	EXPORT BY WBSEDCL	10	7
	iv)	NET TOTAL POWER AVAILABILITY OF ER (INCLUDING CS ALLOCATION +BILATERAL+IPP/CPP+HEL)	26369	12728
	v)	ENERGY SURPLUS(+)/DEFICIT(-) OF ER AFTER EXPORT (v = iv - i -ii - iii)	4392	244