भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
पूर्वी क्षेत्रीय विद्युत समिति
Eastern Regional Power Committee
14, गोल्फ क्लब रोड, टालीगंज, कोलकाता-700033
सत्यमेव जयते

Tel. No.:033-24239651,24239658 FAX No.:033-24239652, 24239653 Web: **www.erpc.gov.in**

NO. ERPC/EE/OPERATION/2022/ 860 **DATE: 07.10.2022**

To

As per list enclosed.

Sub: Minutes of 195th OCC Meeting held on 21.09.2022 (Wednesday) virtually through MS Teams Platform- reg.

Sir,

Please find enclosed minutes of 195th OCC Meeting held on 21.09.2022 virtually through MS Teams Platform for your kind information and necessary action. The same is also available at ERPC website (www.erpc.gov.in)

Observations, if any, may please be forwarded to this office at the earliest.

This issues with the approval of Member Secretary.

Regards,

Yours faithfully,

अलीक 07.X.22

(A. De)
EE(Operation)

LIST OF ADDRESSES:

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2. CHIEF ENGINEER (System Operation), BSPTCL, PATNA, (FAX NO.0612-2504557/2504937)
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CC:

Chief Engineer, OPM, CEA	Chief Engineer, NPC, CEA	ASSISTANT SECRETARY, ERPC

MINUTES
OF
195th OCC MEETING

Date: 21.09.2022
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700033

EASTERN REGIONAL POWER COMMITTEE

MINUTES OF 195TH OCC MEETING HELD ON 21.09.2022 (WEDNESDAY) AT 10:00 HRS

Member Secretary, ERPC chaired the 195th OCC meeting. Welcoming all the participants to the meeting, he outlined the performance of ER Grid during August-2022 in brief. He highlighted the following points:

- *In August-2022, energy consumption of ER was 17,227 MU which was 10.8% more than that of August'2021.*
- *In August-2022, Peak demand of ER was 27228 MW which was 13 % more than that of August'2021.*
- *During August -2022, 75.76 % of time, grid frequency was in IEGC Band (49.90Hz-50.05Hz).*
- *All India thermal PLF during July, 2022 was 70.43 %. However, in Eastern Region Thermal PLF was 70.43%. HEL generating station of CESC achieved a PLF of 91.87%.*
- *As per LGBR 2022-23, total 500 MW thermal capacity was scheduled for planned maintenance in October-2022.*
- *During the month of August-2022, following new transmission elements have been commissioned:*

1) 400kV Jeerat (New)-Subhasgram (PM-JTL-TBCB)- By PGCIL

- *As far as coal stock position is concerned, many of the power stations of Eastern Region are still reeling under coal shortage. He advised thermal power plants to build up their coal stock as per their normative requirement and to import at least 10% of their coal requirement for blending.*

PART – A

ITEM NO. A.1: Confirmation of Minutes of 194th OCC Meeting held on 23rd August 2022 through MS Teams online platform.

The minutes of 194th Operation Coordination sub-Committee meeting held on 23.08.2022 was circulated vide letter dated 29.08.2022.

Members may confirm the minutes of 194th OCC meeting.

Deliberation in the meeting

Members confirmed the minutes of 194th OCC meeting.

PART B: ITEMS FOR DISCUSSION

ITEM NO. B.1:	**Construction of 2 Lane Bridge across River Kosi along with approach road from Bheja to Bakaur section of NH-527A (Design Chainage Km 0+000 to Km 13+300) under BRT scheme of Bharatmala Pariyojana Phase-I (in the state of Bihar on EPC mode. -Outage of relocation/height raising of 400 KV DC Kishanganj-Darbhanga Tower no. 402 & 403.**

A Bridge across River Kosi along with approach road from Bheja to Bakaur section of NH-527A having a length of 13.3 km is being developed between Bheja- Bakaur The said project is a high-end priority project of Government of India which is being developed for connectivity over Kosi river with 10.2 km longest River Bridge, which is one of the longest river bridges in the Country.

It is intimated that there is a 400kV Kishanganj-Darbhanga (DC line) is falling in the main carriageway of NH-527A at Bheja to Bakaur under Construction Bridge which is required to be relocated. The estimate for the said li ne has already been received from Adani transmissions vide letter under reference Amounting to Rs. 77, 67, 76,805.00 / - which includes Rs.13,56,24,508.00 towards transmission availability loss. M/s ALTL vide Letter dated 22.02.2022 had submitted that transmission loss charges amounting to Rs. 13,56,24,508. 00 for outage for 25 days is to be deposited by NHAI for shifting the above-mentioned line. Further, in aforementioned letter M/s. Adani transmissions informed that the payment against the loss due to transmission availability loss (Rs. 13,56,24,508.00) shall be refunded by Alipurduar Transmission Limited to NHAI subject to deemed availability certificate issued by Eastern Regional Power corporation to the transmission company.

In this regard, it may be noted that the payment against the loss due to transmission availability loss claimed by M/s, Adani transmissions are huge and the project being implemented under EPC mode with 100% Government funding will burden the Government budget. It may also be noted that the subject project is in its advanced stage of construction and non-shifting of said tower will adversely affect the completion of the project as it is falling in the main carriage way of the alignment. The completion of the instant project on time will be recognised as a mile stone achievement for Govt of India and will able to facilitate the Public of backward Region State of Bihar.

As per para 5.3 of Ministry of Power Office Memorandum dated 16.08.2021, it is mentioned that in case of projects of national importance WWI projects), deemed availability may be given for the shut-down period availed by transmission licensees for shifting of their transmission lines, provided that transmission customers are not affected by the shutdown (**Annexure B.1**)

In view of the above and the subject project being of National Importance, it is therefore requested to issue the necessary deemed availability certificate to Alipurduar Transmission Limited for waving off of the Transmission availability loss for the shutdown of 400kV Kishanganj - Darbhanga Line (DC li ne) for about 25 days.

Members may discuss.

Deliberation in the meeting

Adani representative submitted that the proposed NH to be constructed would pass between tower locations 402 and 403 (figure attached at Annexure B.1). After detailed survey it was decided that 2 nos. of towers (402 and 403) would be dismantled and 3 nos. of towers (402A,

403A & 403B) would be constructed. Out of the 3 nos. of towers to be newly constructed, 2 nos. are out of alignment with the original line for which the pile foundation and tower erection activities could be completed without any shutdown requirement. For the remaining one tower, pile foundation work could be carried out without any shutdown but during erection and stringing work shutdown would be required.

He further submitted that a minimum of 25 nos. of days are required to complete all the activities related to construction of new towers and shifting of lines. The work would be carried out after receipt of estimated amount from NHAI. He further stressed upon the fact that the work could be carried out only between the months of October to April, as for the remaining months the area is water logged.

Upon enquiring whether the above proposal is approved by any agency, it was informed that the engineering team of Adani had floated the above proposal.

ERLDC representative advised Adani to explore the possibilities of keeping the line in ERS during the shutdown period. Adani representative submitted that the area being heavily waterlogged, implementation of ERS may not be possible but still they would explore the possibilities of the same.

OCC advised Adani to submit a detailed report within 3-4 days depicting all the activities (parallel as well as series) so that a critical path may be worked out to complete the project at the minimum time.

ITEM NO. B.2:	**Proposed diversion of route between tower location 43 to 50 of 400 KV Kishenganj Saharsha 1 & 2 (erstwhile Patna Kishenganj) transmission line on banks of river Kankai in Vill – Amour, Dist – Purnea.**

In reference to the above, this is to bring to submit that heavy flood and incessant rainfall had affected northern parts of Bihar in Purnea and Kishanganj district in previous monsoon season.

Subsequently, heavy soil erosion on the banks of river Kankai was observed near tower location 47 of subject transmission line. The river-bank distance from the tower had reduced from earlier 100 m to 65 m. Thereafter a technical committee was constituted to assess the affected stretch of transmission line from tower location 43 to 50.

It may be noted that change of course of river Kankan is occurring over the years causing soil erosion of the banks. The transmission line has been affected in the stretch earlier also in recent history. Rough sketch is placed at **Annexure B.2.**

Accordingly, it was decided to undertake following preventive measures to safeguard the transmission line from future endangerment and outage:

1. Temporary protection of tower location 47 by providing through stacking of geo bags on river bank. The said work has already been completed on war footing basis in April 2022 and regular monitoring of the location is being done and found safe till date.

2. As a long-term measure, relocation of the route from location 43 to 50 to divert away from the river bank to approximately 600m in the most vulnerable stretch.

This is to inform that the above work is likely to be commenced after monsoon and targeted to be completed before next monsoon season.

Members may discuss.

Deliberation in the meeting

Representative of Powergrid submitted that the towers in location 51 and 52 are already in pile foundation. Further, shifting of towers approximately 600 meters away from the river bank in locations 43 to 50 would be carried out as a permanent measure against flood. Presently, temporary protection to tower at location 47, which is closest to river bank is being provided by stacking of geo bags.

He further submitted that the assessment of the shifting proposal was given by the expert committee from corporate office.

On query, he informed that the shifting work would be carried out from O&M expenses of Powergrid. Further, to complete the above shifting work, shutdown for 10 days would be required in the month of December 2022.

OCC advised Powergrid to carry out the shifting work of towers simultaneously at both the ends and submit a detailed plan of action for the above proposal.

ITEM NO. B.3: Ensuring Reliability of Barauni Generating Station (2X250 MW).

The reliability issue of 220 kV Barauni TPS has been discussed in various OCC meetings and further in 46th TCC and ERPC meeting. In 194th OCC meeting, Bihar representative submitted that:

- Out of the 29 nos. of towers of 220 KV Barauni-Begusarai D/C line, jumper tightening work of 15 towers had been completed. Jumper tightening work in remaining locations would be started from 29th August 2022 and is expected to be completed by the end of August 2022.
- The estimate of reconductoring work (to HTLS) of 220 KV Barauni-Begusarai D/C line is under preparation and would be submitted by 26th August 2022.
- OCC advised NTPC to give update about the load carrying capacity of the 220 KV Barauni Begusarai D/C lines after jumper tightening work.
- Bihar may update the latest status of implementation of the above points.

Bihar may update the latest status of implementation of the above points.

Deliberation in the meeting

Bihar representative submitted that the jumper tightening work of circuit-1 was completed on 8th September 2022. For circuit-2, the jumper tightening work would be completed by 25th September 2022.

The estimate of reconductoring work (to HTLS) is under the process of verification by higher authorities and would be submitted to OEM shortly.

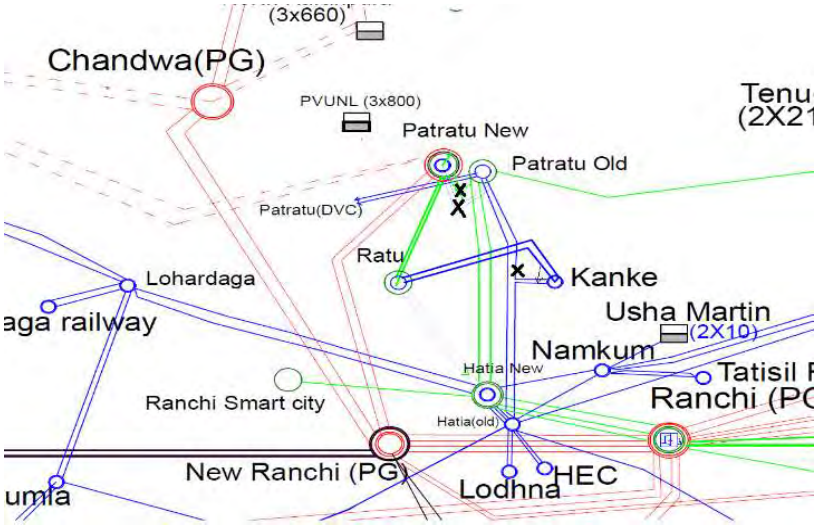
NTPC representative submitted that they would consult their Engineering division regarding increase in load carrying capacity after jumper tightening work and revert at the earliest.

ITEM NO. B.4: Reliability issues at Ratu and Kake areas of Jharkhand.

Ratu (Burmu) and kanke Areas of Jharkhand were previously fed through either 220/132 KV Patratu Old s/s or Hatia old substations of JUSNL. Presently, it is fed through Patratu New 400/220 KV substation having 2 x 315 MVA ICT in a radial manner. The peak load of this stations is around 90 MW and the radial connection through Patratu New source since January 2022 has offloaded Ranchi 2x315 MVA 400/220 KV ICTs.

However, 315 MVA 400/220 KV ICT 1 at Patratu New has been under under outage since 1st August,2022 when it had tripped on Bucholz relay operation. Neither, any update has been received as to what internal fault led to such operation, nor any expected date of its revival has been communicated. Therefore, the reliability of aforesaid stations which are forming part of capital city load of JUSNL has diminished, making it solely dependant on remaining ICT of Patratu New, 315 MVA 400/220 KV ICT 2. Given fact is a violation of N-1 criteria as mentioned in clause 4.2 and 6.2 of Manual on Transmission planning criteria, CEA. The 2nd ICT has tripped recently on consecutive days on 12th September,2022 and 13th September ,2022 due to operation of Oil surge relay leading to total power failure in 220/132 KV Ratu and 132 KV kanke s/s,though no fault was reported. Thus expeditious investigation of such maloperation is needed to ensure such instances are not repeated.

It is informed that one 132 KV ckt of Ratu Kanke d/c has been diverted from Ratu to Hatia old making it 132 KV Kanke Hatia old s/c to supply power to aforesaid areas in events of total power failure during tripping of 315 MVA ICT 2 at Patratu New. However, this arrangement would basically reduce restoration time ,but won't augment the reliability lapse as the load is still fed radially from Patratu New.



JUSNL is requested to respond to below points

1) Actual reason of tripping of 315 MVA ICT 2 At Patratu New and measures taken to ensure to eliminate such maloperation.

2) Reason of long outage in 315 MVA ICT 1 at Patratu New and expected date of its revival.

Deliberation in the meeting

Jharkhand representative submitted that intimation regarding outage of ICT 1 had already been intimated to PGCIL as the ICT is under defect liability period.

Powergrid representative submitted that fault identification of ICT-1 has been done. Entire oil of transformer has been drained out and the complete rectification work would be carried at the site and the work is expected to be completed within 20-25 days i.e., by 20th October 2022.

Jharkhand representative further submitted that oil sample of ICT-2 was sent for testing but they were not satisfied with the test results. Oil sample of ICT-2 has been sent to Patna testing Lab for DG analysis.

OCC advised Powergrid and Jharkhand to submit the details of testing report to ERPC and ERLDC.

ITEM NO. B.5: Islanding Schemes in Eastern Region

B 5.1. Implementation of Islanding Schemes in Eastern Region

In the meeting held on 28th December 2020 and chaired by the Hon'ble Minister of State (IC) it was directed that islanding schemes should be implemented for all major cities of the country considering all the strategic and essential loads. Subsequently, in line with the direction given in the meeting, the subject matter was discussed in PCC meeting of ERPC and it was finalized that new islanding scheme would be implemented for capital city of Patna & Ranchi.

I. <u>Patna Islanding Scheme:</u>

In the 45th TCC Meeting, following was decided:

a) A Technical Committee comprising of the members from BSPTCL, SLDC Bihar, and participating generator, Powergrid, ERLDC and ERPC may be constituted for finalizing the Islanding Scheme.

b) CESC may also be included in the Committee for any technical expertise.

c) The Committee may consult OEM/Vendor as and when required for any inputs.

d) The Committee may submit its report by 15th May'2022. TCC advised the concerned constituents to give their nominations latest by 31st March'2022.

In this regard, ERPC vide letter no. ERPC/Operation/IS/2022/97 dated 18.04.2022 constituted a Technical Committee based on the nominations received for finalizing Patna Islanding Scheme.

In the 190th OCC meeting, Committee submitted that the first meeting was convened on 19th April 2022 and the second meeting is scheduled to be held by 1st week of May 2022. The report would be submitted by 15th May 2022.

In the 46th TCC & ERPC meetings ERPC Secretariat representative stated that as per the direction of 45th ERPC, technical committees were constituted and the matter was discussed in several meetings of the committee.

The deliberation of the committee in brief is as follows:

Patna Islanding Scheme:

Based on the steady state as well as dynamic study result of Patna Islanding scheme, the scheme is found to be stable for all the extreme scenarios.

The islanding system will be formed with one unit of NPGCL and corresponding loads of Patna city as enumerated in the study report.

Committee recommends for a centralized monitoring unit which would monitor & initiate action to balance load generation of the islanding system.

Also, an islanding study shall be done in detail considering the actual models of the governor & excitor of the unit, various control loops of the plant considering influences from speed and pressure control loop in consultation with OEM.

Preparation of detailed project report may be initiated by Bihar based on the preliminary study report of the committee & the DPR shall include provision of detailed study in it.

After deliberation, TCC opined that for detailed study by OEM, NTPC has to take initiatives & advised NTPC to take up the matter with OEM for carrying out detailed study of the proposed islanding scheme in a time bound manner. NTPC agreed to it.

TCC advised Bihar to initiate the process of DPR preparation & advised all the concerned stakeholders to coordinate for providing relevant inputs for preparation of DPR.

In 194th OCC Meeting, NTPC representative submitted that they would submit the detailed study report shortly.

Bihar/NTPC may update.

Deliberation in the meeting

NTPC representative submitted that proposal for detailed study of Islanding scheme is yet to be received from M/s GE.

OCC expressed serious concern over the delay in implementing the Islanding Scheme and advised NTPC to expedite the matter with OEM M/s GE and give a copy of mail to ERPC.

In addition to above new islanding scheme, the following schemes have already been finalized and under different stage of implementation:

II. Chandrapura Islanding Scheme:

The scheme detail in brief is as follows:

- The CTPS-B islanding scheme is to de designed with two units of CTPS-B (2x250 MW) generating station as participating generator and connected loads at CTPS, Putki, Biada, Nimiaghata & Patherdih. The estimated off-peak and peak load in the proposed islanding system is 280 MW & 420 MW respectively.

- The islanding frequency for CTPS-B islanding system was decided as 48.4 Hz.

In the 193rd OCC meeting, DVC representative submitted that the order had been placed to M/s Siemens on 14th July 2022. The expected timeline for completion of work is 9 months due to semi-conductor issues.

DVC may update.

Deliberation in the meeting

OCC advised DVC to submit the details of updates, if any to ERPC and ERLDC.

III. IB-TPS Islanding Scheme:

The scheme was finalized in the special Meeting on Islanding Scheme of IB-TPS held at ERPC, Kolkata on 12th December 2018.

In special meeting held on 06.08.2021, OPGC representative informed that work order had been placed on OEM (M/s BHEL) for implementation of the Islanding scheme at IB TPS units.

OPGC was also advised to take up the issue with their highest authority as well as with the OEM for expediting the implementation of islanding scheme.

In the 190th OCC meeting, OPTCL representative submitted that the installation, commissioning, and testing of DTPC at both Budhipadar and OPGC end was completed.

OPGC representative submitted that end to end signal testing and wiring from switchyard to relay panel had been completed. The testing would be done during shutdown or outage of the units.

In 194th OCC Meeting, OPTCL representative submitted that the testing would be carried out during the end of August 2022.

OPTCL may update.

Deliberation in the meeting

OPTCL representative submitted that the testing of Islanding scheme was planned on the 2nd week of September 2022 which could not be done due to some issues. The testing would be carried out after consultation with OPGC.

ITEM NO. B.6: Reliable Power Supply to Lalmatia/Godda/Dumka areas of JUSNL

B 6.1. Restoration of 220kV Farraka-Lalmatia S/C line

The 220 kV Farakka-Lalmatia S/C was out of service since April 2021 due to tower collapse. The 220/132/33 kV Lalmatia substation is relying on only 132 kV lines. At present the local load at 220 kV Dumka and Godda S/S were being radially fed from 400/220 kV Maithon S/S through 220 kV Maithon-Dumka D/C and 220 kV Dumka-Godda D/C.

In 181st OCC Meeting, JUSNL representative submitted that they had got a letter from NTPC on 19th July '21 regarding anti-theft charging of the220kV Farraka-Lalmatia S/C line at 33kV level. Earlier the antitheft charging of the line was done at 11kV level but incidents of thefts have been

reported in some portion of the conductor.

Further, Jharkhand representative requested NTPC to submit the details of the 33kV lines passing below 220kV Farakka-Lamatia T/L. He added that as per information obtained from their JUSNL Discom part, the 33kV lines are mostly connected with 11kV feeders and due to this it would be difficult to charge the Farakka-Lalmatia line at 33kV level in Pakur area.

NTPC representative informed that they had charged the line up to loc no.241 but in between loc no.76-82 only the top conductor was in charged condition and the bottom rest were not; because of this theft might have happened in that portion. He further added that they had already isolated the section from loc no.76-82, whereas up to loc no.76 the line is in charged Condition and from loc no.82-241 the line needs to be charged.

ERPC advised NTPC and Jharkhand to explore the possibility of antitheft charging at 33kV level first and if that is not feasible then charging at 11kV can be assessed.

In the meeting held on 10th August 2021 by the Hon'ble Secretary, Ministry of Power, Government of India, ECL was directed to handover the FLTS assets on "as is where is basis" to JUSNL, the Operation and Maintenance whereof as was with the NTPC is also to be transferred to the JUSNL without any further delay and latest by 20th August 2021. Further JUSNL was directed to comply with all other directions of the CERC's order dated 21.07.2020, after the transfer of the FLTS from ECL.

In the 46th TCC & ERPC meetings, Jharkhand representative submitted that the tendering work for the rectification of the said line has been completed and they are in process of sanction of fund for placing the order.

In 194th OCC Meeting, JUSNL representative submitted that requisition for sanctioning of funds from Govt. of Jharkhand is in process and is expected to be approved in the first week of September 2022.

Jharkhand may update.

Deliberation in the meeting

Jharkhand representative submitted that the work order was issued on 8th September 2022 with an estimated cost of Rs. 12 Crores. The work is expected to be completed within 3 months.

ITEM NO. B.7: Outage of Important Transmission System.

B 7.1. 132kV Sagbari–Melli.

Sikkim vide mail dated 09.06.2021 updated the following status:

1) In loc 82,83 & 84 we have low ground clearance which need hill cutting but if needed TL can be charged after putting temporarily barbed wire fencing.
2) In loc 98-99 a house had been constructed just below the line and warning had been issued to the owner for not to do vertical extension of the house till any such arrangement is made.
3) In loc 116 &117 land owner demanding for intermediate tower and not allowing for us to clear the jungles.
4) Loc 128 is in dilapidated condition due to sinking effect posing threat to lives and properties.

Local public are asking to shift the tower in safe place before restoration of supply in the TL.

5) 80% of jungle clearance has been completed and remaining 20% is in Forest area most of it is under west district and waiting for permission from Forest department.
6) The delay in obtaining permission for following trees in forest land is that it cannot be ascertained whether FCA clearance during construction of TL was obtained as the record is not available either in power department or in DFO Office. Regarding this it had been told by ERPC that once obtaining environment clearance at the time of construction there need not to take permission for further clearance of ROW from Forest dept and this matter is been conveyed to the Forest department but they informed us as per Forest Act of Sikkim state permission has to be obtained for fresh felling with payment of compensation. File for approval is being send to conservator of Forest from DFO on 10/6/2021.

In the 191st OCC Meeting, Sikkim representative submitted that the 132 KV Sagbari-Melli line would be charged within 6 months.

In the 46th TCC meeting, Sikkim representative updated the following:

1. Tower foundation work is going on in loc 128.
2. Other issues have been resolved.
3. The line is expected to get restored by October-22.

Sikkim may update.

Deliberation in the meeting

Sikkim representative was not present during the discussion.

ITEM NO. B.8: Farakka Unit-6 Revival and Synchronization plan.

Farakka Unit-6 is out of bar since 23.08.2022 due to Turbine Bearing Pedestal vibration high problem. LPT-Generator and Generator- Exciter Rotor decoupled and bearing 4,5,6 & 7 inspected. Some problem was noticed at Bearing-5 pedestal foundation secondary grouting and foundation anchor bolt location. Hence, re-grouting was done as per suggestion of expert BHEL and NTPC Civil Engineer.

Further during Generator casing Air Tightness Test (ATT) at 3.5 Ksc Pressure, leakage was noticed from Exciter Rotor CC bolts (Current carrying). So, leakage was suspected from Generator Rotor CC bolts.

This is like to mention that "NO WORK HAD BEEN DONE IN GENERATOR AND EXCITER SYSTEM DURING THE SHUTDOWN PERIOD" because it was not planned.

Due to Safety of the Machine (Generator and Exciter) following activities were carried out:

1. Generator-Exciter Decoupled.
2. Bearing-6, Generator seal body (Exciter side) and Generator End-shield (Exciter side) were opened.
3. Generator Rotor CC bolts washers replaced and recommended chemical compound applied for sealing.
4. To ensure "no further leakage in CC bolts" Nitrogen pressurization test was carried out at 6 Ksc pressure. Found to be successful.
5. Similarly, Exciter Rotor CC bolts washers replaced and Nitrogen pressurization test conducted successfully.

6. Generator End-shield, Generator Seal body and Bearing-6 assembled and seal oil system charged.
7. Generator Casing pressurized at 3.5 Ksc and ATT started on 08.09.2022 and it will continue for 24 hours.

Further activities to be carried out:

8. LPT-Generator alignment
9. Generator-Exciter alignment
10. Complete alignment for LPT-GEN-Exciter Rotor and coupling bolts tightening
11. Bearing-4, 5, 6 and 7 box up
12. TG bearing 4, 5, 6 and 7 oil flushing.
13. TG on barring
14. Boiler Light up
15. Turbine rolling to 3000 RPM
16. Turbine Trim balancing after attaining Turbine Speed 3000 RPM.
17. Unit Synchronization.

Activities (1-10) as mentioned above shall take around 7 days. However, all efforts are being put to bring Unit-6 on bar by 15.09.2022.

NTPC may update.

Deliberation in the meeting

It was informed that the Farakka unit-6 had already been synchronized.

ITEM NO. B.9: Status of North Karanpura NTPC Generating Station (3 X 660 MW) along with associated transmission elements.

At the 188th OCC Meeting held on 10-03-2022, it was informed that the North Karanpura unit of NTPC is planned to be synchronized by March 2022 and the Patratu unit is scheduled to be commissioned in March 2024.

All India's demand is increasing by leaps and bounds, and so does the Eastern Region's demand. The synchronization of North Karanpura will help a lot of all the beneficiaries, and Jharkhand in particular.

Before synchronizing the North Karanpura unit, establishing ISTS connectivity is required. It seems the respective bays at Chandwa and North Karanpura owned by PGCIL and NTPC, respectively, are already ready to charge, but the lines owned by NKTL are not ready yet. As per communication with NKTL dated 09-09-2022, it was informed that the 400 kV North Karanpura (NTPC)-Chandwa (PGCIL) D/C is expected to be first time charged soon. The following status was received: the total scope was 115 towers. This line has had 100% of its foundation and erection activity completed, with 29 kilometres of stringing completed out of a total of 38 kilometres, leaving only nine kilometres to go. Owing to continuous rain and poor weather conditions, progress at the site is being impeded. NKTL is putting their best efforts against all odds and is targeting mechanical completion by September's end.

Once ISTS connectivity is established, NTPC may provide an update on the drawal of start-up power for each unit and its duration. Further, after the unit synchronization, the infirm power injection duration and tentative date of COD may be updated. Furthermore, present drawing of start-up power and construction power from the DISCOM, as well as the status of all testing activities may also be updated.

PGCIL may provide an update regarding the readiness of the bays as they are already commissioned.

NKTL may provide an update regarding the first time charging of North Karanpura (NTPC) S/S elements.

Deliberation in the meeting

NTPC representative submitted that the works related to transmission lines are under progress. Erection and commissioning activities of coal handling plant is also under progress.

Upon enquiring about the mode of transportation of coal, it was informed that coal would be transported through pipe conveyor which is yet to be commissioned due to some land related issues.

OCC expressed serious concern over the issue of delay in the commissioning of pipe conveyor system for transportation of coal and advised NTPC to expedite the same at the earliest.

Odisha representative submitted that NTPC must ensure immediate synchronization of unit- 1 after the readiness of line.

NKTL representative submitted that 400 kV North Karanpura (NTPC)-Chandwa (PGCIL) D/C is expected to be charged by 1st October 2022.

OCC advised NTPC to submit the detailed timeline regarding synchronization of unit to ERPC at the earliest.

On query, NTPC representative also submitted that Bah-St 1 unit-2 would be commissioned by the end of November 2022.

ITEM NO. B.10: Request for Consent of SLDC Ranchi/ JUSNL regarding Power assistance through 132kV Patratu - Patratu tie w.e.f. 10-10-2022 to 29-12-2022 (tentative).

This is to inform that 132kV Ramgarh - Patratu D/c (L#77 & 78) lines are going to be for re-conductoring purpose to HTLS from 10-10-2022 onwards by taking S/D of the Ckts one by one.

As per the plan, 132kV Ramgarh - Patratu Ckt# 2 (L#78) will be taken under S/D w.e.f. 10-10-2022 to 17-11-2022 each day from 05:00Hrs to 17:00Hrs and thereafter 132kV Ramgarh - Patratu Ckt# 1 (L#77) w.e.f. 19-11-2022 to 29-12-2022 each day from 05:00Hrs to 17:00Hrs. The detail Bar-chart of Execution of the re-conductoring job, as received from the vendor, is also attached at **Annexure B.10.**

During the above S/D period, it is requested for consent regarding Power Assistance of around 45MVA (35-40 MW) through 132 kV Patratu - Patratu Tie for ensuring reliable power supply to 132kV Patratu & North Karanpura.

Members may discuss.

Deliberation in the meeting

DVC representative submitted that during shutdown of 132kV Ramgarh - Patratu Ckt# 2 power assistance to the tune of 40 MW would be availed on continuous basis and during shutdown of 132kV Ramgarh - Patratu Ckt# 1 power would be availed as and when required during contingencies.

Jharkhand representative submitted that they are ready to provide 40 MW power assistance to DVC on continuous basis subject to the availability of both the units of Tenughat. He further submitted that in the actual configuration 2 nos. of circuit for power transfer were there between Patratu and DVC but as of now only one circuit is in service and therefore advised DVC to explore the possibilities of bringing the other circuit in service for maintaining reliability while availing of power on continuous basis from Jharkhand.

ITEM NO. B.11: Ensuring N-1 reliability criteria at 400/220 KV Subhashgram (PG) S/s.

The reliability issue of Subhasgram (PG) was discussed in the 46th TCC and ERPC meeting. In the meeting it was deliberated that there is an urgent requirement for installation of 6th 400/220kV, 500 MVA ICT at Subhasgram (Powergrid) S/s. On request of West Bengal, CESC agreed to bear the cost associated with the installation of the said ICT and its future maintenance. Further, CESC requested Powergrid to execute the project on deposit work basis. In the 194th OCC meeting, Powergrid representative submitted that decision in this regard would be taken by their corporate office and they would submit the details as and when it is received. ERLDC suggested Powergrid for applying requisition of shutdown regarding implementation of SPS scheme. However, no shutdown request has been received by ERLDC till date.

Powergrid is requested to update regarding the installation of new ICT at Subhashgram.

Deliberation in the meeting

Powergrid representative submitted that proposal for cost estimation has already been sent to their corporate office. The MoU would be finalized after deposition of estimated cost by CESC.

OCC advised Powergrid to submit the cost estimate to CESC by the 15th October 2022 and finalize the MoU with CESC by the end of October 2022.

Regarding implementation of SPS scheme, Powergrid informed that they have applied for shutdown on 24th September 2022.

ITEM NO. B.12: Proposal for renewal of AMR Phase-3 AMC of 249 nos. of SEM in ER.

The original LOA for AMR phase-3 was awarded to M/S TCS in Oct-2016. Scope was Supply, Installation, Commissioning of AMR system with one year warranty and 4 years comprehensive AMC. The total Qty. of SEM considered in this scope was: 249. (Details of Substations for the 249 SEM are given in **Annexure B.12**).

Supply, Installation and One year warranty was completed in Aug-2018, and from 01-Sep-2018 AMC was started. 04 years comprehensive AMC has been completed on 31-Aug-2022. From 01-

Sep-2022 onwards, all these 249 SEM Meters are out of AMC support.

Renewal of AMC support is required to continue the AMR operation and ensure SEM data availability to ERLDC for weekly billing. Under proposed AMC period, it is envisaged up to the period of March-2026, such that AMC of Phase-3 could be concurrent with Phase-1/2.

The AMC renewal will be from 01-Sep-2022 till 31-Mar-2026 (43 months). Being OEM the AMC support required to be placed to M/S. TCS only on ST basis. As per budgetary offer the AMC value comes to around Rs. 1.24 Cr (Excluding GST) for 249 SEM for 43 Month time period.

M/S TCS is continuing the AMC support now, and we requested them to continue the AMC support also till finalization of the proposed AMC.

Members may please discuss.

Deliberation in the meeting

Powergrid representative submitted that M/s TCS has submitted a cost estimate of Rs. 1.24 Crores for the renewal of AMC of Phase-3 AMR of 249 nos. of SEMs. The AMC period will be from 01-Sep-2022 till 31-Mar-2026 i.e., for 43 months such that AMC of Phase-3 could be concurrent with Phase-1 & 2. They are in the process of negotiation with M/s TCS for further reduction of AMC cost of phase-3.

Also, the AMC of 254 meters (Phase-4) which is valid up to June 2026 would be preponed to March 2026 so that AMC of all the phases could be started afresh concurrently.

OCC agreed to the above proposal and referred it to the CCM meeting for further approval.

ITEM NO. B.13: Proposal for replacement of old 50 MVAR, (3x16.67 MVAR) Bus Reactor-I of Durgapur under ADDCAP (2019-24) of FSTPS.

Under FSTPP Stage-I, 50 MVAR Bus Reactor -I, Make: - CGL, of Durgapur SS commissioned in the Year 1991 (01-06-1991 as per Form-II/CERC, Year of Mfg-1990). The subject Bus Reactor has already served more than 30 Years in service and continuously giving problem like leakages, high moisture content and high Temperature gradient when compared with similar capacity units.

For further assessment of the health with all aspects, matter referred to CPRI/Bangalore for Residual Life Assessment. After reviewing all parameters, CPRI opined for replacement of the subject Reactor as deterioration observed in Solid Insulation of the Reactor also. Necessary report of the CPRI attached for reference. In addition to presence of moisture in solid insulation, CO2/CO ratio is also high which also indicated cellular insulation deterioration.

After receipt of report of CPRI also, further analysis done internally by POWERGRID and measures like arresting leakages, oil top-up etc. done but still the DGA values not improved which indicates permanent defects.

In view of above, it is evident that subject capital equipment already experienced designed electrical life and started to deteriorate and require replacement as individual component change will not solve the issue. Further spare/supports are very difficult of such ageing population from OEM.

It is proposed to accord in-principal approval for replacement of the subject old Reactor (50 MVAR, 1-Ph) with new 50 MVAR (3-Phase unit) Reactor, under ADDCAP 2019-24 of FSTPS. RLA Report of CPRI is provided at **Annexure B.13.**

Members may discuss.

Deliberation in the meeting

Powergrid representative gave an overview of the agenda item and requested the forum to give the approval regarding replacement of old single phase 50 MVAR (3x16.67 MVAR) bus reactor with a new 3 phase 50 MVAR bus reactor under ADDCAP (2019-24).

OCC agreed to the proposal and advised ERPC to submit the same to CTU for further approval.

ITEM NO. B.14: Failure of mock black start of Teesta-V & synchronization at high angular difference.

While synchronizing the generating units of Teesta-V at Rangpo Substation via Rangpo -Teesta V line during mock black start exercise, it was observed that the synchronization took place at higher angular difference of approximately 140 degrees. This led to very high current feeding by the unit of approx. 46 kA and the same tripped in GT differential and phase overcurrent protection. As such this type of synchronization could be detrimental for the respective generating power plant as well as for the associated equipment. The matter has been already discussed in the 188th OCC meeting and one meeting held between ERPC, ERLDC, PowerGrid -ER-2 & NHPC on 09th Feb, 2022. In the meeting PowerGrid ER-II submitted that in consultation with OEM they will submit a detailed root cause analysis report for synchronization beyond permissible limit of angular difference within 15 days which is yet to be received even after six months.

Hence PowerGrid ER-II is requested to submit the detailed Root cause analysis report for synchronization beyond permissible limit of angular difference. It will be a lesson learnt for all the utilities so that such incidents can be avoided in future by all the utilities.

Deliberation in the meeting

Powergrid representative submitted that simulation on a spare BCU was carried out in Rangpo S/s in conjunction with M/s Schneider Electric. For the simulation of delay between the command given and operation of breaker, shutdown of Teesta-V feeder would be required which is planned in the last week of October 2022.

ITEM NO. B.15: Tower collapse of 400 KV Koderma Bokaro D/C.

Frequent tower collapse of 400 kV Koderma Bokaro D/C line is causing the tripping of both the lines. In recent past tower of 400 kV Koderma Bokaro D/C collapsed on 27.07.2022 which was charged on 04.08.2022. Again, both the lines tripped on tower collapse on 30.08.2022 which was charged on 07.09.2022.

Powergrid is requested to share the root cause of such frequent tower collapse and future strengthening plan.

Deliberation in the meeting

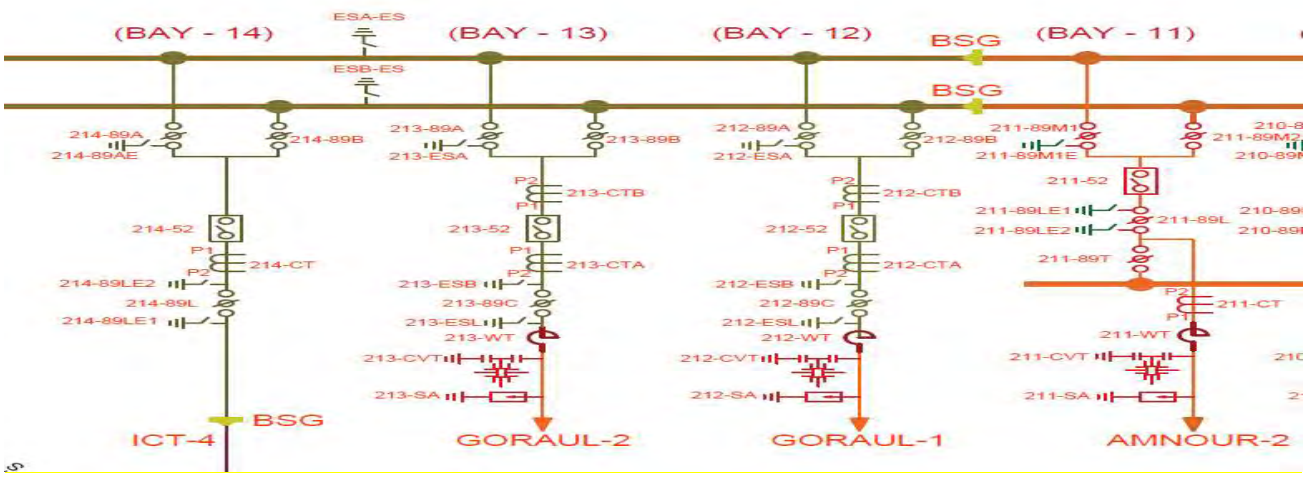
Powergrid representative submitted that the reason of frequent tower collapses is due to the miscreant activities. Usage of anti-climbing devices have also been tried upon but were not successful in preventing the same. Further, planning to deploy the Rural Guard party to mitigate the miscreant activities is also being planned.

OCC advised Powergrid to explore the possibilities of mitigating the miscreant activities by taking help from the local authorities and resolve the issues amicably at the earliest.

ITEM NO. B.16: Agenda by Powergrid ER-I.

B16.1 Restoration of failed GIS modules of 220kV Bay No. 213 (Goraul-1 bay) at Mujaffarpur SS

220 kV GIS bays 212 & 213 at Muzaffarpur SS belongs to BSPTCL and its maintenance is being carried out by BSPTCL. On 11.06.2022, M/s BSPTCL has taken shutdown for 220 kV Goraul 1 feeder i.e 213 bay for rectifying the Auto reclose problem and CVT fuse fail in B phase. During maintenance activities, the Bus-1 Isolator & Earth switch of 213 bay got simultaneously closed, causing damage to 3 nos. GIS sections i.e., 213 bay Bus-1 disconnector section along with disconnector and earth switch, Bus-1 GIB section connected with 214 bay and bus side CT GIS section. The failed portion is highlighted in below mentioned SLD (Feeder name Goaraul-1 & 2 to be considered as interchanged in SLD):



Due to breakdown of 220kV Bus-1 GIB section on 11.06.2022, 220kV Bus-1 (AIS portion) had been restored by keeping out 220kV Bus-1 GIS section by opening jumper connection from 220kV Bus-1 GIS bushing. Due to this jumper disconnection, two nos. 220kV feeders i.e. 500MVA ICT-4 (214 bay) & Goraul-2 (212 bay) are in service through 220kV Bus-2 only. Due to this in one hand we are losing the reliability for these two feeders and on other hand we are unable to carry out maintenance of 220kV Bus-2 as the shutdown of Bus-2 will need outage of these two feeders also.

Since breakdown of GIS section of BSPTCL, more than 3 months have elapsed however till date restoration work has not been taken up by BSPTCL. In view of the above, BSPTCL is requested

to take immediate action for restoration of the faulty GIS bus section so that the maintenance works of 220kV Bus-2 could be carried out without forced outage of 500MVA ICT-4 and Goraul-2 Line. Action plan for restoration of GIS section may be submitted by BSPTCL.

Deliberation in the meeting

Powergrid representative submitted that the bus-1 is out since 11th June 2022 due to which availing the shutdown of the other bay is not possible.

ERLDC representative submitted that they did not have any clear information regarding prolonged outage of bus-1 and opined that such type of outage should be reported to ERLDC in the first place.

SLDC Bihar representative submitted that they have already informed their O&M department. Detailed action plan is awaited from their department and the work is expected to be completed by the end of November 2022.

B16.2 Augmentation of ICT capacity at 220/132 kV Ara SS:

220/132 kV Ara S/S having the present transformation capacity of 360 MVA (2 X 100 MVA + 1 X 160 MVA). From the load pattern of all three ICTs, it has been observed that the power flow through all the transformers exceeds more than 220-230 MW during peak hours and it is clear that with the same transformation capacity of 360 MVA available at Ara, and considering the N-1 contingency and rate of rise of demand per year, the full load of BSPTCL cannot be met in near future. As such the augmentation of transformation capacity at Ara S/S is required immediately to have sufficient margin for N-1 contingency and to take care of load growth in future. Load pattern of ICTs of Ara SS w.e.f. 01.04.2022 is enclosed for reference.

Powergrid may update.

Deliberation in the meeting

Powergrid representative submitted that currently around 240 MW of power is flowing through the Ara S/s. As of now there are only 3 nos. of transformers with a transformation capacity of 360 MVA which is restricting the flexibility in planning of shutdown activities. He further highlighted the need of an additional transformer of 160 MVA capacity.

OCC agreed to the above proposal for installation of an additional 160 MVA ICT at 220/132 KV Ara S/s and advised ERPC to forward the above proposal to CTU for further approval.

ITEM NO. B.17: Planned Maintenance of Generating Units for the 1st Quarter of 2023-24.

You maybe kindly aware that in the Review meeting taken by Chairperson, CEA, on 29.08.2022, RPCs were advised to firm up the monthly schedule of Planned Maintenance of the Generating Units in the respective Regions for the First Quarter of 2023-24 i.e., months of April, 2023, May, 2023 & June, 2023, on priority and forward the same to Grid Management (GM) Division.

It would be pertinent to mention that the said Planned Maintenance Schedule of 1st Quarter of 2023-24 needs to be integrated with the overall Planned Maintenance plan being finalized for each of the months of 2023-24 for the purpose of firming up of the Generation Program by OPM

Division, CEA. Further, in the meeting held in MoP on the subject of power supply during the crunch months of 2023-24, it has been advised by Secretary (Power) that the planned maintenance plan for 2023-24 should be drawn in a manner so as to minimize the maintenance activities during the critical months of April, 2023, May, 023 and September, 023. It is requested that the planned maintenance schedule from October, 2022 onwards up o March, 2024, be firmed up accordingly.

The monthly schedule of Planned Maintenance of the Generating Units in the respective Regions for the First Quarter of 2023-24 i.e., months of April, 023, May, 2023 & June, 2023, may be forwarded to GM Division, CEA, on priority.

Members may update.

Deliberation in the meeting

It was informed that the monthly schedule of Planned Maintenance of the Generating Units for the First Quarter of 2023-24 was received from West Bengal and NTPC.

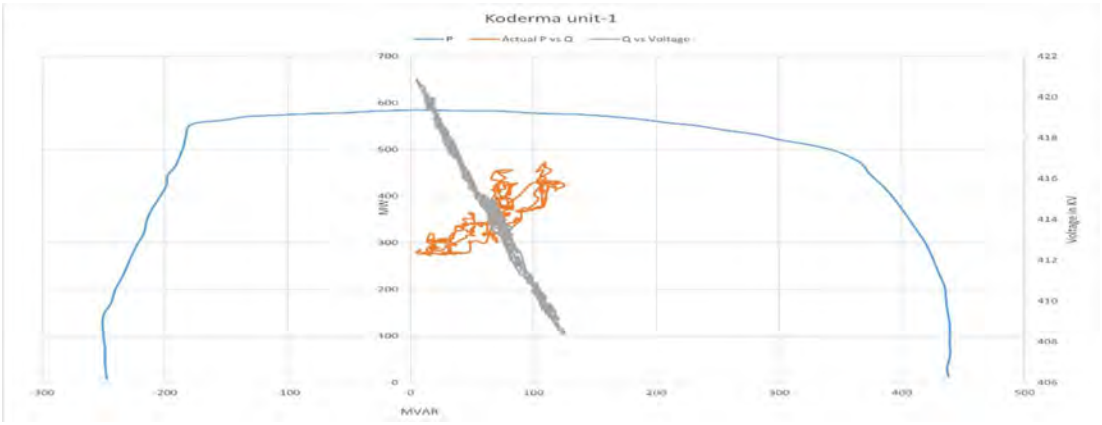
DVC representative submitted that they have already sent the relevant data to their SLDC for further submission to CEA and ERPC.

OCC advised SLDC Odisha to coordinate with OPGC and submit the details to CEA and ERPC. Further, all the IPPs were also advised to submit the necessary details to CEA and ERPC.

ITEM NO. B.18: MVAR injection during high voltage seasons.

On 16th August, 2022 it was observed that voltage of both the Koderma units were injecting MVAR when voltage was above the acceptable limits.

Plot of the reactive performance of the Koderma units as per ERLDC is given below:



Therefore, Koderma power plant was requested to absorb MVAR as per their capability and maintain voltage well below 420 kV at Koderma bus so that all the nearby bus voltage remain within IEGC band. So, all other generating stations are also requested to absorb MVAR at the time of high voltage to maintain the bus voltages within acceptable limit in view of upcoming winter season.

In the 194th OCC meeting, DVC representative submitted that as per the communication received by Koderma Powerhouse, the dynamic AVR which is generally kept in auto mode did not operate

during that period. Necessary tuning of DAVR would be done during shutdown of the unit.

ERLDC representative was of the view that adjustment of set-point may rectify the above issue and advised DVC to implement the same.

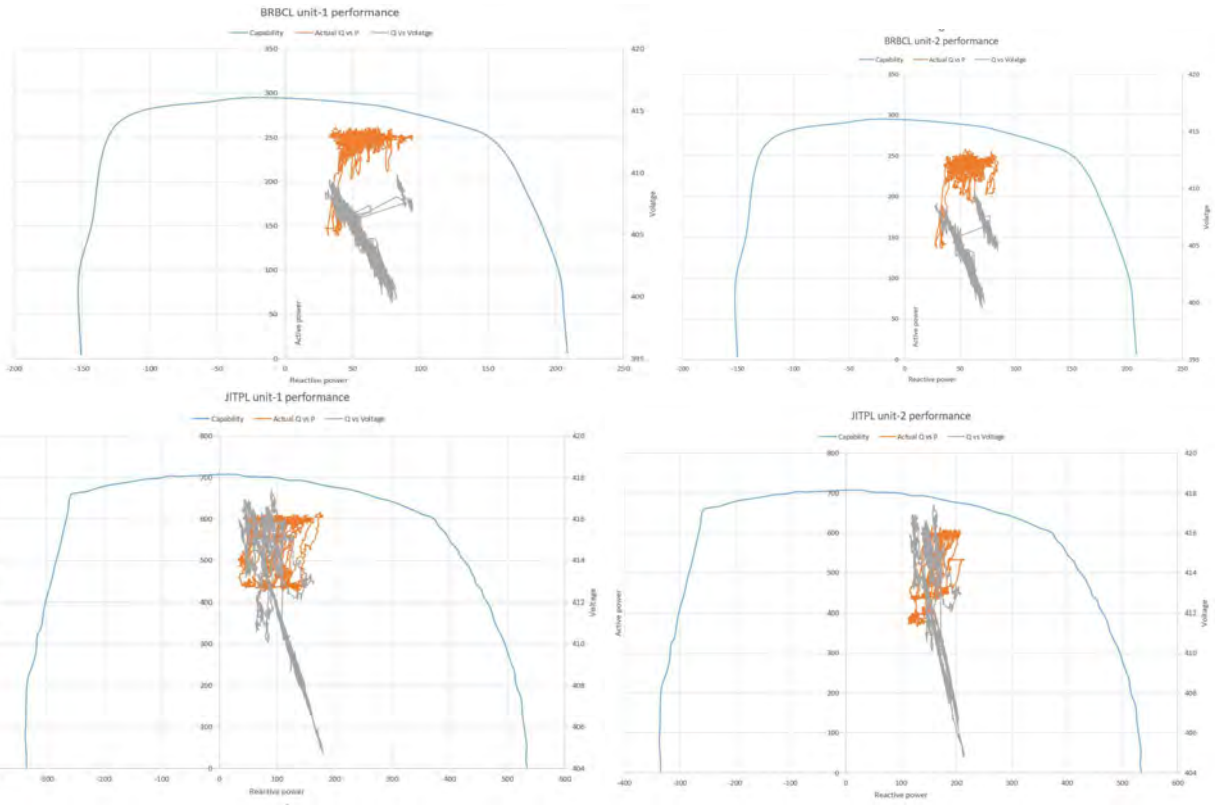
ERLDC representative further emphasized that the issue of generating units injecting MVAR during high voltage conditions which would be more frequent during upcoming winter season.

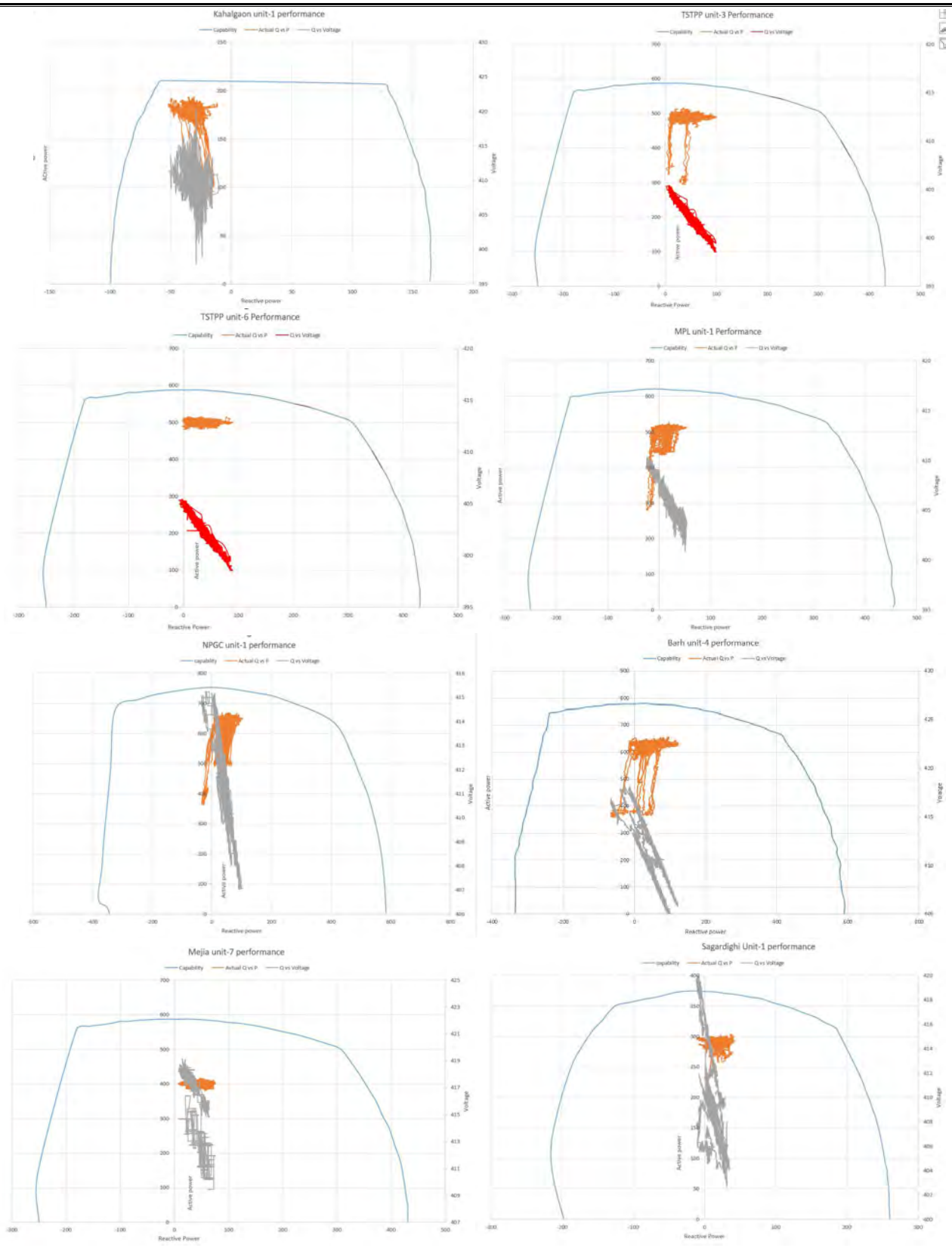
OCC advised all the generating stations to maximize their MVAR absorption during high voltage conditions as per their capability curves.

The reactive power performance of various generating units have been analysed for the month of August-2022. The summary of performance is given below:

Name of the Plant	Performance	Comment
Mejia	Non Satisfactory	Reactive power injection at higher voltages
Barh	Non Satisfactory	Reactive power injection at higher voltages
BRBCL	Non Satisfactory	Reactive power injection at higher voltages
Sagardighi	Non Satisfactory	Reactive power injection at higher voltages
JITPL	Non Satisfactory	Reactive power injection at higher voltages
MPL	Satisfactory	-
NPGC	Non Satisfactory	Reactive power injection at higher voltages
Kahalgaon	Non Satisfactory	Reactive power absorption at all voltages
TSTPS	Satisfactory	-

The plots of reactive power performance of different generating stations are presented below:





So, all other generating stations are also requested to absorb MVAR at the time of high voltage to maintain the bus voltages within acceptable limit in view of upcoming winter season.

Deliberation in the meeting

ERLDC representative submitted that except for MPL and TSTPS, all other generating stations are injecting VAR during high voltage conditions and advised the generators to maintain optimum

setpoint to increase the absorption as per the capability curves.

OCC advised the respective generators to submit the action plan regarding non-satisfactory performance of reactive power absorption in the upcoming OCC meeting.

ERLDC representative also informed the forum that a meeting would be scheduled with all the generating stations as a preparedness against high voltages during the winter season.

ITEM NO. B.19: Ensuring healthiness of ADMS.

Automatic demand management scheme (ADMS) is already commissioned in West Bengal, DVC and Jharkhand. Logic for ADMS is as implemented in these states is as follows.

Sl No	State/Utility	Logic for ADMS operation	Implementation Date	Total Load connected in ADMS logic
1	Jharkhand	System Frequency < 49.9 Hz AND Deviation > 12 % or 25/50/75 MW. Block I, II & III feeders will be selected for load shedding depending on the O/D.	In service from 21st August 2019.	Total 90 MW
2	DVC	F <49.9 Hz AND deviation > 12 % or 150 MW	In service from 17.06.2016.	Total 281 MW
3	West Bengal	F <49.7 AND deviation > 12 % or 150 MW	In service from 25.11.16.	Total 225 MW

ADMS in WB

In August-2022, ADMS criteria fulfilled for the following instances in West Bengal:

Date	Time	Actual	Schedule	Deviation
15 August 2022	05:20	1289.172	1002.255	286.9167
15 August 2022	05:41	1137.868	870.2199	267.6478
18 August 2022	19:24	3263.477	3057.614	205.8625
25 August 2022	18:58	2546.906	2329.169	217.7371

ERLDC has received the details of ADMS operation from West Bengal SLDC for 18th August and 25th August, 2022. However, ERLDC is yet to receive the details of 15th August, 2022. Further as per information received from West Bengal SLDC, ADMS operated on 16th August 19:16 hrs. but the criteria of ADMS operation did not satisfy as per ERLDC SCADA data. Hence WB SLDC is requested to provide the detail of ADMS operation for 15th August ,2022 and share the SCADA data for 16th August,2022 for reconciliation at our end. The same has also been intimated vide mail dated 07th September, 2022.

West Bengal may update.

Deliberation in the meeting

As per the information received from West Bengal, it was informed that ADMS criteria did not satisfy on 15th August 2022 and ADMS operated on 15th, 18th and 25th August 2022.

OCC advised ERLDC to communicate with West Bengal regarding the differences observed in ADMS operation.

ADMS in Jharkhand

In the month of August-2022 also the criteria for operation of ADMS of Jharkhand were satisfied for around 154 instances from 01.08.2022 to 31.08.2022. Details of instances where ADMS criteria was satisfied were shared with Jharkhand SLDC vide mail dated 07th September 2022.

Further in 194th OCC meeting, OCC advised Jharkhand to submit the details of feeders to ERPC and ERLDC at the earliest. OCC further advised Jharkhand to give the details of feeders where communication issues are persisting. However, no such details received at ERLDC end.

Jharkhand may update the status of ADMS at present.

Deliberation in the meeting

Jharkhand representative submitted that some of feeders in ADMS are not being able to operate due to communication issues.

ERLDC representative advised Jharkhand to identify whether the issue pertains to communication issue or software issue and carry out the necessary rectification work.

ADMS in DVC

For the month of August-2022 the criteria for operation of ADMS of DVC satisfied for 30 instances which has been shared with DVC SLDC vide mail dated 07.09.2022.

DVC is requested to update the status of ADMS at present.

DVC has shared the detail of ADMS for the month of July, 2022. In most of the cases no load relief has been observed. DVC is requested to explain the reason of such low relief and further requested to mention the name of the feeders explicitly.

Deliberation in the meeting

OCC advised DVC to submit the feeder wise details to ERLDC.

ADMS in Odisha

From 01.08.2022 to 31.08.2022 the criteria for operation of ADMS of Odisha satisfied for 59 instances the details of which has been shared with Odisha SLDC vide mail dated 07.09.2022.

The logic considered is:
1. System Frequency < 49.9 Hz
2. Odisha over-drawl > 150 MW

In 194th OCC meeting Odisha SLDC was requested to inform about the instances of operation of ADMS to ERLDC.

Odisha is requested to update the status of ADMS at present and share the details of ADMS feeder wise.

Deliberation in the meeting

OCC advised Odisha to submit the detailed list of feeders connected with ADMS to ERLDC.

ITEM NO. B.20: Commissioning status of ADMS.

Automatic demand management scheme (ADMS) is already commissioned in West Bengal, DVC and Jharkhand. However, for Bihar and Odisha it is yet to be implemented, the last status as confirmed in the earlier meeting is as follows.

Sl No	State/Utility	Logic for ADMS operation	Implementation status/target
1	Bihar	F <49.7 AND deviation > 12 % or 150 MW	1st week of May 2022.

Bihar may update the status of the implementation of ADMS scheme.

Deliberation in the meeting

Bihar representative submitted that ADMS testing was carried out successfully on 2 feeders on 22nd July 2022.

Consent for operation of ADMS is still awaited from DISCOM and is expected to be commissioned by the first week of October 2022.

ITEM NO. B.21: Replacement/Calibration of Special Energy Meters – NTPC Talcher Odisha.

In the 192nd OCC meeting, NTPC Talcher representative requested Powergrid to provide the calibration certificates of 8 nos. of solar meters issued in the year 2020.

NTPC vide letter dated 13.07.2022 submitted that, as per the regulation, Special Energy Meters that are provided in various feeders for commercial purpose needs to be calibrated once in five years. The Calibration of feeders connected to Eastern region at TSTPS premises has been carried out between 19.09.2013 to 04.10.2013. Previously this was also raised many times in OCC meeting of ERPC. After deliberation in 171st OCC meeting, TSTPS received 8 Nos SEM Meters for Solar plant from PGCIL however the calibration certificate is not yet provided.

As per discussion in 192nd OCC meeting, PGCIL has provided the test certificate of the meters, which may not be accepted as calibration Certificate. Additionally, necessary action may be taken by PGCIL to replace the other (47 Nos) energy meters of TSTPS at the earliest. Requisition of meters from TSTPS is given on 28.05.22 to PGCIL.

In the 193rd OCC meeting, NTPC representative submitted that requisition was given to Powergrid for providing calibration certificates of 8 nos. of solar energy meters. The reports given by Powergrid are factory test reports and have no calibration validity date mentioned in them. Further, these reports are not acceptable under Solar Clean Development Mechanism.

Powergrid representative submitted that as decided in a meeting, since cost for calibration of meters was equivalent to the new meters, it was decided to replace the meters in case of any deviation beyond acceptable limit. Further, new meters are available with factory test reports and not with calibration reports.

OCC was of the view that factory test reports can be considered equivalent to calibration reports and advised NTPC to furnish them under CDM.

In 194th OCC Meeting, NTPC Talcher representative submitted that as per CEA guidelines, the energy meters are required to be calibrated in every 5 years. The calibration certificates are also required by the auditors. In this regard, the factory test reports of 8 nos. of solar energy meters would expire in 2023.

Also, requisition for replacement of 47 nos. of energy meters of TSTPS which were last calibrated in 2013, had also been submitted to Powergrid.

Upon enquiring about the healthiness of the 47 nos. of meters, it was informed by ERLDC that the meters are error free and no deviations are being observed as of now.

Powergrid representative agreed to provide the meters and submitted that as per present practice, meters are being replaced in case of problems being encountered with the meters. In order to replace the meters upon expiry of calibration date, availability of sufficient meters has also to be ensured. Powergrid further requested NTPC Talcher to submit the details of 47 nos. of meters which are to be replaced.

NTPC Talcher/Powergrid may update.

Deliberation in the meeting

NTPC Talcher representative submitted that the details of 47 nos. of meters to be replaced have already been sent to PGCIL.

Powergrid representative submitted that initially only the main meters (28 nos.) would be replaced. The main meters would be sent by the mid of October 2022.

After replacement of the main meters, the variation with the check meters would be observed and if required the check meters would be replaced thereafter.

ITEM NO. B.22: Errors with Energy meters of 220 KV and 400 KV feeders

Erratic readings with the energy meters of 220kV Malbase -- Birpara Feeder, 220kV Chhukha -- Birpara Feeder - 1 and 400kV Tala -- Siliguri Feeder -1, which are narrated below:

1. Erratic functioning of SEM of 220kV Malbase-Birpara Feeder No. 3

The Genus make SEM of 220kV Malbase - Birpara feeder is consistently showing error more than the permissible limit since its installation in April 2022. Therefore, energy accounting is being done by considering the energy recorded by check energy meter.

2. Erratic reading of the main energy meter of the 220kV Chhukha - Birpara Feeder No. 2

During the JEMR on 1st August 2022, it was observed that the energy meter of the 220kV Chhukha- Birpara Feeder --2 at Birpara end was showing erratic reading. 'Therefore, the energy accounting for the month of July 2022 had to be carried out by considering the reading of check energy meter.

3. Erratic reading of the main energy meter of the 400kV Tala - Siliguri Feeder No. 1

During the JEMR on August 01, 2022, the energy meter reading for the main energy meter of 400kV Tala- Siliguri Feeder No. 1 at Siliguri end as provided by Powergrid was observed to be erratic and not correct. Therefore, the energy accounting for the month of July 2022 had to be carried out by considering the reading of check energy meter.

Since energy meters are used for billing of energy exported to PTC, and any error or malfunctioning of the energy meters shall create serious issue with the energy billing. Therefore, Powergrid is requested to immediately look into the issue of above energy meters and replace them at the earliest if found defective or malfunctioning with intimation to this office.

In the 194th OCC meeting, Bhutan representative briefly explained the issue faced by them.

Powergrid representative informed that they had already communicated with M/s Genus regarding the issue.

OCC advised Powergrid to take up the matter with M/s Genus and rectify the meters at the earliest.

Powergrid is requested to expedite the replacement of the energy meters and confirm the exact schedule for the replacement.

Deliberation in the meeting

Powergrid representative submitted that shutdown has already been applied on 24th to 26th September 2022 for replacement of 3 nos. of meters on pilot basis in response to the requests received from Bhutan.

He further submitted that if replacement of meters does not ensure rectification of errors in the energy meters in that case some other possibilities may be explored.

ERLDC representative submitted that data on their end is matching with that of on Bhutan end and the variation is within the permissible limits.

ITEM NO. B.23: Endangering Grid connectivity, security & stability of 400 KV Sundargarh-Raigarh LILO Ckt – 3 & 4 at tapping points near Sundergarh by M/s Vedanta Ltd, Jharsuguda along with violation of Grid discipline.

As per the agreement dated 22.12.2010 between M/s Vedanta Ltd. And Powergrid, the connectivity to Vedanta Ltd sub-station was carried out from LILO of 400 KV Sundargarh-Raigarh D/C line # 3 between Tower No – 834 (DD+0) & 835 (DD+0) and 400 KV Sundargarh-Raigarh D/C line # 4 between Tower No – 299 (DD+0) & new Vedanta Tower No-VL3 (DD+0) was done during the year 2011. This activity was taken up as per direction of CERC and instruction of ERLDC/WRLDC in order to charge the Vedanta switchyard at Jharsuguda for sending and receiving of power at Vedanta end with CTU transmission system.

After direct connectivity of Vedanta 400 KV sub-station with 765/400 KV sub-station of Powergrid at Sundergarh, the tapping points of LILO portion of line # 3 & # 4 was disconnected by M/s Vedanta Pvt. Ltd. In the year 2014 & 2017 respectively, without completion of direct connectivity for Powergrid, in above-mentioned LILO lines.

M/s Vedanta has dismantled all towers of LILO portion except 2 nos. of towers near each tapping point and left these 4 towers without any routine maintenance/watch & ward activity. At present there is no back support at tower no-VL2 and VL5. As there is no watch and ward and routine maintenance work theft of tower members on these towers have become rampant, subsequently weakening the strength of towers which may lead to collapse of existing Vedanta towers as well as Powergrid towers, resulting interruption of power transfer between Eastern and Western Grid.

In this regard, the authority of M/s Vedanta has been informed many times verbally as well as in written communication for replenishment of all missing/hanging members and to provide backstay (back support) for keeping the tower in safe condition and also to take urgent action for direct connectivity of both LILO points.

Inspite of these correspondences and discussions with M/s Vedanta Ltd., since dt. 04.03.2019, neither any action has been taken nor any permanent connectivity solution has been implemented. The said LILO lines are in severe danger zone and power flow will be affected as stated.

In the 192nd OCC meeting, Vedanta representative submitted that approval for execution of order had been taken from higher authority and the order would be placed in the month of July 2022. Subsequent to that the work would be completed by taking shutdown.

In the 193rd OCC meeting, Vedanta representative submitted that necessary approval had been taken from their commercial department and the order would be placed by the end of July 2022.

Powergrid Odisha representative requested Vedanta to share the updates if any, with GM Sundergarh S/s.

Vedanta may update.

Deliberation in the meeting

Vedanta representative submitted that the ordering is under final stage and would be done by the end of September 2022.

Powergrid Odisha representative submitted that the shutdown of both the lines in the month of November 2022 could be proposed only after the order is placed by Vedanta.

Vedanta representative ensured that the order would be placed shortly as it is under final commercial negotiation and they would inform Powergrid by the 1st week of October 2022.

ITEM NO. B.24: Realization of LILO arrangement of circuit-2 of 220 KV Daltonganj-Latehar-Chatra on temporary basis to charge 400/220/132 KV GSS, Latehar – Additional Agenda.

Temporary LILO arrangement of circuit-2 of 220 KV Daltonganj-Latehar- Chatra TL to charge 400/220/132 KV GSS, Latehar was put up by JUSNL before ERPC and was approved in 189th OCC meeting held on 16.03.2022. PGCIL has almost readied 220 & 132 KV level system at 400/220/132 KV GSS, Latehar under Jharkhand Consultancy Projects also process of obtaining Electrical Clearance is underway for the same. Therefore, the approved scheme can be realized within next 10-15 days and following are the summary of the scheme to be realized: -

A) Currently both circuits of 220 KV Daltonganj-Latehar-Chatra are transmitting power from 400/220/132 KV GSS, Daltonganj (PGCIL) to 220/132/33 KV GSS, Chatra (JUSNL). And circuit-2 of this line will be temporarily made LILO at 400/220/132 KV GSS, Latehar for the time being, till elements of original scheme are completed and this will enable us to complete multiple transmission elements which are impeded due to not charging of 400/220/132 KV GSS, Latehar. During this period communication link between Daltonganj and Chatra sub-stations will be through PLCC of Circuit-1 of the line.

B) OPGW has been installed in Daltonganj-Latehar section of the line thus .establishing communication link between 400/220/132 KV GSS, Daltonganj (PGCIL) to 400/220/132 KV GSS, Latehar (JUSNL).

C) Though replacement of earth-wire with OPGW is pending in Latehar-Chatra section of the line and by design provision of PLCC is not available for 220 KV bays at 400/220/132 GSS, Latehar, carrier aided distance protection or communication based feature in distance protection will not be available till installation of OPGW in the line. For effectiveness of distance protection in Latehar-Chatra section in the proposed scheme without carrier aided protection we propose to reduce the definite time delay of Zone-2 from 350 ms to O ms and seek the permission from committee for the same.

So, the above agenda may be put up before committee so that the temporary LILO arrangement can be realized and 400/220/132 KV GSS, Latehar can be energized as per the scheme described above in point (C) and both circuits remain available for 220/132/33 KV GSS, Chatra (circuit-1 directly from Daltonganj and circuit-2 via Latehar).

Members may discuss.

Deliberation in the meeting

Jharkhand representative submitted that presently OPGW cable is available in Daltonganj-Latehar section but in the Daltonganj-chatra section, neither OPGW nor PLCC is available. He further submitted that the time delay of Zone-2 also may be reduced from 350 ms to 0 ms for effectiveness of distance protection in Latehar-Chatra section.

ERLDC representative submitted that they would consult with their protection team regarding the time delay setting of Zone-2 and revert.

Further, ERLDC representative advised JUSNL that after LILO of one line of Daltonganj-Chatra in Latehar, PLCC of Daltonganj may be used in Latehar.

Jharkhand representative submitted that in Latehar the bays were not designed for PLCC but for OPGW instead. They are planning to shift it to PLCC for which some minor civil works would be

required. The work is expected to be completed within 6 months.

Upon enquiring about the timeline for laying of OPGW cable, it was informed that the bidding of OPGW cable laying work was not successful and a concrete timeline regarding the same may not be provided as of now.

PART C: ITEMS FOR UPDATE

ITEM NO. C.1: ER Grid performance during August 2022

The average and maximum consumption of Eastern Region and Max/Min Demand (MW), Energy Export for the month August-2022 were as follows:

Average Consumption (MU)	Maximum Consumption (MU)/ Date	Maximum Demand (MW) Date/Time	Minimum Demand (MW) Date/Time	Schedule Export (MU)	Actual Export (MU)
540.04	597.6 MU 21-08-2022	27430 MW, 05-08-2022 23:23 Hrs.	17500 MW, 15-08-2022 at 06:02 Hrs.	3334	3115

ERLDC may highlight the performance of the ER grid.

Deliberation in the meeting

Performance of ER grid was highlighted in the OCC forum.

ITEM NO. C.2: Primary Frequency Response of generating units in ER.

Frequency response characteristics (FRC) have been analysed pan India in the event of sudden frequency change that occurred in the month of Aug 2022. The details of these events and the overall response of the Eastern region have been summarized in Table below.

Event	Frequency Change	ER FRC
Event - 1 : On 11th Aug'22 at 11:22 hrs, Y-B phase to phase fault occurred on 220kV Bahdla-Clean Solar Jodhpur Ckt. On this fault, almost all the RE stations connected at Bhadla(PG), Bhadla2(PG), Fatehgarh2(PG) & Bikaner(PG) dropped their generation. However generation didn't recovere in desired time as per LVRT. Due to sudden generation drop, over voltage in transmission network at Rajasthan RE complex also observed. Many 765kV lines and 220kV lines to RE stations tripped due to over voltage. Total RE generation drop of approx. 6157MW (5807MW Solar & 350MW Wind) obsereved(as per SCADA). At the same time, load shedding of approx. 400MW in UP, 200MW in Punjab & 150MW in Haryana control area is also observed on df/dt protection oepration. Hence, net 5407MW generation loss figure has been considered for FRC calculation.	**50.15 Hz to 49.62 Hz.**	**15.3 %**

The availability of sufficient primary frequency response is one of the fundamental requirements of power system operation not only from reliability point of view but also from regulatory compliance point of view. Based on the assessed FRC re-testing of primary frequency response can be recommended. Therefore, the accurate and high-resolution data from generator end is extremely important in absence of which assessment of FRC is done as per low resolution

ERLDC SCADA data. The plant wise data submission statistic for frequency event flagged by ERLDC during July and August is given below:

Name of the Plant	09th July event data submission status	11th Aug event data submission status
Adhunik	Pending	Pending
Barh	Pending	Pending
BRBCL	Pending	Submitted
Darlipalli	Pending	Pending
Farakka	Pending	Pending
GMR	Pending	Pending
JITPL	Pending	Pending
MPL	Submitted	Submitted
NPGC	Pending	Pending
Kahalgaon	Pending	Pending
Teesta III	Submitted	Submitted
Teesta V	Submitted	Submitted
TSTPS	Submitted	Pending

In view of the same all utilities are once again requested to kindly look into the matter and take necessary action to ensure consistent data submission for every frequency event flagged by ERLDC.

Members may note.

Deliberation in the meeting

OCC advised all utilities to take necessary action to ensure consistent data submission for every frequency event flagged by ERLDC.

ITEM NO. C.3: Review of implementation of PSDF approved projects of ER.

In 10th NPC meeting held on 09.04.2021, RPCs were advised take up the matter for improvement of the fund disbursement and expeditious implementation of the sanctioned projects under PSDF.

In view of the above, status review of the projects being executed under PSDF funding in Eastern Region would be carried out on regular basis for expediting the projects. All the constituents are requested to furnish/update the status of their respective project in every month.

Concerned utilities may update the present status of the project as given in the **Annexure-C.3**.

193rd OCC advised all the utilities to update the status of project to the ERPC Secretariat.

Respective utilities may update.

Deliberation in the meeting

Members updated.

ITEM NO. C.4: Status of implementation of AGC as a pilot project in States.

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

WBPDCL informed that they have already collected offer from Siemens for implementation of

AGC and they are awaiting the concurrence from SLDC.

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

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

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

In the 183rd OCC meeting, OPGC representative informed that work order has been issued to M/s Siemens for implementation of AGC. The work would be carried out during the unit shutdown which is scheduled from 18.10.2021.

State	Station/Unit	Deliberation in 184th OCC Meeting
DVC	Mejia unit#7 &8	DVC representative informed that NIT is to be floated.
Odisha	Unit#3 of OPGC	OPGC vide email dated 25th Oct'21 informed that some additional data is needed from SLDC Odisha and after getting the same AGC would be implemented.

In the 185th OCC meeting, DVC representative informed that the NIT for implementation of AGC will be floated by 9th December 2021.

OPGC representative was not present during the discussion.

In the 186th OCC meeting, DVC representative informed that the NIT would be floated by 31st December 2021.

In the 187th OCC meeting, OPGC and DVC representative were not present during the discussion.

In the 188th OCC meeting, DVC representative informed that NIT was floated on 29th December 2021 and the bid opening would be done on 19th February 2022.

OPGC representative was not present during the discussion.

In the 190th OCC meeting, DVC representative submitted that NIT would be re-floated due to some issues in the payment terms.

SLDC Odisha representative submitted that the order has been place to M/s Siemens for AGC

implementation and the feasibility test would be conducted on 3rd May 2022.

DVC and Odisha may update.

Deliberation in the meeting

OCC advised all the utilities to update the status, if any, to ERPC and ERLDC.

ITEM NO. C.5: Primary Frequency Response Testing of ISGS Generating Units

In the 180th OCC meeting, ERLDC representative informed that as per communication received form GMR and JITPL PFR testing has been scheduled by Siemens in August'21.

MPL representative submitted that they would carry out the PFR testing in the month of July'21.

In the 181st OCC meeting, ERLDC representative informed that PFR testing of MPL got postponed due to some technical issue. He further informed that PFR testing is going on in APNRL and that of NPGC and BRBCL is scheduled in the last week of July'21 and 1st week of August'21 respectively.

In the 182nd OCC meeting, ERLDC representative submitted that During July – August 2021, PFR testing has been conducted at the following generating units:

1. Adhunik TPS Unit 1 & 2
2. BRBCL TPS Unit 2 & 3
3. Nabinagar STPS Unit 1
4. Kahalgaon STPS Unit 1

In the 183rd OCC meeting, ERLDC representative updated that PFR testing for Unit# 1 & 2 of GMR had been completed.

In the 185th OCC meeting, ERLDC representative informed that PFR testing of Dikchu is being carried out.

In the 187th OCC Meeting, OCC advised all the members to provide the updated status of PFR testing, if any, to ERPC and ERLDC.

In the 188th OCC meeting, ERLDC representative informed that updated status of PFR testing was received from MPL.

The updated status is enclosed at **Annexure-C.5**.

Members may update.

Deliberation in the meeting

OCC advised all the utilities to update the status, if any, to ERPC and ERLDC.

ITEM NO. C.6: Testing of Primary Frequency Response of State Generating units by third party agency.

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 vide-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 +2 X 250 + 2X 500
6	RTPS Unit # 1 & 2	2 X 600

In the 185th OCC meeting, OHPC representative informed that testing of Primary Frequency Response of all the units of Rengali and Indravati will be done by the end of December 2021.

WBPDCL representative informed that they will place the order in the month of December 2021.

In the 186th OCC Meeting, OHPC representative informed that the testing of Primary Frequency Response of all the units of Rengali and Indravati would be done by the 2nd week of January 2022.

DVC representative informed that the bid opening had been done on 22nd December 2021.

In the 187th OCC meeting, OHPC and DVC representatives were not present during the discussion.

In the 188th OCC meeting, It was informed that PFR testing of all the 3 units of Budge-Budge are scheduled from 26th Feb 2022 to 3rd March 2022.

OHPC representative submitted that PFR testing of all the units of Rengali (5 units) and Indravati (4 units) would be carried out by M/s Solvina from 20th March 2022 onwards.

DVC representative informed that the work order for PFR testing has been placed.

Generating units may update.

Deliberation in the meeting

OCC advised all the generating units to update the status, if any, to ERPC and ERLDC.

ITEM NO. C.7: PSS tuning of Generators in Eastern Region

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 171st OCC Meeting and shared with all concerned utilities.

In the 186th OCC Meeting, Teesta –V representative informed that the PSS tuning would be conducted in the last week of January 2022.

It was informed in the OCC that PSS tuning of Rongnichu and Chuzachen had been completed.

DVC representative informed that PSS tuning of RTPS unit-1 & 2 would be done in the month of March 2022.

BRBCL representative informed that PSS tuning of BRBCL unit-1 has also been completed.

In the 187th OCC meeting, OCC advised ERLDC to send the updated status of PSS tuning to ERPC.

The updated schedule for PSS tuning of the units is attached at **Annexure-C.7**.

Generators may update.

Deliberation in the meeting

OCC advised all the generating units to update the status, if any, to ERPC and ERLDC.

ITEM NO. C.8: Status of UFRs healthiness installed in Eastern Region.

Members may update the status of UFR healthiness installed in Eastern Region.

Members may update.

Deliberation in the meeting

Members updated.

ITEM NO. C.9: Status of Islanding Schemes healthiness installed in Eastern Region.

As per the decision taken in the meeting held on 8th July 2021 and chaired by member (GO&D), CEA, data in prescribed formats may be submitted by concerned utilities to RPCs on monthly basis to certify the healthiness of the Islanding Schemes.

a. Format - I for RLDC/SLDCs

S.NO	Name of Islanding Scheme	Healthiness of Communication channel

b. Format - II for Generating Station

S.NO	Name of Islanding Scheme	Healthiness of Islanding Relay	Healthiness of Communication channel

c. Format - III for Transmission Utility/DISCOMs

S.NO	Name of Islanding Scheme	Elements considered for tripping to from Island	For communication-based tripping logic Of feeders	For UFR based tripping logic of feeders	
			Healthiness of Communication channel	Healthiness of PT Fuse and status of DC supply to UFR relay*	Healthiness of Relay#

* Where dedicated UFR relay have been installed for tripping of the feeders under Islanding scheme

Where UFR functions have been enabled within backup protection relay of the line.

d. Format - IV for collecting Relay details of the Islanding scheme.

The following format may be used to get Relay details of the Islanding scheme:

S.NO	Description	UFRs-for load relief (A)	df/dt -for load relief (B)	Relay for Island creation(C)
1	Relay location (S/s name)			
2	Relay make & model			
3	Frequency setting of the relay (at which load shedding is envisaged)			
4	Feeder name (voltage level and source-destination name) signaled by the Islanding Relay for separation /load shedding/separation from outside grid			

5	Quantum of load relief due to tripping of feeder (as per state's peak of previous year)			
6	Quantum of load (Min, Avg, Max in MW) on the feeder (as per state's peak of previous year)			

e. Format - V for Contact details of all Nodal Officer

Utility Name &Location	Name	Designation	Organization	Email ID	Mobile No.

It was deliberated in the 186th OCC meeting that except West Bengal all the entities are sending the report as per the new format.

In the 192nd OCC meeting, it was informed that except for West Bengal all entities are sending the report as per the new format.

Members may update.

Deliberation in the meeting

Members updated.

ITEM NO. C.10: Latest Status of States ATC/TTC declared by States for the month of October-2022.

To harmonize the ATC/TTC calculation methodology and timeline One to one meeting and hands on training with each SLDC was conducted in the month of Sep-21 and Oct-21. As per the common agreed procedure and timeline ATC/TTC calculation in three months advance and reconciliation of the TTC/ATC figure for the upcoming month between RLDC and SLDC has started from month Dec-21. Reconciled ATC/TTC figures for **October-2022** are as follows:

Sl No	State/Utility	TTC (MW)		RM(MW)		ATC Import (MW)		Remark
		Import	Export	Import	Export	Import	Export	
1	BSPTCL	7245	--	145	--	7100	--	Oct-22
2	JUSNL	1498	--	54	--	1444	--	Oct-22
3	DVC	1710	3716	66	52	1644	3664	Oct-22
4	OPTCL	3569	1756	134	60	3435	1696	Oct-22
5	WBSETCL	6116	--	450	--	5666	--	Oct-22
6	Sikkim	169.35	--	2.28	--	167.07	--	Oct-22

As per the agreed philosophy the status of month wise ATC/TTC submission is as follows:

State / Month	Bihar	Jharkhand	DVC	Odisha	West Bengal	Sikkim
Sep-22	Submitted	Submitted	Submitted	Submitted	Submitted	Pending
Oct-22	Submitted	Submitted	Submitted	Submitted	Submitted	Submitted
Nov-22	Submitted	Submitted	Pending	Submitted	Submitted	Submitted
Dec-22	Pending	Pending	Pending	Submitted	Submitted	Pending
Jan-23	Pending	Pending	Pending	Pending	Pending	Pending

Declaration of TTC/ATC on SLDC Website:

Sl No	SLDC	Declared on Website	Website Link	Constraint Available on Website	Type of Website Link
1	BSPTCL	Yes	http://www.bsptcl.in/ViewATCTTCWeb.aspx?GL=12&PL=10	Yes	Static Link-Table
2	JUSNL	Yes	http://www.jusnl.in/pdf/download/ttc_atc_nov_2020.pdf	Yes	Static link –pdf file
3	DVC	Yes	https://application.dvc.gov.in/CLD/atcttcmenu.jsp#	Yes	Static Link-Word file
4	OPTCL	Yes	https://www.sldcorissa.org.in/TTC_ATC.aspx	Yes	Static Link-pdf file
5	WBSETCL	Yes	http://www.wbsldc.in/atc-ttc	No (Not updating)	Static Link-Table
6	Sikkim	No	https://power.sikkim.gov.in/atc-and-ttc	No (Not updating)	Static Link-Excel file

All the states having net export schedule should declare their export TTC. In view of the same West Bengal is once again requested to share export TTC.

It is observed that from Odisha and Sikkim submission of ATC/TTC and base case are not regular. All the states are once again requested to share ATC/TTC in timely manner.

Further it is noted that ATC declared by Bihar SLDC is much lower than the allocation given to them.

Members may update.

Deliberation in the meeting

Members updated.

ITEM NO. C.11: Mock Black start exercises in Eastern Region

As per IEGC Clause 5.8(b), Mock trial runs of the procedure for different subsystems shall be carried out by the Users/CTU/STU at least once every six months under intimation to the RLDC. Accordingly, the Black Start Schedule of different hydro stations for 2022-23 are given below:

Sl	Name of Hydro Station	Schedule of Mock	Actual	Schedule of	Actual Date of

No		Black Start	Date of Test	Mock Black Start	Test
		Test-1		Test-2	
1	U. Kolab	June-2022	21st July-2022	Jan-2023	
2	Balimela	July-2022	09th Sep-2022	Feb-2023	
3	Rengali	June-2022	27- June-2022	Dec-2022	
4	Burla	July-2022	23-June-2022	Jan-2023	
5	U. Indravati	May-2022	25-May-2022	Feb-2023	
6	Maithon	DVC representative submitted that upgradation work is under progress due to issues in the governing system. Detailed timeline would be submitted to ERPC and ERLDC. Detail timeline yet to be received from DVC SLDC		Dec-2022	
7	TLDP-III	Oct-2022		Jan-2023	
8	TLDP-IV	Oct-2022		Feb-2023	
9	Subarnarekha	Sep-2022		Dec-2022	
10	Teesta-V	Oct-2022		Jan-2023	
11	Chuzachen	Oct-2022		Feb-2023	
12	Teesta-III	April-2022	08-April-2022	Dec-2022	
13	Jorethang	Oct-2022		Jan-2023	
14	Tasheding	Oct-2022		Feb-2023	
15	Dikchu	Oct-2022		Dec-2022	
16	Rongnichu	Oct-2022		Jan-2023	

Members may update.

Deliberation in the meeting

OCC advised all the generating units to update the status, if any, to ERPC and ERLDC. Procedure for periodic exercise of black starting Teesta-V is provided at ***Annexure C.11****.*

ITEM NO. C.12: Requirement of cold spares for ICTs in Eastern Region to meet any exigency.

As per CEA guidelines for availability of spares and inventories for power transmission system (transmission lines & substation/switchyard) assets, adequate cold spare for ICTs has to be maintained at regional as well as state level. Key guidelines for determining spare as per the guidelines are provided below:

- At present PGCIL along with multiple ISTS licensee is operating and maintaining most of the Inter-State Transmission System (ISTS) assets The transmission lines of above power utilities are spread across more than one states in the country.

- Regional level spare: For regional power utilities (PGCIL & Transmission licensees), the spare at regional level would be required for these assets. These spares should be increased, optimized and limited to double the quantities mentioned for State Level based on transmission line assets in that region in order to avoid unnecessary storage of inventories.

- State level spare: The spares at 'State level' can be maintained at a centralized location which could be conveniently accessed to meet the emergency requirement of various substations/switchyards spread across the State.

- Requirement of state level: ICT and Shunt Reactor: One number single phase/three-phase unit of each rating, as applicable

- Utility for State level spare: If there are five or more substations/switchyards (of same voltage class) of a utility in a State, the 'State Level' spares shall be maintained by the utility.

- Spare at state level by utility having spread in different states: If any utility has five or more substations/switchyards (of same voltage class) spread across different States, spare recommended for 'State Level' shall be maintained for these cluster of substations/switchyards at one or more appropriate locations in any of these States.

- Higher spare for areas having higher probability of damage with natural disaster events: The quantities of spares specified shall be applicable to transmission lines and substations / switchyards in all areas including cyclone / whirlwind / tornado prone areas. However, higher quantity of spares (for some spare items) shall be kept for cyclone / whirlwind / tornado prone areas as indicated in guideline.

- Support between utilities for sharing of spare and associated commercial mechanism: There may be cases, where the extent of damage is so much that specified minimum quantum of spares/inventories may be inadequate in meeting the eventuality. In such cases, support from central power utilities (PGCIL/NTPC/DVC etc.)/transmission licensees/neighboring State utilities may be requested. The financial modalities for providing spares to other utility shall be mutually decided between the utilities.

- Replenishment of Consumed spare: Replenishment of the consumed mandatory spares shall be made at the earliest but in any case, not later than six months from the date of its consumption depending on the criticality of equipment component/material.

With a significant rise in state demands and regional demand along with the number of ICTs, it would be desirable to have an adequate spare to improve reliability and resilience in case of any exigency. Recently, a substantial delay in restoration of damaged ICTs in eastern region has been observed.

Thus, maintaining adequate regional and state level cold spare is important. Table 1-4 provides various details for deciding the requirement of regional and state level cold spare in Eastern region.

Table 1: State wise ICTs at various voltages in ER

State Wise ICT	315 MVA 400/220 kV	500 MVA 400/220 kV	315 MVA 400/132 kV	200 MVA 400/132 kV	270 MVA 400/132 kV	250 MVA 400/220 kV	1500 MVA 765/400 kV	255 MVA 765/132 kV	Cold Spare Availability
Bihar	6	27	3	15			5		

Jharkhand	15	6				1	2		
Sikkim	5				1				
Odisha	30	5					8	2	
West Bengal	38	5					4		

Table 2: Utility wise ICTs detail at various voltage level in ER

Utility	315 MVA 400/220 kV	500 MVA 400/220 kV	315 MVA 400/132 kV	200 MVA 400/132 kV	270 MVA 400/132 kV	250 MVA 400/220 kV	1500 MVA 765/400 kV	255 MVA 765/132 kV	Cold Spare Availability
PGCIL	47	27	3				15		
Other ISTS (NKTL, PMJTL, PMTL, DMTCL)		8		2			4		
IPP (Dikchu)					1				
NTPC/NPGC/BRBCL	4			9				2	
WBSETCL/WBPDCL/CESC	22			4					
OPTCL/SEL	11	2							
DVC	10								
BGCL		4							
JUSNL/TTPS		2				1			

Table 3: Utility wise number of substations with ICTs in ER

Utility Substation with ICTs	Number of Substation
PGCIL ERTS 1	15
PGCIL ERST 2	8
PGCIL Odisha	10
WBSETCL	5
WBPDCL	2
OPTCL	5
BGCL	2
DVC	5
JUSNL	1
ISTS (NKTL/DMTCL/PMTL/PMJTL)	7
NTPC	7

Table 4: Spread of substations of various utilities in different states

State	PGCIL ERTS 1	PGCIL ERTS 2	PGCIL Odisha	DVC	WBSETCL	OPTCL	Other ISTS	BGCL	JUSNL	NTPC	Others
Bihar	9						4	2		4	
Jharkhand	6			3			1		1		
Sikkim		1									
Odisha			10			5				2	1
West Bengal		6		2 + 1 (MTPS)	5		2			1	2

In the 192nd OCC meeting, ERLDC representative submitted that as per the CEA guidelines, maintenance of adequate spares at State level as well as at Regional level had to be ensured.

ERPC representative submitted that as per the CEA guidelines, the inventory of spares should be digitized and reports of the same should be submitted to CEA on half-yearly basis.

OCC advised all the states to digitize the inventory of spares and submit the report to CEA with a copy to ERPC on half yearly basis.

Further, ERLDC was advised to make a standard format mentioning the date of procurement of ICTs, date of COD of ICTs, declared age of ICTs, remaining life etc and circulate among the

concerned utilities.

OCC advised all the concerned utilities to follow the guidelines and submit the report on availability of spares ERPC and ERLDC at the earliest.

Further, Powergrid representative raised a concern regarding diverting the spares from ISTS pool to the states which may pose reliability issues and thereby requested the states to maintain a pool for cold spare ICTs.

MS, ERPC was of the view that the pool of cold spare ICTs may be maintained by a central agency like Powergrid. In case of any requirement of spare ICT on emergency basis by any utility, the same may be provided and the commercial modalities may be decided mutually. Further, to

avoid any reliability issues arising out of insufficient spares for the existing ISTS systems, the required optimum number of cold spare ICTs to be maintained by Powergrid may be enhanced which may be put up for approval subsequently.

In the 193rd OCC meeting, Powergrid Odisha representative submitted that 500 MVA and 160 MVA ICT are under procurement which would be placed at Pandiabili and Baripada S/s respectively and cater to the requirement of Odisha. A 315 MVA ICT was recently used in Jeypore S/s. After detailed cost benefit analysis, decision regarding procurement of 315 MVA ICT would be approved.

Powergrid ER-II representative submitted that a 500 MVA ICT is under procurement which would be located at Maithon or Subhashgram. 315 MVA spare ICT (released after augmentation) is available at Durgapur and Malda S/s. one 160 MVA spare ICT is available at Siliguri and one 50MVA ICT was available at Gangtok which was used recently.

Powergrid ER-I representative submitted that regional spare is available at Jamshedpur and Biharshariff S/s. The spare available at Jamshedpur was utilized at Chaibasa. One 315 MVA spare is available at Mujaffarpur S/s. one 160 MVA spare ICT of 220/132 KV is available at Purnea. Further, approval has been taken regarding procurement of one 500 MVA and one 160 MVA spare ICT at Pusauli and Daltonganj respectively.

OPTCL representative submitted that a 315 MVA spare ICT was available at Duburi S/s which was utilized in Meramundali S/s. Procurement of one 500 MVA spare ICT is under progress which would be located at new Duburi S/s. One 500 MVA ICT is available at Meramundali B. Regarding 315 MVA spare ICT, discussions are going on for procuring the same.

SLDC DVC representative submitted that one 315 MVA ICT would be replaced by 500 MVA ICT which would be kept as spare and will be located at Ramkanali S/s.

OCC was of the view that a detailed representation highlighting the ICTs under procurement and ICTs available at present would be prepared by ERLDC, based on which decision regarding maintaining pool of spares and procurement of spares would be anticipated.

Present Situation of spare ICTS as per update in 193rd OCC Meeting

Utility	500 MVA 400/220 kV	315 MVA 400/220 kV	160 MVA 220/132 kV
PGCIL ERTS 1	1: Under procurement; will be put at Sasaram	1: Muzaffarpur (released with ICT upgradation) 1: Bihar Sharif	1: Purnea 1: Daltonganj

		1 : Under Procurement	
PGCIL ERTS 2	1 : Under procurement will be put at either Malda or Shubhasgram	1 : Malda (released with ICT upgradation) 1: Durgapur (released with ICT upgradation)	1 : Silliguri
PGCIL Odisha	1: Under procurement and will be put at Pandiabili	1: Will be procured	1 : Baripada
OPTCL	1: Under procurement	Under discussion with management	Not available
DVC	Not available	1 will be spare in future as per new approved plan	Not available
WBSETCL	No detail	No detail	Not available

- **For 43 numbers of 400/220 kV 500 MVA ICTs:** 3 regional and 1 state spare are under procurement

- **For 94 numbers of 400/220 kV 315 MVA ICTs:** 3 old and 1 new is available and 2 are under procurement

- **For 220/132 kV 160 MVA ICTs:** 4 regional spares are available.

Members are requested to update the status regularly.

Deliberation in the meeting

OCC advised all the utilities to update the status, if any, to ERPC and ERLDC.

ITEM NO. C.13: Availability of ERS in the Eastern Region and update on the status by various utilities including inter-state and intra-state transmission licensees

In line with CEA guidelines for the availability of spares and inventories for power transmission system (transmission lines & substation/switchyard) assets 2020 and the CEA disaster management plan for power sector 2021, adequate ERS is required to be maintained in ER grid for early restoration of transmission line due to any tower collapse. The Eastern region is prone to cyclones, Norwester/Kalbaisakhi localized storms, hilly terrain with landslides, floods, changes in river course, substation flooding, etc. due to which each year tower collapse occurs causing forced outages of transmission lines. This necessitates adequate ERS maintenance by various utilities in the eastern region for early restoration.

Present status available at ERLDC on ERS as collected during cyclone Yaas in 2021 is provided in the attached table. All transmission utilities are requested to kindly update the ERS availability and any ERS which are already engaged.

Status Update by: PGCIL ERTS 1, PGCIL ERST 2, PGCIL Odisha, WBSETCL and OPTCL (if any ERS is already engaged then same may be put as remarks)

Utility to provide details of available ERS in the attached format:

- State-level: BSPTCL, BGCL, DVC, JUSNL, Sikkim power department (SPD)

- ISTS: Indigrid (OGPTL, PKTCL, ENICL), PGCIL Subsidiaries (CBPTCL, PMTL, PMJTL), Powerlink Transmission limited (PTL), DMTCL, Adani transmission (ATL, NKTL), TPTL

In the 192nd OCC meeting, TPTL representative submitted that they would provide the details by the end of June 2022.

DVC representative submitted that procurement of 7 nos. (Combination of suspension and tension) of ERS is under progress. Further, pile and structures (2 nos.) at Putki and Maithon are available as immediate remedial measures up to 220 KV level.

West Bengal representative submitted that 10 nos. of ERS towers which can be used at all levels are available out of which 6 nos. have been used. Of the remaining, 3 nos. are tension towers and 1 is suspension tower.

OPTCL representative submitted that they would provide the details shortly.

JUSNL representative submitted that 8 nos. of ERS are available which could be used for up to 220 KV levels.

Bihar representative submitted that 36 nos. of ERS (for 220 KV and 132 KV level) are available and all are engaged at present.

The details have been received from OPTCL, PGCIL ERTS-1, ATL, PGCIL Odisha, PGCIL ERTS-2, PTL, ENICL, OGPTL, PKTCL. The details are awaited from WBSETCL, TPTL, BSPTCL, JUSNL and Sikkim Power Department. The utilities are requested to share the details at the earliest.

Present status available at ERLDC on ERS as collected during July 2022 is provided in the attached table.

Sl	**Utility**	**voltage levels**	**Number of ERS towers available**	**Location of ERS situated**	**Type of ERS (Suspension/ Tension/ any other)**
1	OPTCL	400 kV	14 + 18 procured and in transit (arrive by Sept 2022)	Mancheswar grid - 4 nos. (high Tech)	Can be used for both suspension and Tension
				Mancheswar store - 8 nos. (high tech)	
				Mancheswar store - 2 nos. (Lindsey)	
		220 kV	42	Budhipadar - 14 nos. (Lindsey)	
				Mancheswar grid - 14Nos. (Lindsey)	
				Chatrapur - 14 nos. (Lindsey)	

Sl	Utility	voltage levels	Number of ERS towers available	Location of ERS situated	Type of ERS (Suspension/ Tension/ any other)
2	PGCIL ERTS 1	765 kV -24 sets	24 Sets	GAYA	15 Suspension & 9 Tension tower
		400 KV -30 sets	30 Sets	Jamshedpur, Purnea, Lakhisarai	Total 20 nos. Suspension & 10 nos. Tension ERS towers
3	Adani transmission limited (ATL)	400 KV	1 set (12 Column). Nos of ERS towers shall depend on line configuration, type of tower and extension of towers. Approximate 6 suspension towers/ set for 400kV D/C twin conductor.	Central India (Koradi, Maharashtra)- **48 Hours**	Modular aluminum guyed towers- Suspension tower
4	PGCIL (Odisha)	400 KV ERS - 3	3	Rourkela	Suspension - 2 & Tension-1
		765 KV ERS - 24	24	Rengali	Suspension - 15 & Tension-9
5	PGCIL ERTS 2	400 KV	1 Set (consisting of 10 towers) - 400 KV Voltage level	Durgapur	7 Set-Suspension 03 Set-Tension
6	WBSETCL	400, 220, 132 kV	05+05set (can be used with 400/220/132 kV level) 6 used for Durgapur -	at Arambagh & Gokarno	Can be used for both suspension and Tension

Sl	Utility	voltage levels	Number of ERS towers available	Location of ERS situated	Type of ERS (Suspension/ Tension/ any other)
			asansol line diversion. 4 available		
7	TPTL		MoU with PGCIL Tie up with Supreme Industry in progress	-	-
8	CBPTCL		No ERS	PTC does not own any ERS, however, in case of any such requirement for deployment of ERS, CPTC has an existing agreement with POWERGRID for deployment of ERS.	-
9	PMTL	-	No ERS	-	-
10	PMJTL	765 kV	NO ERS	-	-
11	PTL	400 kV	07 towers set ERS structures suitable for Twin Moose Configuration 400 or 220 kV.	Siliguri (W.B.)	Lindsey Manufacturing Company Ltd USA Model 600
			07 towers set ERS structures suitable for Twin Moose Configuration 400 or 220 kV.	Muzaffarpur (Bihar)ER1	
12	Indigrid (ENICL, OGPTL & PKTCL)	400 KV & 765 KV Line	765 KV- 6 Sets / 400 KV- 8 Sets	Siliguri, WB.	For 765 KV- 4 Suspension & 2 Tension. For 400 KV- 6 Suspension & 2 Tension.

Sl	Utility	voltage levels	Number of ERS towers available	Location of ERS situated	Type of ERS (Suspension/ Tension/ any other)
13	DMTCL	400 kV Lines	Arrangement of ERS with M/s Supreme Engineering at Kolkata.	Can be Dispatched in 2–3-weeks periods	-
14	BSPTCL	220 kV & 132 kV	38 ERS which can be used for 220 and 132 kV	18 Towers in use for 132 kV Kishanganj-Barsoi ckt 4 towers for 220 kv BTPS-Hazipur ckt 4 towers for 220 kV Bodhgaya- Chandauti Purnea : 1 Dehri on sone: 2 Sultanganj: 2 Fatuah: 2 Muzaffarpur : 4	Can be used for both suspension and Tension
15	BGCL	-	No ERS	No ERS	-
16	JUSNL	220 kV	Total 8 ERS	Hatia: 3 Jamshedpur: 2 Dumka: 3	Details awaited
17	DVC	400 kV and 220 kV	400 kV: 7 (under procurement) 220 kV: 2 set Pilon structure	400 kV: **Under procurement** 220 kV: 1 at putki and 1 at Maithon	-
18	Sikkim Power Department		Details awaited	Details awaited	Details awaited

In the 193rd OCC meeting, TPTL representative submitted that they do not have any ERS towers of their own. In this regard, discussion for signing a MoU with PGCIL is under progress and tie up with M/s Supreme Engineering has also been initiated.

WBSETCL representative submitted that 10 nos. of ERS towers are available which could be

used at all the voltage levels. Out of 10 nos., 6 nos. are used for Durgapur-Asansol line and 4 nos. are available. Procurement of additional 6 nos. of ERS towers (which could be used both under suspension and tension) is under planning stage.

Bihar representative submitted the status of ERS towers which is mentioned below.

Location	Status	Usage	Type	Quantity
Kishanganj-Barsoi Line	engaged	220/132 KV	Suspension/Tension	18
BTPS-Hajipur Line	engaged	220/132 KV	Suspension/Tension	4
Bodh Gaya-Chandauti	to be engaged	220/132 KV	Suspension/Tension	4
Purnea	**Spare**	220/132 KV	Suspension/Tension	**1**
Dehri	**Spare**	220/132 KV	Suspension/Tension	**2**
Fatuha	**Spare**	220/132 KV	Suspension/Tension	**3**
Mujaffarpur	**Spare**	220/132 KV	Suspension/Tension	**4**
Sultanganj	**Spare**	220/132 KV	Suspension/Tension	**2**
Total				**38**

OCC was of the view that many lines of BGCL and other new sub-stations like Mokama, Hajipur, etc. in Bihar fall under the coverage of river corridor and advised Bihar to keep provisions of ERS **towers for those lines.**

Members may update.

Deliberation in the meeting

OCC advised all the utilities to update the status, if any, to ERPC and ERLDC.

ITEM NO. C.14: List of lines of Eastern Region violating N-1 security criteria.

The list of such lines for which necessary planning needs to be done to make the system N-1 secure are given below:

Sl. No	Name of Element	Short Term Measures	Long term Measures	The target date for long term measures
Transmission Constraint in Odisha Network				
1	i. 220 kV Budhipadar-Lapanga D/C, ii. 220 kV Budhipadar Vedanta D/C iii. 220 kV Rourkela-Tarkera D/C	SPS available only for 220 kV Rourkela-Tarkera D/C. However, even with SPS N-1 criteria is not satisfied for all the conditions. **Action Required**:- Load trimming scheme needs to be planned	1. Reconductoring of 220 kV Rourkela-Tarkera D/C with HTLS. 2. 220 kV Rourkela-Tarkera second D/C 3. Shifting of Vedanta from 220 kV to 400 kV	**OPTCL to provide a target date for Long term measures**

Sl. No	Name of Element	Short Term Measures	Long term Measures	The target date for long term measures
2	i. 220 kV Lapanga-Katapalli D/C , ii. 220 kV Katapali-New Bargarh-Sadepalli (New Bolangir) S/C iii. 220 kV Katapali-Bolangir (PG)- S/C	No SPS Available. **Action Required:-** SPS/Load trimming scheme needs to be planned	Odisha to share long-term remedial action to make the system N-1 secure.	**OPTCL to provide a target date for Long term measures**
		Transmission Constraint in West Bengal Network		
3	i. 220 kV Waria-Bidhan Nagar D/C ii. 220 kV Waria-Mejia D/C	Opening of 220 kV Waria-Bidhan Nagar D/C as and when required	400/220kV, 315MVA (3rd) ICT at Bidhannagar	Target Date 2022-23. **WBSETCL may update the present Status**
		Transmission Constraint in DVC Network		
4	**i. 220 kV DSTPS-Waria D/C***	No SPS is Available. **Action Required:-** SOP/SPS/Load trimming scheme needs to be planned for the time being	i. 220 kV Connectivity at 400 kV Mejia-B ii. LILO of 220 kV Mejia-A and Barjora at Mejia-B	**DVC may update the target date**
5	ii. 220 kV Maithon-Dhanbad D/C, iii. 220 kV Maithon-Kalyaneshwari D/C	No SPS is Available. **Action Required:-** SOP/SPS/Load trimming scheme needs to be planned for the time being	iii. 220 kV Connectivity at 400 kV Mejia-B iv. 220 kV Connectivity at 400 kV RTPS	**DVC may update the target date**
*** The N-1 violation of 220 kV DSTPS- Waria D/C or DSTPS ICT 1&2 may result in large-scale disturbance, impacting an area between Durgapur and Maithon. To avoid any such mishap DVC needs to plan and implement an SPS on an urgent basis. Further, the long term measure also needs to be**				

Sl. No	Name of Element	Short Term Measures	Long term Measures	The target date for long term measures
implemented in time bound manner.				
Transmission Constraint in Jharkhand Network				
6	220 kV Maithon Dumka D/C	No SPS Available. **Action Required:-** SPS/Load trimming scheme needs to be planned	i. LILO of 1st circuit of 220kV Dumka – Govindpur D/c line at Dhanbad	Target Date 2023. **Jharkhand may update the target date**
Transmission Constraint in West Bengal Network				
6	i. 220 kV Rajarhat-Newtown AA3 D/C, ii. 220 kV Subhasgram -EMSS D/C	SPS is Available for both the Ckts	1. 220 kV Rajarhat-Newtown AA3 D/C line with HTLS. 2. No Strenthing planned for 220 kV Subhasgram-EMSS D/C	1. Target Date November 2022 for recondutoring **WBSETCL may update the present Status**
7	i. 220 kV Subhasgram (PG) – Subhasgram (WB) D/C ii. 220 kV Subhasgram (WB)-Lakshmikantpur D/C	SPS Available for 220 kV Subhasgram (PG) – Subhasgram (WB) D/C	i. 220 kV Subshagram – Baruipur D/C ii. 400/132 kV Substation at Lakshimikantpur.	i. Line antitheft charged from Subhasgram end ii. Lakshimikantpur tareget date is December 2024 **WBSETCL may update the present Status**
Transmission Constraint in Bihar Network				
8.	220 kV Darbhanga-Darbhanga(BH) D/C	No SPS Available. **Action Required:-** SPS/Load trimming scheme needs to be planned	Bihar to share long-term remedial action to make the system N-1 secure.	**Bihar to provide a target date for Long term measures**
9.	220 kV Muzzafarpur-Hazipur D/C	No SPS Available. **Action Required:-** SPS/Load trimming scheme needs to be planned	1. 220 kV Muzzafarpur-Amnour D/C	**Bihar to provide a target date for Long term measures**

Sl. No	Name of Element	Short Term Measures	Long term Measures	The target date for long term measures
10.	220 kV Gaya Bodhgaya D/C	No SPS Available. **Action Required:-** SPS/Load trimming scheme needs to be planned	1. 220 kV Gaya Bodhgaya Second D/C	**Bihar to provide a target date for Long term measures**

In the 193rd OCC meeting, ERLDC representative submitted that outage of DSTPC ICTs or DSTPS Waria D/C line may create a large scale disturbance.

DVC representative submitted that the contracts for connectivity between MTPS 220 KV to 400 KV and RTPS connectivity have already been awarded and the work is expected to be completed by December 2023. The 400 KV bus connectivity would extend some relief in case of evacuation problem from 220 KV bus due to MTPS generation.

Under long-term measures, programs for augmentation of DSTPS ICT and DSTPS-DTPS HTLS is under progress. Necessary approval from ERPC and CTU has already been taken in this regard.

Moreover, Parulia (PG)-Parulia (DVC) line has already been given to Powergrid for HTLS connectivity. After the HTLS connectivity, possibilities of switching-off of DSTPS ICT may be explored. Further, possibilities of bus-splitting at MTPS may also be worked out.

ERLDC representative requested DVC to maintain some minimum generation in Mejia. DVC representative submitted that Mejia unit-6 would be synchronized by 21st July 2022.

ERLDC representative was of the view that as per the study undergone by them, closing of

Bidhannagar-Waria circuit would not cater to the generation loss issues and advised DVC to explore the possibilities of bus splitting and connectivity to 400 KV of MTPS and RTPS.

Members may discuss.

Deliberation in the meeting

OCC advised all the utilities to update the status, if any, to ERPC and ERLDC.

ITEM NO. C.15: ICT Constraints violating N-1 security criteria.

The list of ICTs which are not N-1 complaint are given below:

Sl. No	Name of ICT	Short Term Measures	Long term Measures	The target date for long term measures
ICT Constraint in West Bengal Network				

Sl. No	Name of ICT	Short Term Measures	Long term Measures	The target date for long term measures
1	i. 400/220 kV 2 X 315 MVA ICTs at Gokarna & ii. 400/220 kV Sagardighi 1 X 315 MVA ICTs	SPS Available for Gokerno ICTs **Action Required**:- Load trimming scheme needs to be planned for Sagardighi	i. 3rd ICT at Gokerno	Target Date Dec-22 **WBSETCL may update the present Status**
2	i. 400/220 kV ICT-1 & 2 at Bidhannagar	No SPS Available **Action Required**:- SPS needs to be planned	i. 400/220kV 315MVA (3rd) ICT at Bidhannagar	Target Date 2022-23 **WBSETCL may update the present Status**
ICT Constraint in ISTS Network				
3	i. 400/220 kV Ranchi 2 X 315 MVA ICTs	SPS Available	i. 3rd 500 MVA ICT at Ranchi	**POWERGRID may update the target date**
ICT Constraint in DVC Network				
4	i. 400/220 kV Bokaro A 2 X 315 MVA ICTs	No SPS Available **Action Required**:- SPS needs to be planned	i. Upgradation with 500 MVA ICTs	**DVC may update target date**
5	**i.400/220 kV ICT-1 & 2 at DSTPS ***	No SPS Available **Action Required**:- SPS needs to be planned	i. Upgradation with 500 MVA ICTs	**DVC may update target date**
ICT Constraint in Odisha Network				
6	i. 400/220 kV New Duburi 2 X 315 MVA ICTs	No SPS Available **Action Required**:- SPS needs to be planned	i) 3rd ICT at New Duburi	**Odisha may update the target date**

In the 193rd OCC meeting, ERLDC representative submitted that outage of DSTPC ICTs or DSTPS Waria D/C line may create a large scale disturbance.

DVC representative submitted that under long-term measures, programs for augmentation of DSTPS ICT is under progress. Necessary approval from ERPC and CTU has already been taken in this regard.

Moreover, Parulia (PG)-Parulia (DVC) line has already been given to Powergrid for HTLS connectivity. After the HTLS connectivity, possibilities of switching-off of DSTPS ICT may be explored.

Members may update.

Deliberation in the meeting

OCC advised all the utilities to update the status, if any, to ERPC and ERLDC.

ITEM NO. C.16: Draft Central Electricity Authority (Flexible Operation of Thermal Power Plants) Regulations, 2022 and associated draft procedure by NLDC.

CEA has notified Draft Central Electricity Authority (Flexible operation of thermal power plants) Regulations, 2022. They have asked for comments by 26th August 2022.

Highlights of draft regulation:

- Applicable to all coal and lignite-based thermal power plants and load despatch centres.
- Objective of regulation is to mandate necessary retrofitting of thermal generators to support flexible operation to facilitate dispatch of must run generators like renewables
- This includes measures to reduce technical minimum, now termed as MPL (Minimum Power Level) , increase the ramp rates and optimize the start-up of the power plants
- Units throughout their service life shall be considered for flexible operation.
- Beforehand assessment for Suitability for start/stops, deep load following (Ramps), condition assessment and required upgradation for flexible operation need to be done.
- Load despatch can schedule flexible plants to support the operation of must-run stations.
    - All thermal plants up to minimum power levels of 55 % (Within 1 year)
    - All thermal plants up to minimum power levels of 40% with condition that (Within 3 years based in consultation with OEM)
        - Coal-based thermal plant: Minimum loading/unloading rate shall be 3 %/minute above MPL
        - Supercritical and ultra-super-critical units: Minimum loading/unloading rate shall be 5 %/minute above MPL
- All thermal plants to achieve the requirements should go for technical feasibility studies in consultation with the concerned Original Equipment Manufacturers/ Qualified Consultants
- All Thermal power plants to implement the necessary modifications as per this regulation.
- Any deviation from the limits prescribed under these Regulations shall be brought before the Authority on case-to-case basis by the thermal power plants for exemption, if any.

In view of the same, all thermal power plants in the eastern region should check their feasibility of operation at 55% and 40% status including ramping capability in consultation with OEM. For this ISGS, IPPs, Intra-state SGS and IPPs may also explore associated testing of their respective units at lower levels in consultation with OEM as a pilot project. This activity has been earlier done successfully on various ISGS/IPP power plants. Further, all are requested to submit comments.

It is also informed that Tamil Nādu is doing two-shift operations of Mettur and Tuticorin units to accommodate RE. They are taking units out between 0800-1100 hours and bringing them back between 1445-1815 hours.

In the 194th OCC meeting, NTPC representative submitted that all its units are able to run at 55% load capacity without any oil support.

DVC representative submitted that they are able to achieve the minimum load capacity of 55% in case of 500 MW and 600 MW units provided the coal quality is good. The lower capacity units are ball and tube mill type for which necessary permission from CEA and ERPC would be taken prior

to testing of minimum load capacity.

WBPDCL representative submitted that the technical minimum for their units is different and varies depending upon their unit capacity. He further submitted that in general a minimum load capacity of 75% is maintained for all their units but due to deteriorated coal quality, at times it becomes difficult to maintain the load capacity especially for Kolaghat units.

WBPDCL was advised to send the detailed report on technical minimum of their units to ERPC at the earliest.

OCC advised all the generating units to submit their comments on draft CEA regulations, 2022 of Flexible Operation of Thermal Power Plants to CEA within the stipulated time period. Further, all the generating stations were also advised to submit the reports to ERPC & ERLDC on the present minimum load achieved by them against the designed technical minimum.

All the generating stations are requested to update the status.

Deliberation in the meeting

OCC advised all the generating stations to submit their comments on draft CEA regulations, 2022 to CEA within the stipulated time period.

PART D: OPERATIONAL PLANNING

ITEM NO. D.1: Anticipated power supply position during October 2022

The abstract of peak demand (MW) vis-à-vis availability and energy requirement vis-à-vis availability (MU) for the month of October 2022 provided at Annexure D.1 were prepared by ERPC Secretariat on the basis of LGBR for 2022-23 and feedback of constituents, keeping in view that the units are available for generation and expected load growth etc.

Members may update.

Deliberation in the meeting

*The updated anticipated power supply position is provided at **Annexure D.1**.*

ITEM NO. D.2: Shutdown proposal of generating units for the month of October 2022

Proposed Maintenance Schedule of Thermal Generating Units of ER in the month of OCT' 2022

System	Station	Unit No.	Capacity (MW)	Period (As per LGBR 2022-23)		No. of Days	Reason	Remarks
				From	To			
WBPDCL	Sagardighi TPS	3	500	27.10.2022	20.11.2022	25	COH	

Members may update.

Deliberation in the meeting

*The approved shutdown proposal is provided at **Annexure D.2**.*

NTPC representative requested for availing shutdown of NPGC unit-1 would be taken from 1st November 2022 for 80 days.

ITEM NO. D.3: Shutdown of 132/66 KV ICT-1 & 2 at Gangtok.

In 195th OCC Outage Coordination Meeting, Powergrid has proposed shutdown of 50 MVA ICT-1 & 2 at Gangtok to carryout LBB relay retrofitting work.

132KV/66KV 50 MVA ICT 1 AT GANGTOK	TRANSFORMER	LBB RELAY RETROFIT WORK	14-Oct-2022 09:00 hrs	14-Oct-2022 17:00 hrs
132KV/66KV 50 MVA ICT 2 AT GANGTOK	TRANSFORMER	LBB RELAY RETROFIT WORK	15-Oct-2022 09:00 hrs	15-Oct-2022 17:00 hrs

During discussion, ERLDC is of view that ICT loadings at Gangtok during October will be more than 50 MW and as such n-1 criteria is not going to satisfy for the ICTs. Also, in view of upcoming winter season there will be gradual increase in loading of the ICTs at Gangtok. They suggested to defer this shutdown till end of the winter season.

Sikkim may update. Members may discuss.

Deliberation in the meeting

Sikkim representative was not available during the discussion.

OCC advised Sikkim to facilitate the S/d as requested by Powergrid.

Teesta-III representative further requested for S/d of Teesta-III Rangpo line on 13.10.2022 for 4 hours. OCC approved the same.

ITEM NO. D.4: Major Generating Units/Transmission Element outages/shutdown in ER Grid (as on 11.09.2022)

a) Thermal Generating Stations outage report:

SL No	STATION	STATE	AGENCY	UNIT NO	CAPACITY (MW)	REASON(S)	OUTAGE DATE
1	BARAUNI TPS	BIHAR	NTPC	7	110	Excessive chemical deposits on Turbine blades(turbines need to be opened for assessment of the extent of deposits and the repairs required to address the issue of High First Stage pressure in HP Turbine)	19-Feb-2022
2	BARAUNI TPS	BIHAR	NTPC	6	110	Initially unit tripped on flame failure but later, problem found in condenser.	14-Jul-2022
3	MEJIA TPS	DVC	DVC	1	210	Initially unit taken out in STATOR EARTH FAULT, later it is in annual overhauling from 28/07/2022	16-Jul-2022
4	STERLITE	ODISHA	SEL	1	600	Capital Overhauling	18-Jul-2022
5	DPL	WEST BENGAL	WBPDCL	7	300	Poor coal stock	02-Aug-2022
6	HEL HIRANMAYEE	WEST BENGAL	WBPDCL	2	150	Poor coal stock	29-Aug-2022
7	TSTPP	ODISHA	NTPC	2	500	Taken out due to generator bus duct hotspot, later shutdown extended for unit overhauling for 45 days.	09-Aug-2022
8	DSTPS	DVC	DVC	1	500	Initially it tripped on Boiler Tube Leakage but later, DVC has taken the machine under overhauling work considering the poor condition of boiler.	27-Aug-2022
9	KHSTPP	BIHAR	NTPC	2	210	Annual Overhauling	14-Aug-2022
10	SANTALDIH TPS	WEST BENGAL	WBPDCL	6	250	Annual Overhauling	15-Aug-2022
11	FSTPP	WEST BENGAL	NTPC	6	500	Tripped on generator lockout relay due to high turbine vibration	23-Aug-2022
12	BARH	BIHAR	NTPC	1	660	Boiler Tube leakage	10-Sep-2022
13	SAGARDIGHI	WEST BENGAL	WBPDCL	4	500	Boiler Tube Leakage	10-Sep-2022

14	DARLIPALI	ODISHA	NTPC	1	800	Boiler Tube Leakage	11-Sep-2022

All Generating stations are requested to update expected restoration time and reason outage 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.

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

NIL

c) Hydro Unit Outage Report:

S. NO	STATION	STATE	AGENCY	UNIT NO	CAPACITY (MW)	REASON(S)	OUTAGE DATE
1	RENGALI HPS	ODISHA	OHPC	3	50	Damage of GT	26-Nov-2021
2	BALIMELA HPS	ODISHA	OHPC	3	60	The unit taken out under R & M for 18 months.	08-Jul-2022
3	BALIMELA HPS	ODISHA	OHPC	4	60	The unit taken out under R & M for 18 months.	08-Jul-2022

d) Long outage report of transmission lines (As on 11.09.2022):

Transmission Element / ICT	Outage From	Reasons for Outage
400 KV IBEUL JHARSUGUDA D/C	29.04.2018	TOWER COLLAPSE AT LOC 44,45
220 KV PANDIABILI - SAMANGARA D/C	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
220/132 KV 100 MVA ICT II AT LALMATIA	22.01.2019	FAILURE OF HV SIDE BREAKER
220/132 KV 100 MVA ICT 3 AT CHANDIL	30.04.2020	ICT BURST AND DAMAGED AFTER FIRE REPORTED
400KV/220KV 315 MVA ICT 4 AT JEERAT	09.04.2021	VERBALLY CONFIRMED BY WB THAT NEW TRANSFORMER PROCUREMENT UNDER PIPELINE AND SHALL BE REPLACED IN THE NEAR FUTURE.
220KV-FSTPP-LALMATIA	21.04.2021	THREE TOWER COLLAPSED NEAR LALMATIA
400KV MAIN BUS - 2 AT DIKCHU	05.05.2021	REPEATED SPURIOUS BUSBAR PROTECTION OPERATION
220KV-GAYA-CHANDAUTI (PMTL)-DC	22.05.2021	FOR DISMANTLING OF TOWER NO 51 UNDER LILO WORK AT BODHGAYA.
400KV/220KV 315 MVA ICT 1 AT INDRAVATI (PH)	24.02.2022	INITALLY REPORTED BUCHHOLZ RELAY OPERATED. LATER SLDC ODISHA REPORTED THAT CONTROL & RELAY PANEL OF ICT BURNT. REPLACEMENT FOR THE SAME IS UNDER PROCESS.
220KV-ALIPURDUAR (PG)-ALIPURDUAR(WB)-1	14.07.2022	S/D TAKEN FOR RELAY TESTING PURPOSES, COULD NOT BE RETURNED DUE TO B-PH CB LOCKOUT
400KV/220KV 315 MVA ICT 1 AT PATRATU	01.08.2022	BUCHHOLZ RELAY OPERATED
400KV/220KV 315 MVA ICT 1 AT DURGAPUR	08.08.2022	FOR REPLACEMENT OF 416-89T ISOLATOR, RELAY & CONTROL PANEL WIRING, REPLACEMENT OF 408 BCT WITH BPI, TESTING

400KV-ALIPURDUAR (PG)-PUNASANGCHUN-JIGMELING-2	11.08.2022	ALIPURDUAR: B PHASE TO EARTH, Zone-2, DISTANCE-100%

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.

Members may update.

Deliberation in the meeting

Members noted.

ITEM NO. D.5: Commissioning of new units and transmission elements in Eastern Grid in the month of Aug-2022

The details of new units/transmission elements commissioned in the month of Aug-2022 based on the inputs received from beneficiaries:

GENERATING UNITS							
SL. NO.	Location	OWNER/UNIT NAME	Unit No/Source	Capacity added (MW)	Total/Installed Capacity (MW)	DATE	Remarks
NIL							
ICTs/ GTs / STs							
SL. NO.	Agency/ Owner	SUB-STATION	ICT NO	Voltage Level (kV)	CAPACITY (MVA)	DATE	Remarks
NIL							
TRANSMISSION LINES							
SL. NO.	Agency/ Owner	LINE NAME		Length (KM)	Conductor Type	DATE	Remarks
1	PMJTL	400 kV Subhashgram-New Jeerat Transmission Line-1		107.00	Quad Moose	22-Aug-22	Line first charged on 22-08-2022 at 20:25 Hrs.
2	PMJTL	400 kV Subhashgram-New Jeerat Transmission Line-2		107.00	Quad Moose	24-Aug-22	Line first charged on 24-08-2022 at 08:03 Hrs.
LILO/RE-ARRANGEMENT OF TRANSMISSION LINES							
SL. NO.	Agency/ Owner	Line Name/LILO at		Length (KM)	Conductor Type	DATE	Remarks
NIL							
BUS/LINE REACTORS							
SL. No.	Agency/ Owner	Element Name		SUB-STATION	Voltage Level (kV)	DATE	Remarks
1	Odisha	400 kV, 125 MVAr Bus Reactor 1 at New Dubri along with the associated bays (Bay No. 401)		New Duburi	400	23-Aug-22	Reactor first charged on 23-08-2022 at 13:01 Hrs.
HVDC /AC Filter bank / FACTS DEVICE associated System							
SL. NO.	Agency/ Owner	Element Name		SUB-STATION	Voltage Level (kV)	DATE	Remarks
NIL							
BAYS							
SL. NO.	Agency/ Owner	Element Name		SUB-STATION	Voltage Level (kV)	DATE	Remarks
NIL							

Members may update.

Deliberation in the meeting

Members noted.

ITEM NO. D.6: UFR operation during the month of August 2022.

Frequency profile for the month as follows:

Month	Max (Date/Time)	Min (Date/Time)	Less IEGC Band (%)	Within IEGC Band (%)	More IEGC Band (%)
August, 2022	50.31 Hz on 15.08.2022 at 13:41 Hrs.	49.47 Hz on 16.08.2022 at 19:23 Hrs.	8.77	75.77	15.46

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

Members may note.

Deliberation in the meeting

Members noted.

****

सत्यमेव जयते

भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
(सड़क परिवहन और राजमार्ग मंत्रालय, भारत सरकार)
National Highways Authority of India
(Ministry of Road Transport and Highways, Government of India)
जी-5 एवं 6, सेक्टर-10, द्वारका, नई दिल्ली - 110 075 • G-5 & 6, Sector-10, Dwarka, New Delhi-110075
दूरभाष/Phone : 91-11-25074100 / 25074200

NHAI/PIU-Supaul/UtilityPeerReview/Pkg-IV/101/2021/ADANI/896 Date: 13.09.2022

To,

Shri N.S. Mondal,
Member Secretary of Eastern Regional Power Committee
Eastern Regional Power Committee
14, Golf Club Road Tollygunje Kolkata-700033

Subject:- Construction of 2 Lane Bridge across River Kosi along with approach road from Bheja to Bakaur section of NH-527A (Design Chainage Km 0+000 to Km 13+300) under BRT scheme of Bharatmala Pariyojana Phase-I (in the state of Bihar on EPC mode.-**Outage of relocation/height raising of 400 KV DC Kishanganj-Darbhanga Tower no. 402 & 403. -reg.**

Ref.:- M/s ALTL letter no- ALTL/SLG/NH/2021-22/008 dated 22.02.2022

Sir,

This has reference to the above letter in the captioned subject Project. A Bridge across River Kosi along with approach road from Bheja to Bakaur section of NH-527A having a length of 13.3 km is being developed between Bheja- Bakaur The said project is a high-end priority project of Government of India which is being developed for connectivity over Kosi river with 10.2 km longest River Bridge, which is one of the longest river bridges in the Country.

2. It is intimated that there is a 400kV **Kishanganj-Darbhanga** (DC line) is falling in the main carriageway of NH-527A at Bheja to Bakaur under construction Bridge which is required to be relocated. The estimate for the said line has already been received from Adani transmissions vide letter under reference Amounting to Rs. 77,67,76,805.00/- which includes Rs.13,56,24,508.00 towards transmission availability loss. M/s ALTL vide Letter dated 22.02.2022 had submitted that transmission loss charges amounting to Rs. 13,56,24,508.00 for outage for 25 days is to be deposited by NHAI for shifting the above-mentioned line. Further, in aforementioned letter M/s. Adani transmissions informed that the payment against the loss due to transmission availablity loss (Rs. 13,56,24,508.00) shall be refunded by Alipurduar Transmission Limited to NHAI subject to deemed availablity certificate issued by Eastrean Regional Power corporation to the trasmission company.

3. In this regard, it may be noted that the payment against the loss due to transmission availablity loss claimed by M/s, Adani tranmissions are huge and the project being implemented ubder EPC mode with 100% Government funding will burden the Government budget. It may also be noted that the subject project is in its advanced stage of construction and non-shifting of said tower will adversely affect the completion of the project as it is falling in the main carriage way of the alignment. The completion of the instant project on time will be recognised as a mile stone achievement for Govt of India and will able to facilitate the Public of backward Region State of Bihar.

4. As per para 5.3 of Ministry of Power Office Memorandum dated 16.08.2021, it is mentioned that in case of projects of national importance WWI projects), deemed availability may be given for the shutdown period availed by transmission licensees for shifting of their transmission lines, provided that transmission customers are not affected by the shutdown (copy enclosed for reference)

5. In view of the above and the subject project being of National Importance, it is therefore requested to issue the the neccessary deemed availablity certificate to Alipurduar Transmission Limited for waving off of the Transmission availability loss for the shutdown of 400kV **Kishanganj-Darbhanga** Line (DC line) for about 25 days.

6. This letter is issued with the approval of the Competent Authority.

Yours faithfully,

13/9/2022

(Mukesh Kumar Meena)
DGM (T)-BH
for General Manager (T)-BH

Copy to:

i. RO Patna
ii. PD, PIU Supaul

No. 2/7/2017-Trans-Pt(1)
Government of India
Ministry of Power
Shram Shakti Bhawan, Rafi Marg, New Delhi-110001
****

Dated- 16th August, 2021

OFFICE MEMORANDUM

Subject: **Minutes of the meeting taken by Secretary (Power) to discuss the issue of Supervision charges, Shutdown charges and preparation of estimates for shifting of power lines by private transmission companies- reg.**

The undersigned is directed to forward herewith the minutes of the meeting taken by Secretary (Power) to discuss the issue of Supervision charges, Shutdown charges and preparation of estimates for shifting of power lines by private transmission companies, on 11.08.2021 for information and further necessary action.

Encl: as stated.

(Goutam Ghosh)
Director (Trans)

To

1. Secretary(MoRTH), GoI, New Delhi.
2. Chairperson, CEA, New Delhi.
3. Chairman, NHAI, New Delhi.
4. CMD, PGCIL, Gurugram.
5. CMD, POSOCO, New Delhi.
6. COO, CTUIL, Gurugram.
7. DG, EPTA, New Delhi

Copy to: Sr. PPS/PPS/PS to Secretary(Power)/ AS(Trans)/ JS(Trans)/ Director(Trans), MoP.

Minutes of the meeting taken by Secretary (Power) to discuss the issue of Supervision charges, Shutdown charges and preparation of estimates for shifting of power lines by private transmission companies, on 11.08.2021.

A meeting was held under the Chairmanship of Secretary (Power) on 11.08.2021 to discuss the issues raised by Secretary, Ministry of Road Transport and Highways (MoRTH) vide his DO letter dated 02.08.2021 and by CMD, PGCIL related to supervision charges, cost estimates and shutdown charges levied by transmission licensees for shifting of transmission lines for NHAI projects. List of participants is attached at **Annexure – I**.

2. At the outset, Secretary (Power) welcomed all the participants and requested CEA to start the discussions. Representative of CEA made a presentation (copy at **Annexure-II**) highlighting the issues raised in the DO letter of Secretary, MoRTH and comments/status on these issues. Discussion/ decisions taken in the meeting are as under:

3. Supervision Charges:

3.1 It has been mentioned in the MoRTH's letter that private Transmission licensees levy Supervision Charges @15% of total Project Cost irrespective of the implementing agency. MoRTH requested to rationalize the supervision charges for private transmission developers in line with supervision charges levied by POWERGRID for shifting of transmission lines in NHAI projects.

3.2 It was noted that the supervision charges levied by POWERGRID are as below:-

NHAI Projects	Shifting works by concessionaire of NHAI	Shifting works by POWERGRID
Under Bharatmala Pariyojana	2.5%	2.5%
Other Projects of NHAI	2.5%	15%

3.3 It was generally agreed by private transmission developers to levy supervision charges in line with above supervision charges levied by POWERGRID for shifting of transmission lines for NHAI projects.

3.4 Representative of Torrent Power submitted that NHAI levies higher charges from private transmission licensees for crossing of National Highways compared to the charges levied from POWERGRID.

3.5 Member(Projects), NHAI submitted that this policy of NHAI was general in nature and not specific to transmission developers.

3.6 After detailed deliberations, it was decided that-

i. Private transmission developers would levy supervision charges for shifting of transmission lines for NHAI projects in line with supervision charges levied by POWERGRID (para 3.2), subject to the condition that NHAI shall not differentiate between private and public transmission developers in respect of charges levied

by them for crossing of National Highways by transmission lines.

ii. Based on decisions taken in the meeting, CEA shall issue Guidelines on Supervision charges to be levied by all transmission licensees for shifting of transmission line in case of NHAI projects.

4. Cost Estimates:

4.1 In the MoRTH letter dated 02.08.2021, it was pointed out that cost estimates submitted by private transmission developers for shifting works are on higher side and requested that CEA should vet these estimates in time bound manner (within 7 days)

4.2 It was informed by CEA that-

a) Cost Estimates for shifting of transmission line include (i) Supply Cost, (ii) Erection Cost, (iii) Uninstallation Charges, (iv) RoW charges, (v) Availability Charges, & (vi) Other Charges like Contingency, Administrative etc.

b) Cost estimates are based on BoQ of items/material/services

c) Generally both NHAI and Transmission licensees carry out survey and work out the route alignment and accordingly BoQ prepared.

d) Before vetting the Cost estimates, CEA examines the technical aspects including BoQ.

e) For examination of the cost estimates, POWERGRID's schedule of rates used on cost of items/services.

f) Cost estimates in respect of Right of Way/Crop/Tree compensation charges depend on several factors which varies from location to location and these charges are considered as per actual.

g) Normally CEA takes 30 working days to vet the cost estimates, provided the BoQ has been vetted by NHAI.

4.3 On the issue of using Schedule of Rate (SoR) of POWERGRID for vetting of cost estimates, CMD, POWERGRID informed that SoR is applicable for large volume of works, and should not be used for estimation of cost for shifting of lines, which is a small volume work. He informed that actual cost of shifting may be taken from POWERGRID on annual basis and it may be appropriately escalated (to reflect price increase in next one year) to vet the cost estimates. Representative of IndiGrid endorsed the views of POWERGRID.

4.4 After detailed deliberations, it was decided that-

i. CEA shall build and maintain a database in the beginning of every year, with the help of POWERGRID that will include rates for various items to be used in shifting of transmission line; and update it quarterly, with the help of change in indices and actual cost incurred in shifting of various lines.

ii. CEA shall vet the cost estimates within 15 days, after vetting of BoQ by NHAI.

5. Shutdown charges:

5.1 Secretary, MoRTH in his DO letter mentioned that shutdown charges are levied on MoRTH agencies for shifting of transmission lines. Till last year, the charges were about @ 2% of estimated costs, and now it has increased to about Rs 5 cr to 7 cr in some estimates. MoRTH requested MoP to give deemed availability certificate for waiving of these charges.

5.2 Representative of CEA informed that

i. CERC (Terms and Conditions of Tariff) Regulations, 2019 provide that the transmission elements under outage only due to following reasons shall be deemed to be available: "Shut down availed for maintenance of another transmission scheme or construction of new element or renovation/upgradation/ additional capitalization in existing system approved by the Commission".

ii. Presently Regional Power Committees (RPCs) do not provide deemed availability in cases of outages of transmission lines for construction of projects of NHAI/ Railways etc.

5.3 It was noted that generally customers of transmission lines are not affected by shutdown of a particular transmission line during the period of shifting of utilities, because of redundancy in the power system. Therefore, it was suggested that in case of projects of national importance (NHAI projects), deemed availability may be given for the shutdown period availed by transmission licensees for shifting of their transmission lines, provided that transmission customers are not affected by the shutdown. It was also suggested that there is need for standardization of shutdown period, so that deemed availability period is not utilized for other than intended purposes.

5.4 After detailed deliberations, it was decided that

i. In case of NHAI projects, RPC Secretariat would provide deemed availability certificate for the shutdown period availed by transmission licensees for shifting of their transmission lines, provided that transmission customers are not affected by the shutdown of the line. Shutdown charges would be computed by CEA as per standard norms and would be included in the cost estimates to be provided to NHAI for shifting of lines.

ii. Decision at para 5.4(i) will be immediately implemented. CERC shall also be requested to suitably modify their Regulations, so that RPC Secretariat can issue deemed availability certificate for the shutdown period availed by transmission licensees for shifting of their transmission lines in NHAI projects, provided that transmission customers are not affected by the shutdown of the line.

iii. CEA shall standardize the shutdown period required for such shifting works, so that deemed availability period is not utilized for other than intended purposes.

5.5 A provision may be added in the Standard RfP for TBCB projects that the developer shall abide by the Guidelines of CEA w.r.t. shifting of transmission lines for NHAI projects and other projects notified by Ministry of Power.

6. CEA will issue formal guidelines in accordance with decisions taken in this meeting.

7. DG, EPTA suggested that a separate meeting may also be organized to resolve similar issues with Railways. EPTA was requested to send the details to Ministry of Power in this regard.

8. The meeting ended with thanks to chair.

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Annexure-I
F. No. 2/7/2017-Trans-Pt(1)

Date/Time of the meeting: 11.08.2021 at 1.00 pm
Venue: MS Teams Platform

Subject: **Minutes of the meeting taken by Secretary (Power) to discuss the issue of Supervision charges, Shutdown charges and preparation of estimates for shifting of power lines by private transmission companies- reg.**

List of Participants

Ministry of Power

1. Shri Alok Kumar, Secretary - in the chair
2. Shri Vivek Kumar Dewangan, Additional Secretary(Trans)
3. Shri Mritunjay Kumar Narayan, Joint Secretary (Trans)
4. Shri Goutam Ghosh, Director (Trans)
5. Shri Bihari Lal, Under Secretary(Trans)

Central Electricity Authority

6. Shri Goutam Roy, Member(PS)
7. Shri Ishan Sharan, CE
8. Smt. Manjari Chaturvedi, Director

NHAI

9. Shri Manoj Kumar, Member(Projects)

PGCIL

10. Shri K Sreekant, CMD
11. Smt. Seema Gupta, Director(Operations)
12. Shri Shyam Kumar, GM
13. Shri Ajit Kumar Bishnoi

POSOCO

14. Shri KVS Baba, CMD
15. Shri Debasis De, ED(NLDC)

CTUIL

16. Shri Subir Sen, COO
17. Shri Ashok Pal, ED

Representatives from EPTA

18. Shri Vijay Chhibber, DG
19. Shri Rohit Gera, Sterlite Power
20. Shri Harsh Shah, Indigrid
21. Shri Nihar Raj, Adani Power
22. Shri L N Mishra, Torrent Power
23. Shri TAN Reddy, Sterlite Power

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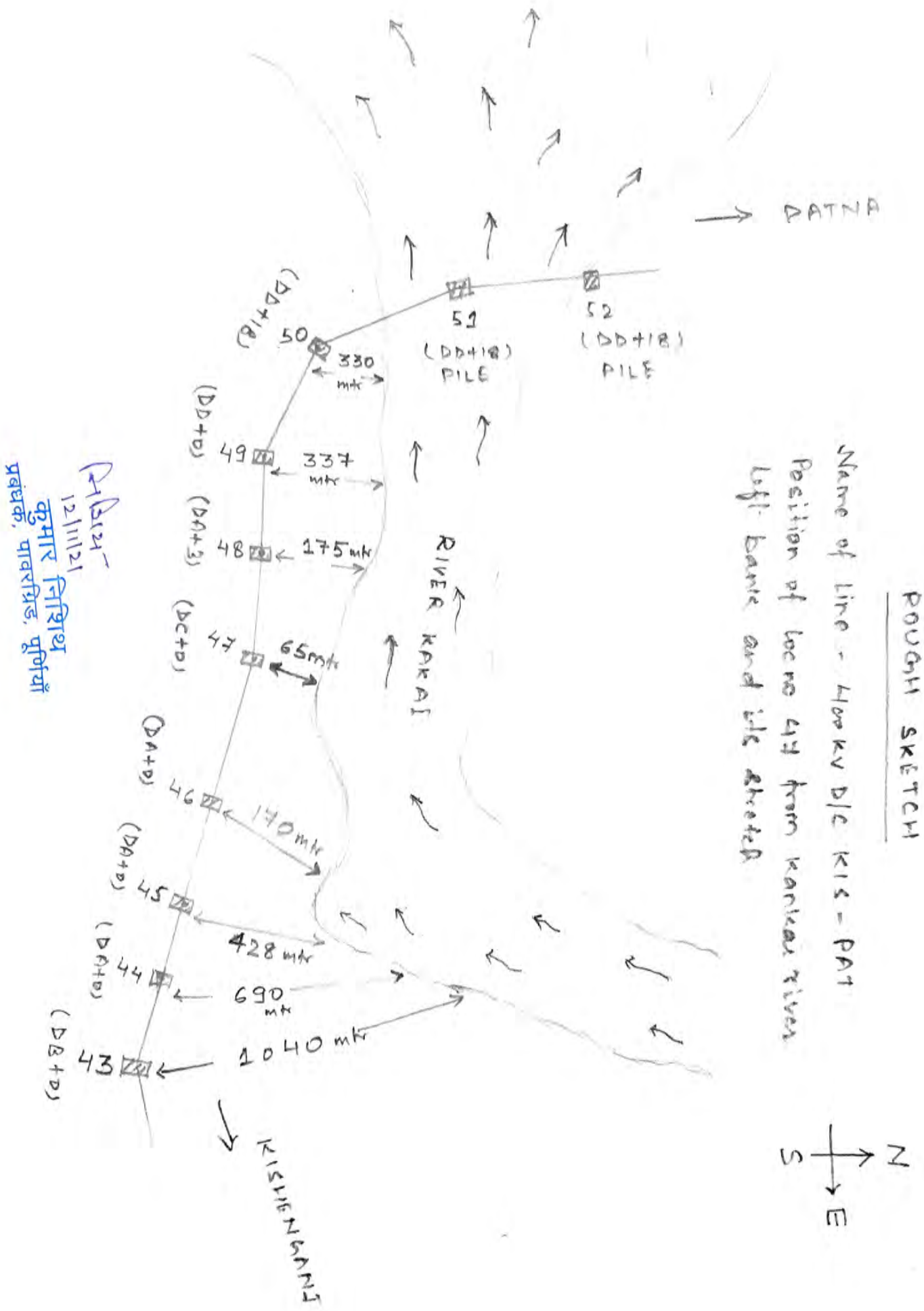
Annexure B.2



12/11/21
कुमार निशिथ
प्रबंधक, पावरग्रिड, पूर्णियाँ

Annexure B.10

Package Description: Survey, Design, Supply, Erection, Testing & Commissioning works for replacement of existing ACSR Lark conductor by HTLS (High Temperature Low Sag) conductor in respect of **132KV D/C Ramgarh-Patratu line of DVC**

SHUTDOWN PLAN FOR EXECUTION

CKT-1 (Line No. 78)									CKT-2 (Line No. 77)							
Sl. No.	Sections		Sectional Length (Mtr)	Gang Name	Proposed Shutdown Timing & Date			Days	Sections		Sectional Length (Mtr)	Gang Name	Proposed Shutdown Timing & Date			Days
	From	To			Timing	From	To		From	To			Timing	From	To	
1	TN. 09	TN. 16	2488	Gang-1	05:00 to 17:00 Hrs.	**10-10-2022**	14-10-2022	5	GANTRY	TN. 01	35	Gang-1	05:00 to 17:00 Hrs.	**19-11-2022**	19-11-2022	1
2	TN. 16	TN. 18	766	Gang-1	05:00 to 17:00 Hrs.	15-10-2022	17-10-2022	3	TN. 01	TN. 02	300	Gang-1	05:00 to 17:00 Hrs.	20-11-2022	21-11-2022	2
3	TN. 18	T.N. 18 A	220	Gang-1	05:00 to 17:00 Hrs.	18-10-2022	19-10-2022	2	TN. 02	TN. 04	476	Gang-1	05:00 to 17:00 Hrs.	22-11-2022	23-11-2022	2
4	T.N. 18 A	TN. 19	227	Gang-1	05:00 to 17:00 Hrs.	20-10-2022	21-10-2022	2	TN. 04	TN. 09	1527	Gang-1	05:00 to 17:00 Hrs.	24-11-2022	27-11-2022	4
5	TN. 19	TN. 20	150	Gang-1	05:00 to 17:00 Hrs.	22-10-2022	23-10-2022	2	TN. 09	TN. 16	2488	Gang-1	05:00 to 17:00 Hrs.	28-11-2022	02-12-2022	5
6	TN. 20	TN. 20A	310	Gang-1	05:00 to 17:00 Hrs.	24-10-2022	25-10-2022	2	TN. 16	TN. 18	766	Gang-1	05:00 to 17:00 Hrs.	03-12-2022	05-12-2022	3
7	TN. 20A	TN. 21	312	Gang-1	05:00 to 17:00 Hrs.	26-10-2022	27-10-2022	2	TN. 18	T.N. 18 A	220	Gang-1	05:00 to 17:00 Hrs.	06-12-2022	07-12-2022	2
8	TN. 21	TN. 21A	200	Gang-1	05:00 to 17:00 Hrs.	28-10-2022	29-10-2022	2	T.N. 18 A	TN. 19	227	Gang-1	05:00 to 17:00 Hrs.	08-12-2022	09-12-2022	2
9	TN. 21A	TN. 23	533	Gang-1	05:00 to 17:00 Hrs.	30-10-2022	31-10-2022	2	TN. 19	TN. 20	150	Gang-1	05:00 to 17:00 Hrs.	10-12-2022	11-12-2022	2
10	TN. 23	TN. 24	308	Gang-1	05:00 to 17:00 Hrs.	01-11-2022	02-11-2022	2	TN. 20	TN. 20A	310	Gang-1	05:00 to 17:00 Hrs.	12-12-2022	13-12-2022	2
11	TN. 24	TN. 25	167	Gang-1	05:00 to 17:00 Hrs.	03-11-2022	04-11-2022	2	TN. 20A	TN. 21	312	Gang-1	05:00 to 17:00 Hrs.	14-12-2022	15-12-2022	2
12	TN. 25	TN. 34	2809	Gang-1	05:00 to 17:00 Hrs.	05-11-2022	09-11-2022	5	TN. 21	TN. 21A	200	Gang-1	05:00 to 17:00 Hrs.	16-12-2022	17-12-2022	2
13	TN. 04	TN. 09	1527	Gang-1	05:00 to 17:00 Hrs.	10-11-2022	13-11-2022	4	TN. 21A	TN. 23	533	Gang-1	05:00 to 17:00 Hrs.	18-12-2022	20-12-2022	2
14	TN. 02	TN. 04	476	Gang-1	05:00 to 17:00 Hrs.	14-11-2022	15-11-2022	2	TN. 23	TN. 24	308	Gang-1	05:00 to 17:00 Hrs.	21-12-2022	22-12-2022	2
15	TN. 01	TN. 02	300	Gang-1	05:00 to 17:00 Hrs.	16-11-2022	17-11-2022	2	TN. 24	TN. 25	167	Gang-1	05:00 to 17:00 Hrs.	23-12-2022	24-12-2022	2
16	GANTRY	TN. 01	35	Gang-1	05:00 to 17:00 Hrs.	17-11-2022	**17-11-2022**	1	TN. 25	TN. 34	2809	Gang-1	05:00 to 17:00 Hrs.	25-12-2022	**29-12-2022**	5
17	TN. 34	TN. 48	4499	Gang-2	05:00 to 17:00 Hrs.	**10-10-2022**	17-10-2022	8	TN. 34	TN. 48	4499	Gang-2	05:00 to 17:00 Hrs.	**19-11-2022**	26-11-2022	8
18	TN. 48	TN. 54	1819	Gang-2	05:00 to 17:00 Hrs.	17-10-2022	20-10-2022	4	TN. 48	TN. 54	1819	Gang-2	05:00 to 17:00 Hrs.	27-11-2022	30-11-2022	4
19	TN. 54	TN. 62	2576	Gang-2	05:00 to 17:00 Hrs.	21-10-2022	25-10-2022	5	TN. 54	TN. 62	2576	Gang-2	05:00 to 17:00 Hrs.	01-12-2022	05-12-2022	5
20	TN. 62	TN. 63	262	Gang-2	05:00 to 17:00 Hrs.	26-10-2022	27-10-2022	2	TN. 62	TN. 63	262	Gang-2	05:00 to 17:00 Hrs.	06-12-2022	07-12-2022	2
21	TN. 63	TN. 64	222	Gang-2	05:00 to 17:00 Hrs.	28-10-2022	29-10-2022	2	TN. 63	TN. 64	222	Gang-2	05:00 to 17:00 Hrs.	08-12-2022	09-12-2022	2
22	TN. 64	TN. 65	194	Gang-2	05:00 to 17:00 Hrs.	30-10-2022	31-10-2022	2	TN. 64	TN. 65	194	Gang-2	05:00 to 17:00 Hrs.	10-12-2022	11-12-2022	2
23	TN. 65	TN. 66	166	Gang-2	05:00 to 17:00 Hrs.	01-11-2022	02-11-2022	2	TN. 65	TN. 66	166	Gang-2	05:00 to 17:00 Hrs.	12-12-2022	13-12-2022	2
24	TN. 66	TN. 67	235	Gang-2	05:00 to 17:00 Hrs.	03-11-2022	04-11-2022	2	TN. 66	TN. 67	235	Gang-2	05:00 to 17:00 Hrs.	14-12-2022	15-12-2022	2
25	TN. 67	TN. 71	1279	Gang-2	05:00 to 17:00 Hrs.	05-11-2022	08-11-2022	4	TN. 67	TN. 71	1279	Gang-2	05:00 to 17:00 Hrs.	16-12-2022	19-12-2022	4
26	TN. 71	TN. 72	88	Gang-2	05:00 to 17:00 Hrs.	09-11-2022	09-11-2022	1	TN. 71	TN. 72	88	Gang-2	05:00 to 17:00 Hrs.	20-12-2022	20-12-2022	1
27	TN. 72	TN. 73	308	Gang-2	05:00 to 17:00 Hrs.	10-11-2022	11-11-2022	2	TN. 72	TN. 73	308	Gang-2	05:00 to 17:00 Hrs.	21-12-2022	22-12-2022	2
28	TN. 73	TN.74	230	Gang-2	05:00 to 17:00 Hrs.	12-11-2022	13-11-2022	2	TN. 73	TN.74	230	Gang-2	05:00 to 17:00 Hrs.	23-12-2022	24-12-2022	2
29	TN.74	TN. 75	288	Gang-2	05:00 to 17:00 Hrs.	14-11-2022	15-11-2022	2	TN.74	TN. 75	288	Gang-2	05:00 to 17:00 Hrs.	25-12-2022	26-12-2022	2
30	TN. 75	TN. 76	169	Gang-2	05:00 to 17:00 Hrs.	16-11-2022	16-11-2022	1	TN. 75	TN. 76	169	Gang-2	05:00 to 17:00 Hrs.	27-12-2022	28-12-2022	1
31	TN. 76	GANTRY	66	Gang-2	05:00 to 17:00 Hrs.	17-11-2022	**17-11-2022**	1	TN. 76	GANTRY	66	Gang-2	05:00 to 17:00 Hrs.	29-12-2022	**29-12-2022**	1

**** This plan is subject to following points**

1. **Timely Shutdowns of LT, 11/33 KV**
2. **Timely Rights of Way Clearance**

For Sterlite Power Transmission Ltd.

(PrapinSamanta)
Chief Manager- Project

Annexure-B.12

List of Sub Stations, associated with AMR Phase-3 project for 249 number of SEM integration with AMR.

Utility Name	Substation Name	SEM Count
BIHAR	BANKA(BAN)	1
BIHAR	JAMUI(BSPHCL)	2
BIHAR	KUDRA(KUD)	1
BIHAR	LAKHISARAI(LKK)	2
BIHAR	NALANDA(NLN)	1
BIHAR	NEW PUSAULI(NPS)	2
BIHAR	SABOUR(SBR)	3
BIHAR	SONNAGAR NEW	1
BIHAR	SULTANGANJ(SUL)	3
CESC	HALDIA(HAL)	2
WEST BENGAL	KHARAGPUR (KSG)	2
WEST BENGAL	PPSP NEW	2
JHARKHAND	CHAIBASA(CHA)	2
JHARKHAND	DUMKA(DUM)	2
JHARKHAND	KENDOPOS(KEN)	1
GRIDCO	BANGRIPOSHI	1
GRIDCO	KATAPALLI(KTP)	1
GRIDCO	MENDHASAL(MEN)	1
GRIDCO	NEW DUBRI(DBR)	2
GRIDCO	SADEIPALI	1
DVC	RTPS(RTP)	4
NTPC	DARLIPALLI	4
NTPC	NABINAGAR	5
NTPC	TALCHER SOLAR(TLS)	12
NHPC	RANGIT(RGT)	5
IPP	ADHUNIK(APNRL)	2
IPP	DIKCHU	9
IPP	JORTHANG	6
POWERGRID	ANGUL	16
POWERGRID	ARAH(ARP)	4
POWERGRID	BANKA(BNK)	13
POWERGRID	BARIPADA(BPD)	2
POWERGRID	BERHAMPORE(BMP)	2
POWERGRID	BOLANGIR(BLR)	3
POWERGRID	CHAIBASA	7

NTPC	FARAKKA	2
POWERGRID	GAYA(GYA)	4
POWERGRID	JAMSHEDPUR(JSR)	3
POWERGRID	KISHANGANJ(KGN)	12
POWERGRID	MAITHON(MTN)	4
POWERGRID	MALDA(MLP)	2
POWERGRID	MUZAFARPUR(MZP)	7
POWERGRID	NEW MELLI	2
POWERGRID	PANDIABIL(PNB)	9
POWERGRID	PATNA(PAT)	1
POWERGRID	PUSAUL	3
POWERGRID	RANCHI NEW	14
POWERGRID	RANGPO(RGP)	19
IPP	IND BHARAT	6
POWERGRID	SUNDERGARH(SND)	7
DMTCL	DARBHANGA	13
DMTCL	MOTIHARI	14

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CPRI

FINAL REPORT

Sub: Consultancy Assignment for Analysis and Submitting the Report on Transformers and Reactors (89 Nos.) of POWERGRID by CPRI, Bangalore

Ref: No. SRTS-II/C&M/WC-2183/LOA-2051/2019/3212 dated 20.03.2019

Date: 20.01.2020

Condition Assessment of Durgapur Bus Reactor-I R Phase

Make: CGL, Equipment Sl. No. 24893, Rating: 400kV, 16.67 MVAR, Phase: Single Phase
Year of Manufacturing: 1990 (**30 Years old**)

The diagnostic test data provided by POWERGRID have been analysed in detail and following are our observations:

1. IR and PI values lie in the normal permissible range. Tan delta values of windings are in normal range.
2. Core insulation resistance values are normal.
3. Tan delta values of the HV bushings are in normal range.
4. Estimated moisture content in the solid insulation is 2.4% exceeding the maximum permissible range.
5. The oil test results are satisfactory. However it is observed that water content increases and BDV decreases after every filtration.
6. D.G.A results indicate high CO2/CO ratio (CO2/CO>10). However due to frequent topping up and filtration the DGA test results are fluctuating.
7. Furan analysis shows high furan content (1911 ppb-October 2017) indicating high deterioration of solid insulation. Fluctuations in furan results are observed due to frequent dry out and topping up of oil.
8. Review of maintenance and equipment history indicates that the reactor is subjected to frequent oil filtration, oil top up and online dry out due to oil leakages from several points of the reactor.

Recommendations:

From the Furan test data, it can be inferred that the solid insulation is deteriorating. FDS data indicates high moisture content in the solid insulation. In view of high power system reliability, the unit is recommended for replacement.

R. Arunjothi

(R. ARUNJOTHI)
JOINT DIRECTOR (CDD)

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FINAL REPORT

Sub: Consultancy Assignment for Analysis and Submitting the Report on Transformers and Reactors (89 Nos.) of POWERGRID by CPRI, Bangalore

Ref: No. SRTS-II/C&M/WC-2183/LOA-2051/2019/3212 dated 20.03.2019

Date: 20.01.2020

Condition Assessment of Durgapur Bus Reactor-I Y Phase

Make: CGL, Equipment Sl. No. 24894, Rating: 400kV, 17 MVAR, Phase: Single Phase
Year of Manufacturing: 1990 (**30 Years old**)

The diagnostic test data provided by POWERGRID have been analysed in detail and following are our observations:

1. IR and PI values lie in the normal permissible range. Tan delta values of windings are in normal range.
2. Core insulation resistance values are normal.
3. Tan delta values of the HV bushings are in normal range.
4. Estimated moisture content in the solid insulation (1.3%) lies in the normal permissible range.
5. The oil test results are satisfactory.
6. D.G.A results indicate high CO2/CO ratio (CO2/CO>10). However due to frequent topping up and filtration the DGA test results are fluctuating.
7. Furan analysis shows high furan content (1607 ppb-October 2017) indicating high deterioration of solid insulation. Fluctuations in furan results are observed due to frequent dry out and topping up of oil.
8. Review of maintenance and equipment history indicates that the reactor is subjected to frequent oil filtration, oil top up and online dry out due to oil leakages from several points of the reactor.

Recommendations:

From the Furan test data, it can be inferred that the solid insulation is deteriorating. In view of high power system reliability, the unit is recommended for replacement.

R. Arunjothi

(R. ARUNJOTHI)
JOINT DIRECTOR (CDD)

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CPRI

FINAL REPORT

Sub: Consultancy Assignment for Analysis and Submitting the Report on Transformers and Reactors (89 Nos.) of POWERGRID by CPRI, Bangalore

Ref: No. SRTS-II/C&M/WC-2183/LOA-2051/2019/3212 dated 20.03.2019

Date: 20.01.2020

Condition Assessment of Durgapur Bus Reactor-I B Phase

Make: CGLL, Equipment Sl. No. 24895, Rating: 400kV, 17 MVAR, Phase: Single Phase
Year of Manufacturing: 1990 (**30 Years old**)

The diagnostic test data provided by POWERGRID have been analysed in detail and following are our observations:

1. IR and PI values lie in the normal permissible range. Tan delta values of windings are in normal range.
2. Core insulation resistance values are normal.
3. Tan delta values of the HV bushings are in normal range.
4. Estimated moisture content in the solid insulation (1.0%) lies in the normal permissible range.
5. The oil test results are satisfactory.
6. D.G.A results indicate high CO2/CO ratio (CO2/CO>10). However due to frequent topping up and filtration the DGA test results are fluctuating.
7. Furan analysis shows moderate furan content (733 ppb-October 2017) indicating moderate deterioration of solid insulation. Fluctuations in furan results are observed due to frequent dry out and topping up of oil.
8. Review of maintenance and equipment history indicates that the reactor is subjected to frequent oil filtration, oil top up and online dry out due to oil leakages from several points of the reactor.

Recommendations:

From the Furan test data, it can be inferred that the solid insulation is deteriorating moderately but considering the condition of other two sister units and to maintain high power system reliability, the unit is recommended for replacement.

R. Arunjothi

(R. ARUNJOTHI)
JOINT DIRECTOR (CDD)

Annexure-C.3

POWER SYSTEM DEVELOPMENT FUND

Status of the Projects in Eastern Region

Sl No	State	Entity	Name of the scheme	Grant Approved	Grant sanctioned on	1st Installment grant released on	Completion Schedule	Completion schedule w.r.t date of 1st instalment	Grant aviled so far	Under process of release	Total awards amount of placed of till date	Latest status
1	**Bihar**	**BSPTCL**	Renovation and Upgradation of protection system of substations. (18)	64.22	42135	42506	24	43236	56.04		69.195	90% grant availed on award cost.
2			Installation of Capacitor bank in 20 Nos of Grid Sub Station. (74)	18.882	42618	43550	24	44281	16.99		21.55	
			Total	**83.10**					**73.03**		**90.745**	
5	**Jharkhand**	**JUSNL**	Renovation & Upradation of protection system of Jharkhnad. (161)	138.13	15-Nov-17	28-Mar-19	16	28-Jul-20	114.68	1.01	145.674	90% grant availed on award cost. Project closure is expected by Q-2 of 2021-22.
6			Reliable Communication & data acquisition system upto 132kV Substations ER. (177)	22.36	24-May-19		24					Price bid has been opened. Tender on awarding stage.
			Total	**160.49**					**114.68**		**145.674**	
7	**Odisha**	**OPTCL**	Renovation and Upgradation of protection system of substaions. (08)	162.50	11-May-15	22-Mar-16	24	22-Mar-18	46.04		63.31	Project Completed on Dec-20. Request for release of final 10 % fund has been placed.
8			Implementation of OPGW based reliable communication at 132 kv and above substations. (128)	25.61	15-Nov-17	29-Mar-19	36	29-Mar-22	23.04		51.22	90% grant availed on award cost. Work In Progress
9			Installation of 125 MVAR Bus Reactor along with construction of associated by each at 400kV Grid S/S of Mendhasal, Meramundali & New Duburi for VAR control & stabilisation of system voltage. (179)	27.23	27-Jul-18	1-Apr-19	18	1-Oct-20	8.17		24.5	90% grant availed . Rest work in progress
10			Implementation of Automatic Demand Management System (ADMS) in SLDC, Odisha. (196)	2.93	24-May-19	19-Feb-20	10	19-Dec-20	0.29		0.29	10% grant availed
11			Protection Upgradation and installation os Substation Automatic System (SAS) for seven nos of 220/132/33kV Substations (Balasore, Bidanasi, Budhipadar, Katapali, Narendrapur, New-Bolangir & Paradeep). (209)	29.56	24-May-19	13-Feb-20	18	13-Aug-21	8.87		32.85	30% grant availed. Work in Progress.
12		**OHPCL**	Renovation and Upgradation of protection and control system of OHPC. (109)	22.35	22-May-17	25-May-18	24	25-May-20	14.94		21.25	90% grant availed on award cost.
			Total	**270.18**					**101.35**		**193.42**	
14	**West Bengal**	**WBSETCL**	Installation of switchable reactor & shunt capacitor for voltage improvement. (88)	43.37	22-May-17	22-Jun-18	19	22-Jan-20	33.07		40.83	90% grant availed on award cost. Will get completed by Oct'21
15			Renovation & Modernisation of Transmission System. (87)	70.13	22-May-17	25-Jun-18	25	25-Jul-20	63.12		96.44	90% grant availed on award cost. Will get completed by Mar'22
16			Installation of Bus Reactors at different 400kV Substation within the state of West Bengal for reactive power management of the Grid. (210)	71.74	24-May-19	23-Oct-19	19	23-May-21	39.3		45.62	30% grant availed on award cost. 04 Nos. of Reactors will be commissioned by December 2021. LoA of the 5th Reactor is yet to be placed.
17			Project for establishment of reliable communication and data acquisition at different substation at WBSWTCL. (222)	31.19	24-May-19	23-Oct-19	25	23-Nov-21	3.12			The tender has been been cancelled for OPGW. Re-tendering has to be done.
18			Implementation of Integated system for Scheduling, Accounting, Metering and Settlement of Transactions (SAMAST) system in West Bengal. (197)	10.08	43910		12					10% grant not yet requested
19		**WBPDCL**	Renovation and Modernization of 220/ 132 kV STPS switch yard and implementation of Substaion Automation System. (72)	23.48	5-Sep-16	18-May-17	18	18-Nov-18	21.13		32.09	Target date for completion of project is Sept.'21 subject to availability of S/D & Covid scenario. Request for release for final 10% grant has been placed.
21			Renovation and Modernization of switchyard and related protection system of different power stations (BTPS, BKTPS and KTPS) of WBPDCL (155)	45.16	27-Jul-18	27-Mar-19	12	27-Mar-20	34.52		41.68	Target date for completion of project is Oct'21, subject to availability of S/D & Covid scenario. 90% grant availed on award cost.
			Total	**295.15**					**194.26**		**256.661**	

POWER SYSTEM DEVELOPMENT FUND												
Status of the Projects in Eastern Region												
Sl No	**State**	**Entity**	**Name of the scheme**	**Grant Approved**	**Grant sanctioned on**	**1st Installment grant released on**	**Completion Schedule**	**Completion schedule w.r.t date of 1st instalment**	**Grant aviled so far**	**Under process of release**	**Total awards amount of placed of till date**	**Latest status**
22	**DVC**	**DVC**	Renovation and Upgradation of the protection and control system of Ramgarh Sub Station. (81)	25.96	2-Jan-17	31-May-17	24	31-May-19	22.95	2.57	28.603	90% grant availed on award cost.
23			Renovation and Modernization of control and protection system and replecement of equipment at Parulia, Durgapur, Kalyanewari, Giridhi Jamsedpur, Barjora, Burnpur, Dhanbad and Bundwan substation. (106)	140.50	16-May-17	14-Dec-17	24	14-Dec-19	102.43	0.98	127.684	
			Total	**166.46**					**125.38**		**156.287**	
24	**Sikkim**	**ENPD, Sikkim**	Drawing of optical ground wire (OPGW) cables on existing 132kV & 66kV transmission lines and integration of leftover substations with State Load Despatch Centre, Sikkim. (173)	10.00	24-May-19		18		3.00		20	30% grant availed on award cost
				10.00					**3.00**		**20.00**	
26	**ERPC**	**ERPC**	Creation and Maintenance of web based protection database management. (67)	20.00	17-Mar-16	28-Jun-16	18	28-Dec-17	14.83		16.48	Project Completed
27			Study Programme on power trading at NORD POOL Academy for Power System Engineers of Eastern Region. (122)	5.46	27-Jul-18	27-Mar-19	13	27-Apr-20	4.61		5.37	
28			Traning Program for Power system Engineers of various constituents of Eastern Region. (117)	0.61	27-Jul-18	11-Apr-19	24	11-Apr-21	0.54		0.60888	90% grant availed on award cost.
			Total	**26.07**					**19.98**		**22.45888**	
			GrandTotal	**1,011.46**					**631.68**		**885.25**	

Annexure-C.5

Date of PFR testing scheduled /completed for generating stations in ER

Sr. No	Station	Generating Unit	Test schedule	Remarks
1	TALCHER STAGE 2	3	Unit 3 - 5: 23-11-2020 to 28-11-2020	Testing for unit 6 yet to be conducted
2		4		
3		5		
4		6		
5	Farakka	2	01-02-2021 to 10-01-2021	Testing completed
6		3		
7		4		
8		5		
9		6		
10	Kahalgaon	1	August'21	Testing completed for Unit 1
11		5		
12		6		
13		7		
14	Barh	4	18-02-2021 to 21-02-2021	Scheduled
15		5		
16	Teesta V	1	07-01-2021 - 08-01-2021	Testing completed
17	Teesta III	1	30-01-2021 - 10-02-2021	Testing completed
18		2		
19		3		
20		4		
21		5		
22		6		
23	Dikchu	1	Unit#1: 6th & 7th April' 21 Unit#2: 8th & 9th April' 21	Scheduled
24		2		
25	MPL	1	-	Postponed due to some technical issue
26		2		
27	GMR	1	August'21	Testing Completed
28		2		
29		3		
30	JITPL	1	August'21	Scheduled
31		2		
32		3		
33	NPGCL	1	August'21	Testing Completed

34	BRBCL		1st Week of August'21	Testing Completed
35	APNRL	1&2	July'21-August-21	Testing Completed
36	BBGS	1,2&3	26th Feb 22 - 3rd Mar 22	Scheduled

Annexure C.7

Power Plant	Unit No	PSS tuned (Yes/No)	PSS in Service (Yes/No)	Last PSS Tuning Date	Whether Done in Last 3 Years	Whether Next to be planned	Planned Next PSS Tuning
West Bengal							
Kolaghat-WBPDCL	3	No	Yes	Long Back	No	Yes	To be done within Jan./Feb. 2022 after DAVR replacement.
Bakreshwar-WBPDCL	2	Yes	Yes	2019	Yes	Yes	PSS tuning to be done during Unit O/H in the month of November-December, 2021
Bakreshwar-WBPDCL	4	Yes	Yes	2019	Yes	Yes	BHEL offer received. PSS tuning to be done within Nov. , 2021
Bakreshwar-WBPDCL	5	Yes	Yes	2019	Yes	Yes	BHEL offer received. PSS tuning to be done within Nov. , 2021
PPSP	1	No	Yes	2009	No	Yes	Dec-21
PPSP	2	No	Yes	2009	No	Yes	Dec-21
PPSP	3	No	Yes	2009	No	Yes	Dec-21
PPSP	4	No	Yes	2009	No	Yes	Dec-21
TLDP III	4 x 33			No Detail	No Detail	Yes	To be updated by WBSEDCL
TLDP IV	4 X 44			No Detail	No Detail	Yes	To be updated by WBSEDCL
DVC							
Raghunathpur-DVC	1	No	No		No Detail	Yes	Will be done after AOH
Raghunathpur-DVC	2	No	No		No Detail	Yes	Jun-21
Waria	4	Yes	Yes	2008	No	Yes	Unit Is out of Service
ISGS							
Kahalgaon NTPC	1	Yes	Yes	2017	Yes	Yes	Apr-21
Kahalgaon NTPC	3	Yes	Yes	2016	Yes	Yes	Jul-21
Kahalgaon NTPC	4	Yes	Yes	2015	No	Yes	Mar-21
Kahalgaon NTPC	6	Yes	Yes	2009	No	Yes	Mar-21
Talcher Stage 2	3	Yes	Yes	2016	Yes	Yes	Nov-21
Talcher Stage 2	4	Yes	Yes	No Details	No Details	Yes	Nov-21
Talcher Stage 2	5	Yes	Yes	No Details	No Details	Yes	Nov-21
Talcher Stage 2	6	Yes	Yes	2016	Yes	Yes	Nov-21
Barh NTPC	1						
Barh NTPC	4			2015		Yes	In Next AOH
Barh NTPC	5			During Unit commissioning		Yes	June 2021 (AOH)
Teesta V	1	Yes	Yes	2008	No	Yes	Nov-21
Teesta V	2	Yes	Yes	2008	No	Yes	Nov-21
Teesta V	3	Yes	Yes	2008	No	Yes	Nov-21
BRBCL	2	Yes	Yes	2019	Yes	Yes	Jun-21

BRBCL	3	No	Yes	Vendor to Do	No	Yes	Jun-21
BRBCL	4	No	Yes	Vendor to Do	No	Yes	To be updated
KBUNL	1	Yes	Yes	2014	No	Yes	2021-22
KBUNL	2	Yes	Yes	2014	No	Yes	2021-22
Rangit	3 x 20			Not Available	No	Yes	To be updated by NHPC
IPP							
ADHUNIK	1	Yes	YES	2013	No	Yes	Mar-21
ADHUNIK	2	Yes	YES	2013	No	Yes	Mar-21
JITPL	1	Yes	Yes	2016	Yes	Yes	Jul-21
JITPL	2	Yes	Yes	2016	Yes	Yes	Jul-21
GMR	1	Yes	Yes	2013	No	Yes	Dec-21
GMR	2	Yes	Yes	2013	No	Yes	Dec-21
GMR	3	Yes	Yes	2013	No	Yes	Dec-21
Orissa							
IB TPS	1	Yes	Yes	2011	No	Yes	Mar'2021
IB TPS	2	Yes	Yes	2012	No	Yes	Mar'2021
Upper Indravati	1	Yes	No	2015	No	Yes	To be updated by OHPC
Upper Indravati	2	Yes	No	2015	No	Yes	To be updated by OHPC
Upper Indravati	3	Yes	No	2000	No	Yes	To be updated by OHPC
Upper Indravati	4	Yes	No	2001	No	Yes	To be updated by OHPC
Balimela	1 (60 MW)			No detail		Yes	To be updated by OHPC
Balimela	2 (60 MW)			No detail		Yes	To be updated by OHPC
Balimela	3 (60 MW)	No	No	Not tuned	No	Yes	To be updated by OHPC
Balimela	4 (60 MW)	No	No	Not tuned	No	Yes	To be updated by OHPC
Balimela	5 (60 MW)	No	No	Not tuned	No	Yes	To be updated by OHPC
Balimela	6 (60 MW)	No	No	Not tuned	No	Yes	To be updated by OHPC
Balimela	7 (75 MW)	No	No	Not tuned	No	Yes	To be updated by OHPC
Balimela	8 (75 MW)	No	No	Not tuned	No	Yes	To be updated by OHPC
Upper Kolab	1	Yes	Yes	2007	No	Yes	To be updated by OHPC
Upper Kolab	2	Yes	Yes	2007	No	Yes	To be updated by OHPC
Upper Kolab	3	Yes	Yes	2007	No	Yes	To be updated by OHPC
Upper Kolab	4	Yes	Yes	2007	No	Yes	To be updated by OHPC
Sterlite	4 X 600			No detail		Yes	To be updated by SLDC
Jharkhand							
Tenughat	1	Yes	Yes	2017	Yes	Yes	Dec-21
Tenughat	2	Yes	Yes	2017	Yes	Yes	Dec-21
Subarnrekha	2 X 65					Yes	To be updated
Bihar							
BTPS	6 (110)					Yes	To be updated by BSPGCL

BTPS	7 (110)					Yes	To be updated by BSPGCL
BTPS	8					Yes	To be updated by BSPGCL
BTPS	9					Yes	To be updated by BSPGCL
Bhutan							
Tala	1	No	Yes			Yes	To be updated by BPC
Tala	2	No	Yes			Yes	To be updated by BPC
Tala	3	No	Yes			Yes	To be updated by BPC
Tala	4	No	Yes			Yes	To be updated by BPC
Tala	5	No	Yes			Yes	To be updated by BPC
Tala	6	No	Yes			Yes	To be updated by BPC
Chukha	1	No	Yes	2005	No	Yes	To be updated by BPC
Chukha	2	No	Yes	2005	No	Yes	To be updated by BPC
Chukha	3	No	Yes	2005	No	Yes	To be updated by BPC
Chukha	4	No	Yes	2005	No	Yes	To be updated by BPC
Mangdechu	1	No	Yes			Yes	Sep-21
Mangdechu	2	No	Yes			Yes	Sep-21

Procedure for periodic exercise of black starting Teesta-V

Mock exercise for black start of Teesta-V units

In order to facilitate the mock black start exercise of Teesta-V Power house following switching operations are suggested at 400 kV Rangpo, 400kV Binaguri (POWERGRID), 220kV Binaguri and 132kV N. Jalpaiguri (WBSETCL).

The exercise will be undertaken during the period when the schedule of Teesta-V generation will be nil. During this exercise, about 150 MW load in N. Bengal comprising NJP, Siliguri, Moinaguri, Chalsa, and if required, Coochbehar is planned to be fed from the unit earmarked for black-starting at Teesta-V, in islanded mode. Thus, supply to the aforesaid sub-stations in W. Bengal would be disrupted for short durations during disconnection and reconnection to the main grid.

In order to carry out the exercise, an island would be created by splitting the 400kV bus at Rangpo, 400kV and 220kV buses at Binaguri(PG), and also switching off some of the 132kV lines from NJP 220kV (WBSETCL) S/Stn so that only the local load of NJP(WB), Siliguri(2nd Mile), Chalsa and Moinaguri get included within the island. Mock exercise would be carried out by supplying the island from the black-started unit of Teesta-V and then the island system would be synchronised back to the main grid. This exercise can be divided in three stages.

Stage-1

A. At Binaguri 400kV Bus

Distribute the feeders and ICTs on Bus-I & II as tabulated below.

Sl. No.	400 kV BUS-I	400 kV BUS-II
1	315 MVA 400/220kV ICT-1	315 MVA 400/220kV ICT-2
2	400kV Rangpo-I	400kV Rangpo-II
3		400 kV Purnea-I &II 400 kV Kishanganj-I &II
4		400 kV Tala I to IV
5		400 kV Bongaigaon I &II 400 kV Alipurduar I &II
6		125 MVAR Reactors I & II

B. At Binaguri 220kV – the various incoming / outgoing feeders to be distributed as follows:

Sl. No.	220 kV BUS-I	220 kV BUS-II
1	315 MVA 400/220kV ICT-1	315 MVA 400/220kV ICT-2
2	220kV NJP(W)-I (bus-to-bus connection)	220kV Birpara I & II
3		220kV Siliguri(PG) I & II
4		220kV NJP(W)-II

C. At Rangpo 400kV – the various incoming / outgoing feeders to be distributed as follows:

Sl. No.	400kV kV BUS-I	400kV kV BUS-II
1	Rangpo-Teesta-I	Rangpo-Teesta-II
2	Rangpo-Binaguri-I	Rangpo-Binaguri-II
3	80MVAR Bus reactor-I	Rangpo-Dukchu
4		5X315MVA, 400/220kV ICTs
5		80 MVAR Bus reactor-II
		400 kV Rangpo-Kishanganj

This arrangement is suggested so that Gangtok and Jorethang HEP can still remain synchronized with the grid at Rangpo, while the black-start exercise of Teesta-V unit is being carried out.

During the exercise, since NER and Bhutan would remain synchronised at 400kV Binaguri Bus-2 only, HVDC Agra-B. Chariyali flow may be maintained at around 500MW towards NER (B. Chariyali), to minimise the impact of any contingency.

At Teesta-V, all necessary preparatory actions to be taken to keep the unit(s) scheduled for the self-start exercise, ready.

Stage-2 –The Mock exercise

A. Switching at different substations:

- At NJP(W), WBSETCL to ensure that both the 160MVA, 220/132kV ICTs are in service and connected to Bus-II. The 220kV bus coupler CB is to be opened to isolate the two buses. 220kV Bus-I to remain connected to 220kV Binaguri (PG) Bus-I. For this purpose, no separate code will be given by ERLDC.
    - At NJP(W) 132kV : TCF-I feeder to be switched off
    - 132kV tie line to Siliguri(PG) and 132kV NJP(WB)-NBU S/C will be kept open from NJP(WB)
    - 132kV Siliguri(WB)-NBU to be also switched off so that NBU remains connected only to Siliguri(PG) , Rammam, Lebong and TCF-I
    - All other remaining 132kV feeders from NJP(WB) i.e. Siliguri (WB) I & II , Moynaguri-I & II (Chalsa) along with 33kV local load of NJP (WB) to remain on 220kV Bus-II
    - 66kV Kalimpong-Chalsa line may be opened by WBSETCL, with consent of Sikkim, so that Kalimpong load is supplied from Melli only, during the exercise.
    - Further, Jaldhaka units, if already generating, are to be desynchronized as they may be re-synchronized only after completion of the exercise when Chalsa S/Stn finally gets supply at main grid frequency.

SLDC , WBSETCL to inform ERLDC after completing the above switching operations.

- On receiving clearance from ERLDC, Rangpo to open the CBs and isolators of 400kV Teesta-I, Teesta-II, Shunt Reactor-I and Binaguri-I; bus-coupler CB

between 400kV Bus-1 and Bus-2 and shift Binaguri-II, Shunt Reactor-II and all the 400/220kV ICTs on 400kV Bus-II

- On receiving clearance from ERLDC, Binaguri to open
    - both main and tie CBs of 400/220kV ICT-I, Rangpo-I,
    - main CB of Rangpo-II and
    - main CBs of 400/220kV ICT-II, Purnea-I, Purnea-II, Purnea-III , Purnea-IV and Tala-IV at Binaguri 400kV switchyard.

Accordingly, at Rangpo end the 400kV Bus-2 isolator and at Binaguri end the tie CB and 400kV Bus-2 CB of Rangpo-Binaguri-II line should remain closed to ensure that Jorethang-Rangit-Chujachen system remains synchronized with main grid through 400kV Rangpo-Binaguri-II.

- At Binaguri 220kV switchyard, after ensuring that 400/200kV ICT –I is connected to bus-I and all other feeders on bus-II, as already stated, the 220kV bus-coupler CB to be opened. Hence, 400/220kV ICT-I and Binaguri 220kV bus-I will now remain connected only to the 220kV Bus-I of NJP(WB) S/S.

- Thus Rangpo 400kV Bus-I, Binaguri 400kV Bus-I, 400/200kV ICT-I, Binaguri 220kV Bus-I and NJP(WB) 220kV bus-I will form a separate sub-system that remains dead / uncharged. Binaguri(PG) to confirm ERLDC when this status is achieved.

- ERLDC will now advise Teesta-V to self-start one of its units. It may be ensured by Teesta-V that auxiliary supply is taken from local DG set (as would be done during a real blackout). The 400kV bus voltage at Teesta-V may be maintained between 370-380 KV by controlling the excitation. A second unit may also be self-started at Teesta-V. The units would be on free governor mode of operation and their AVRs may be kept in AUTO mode.

- Rangpo to keep the Bus-I isolator of TeestaV-1 line and Binaguri-I line closed. Binaguri to keep Bus-I isolator of Rangpo-I line closed.

- On receipt of clearance from Rangpo the dead 400 kV Bus–1 at Rangpo is to be charged, from Teesta-V using 400kV Teesta-V-Rangpo -I .

- On receipt of clearance from Binaguri, the dead 400 kV Bus–1 at Binaguri is to be charged from Rangpo using 400kV Rangpo-Binaguri-I line.

- Thereafter Binaguri(PG) is to close the 400kV side main CB and the 220kV side CB of ICT-I. This will charge the 220kV Main Bus-I at Binaguri(PG)

- In case of difficulty in extending power from Teesta-V upto Binaguri 400kV Bus-I due to high voltage problem, the 80MVAR shunt reactor-1 at Rangpo may be taken into service on Bus-I prior to idle-charging 400kV Rangpo-Binaguri-I from Rangpo

- In consultation with NJP(WB), Binaguri(PG) to close the CB connecting 220kV Bus-I extension to 220kV NJP(WB) Bus-I, thus making Teesta-V power available upto 220kV Main Bus-I of NJP(WB).

- 400kV and 220kV voltages at Binaguri to be controlled within permissible limits through excitation control of Teesta-V unit(s).

- Once the NJP(WB) 220kV Bus-I is found to be within limit and ready for loading, the 132kV feeders and loads connected to Bus-II will be switched off from NJP(WB) i.e.

    - Siliguri I & II
    - Moynaguri I & II (Chalsa)
    - 33kV local load of NJP

- Following the above switching operations, NJP(WB) will give clearance to Binaguri and the CB connecting 220kV Binaguri (PG) bus-II extension to 220 NJP(WB) bus-II is to be switched off at Binaguri S/S, thus isolating the NJP(WB) 220kV Bus-II from Binaguri 220kV Bus-II.

- The 220kV Bus coupler at NP(WB) to be now closed to extend Teesta-V power from Bus-I to Bus-II. ERLDC should be informed after completion of these operations.

- ERLDC will now advise Teesta-V to be ready for taking up load. ERLDC will also give necessary clearance to NJP(WB) (through Binaguri) for re-connecting loads.

B. <u>At 220 NJP(W) S/S</u>

- On receiving clearance from Binaguri, WBSETCL to charge the 220/132kV ICTs one by one
- NJP(WB) local load, 132kV Siliguri I & II, 132kV Moynaguri & Chalsa to be switched on in steps of 20-25 MW
- After connecting a total load of 60 MW, the rest of the loads in the island are to be added rapidly , say within 3 minutes until the total load attains around 150MW. This is to avoid undesirable vibration of the Teesta-V unit.
- Frequency of the island may be kept close to 50Hz through proper coordination.

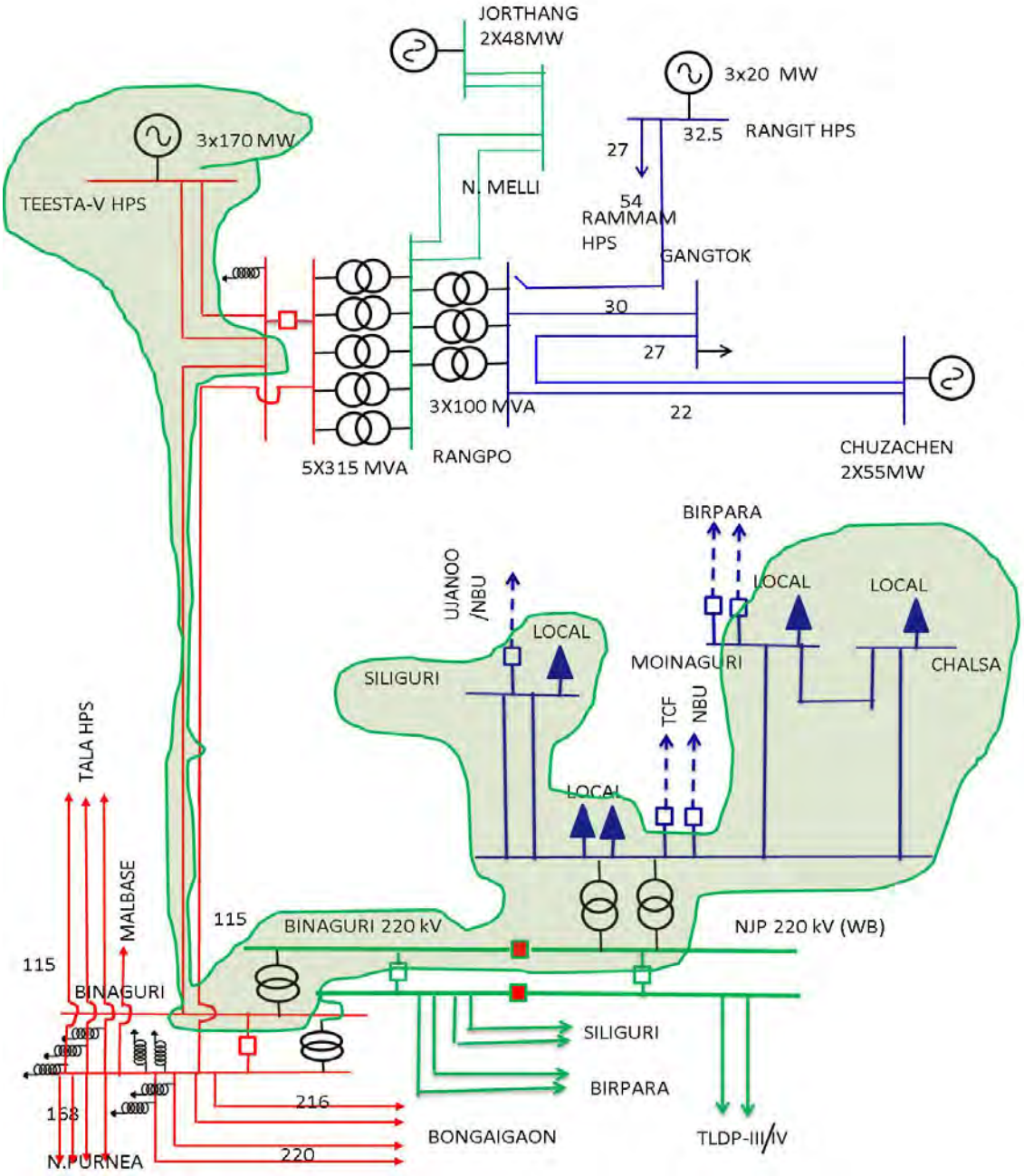
The islanded operation may be observed for about 15 minutes. During this period, the nodal personnel at Binaguri and Teesta should be in constant touch with ERLDC. Additionally, Binaguri should also be in touch with Rangpo and NJP(W) so that load increments and switching operations in WBSETCL system are properly coordinated with Teesta generation and action can be taken without delay in case of any exigency at Rangpo.

<u>Stage-3 – The Restoration</u>

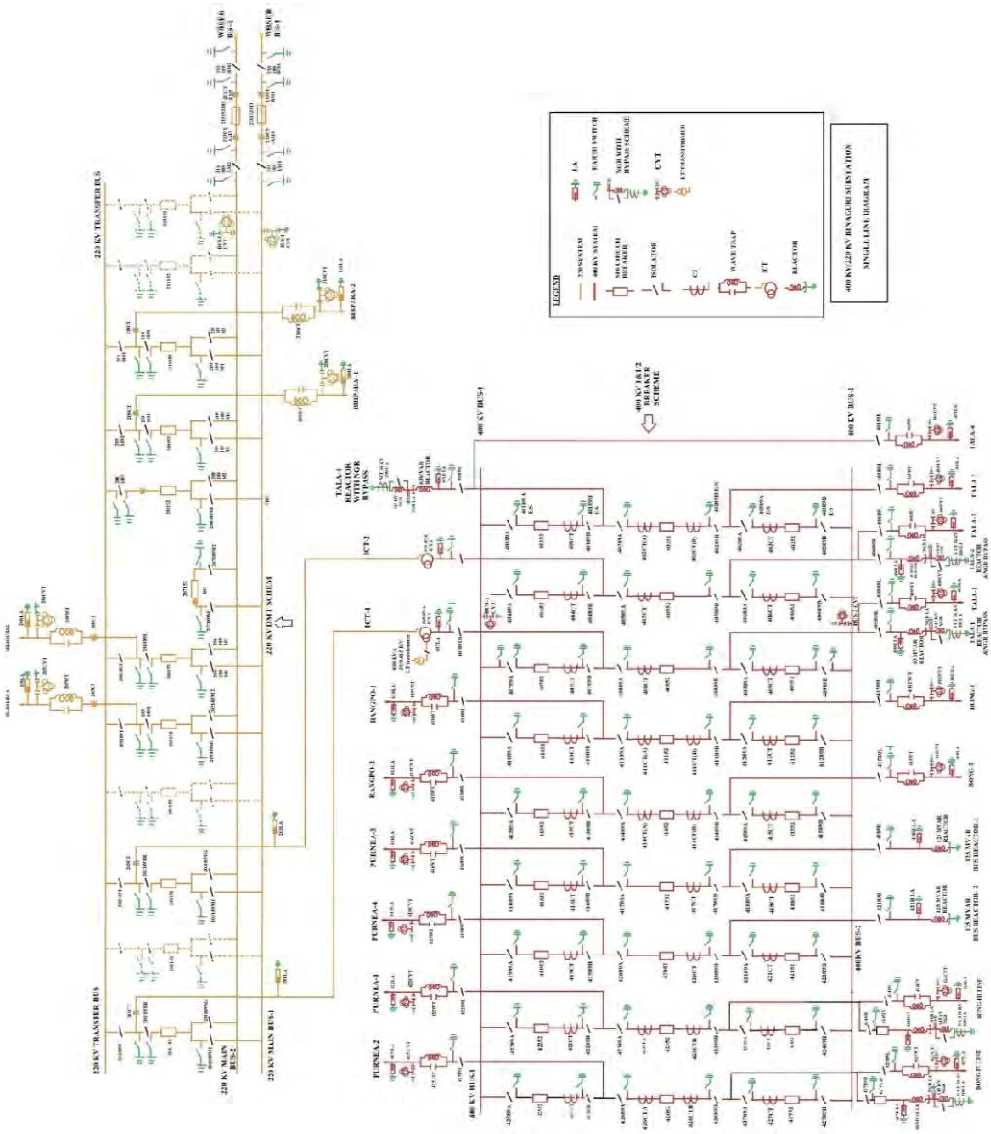
- On receipt of clearance from ERLDC, Teesta-V generation to be controlled so as to match the island frequency with the grid frequency.
- At Binaguri, 400kV Bus-I to be synchronised with Bus-II by closing the tie-CB of ICT-I when the voltage and frequency conditions permit. Main and tie CBs of other bays also to be closed. Similarly, the 220kV bus coupler and CB for 220kV NJP(W)-II should also be taken into service.
- At Rangpo, 400kV bus-coupler CB to be closed to ensure that Sikkim-Jorethang-Rangit-Chujachen system remains synchronized through 400kV Rangpo-Binaguri D/C line.
- Teesta unit(s) may be desynchronized after opening of 400kV Teesta-V – Binaguri-I.

**However, at present simply black-starting Teesta-V and synchronizing evacuating lines at Rangpo is being practiced considering the risk involved in bus-splitting, due to lack of redundant evacuation path.

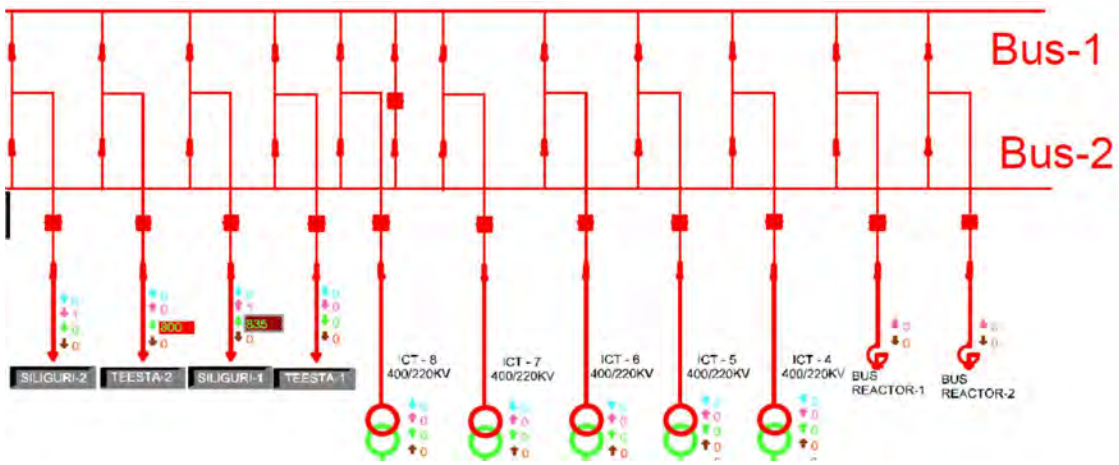
Network Diagram for Teesta-V Mock Black start Exercise:



Switching Diagram of 400/220kV Binaguri S/Stn



Single Line Diagram – Rangpo 400kV


Bus-1
Bus-2
SILIGURI-2
TEESTA-2
SILIGURI-1
TEESTA-1
ICT - 8
400/220KV
ICT - 7
400/220KV
ICT - 6
400/220KV
ICT - 5
400/220KV
ICT - 4
400/220KV
BUS
REACTOR-1
BUS
REACTOR-2

Procedure for extending start-up power to UIHEP from SR grid by bypassing HVDC Gazuwaka B/B

Pre-requisites

1. All the circuit-breakers at 400kV Jeypore and Indravati S/Stns should be in healthy condition for ensuring maximum flexibility in switching operation.

2. Both the circuits of 400kV Jeypore-Gajuwaka D/C , 400kV Jeypore-Indravati S/C, 400kV Indravati-UIHEP S/C and at least one 400/220kV ICT at UIHEP should be in service.

3. Two units at U. Kolab HEP and two units at Balimela HEP (at least one of them preferably 75MW) to be kept on bar during the exercise

4. Data and voice communication from the following locations should be in healthy condition:

    - 400kV Jeypore
    - 400kV Indravati
    - U. Indravati HPS
    - U. Kolab HPS
    - Balimela HPS

Preparatory actions

Before starting the process, ERLDC to ascertain readiness of SRLDC for taking HVDC Gajuwaka out of service.

All the lines (Merramnadali-Jeypore and Gazuwaka-Jaypore d/c) of FSCs should be ensured that none of them are in service. Power flow though HVDC Gajuwaka to be gradually ramped down and made NIL. During the process of ramping down,

1) The units at U. Kolab and Balimela to enhance absorption of reactive power within their respective capability limits, so as to maintain the 400kV bus voltage of Jeypore within 408kV.
2) One of the circuits of 400kV Jeypore-Gajuwaka D/C line to be switched out from Jeypore on receipt of instruction from ERLDC and finally as the power flow reduces to zero, the other circuit should also be switched off.
3) 400kV Indravati – Rengali and 400kV Indravati – Jeypore and 400kV Indravati-UIHEP lines are to be switched out from Indravati(PG) S/Stn, on receipt of clearance from ERLDC.
4) 400Kv line reactor of Indaravati-Rengali line may be use as bus reactor at Indravati 400KV sub-station.
5) If power flow through 315 MVA ICT at Jaypore is low then one ICT may be taken out from service for controlling over voltage at Jeypore.

Switching operations to be carried out at UIHEP switchyard

400kV UIHEP – Indravati (PG) S/C line , both the 400/220kV ICTs and the 220kV bus coupler to be switched off.

The 220kV side isolator of 400/220kV ICT -1 and the unit to receive start-up power, to be connected to 220kV Bus-A . The other 400/220kV ICT to remain off. All other units and the 220kV UIHEP – Theruvali circuits to remain connected to 220kV Bus-B.

Bus segregation at Jeypore

Alternative – I

Line isolator of 400kV Gajuwaka-II to be kept off
Following elements to remain connected to 400kV Bus-2 and synchronized with NEW grid:

- 400kV Jeypore-Meramundali S/C
- 400/220kV ICT-2
- 400/220kV ICT-1
- 63/125 MVAR bus reactor

Following elements to be connected to 400kV Bus-1

- 400kV Jeypore-Gajuwaka-I
- 400kV Jeypore-Indravati

Alternative – II

400/220 kV ICT – 1 & II, 400kV Jeypore-Meramundali S/C to remain connected to 400kV Bus-1 and synchronized with NEW grid. 400kV Jeypore-Gajuwaka-II along with 63 MVAR bus reactor and 400kV Jeypore-Indravati S/C to be connected to 400kV Bus-2.

In this case, the voltage of 400kV bus-1 may shoot up by 8-10 kV, (depending upon the short circuit level at Jeypore) due to elimination of the 63MVAR bus reactor. In this arrangement, the reactor will be used as Jeypore end line reactor of the Jeypore – Gajuwaka line charged from SR grid, and may be essential in case the line does not hold, due to very high open end voltage at Jeypore.

During execution of the above activities in ER grid , the bypass of HVDC Gajuwaka is to be taken into service, under the supervision of SRLDC in coordination with ERLDC.. Further, all efforts will have to be made by SRLDC to maintain the Gajuwaka(South) bus voltage within 410 kV.

On receipt of readiness from UIHEP, Jeypore and Indravati, ERLDC will convey readiness to SRLDC for obtaining power from SR grid.

With alternative-I, Jeypore-Gajuwaka-I is to be charged from Gajuwaka end , after obtaining final clearance from Jeypore(PG). As estimated by SRLDC, the short-circuit capacity of Gajuwaka(South) bus being of the order of 10,000 MVA, the voltage rise at Gajuwaka is expected to be around 2 kV , while the rise along the line of the order of 5kV.

In case difficulty is experienced with the first arrangement, the second alternative may be resorted to. In such case, the line CB of 400kV Jeypore-Gajuwaka-II at Jeypore and main CB of the 63 MVAR bus reactor at Jeypore are to be kept pre-closed, thereby ensuring that the reactor acts as a line reactor for the line. The line may then be charged from Gajuwaka.

After controlling the 400kV Jeypore bus voltage (energized from SR) within 415kV, the 400kV Jeypore-Indravati S/C line is to be charged from Jeypore on receipt of clearance from Indravati(PG) and the 400kV bus –II at Indravati(PG) energized. The voltage of Jeypore bus is expected to rise further by around 9 kV, while the rise along the line will be of the order of 1.5 kV.

400kV Indravati(PG) – UIHEP line to be charged on receipt of final clearance from UIHEP. This will charge 400kV Bus-I of UIHEP.By closing the 400kV side main CB of 400/220kV ICT-I, the ICT will be charged from 400kV side.

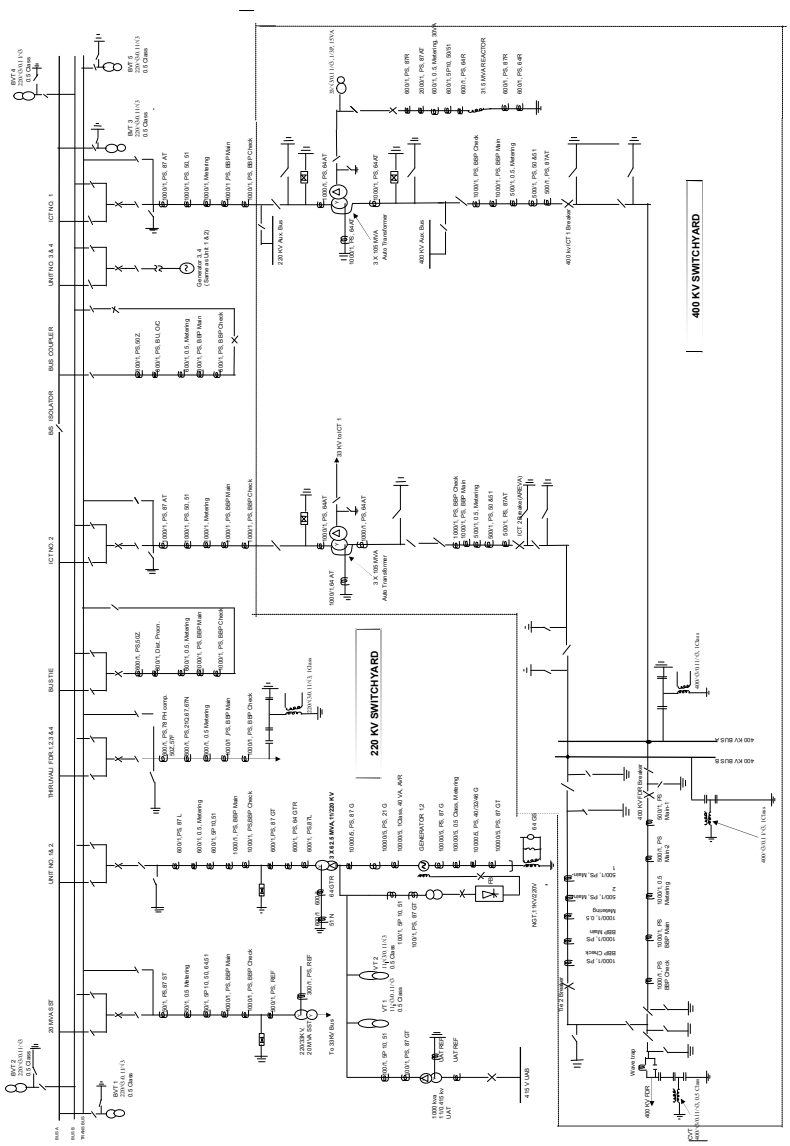
UIHEP to now avail start-up power for one of its units from 220kV Bus-A by closing 220kV side CB of the ICT-1.

Restoring normal operation

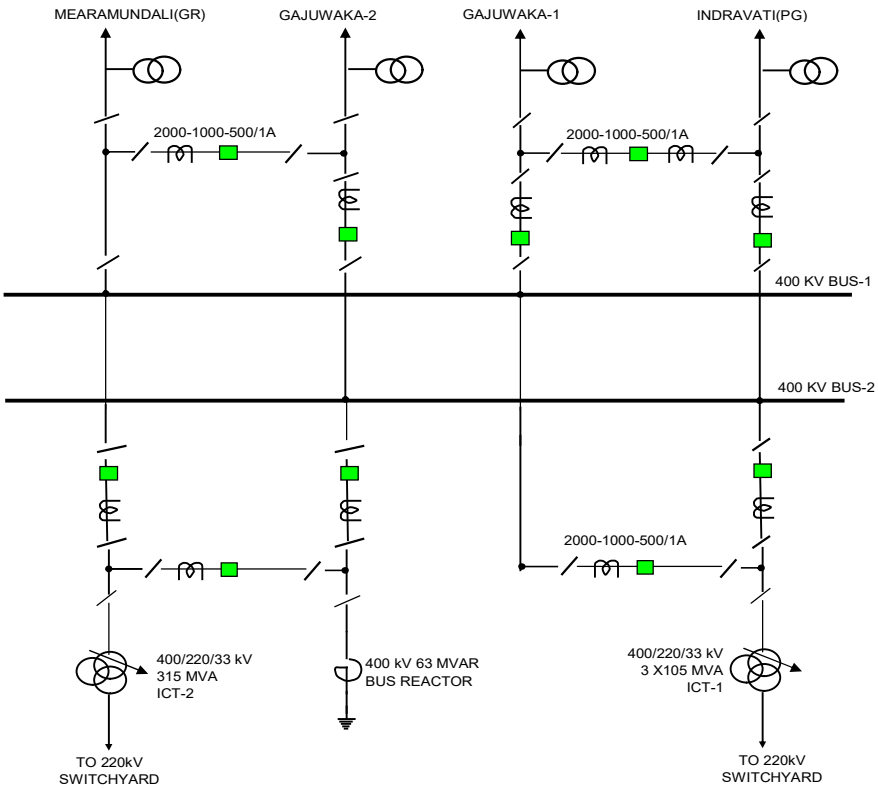
The unit-start up operation may require around 30 minutes. After successful completion of the trial operation, the unit may be desynchronized , the 400/200kV ICT –I and UIHEP – Indravati (PG) line opened from UIHEP, with consent from ERLDC. On receipt of clearance from OHPC, 400kV Indravati(PG) – UIHEP and 400kV Indravati(PG) – Jeypore lines are to be switched off from Indravati(PG), under instructions issued from ERLDC. At the same time, ERLDC will also request SRLDC to switch off the 400kV Gajuwaka – Jeypore circuit from Gajuwaka end.

After ensuring complete withdrawal of SR power, and readiness of Rengali and Indravati S/Stns, ERLDC shall advise Rengali(PG) S/Stn to charge 400kV Rengali – Indravati S/C and close the line at Indravati(PG) end.. At Indravati(PG), main CB for Indravati – UIHEP line is to be closed, with consent from UIHEP. ERLDC , after ascertaining readiness of Jeypore S/Stn, shall advise it to couple both the 400kV main buses. In the mean time, SRLDC to issue necessary instructions to Gajuwaka S/Stn, for removal of the bypass arrangement between South and East buses. After ascertaining readiness of SR, ERLDC will advise Jeypore to charge one ckt of 400kV Jeyore-Gajuwaka line.

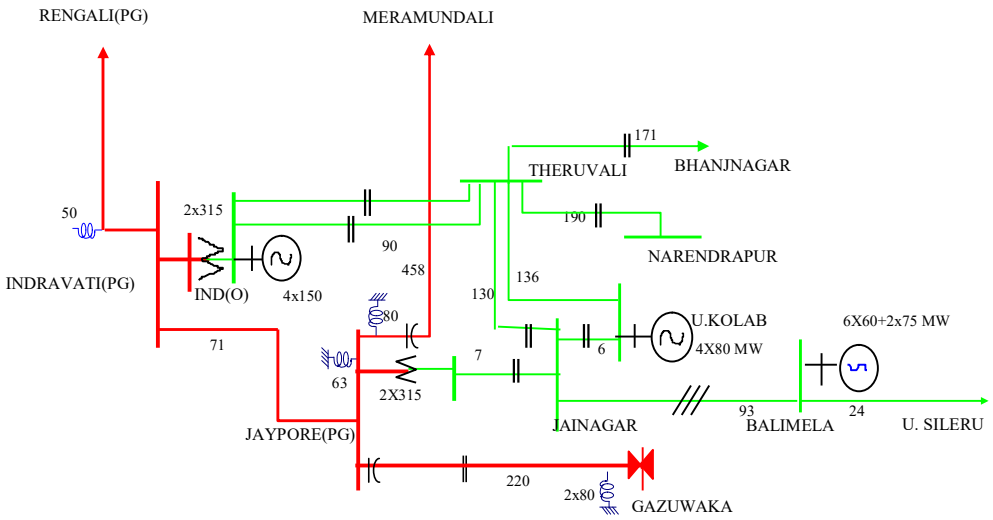
SINGLE-LINE DIAGRAM OF UIHEP SWITCHYARD



SINGLE –LINE DIAGRAM OF JEYPORE 400KV SWITCHYARD



Network around Jeypore and Indravati



Procedure for periodic exercise of Blackstarting Maithon HEP

In compliance with the provisions of IEGC, periodic testing of black-start facilities is required to be undertaken in the region as part of preparedness to combat emergency conditions in the regional grid. Accordingly, mock black start exercises are required to be carried out in a phased manner.

In order to facilitate the mock black start exercise of Maithon HEP following switching operation is being suggested at 132 kV and 33 kV level.

STAGE – I (Switching Operation)

A. 33 kV level at Maithon HEP:-

33 kV Maithon HEP have Single main and transfer bus scheme and following feeders:-

i) Maithon (JSEB) feeder I & II.
ii) Kulti feeder I & II
iii) 132/33 kV, 50 MVA ICT feeder I
iv) GT feeder I, II & III

Distribute the feeder and ICT on Bus I & II as tabulated below

Sl No.	Bus – I	Bus -II
1	GT feeder I, II and III	Maithon (JSEB) feeder I & II
2	50 MVA ICT feeder I	
3	Kulti feeder I & II	

All the feeders connected to bus – I is switched off, units need to be desynchronized and bus is dead.

B. 132 kV level at Maithon HEP:-

132 kV Maithon HEP have Single main and transfer bus scheme and following feeders:-

i) Jamtara feeder I
ii) Kalyaneswari feeder I & II
iii) Kumardubi feeder I
iv) Panchet feeder I
v) 132/33 kV, 50 MVA ICT feeder I

Distribute the feeder and ICT on Bus I & II as tabulated below

Sl No.	Bus – I	Bus -II
1	Jamtara (switched off)	Kalyaneswari -II
2	Kumardubi (switched off)	
3	Panchet (switched off)	
4	Kalyaneswari – I (switched off)	
5	50 MVA ICT (switched off)	

By performing these switching operations Bus – I at 132 kV Maithon HEP can be made dead.

STAGE – II (Mock Black Start)

Once the switching operation completed the GCB of any unit can be switched on and one 20 MW unit of Maithon HEP can be black started by supplying its auxiliary power from station battery. The station battery has an output of 250V (DC) and capacity 200Ah. This capacity will be shortly augmented to 400Ah under the ongoing R &M scheme.

During start-up of a unit, power is required for driving the following auxiliary pumps:

1. Governor oil pump – 1 no. which can be run either by an AC or a DC motor (optional). The wicket gate is operated by the same motor used for running this pump.
2. Generator bearing oil pump – 1 no. which can be run either by an AC or a DC motor (optional).
3. Turbine bearing oil pump -1 no. which can be run only by a DC motor.
4. Generator shaft lift pump -2 nos which can be run only by DC motors.

Once the unit got blackstarted extend power to 132 kV level by charging 132/33 kV 50 MVA ICT. Power can be further extended to Panchet HEP by charging 132 kV Maithon-Panchet S/C line or an island can be formed taking load of Jamtara by charging 132 kV Maithon Jamtara. However these possibilities are not feasible at present as adjacent substations to Maithon does not have synchronizing facility.

Procedure for periodic exercise of Blackstarting Indravati HEP

The maiden exercise of black-starting a hydro unit of Upper Indravati HEP (UIHEP) is proposed to be attempted in the following manner:

Though during actual blackout of Odisha, power has to be extended upto Balimela / U. Kolab hydro stations, yet as the initial step it is proposed to form a small island by self-starting one unit of UIHEP, charging one circuit of 220kV UIHEP-Theruvali line (i.e.220kV Indravati-Jaypatna), one 220/132kV ICT at Jaypatna and taking up matching local load of Jaypatna, Dabugaon and Umerkote.

Bus segregation required at UIHEP

The 220 kV switchyard of this station is of 2-main + 1 transfer Bus configuration. On one of the 220 kV main bus, one hydro unit to be black started and the 220 kV Indravati-Jayapatna line are to be connected while all other units, lines and transformers to be connected to the other main bus.

Switching operation at Jayapatna

The 220 kV Jayapatna-Kasipur Feeder is to be made off at Jayapatna Grid SS end.

Switching operation at Dabugaon

The 132kV Dabugaon-Tentulikhunti Feeder is to be made off and isolated after getting instruction from SLDC and in coordination with Jayapatna, Tentulikhunti and Jayanagar GSS, so that power can be availed from the unit of UIHEP under black start operation.

Switching operation at UIHEP 220 kV

The selected unit and 220 kV Jayapatna feeder to be switched off and connected to Main Bus-2. Other feeders, ICTs and units are to be connected to Main Bus-1. By opening the bus coupler CB, the selected unit and 220 kV UIHEP-Jayapatna feeder will get isolated.

The procedure

As the exercise is planned to be carried out during off-peak hours, additional units at Balimela and / or U. Kolab and , if necessary at UIHEP will have to be kept synchronized with the South Odisha system to maintain the requisite fault level.Before carrying out the trial operation, it is to be ensured that both the 400/220 kV ICTs at Jeypore and Indravati and 220 kV Jeypore-Jayanagar ckt-I, II, III & IV line are in service. Availability of data and voice communication of Jeypore and Indravati with ERLDC and between UIHEP, Jayapatna, Dabugaon and Umerkote are also to be checked.The entire operation is to be co-ordinated by SLDC.

The selected unit of UIHEP is to be self-started with the help of DG and 220 kV UIHEP-Jayapatna feeder to be charged. At Jayapatna GSS, power supply to be extended to the 132kV Bus by charging the Auto Transformer. Then 132kV Dabugaon feeder is to be charged to extend the power supply to Dabugaon and Umerkote GSS. Load is then to be released gradually taking care to maintain the island frequency and voltages at UIHEP and Dabugaon within acceptable limits. Around 50 MW load is to be released. The islanded operation of the unit may be continued for around 15 minutes. After successful completion, the island is to be synchronized with the system at Indravati PH as per the instruction of SLDC and normal configuration is to be restored.

SEQUENCE OF OPERATION:

1. 220 kV Indravati-Jayapatna feeder shall be made OFF from both the ends.

2. 132kV Jayapatna-Dabugaon feeder shall be made OFF from both the ends.

3. At Indravati PH switchyard, all outgoing 220 kV feeders i.e. Theruvali-1, 2 & 3, ICT 1 & 2, all running units shall be kept on Bus-1.

4. At Indravati PH switchyard, 220 kV Jayapatna feeder and the identified unit for black start shall be kept on 220 kV Bus-2. Bus coupler breaker shall be kept OFF.

5. At Jayapatna grid sub-station, 220kV Kasipur feeder shall be made OPEN.

6. At Indravati PH, the identified unit shall be started by availing auxiliary power supply from DG set and charged the Bus-2. The DG set starting time and the output parameters shall be recorded.
7. At Indravati PH switchyard, 220 kV Jayapatna feeder shall be charged.

8. At Jayapatna grid sub-station, 220 kV Indravati feeder shall be CLOSED to avail the power supply from the Black Start unit at Indravati P.H.

9. At Dabugaon grid sub-station, 132kV Tentulikhunti feeder shall be made open.

10. At Jaypatna grid sub-station, Auto Transformer and then 132kV Dabugaon feeder shall be charged.

11. At Dabugaon grid sub-station, 132kV Jaypatna feeder shall be charged to extend power supply to Umerkote grid sub-station.

12. Now load to be released gradually at Umerkote, Dabugaon and Jaypatna grid sub-stations in coordination with SLDC and Indravati P.H.

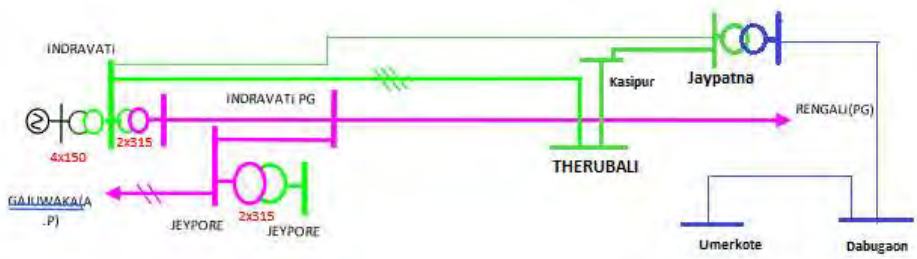
13. At each step, Umerkote, Dabugaon grid sub-station and Indravati PH shall record all the parameter readings such as Power Flow (both MW & MVAr), Frequency and Voltage etc.

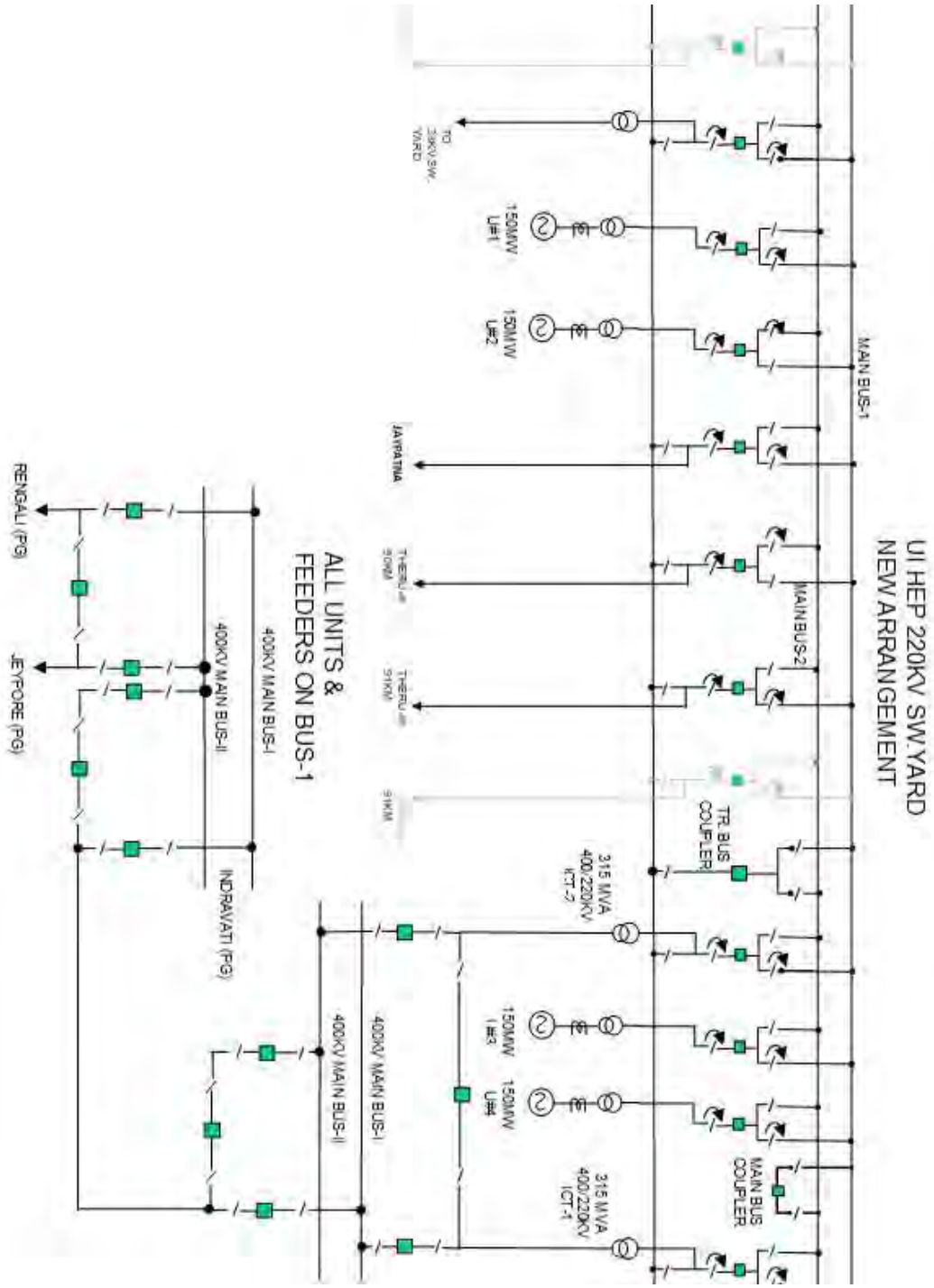
14. The island so formed shall be synchronized with the system at Indravati P.H as per the direction of SLDC.

15. All operations shall be carried out in co-ordination with SLDC.

16. The electrical parameters at different time period of operation and activity time should be recorded at Upper Indravati HPS .

Area containing the island of Indravati with 132 KV Umerkote and Dabugaon is shown below-


INDRAVATI
INDRAVATI PG
2x315
4x150
GAJUMAKALA
.P)
JEYPORE
2x315
JEYPORE
Kasipur
Jaypatna
RENGALI(PG)
THERUBALI
Umerkote
Dabugaon



Procedure for periodic exercise of Blackstarting Balimela HEP

In compliance with the provisions of IEGC, periodic testing of black-start facilities is required to be undertaken in the region as part of preparedness to combat emergency conditions in the regional grid. Accordingly, mock black start exercises are required to be carried out in a phased manner.

Present status at Balimela HEP:-

Constraints in Immediate black start of Generating Units:-

i) Governors of Balimela Generating Unit No. 1 to 5, 7 & 8 are not operating in auto mode, whereas the Unit No. 6 cannot supply auxiliary power.
ii) DG set is connected to the auxiliary bus of Unit No. 1 to 4, as the auxiliary bus of Unit No. 1 to 4 and 5 to 8 are not inter connected. These are two separate sections.
iii) Hence the Unit No. 6 governor is functioning in auto mode cannot be started during black start with help of DG set.

So, following procedure can be adopted to charge dead bus during black start:-

i) Either Unit No. 1 or 3 (Auxiliary Units) can be started through DG set.
ii) Any of these two units can be kept in spinning condition with excitation (11 kV voltage) to get power house auxiliary.
iii) Unit No. 6 can be started for black start purpose from the auxiliary available either from Unit No. 1 or Unit No. 3.

In order to facilitate the mock black start exercise of Balimela HEP following switching operation is being suggested:-

Switching operations required:

At Balimela Power House (OHPC) 220kV switchyard

- At Balimela HPS, the unit to be black-started and the 220kV Balimela (OHPC)-Balimela (OPTCL) circuit to be charged by this unit to remain connected at one 220kV bus while rest of the units and lines to be shifted to the other 220kV bus, by opening the 220kV main bus coupler CB. 220KV Balimela (OHPC) –Jayanagar Ckt.-II shall be kept open.

At Balimela sub-station (OPTCL) 220kV switchyard

- At Balimela (OPTCL) 220kV breakers of 220KV Balimela (OHPC)-Balimela (OPTCL) Ckt. and 220KV Balimela (OPTCL) –Jayanagar Ckt.-II shall be kept open.

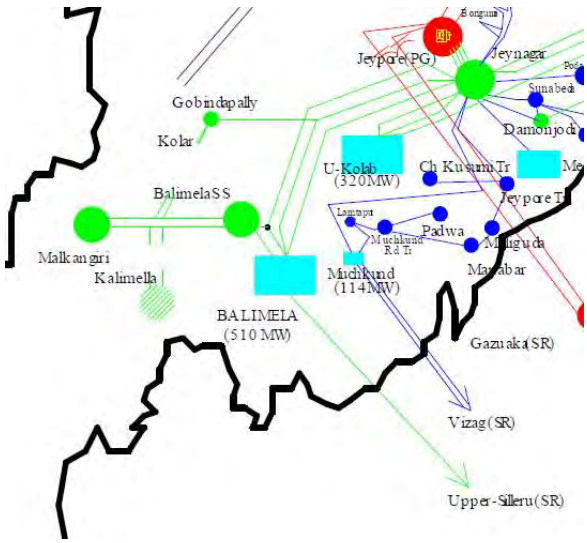
At Jayanagar sub-station (OPTCL) 220kV switchyard

- 220KV Balimela (OHPC) –Jayanagar Ckt.-II shall be kept open.

Sequence

1. At Balimela (OPTCL) sub-station, 220kV breakers of 220KV Balimela (OHPC)-Balimela (OPTCL) Ckt. and 220KV Balimela (OPTCL) –Jayanagar Ckt.-II shall be opened as per instruction of SLDC.
2. At Balimela HPS, the unit to be black-started and the 220kV Balimela (OHPC)-Balimela (OPTCL) ckt to be charged from Balimela HPS shall be kept on one bus and all other available units and lines shall be transferred to other 220kV bus. 220KV Balimela (OHPC) –Jayanagar Ckt.-II shall be kept open.

3. On receipt of clearance from SLDC, Balimela HPS should start up the identified unit using the DG set as the source of auxiliary supply and charge the dead 220kV station bus.
4. The selected unit should have its AVR and governor action activated.
5. On receipt of clearance from SLDC as well as Balimela (OPTCL) sub-station, the 220kV Balimela (OHPC)-Balimela (OPTCL) circuit is to be idle charged from Balimela HPS.
6. Assuming the minimum stable generation level of Balimela unit to be 20 MW, load of the same order is to be released by connecting 33kV feeders at Balimela (OPTCL) & Malkangiri sub-station.
7. The island created should operate stably for around ten minutes and to be synchronized at Jayanagar Grid substation as per the instruction of SLDC through 220kV Balimela (OPTCL) - Jayanagar Ckt. - II.
8. During the exercise, SLDC, OPTCL may keep record of the time of issuance of every instruction and time of actual execution of the switching operation.
9. Additional data such as frequency and voltage of the isolated Balimela (OPTCL) 220kV bus, terminal voltage, MW and MVAR of the unit should also be recorded by Balimela(OHPC)/ Balimela (OPTCL)/SLDC.



Procedure for periodic exercise of blackstarting Rengali HEP

The 220kV line flows around Rengali and OPTCL network as a whole, to be closely monitored by SLDC.

At RENGALI PH (OHPC)

1. 220 kV Rengali(HPS)-Rengali Switchyard ckt.-II is to be switched off from both ends.
2. All outgoing / incoming feeders i.e. TTPS, Kaniha, Rengali Switchyard Ckt-I & Stn. Tfr to be transferred to 220kV Bus 'B' except 220kV Rengali Switchyard Ckt-II, which is to be connected to Bus 'A'. Both the buses are to be isolated by opening the bus-coupler breaker.
3. The selected generating unit at Rengali HPS is to be started up using the diesel generating set available at the power station.
4. The above unit is to be connected to the isolated bus -A at Rengali HPS.

5. 220kV Rengali PH- Rengali Switchyard Ckt.-II is to be idle charged from Rengali PH end from Bus 'A'.

At Rengali Switchyard Sub-Station (OPTCL)

220kV Rengali PH- Rengali Switchyard Ckt.-II is to be isolated from Rengali Switchyard sub-station.

Important Points:

- Voltage of the isolated bus and reactive power generation by the unit (on primary side of GT) before and after idle-charging the 220 kV circuit as well as after connecting load are to be recorded.
- The unit is to be synchronized with the system at Rengali PH as per the direction of SLDC.
- During the exercise, SLDC shall keep record of the time of issuance of every instruction and time of actual execution of the switching operation.
- Additional data such as frequency & voltage of the MW / MVAr of the unit shall also be recorded by Rengali PH / SLDC.
- The electrical parameter at different time period of operation should be recorded at Rengali HPS in the format given below.

Time--→			
Frequency (Hz)			
Load (MW)			
Generator Terminal Voltage (kV)			
220 kV Isolated Bus Voltage			
Reactive Power (Mvar)			
Generator Current (kA)			
Pf (Lead / Lag)			

Procedure for periodic exercise of blackstarting Burla HEP

The 132kV line flows around Burla and OPTCL network as a whole, to be closely monitored by SLDC.

AT BURLA PH (OHPC)

1. 132 kV Burla (HPS)-Sambalpur Ckt. to be switched off from both ends.

2. All outgoing / incoming feeders i.e. Chiplima, Lapanga I & II (Budhipadar I & II), 132kV Burla (HPS)-Katapalli ckt.-I & II & Station Transformers to be transferred to 132kV Main Bus except 132kV Burla (HPS)-Sambalpur ckt., which is to be connected to 132kV Reserve Bus. Both the buses are to be isolated by opening the bus-coupler breaker.

3. The selected generating unit at Burla HPS to be started up using the Diesel Generator set available at the power station.

4. The above unit is to be connected to the isolated Reserve Bus at Burla HPS.

5. 132 kV Burla (HPS)-Sambalpur ckt. to be idle charged from Burla PH end through Reserve Bus.

AT SAMBALPUR SUB-STATION (OPTCL)

1. All outgoing / incoming 132kV feeders i.e. Katapali, SDRI & 132 / 33kV Transformer to be kept on 132kV Main Bus except one 132kV Burla PH Ckt and 132kV Maneswar Ckt. 132kV Burla PH Ckt and 132kV Maneswar Ckt. are to be connected through Reserve Bus of Sambalpur. Both the buses are to be isolated by opening the bus-coupler breaker.

2. 132kV Burla PH - Sambalpur Ckt, idle charged from Burla PH will be extended up to Maneswar Grid Sub-station.

AT MANESWAR SUB-STATION (OPTCL)

1. 132kV Sambalpur-Maneswar ckt and 132kV Maneswar-Rairakhol will be connected to Main Bus of Maneswar.

2. Maneswar & Rairakhol area load will be put on 132kV Burla-Sambalpur, 132kV Sambalpur- Maneswar-Rairakhol ckt after getting clearance from SLDC.

AT RAIRAKHOL SUB-STATION (OPTCL)

1. 132kV Rairakhol-Boinda Ckt. is to be kept open at Rairakhol end after getting clearance from SLDC.
2. 132kV Rairakhol-Maneswar-Sambalpur-Burla P.H. Ckt. To be charged after getting clearance from SLDC.

SEQUENCE OF OPERATION:

1. 132 kV Burla PH-Sambalpur Ckt. shall be made OFF from both the ends.

2. At Burla PH switchyard, all outgoing / incoming feeders i.e. Chiplima, Lapanga I & II, 132kV Burla (HPS)-Katapalli ckt.-I & II & Station Transformers to be transferred to 132kV Main Bus except 132kV Burla (HPS)-Sambalpur ckt., which is to be connected to 132kV Reserve Bus. Both the buses are to be isolated by opening the bus-coupler breaker.

3. At Burla PH the identified unit for black start shall be kept on Reserve Bus.

4. At Sambalpur grid sub-station Switchyard, 132kV Katapali - Sambalpur Ckt. & 132kV SDRI- Sambalpur Ckt. to be kept on 132kV Main Bus and 132kV Burla P.H. - Sambalpur Ckt. & 132kV Sambalpur-Maneswar Ckt. to be kept on Reserve Bus.

5. At Maneswar grid sub-station, 132kV Sambalpur-Maneswar and 132kV Maneswar-Rairakhol to be kept on Main Bus.

6. At Rairakhol grid sub-station Switchyard 132kV Rairakhol-Boinda Ckt. is to be kept open.

7. At Burla PH, the identified unit shall be started by availing auxiliary power supply from DG set and charge the Reserve Bus. The DG set starting time and the output parameters shall be recorded.

8. At Burla PH switchyard, 132 kV Burla PH-Sambalpur Ckt. shall be charged.

9. At Sambalpur grid sub-station Switchyard, the Reserve Bus shall be charged by availing power supply from Burla PH Ckt. and power supply shall be extended to Maneswar grid substation through 132kV Sambalpur-Maneswar Ckt.

10. At Maneswar grid sub-station, 132kV Sambalpur-Maneswar and 132/33kV 40MVA transformers shall be charged and gradually loaded in consultation with Burla P.H/SLDC.

11. At Rairakhol grid sub-station, 132kV Maneswar-Rairakhol and 132/33kV, 12.5MVA transformers shall be charged and gradually loaded in consultation with Burla P.H/SLDC.

12. At each step, Rairakhol grid sub-station and Burla PH shall record all the parameter readings such as Power Flow (both MW & MVAr), Frequency and Voltage etc.

13. The island so formed shall be synchronized with the system at Burla PH as per the direction of SLDC.

All operations shall be carried out in co-ordination with SLDC.

Important Points:

- Voltage of the isolated bus and reactive power generation by the unit (on primary side of GT) before and after idle-charging the 220 kV circuit as well as after connecting load are to be recorded.

- The unit is to be synchronized with the system at Burla PH as per the direction of SLDC.

- During the exercise, SLDC shall keep record of the time of issuance of every instruction and time of actual execution of the switching operation.

- Additional data such as frequency & voltage of the MW / MVAr of the unit shall also be recorded by Burla PH / SLDC.

- The electrical parameter at different time period of operation should be recorded at Burla HPS in the format given below.
-

Sl. No.	**Parameters**	**Time**	**Time**	**Time**	**Time**	**Time**
1.	Frequency (Hz)					
2.	Load (MW)					
3.	Generator Voltage (kV)					
4.	220kV isolated Bus Voltage (kV)					

5.	Reactive Power (MVAr)					
6.	Generator Current (kA)					
7.	Power Factor (lead / lag)					

Procedure for periodic exercise of blackstarting U.Kolab HEP

Network configuration required:

Bus segregation required at UKHEP

At UKHEP, Bariniput both the Bus (Bus - A & B) cannot be used simultaneously due to non provision of independent PT supply to both Bus. One of the unit, identified to be black-started and the 220kV Upper Kolab-Jayanagar circuit are to be connected to any one of the 220kV Buses while rest of the units and lines shall be kept 'OFF'.

Bus segregation required at Jayanagar Sub-station (220 kV)

The 220 kV switchyard of the sub-station is having one-and-half breaker configuration. The 220 kV Upper Kolab-Jayanagar ckt-I line (charged from the isolated UKHEP unit) and 220kV Jayanagar-Balimela ckt-II are to be connected to 220 kV Bus-I, while all other lines and auto Transformers are to be connected to the other 220 kV Bus-II.

Switching operation at Jayanagar

The 220kV Jayanagar-Balimela ckt-II is to be connected only to 220 kV Bus-1 by switching off the respective the main CB with Bus 2. The main CBs of 220 kV Upper Kolab 2, Laxmipur 1 & 2 feeders, Jeypore PG-III feeders & 220/132kV Auto-1, connected to Bus 1 are to be switched off. The tie-breakers of these feeders shall be in closed position to enable their connectivity with Bus-2. 220 kV Upper Kolab-Jayanagar circuit-I shall be kept on Bus-1 only by opening the tie-breaker.

Switching operation at UKHEP

The selected unit and 220 kV Jayanagar circuit to be switched off and connected to the selected 220kV Bus. Other feeders and units are to be kept 'OFF'.

Switching operation at Balimela(OPTCL)

At Balimela (OPTCL) 220kV breakers of 220KV Balimela (OHPC)-Balimela (OPTCL) Ckt. and 220KV Balimela (OPTCL) –Jayanagar Ckt.-II shall be kept open.

Switching operation at Balimela PH 220kV switchyard

220KV Balimela (OHPC) –Jayanagar Ckt.-II shall be kept open.

The procedure

As the exercise is planned to be carried out during off-peak hours, if required, additional units at Balimela and UIHEP will have to be kept synchronized with the South Odisha system to maintain the requisite fault level. Availability of data and voice communication of Jaynagar, Upper Kolab, Balimela and Indravati are also to be checked.

The selected unit of UKHEP is to be self-started with the help of DG and 220 kV UKHEP-Jayanagar ckt-II to be charged. At Balimela OPTCL 220 kV CB for Auto Transformer-1 is to be closed. 132 kV side of Auto Transformer-1 is to be connected with the Transfer Bus. This will also charge the 132 kV load feeder. Load is then to be released gradually taking care to maintain the island frequency and voltages at UKHEP and Theruvali within acceptable limits. Load is to be released gradually as per the direction of SLDC. The islanded operation of the unit may be continued for around 15 minutes. After successful completion, the island is to be

synchronized with the system at Jayanagar as per the instruction of SLDC and normal configuration is to be restored.

SEQUENCE OF OPERATION:

1. 220 kV Upper Kolab-Jayanagar ckt-I. shall be made OFF from both the ends.
2. At Upper Kolab PH switchyard, all outgoing 220 kV feeders i.e. Jaynagar-I & II, all running units shall be made 'OFF'.
3. At Upper Kolab PH switchyard, 220 kV Jayanagar Ckt.-I and the identified unit for black start shall be kept on the selected 220 kV Bus.
4. At Jayanagar grid sub-station, 220 kV Upper Kolab ckt-I and 220kV Balimela-II shall be transferred to 220kV Bus-I.
5. At Jayanagar grid sub-station, 220 kV Upper Kolab-II, Laxmipur-I & II, Jeypore PG ckt-III & Auto-I shall be transferred to 220kV Bus-II.
6. At Balimela (OPTCL) sub-station, 220kV breakers of 220KV Balimela (OHPC)-Balimela(OPTCL) Ckt. and 220KV Balimela (OPTCL) –Jayanagar Ckt.-II shall be opened as per instruction of SLDC.
7. At Balimela HPS, 220KV Balimela (OHPC) –Jayanagar Ckt.-II shall be kept open.
6. At Upper Kolab PH, the identified unit shall be started by availing auxiliary power supply from DG set and charged the selected Bus. The DG set starting time and the output parameters shall be recorded.
7. At Upper Kolab PH switchyard, 220 kV Jayanagar ckt-I shall be charged from the black started unit through selected 220kV Bus.
8. At Jayanagar grid sub-station, the 220 kV Bus-I shall be charged by availing power supply through Upper Kolab ckt-I and subsequently Balimela-II shall be charged.
9. At Balimela OPTCL grid sub-station, 220kV Balimela OPTCL-Jayanagar ckt-II feeder shall be charged and gradually loaded.
10. Assuming the minimum stable generation level of Upper Kolab unit to be 20 MW, load of the same order is to be released by connecting 33kV feeders at Balimela (OPTCL) & Malkangiri sub-station.
11. The island created should operate stably for around ten minutes and to be synchronized at Jayanagar Grid substation as per the instruction of SLDC through 220kV Balimela (OPTCL)- Jayanagar Ckt. - II.
12. At each step, Jayanagar grid sub-station and Upper Kolab PH shall record all the parameter readings such as Power Flow (both MW & MVAr), Frequency, Voltage etc.
13. All operations shall be carried out in co-ordination with SLDC.

14. The electrical parameters at different time period of operation and the activity time should be recorded at Upper Kolab HPS in the format given below.

Sl. No.	Parameters	Time	Time	Time	Time	Time
1.	Frequency (Hz)					
2.	Load (MW)					
3.	Generator Voltage (kV)					
4.	220kV isolated Bus Voltage (kV)					
5.	Reactive Power (MVAr)					
6.	Generator Current (kA)					
7.	Power Factor (lead / lag)					

Activity	Time (Minutes)
Time taken to start DG set after black out of Island	
Time taken to charge dead bus at Black start station	
Time taken to charge dead bus at Remote end by line charging	
Time taken to connect first load post a black out in the island	
Duration of stable island operation after successful black start and building up the of the island till synchronization with grid	
Time taken to synchronize the island with Grid	

Procedure for periodic exercise of blackstarting TLDP-IV HEP

GUIDELINES TO BE FOLLOWED TO PERFORM MOCK BLACK START DRILL AT TLDP-IV WITH FEEDING OF NJP LOAD

The concept Is to isolate a 220KV Main Bus at NJP to receive the power of the Black started generator through the 220KV NJP-TLDP IV #2 and then to step down the power through 220/132KV,160MVA & 132/33KV, 31.5 MVA transformer to feed the 33KV & 11KV load in islanded mode, isolated from the main grid.

Part A: Switching at NJP (WB) 220 KV s/stn. :

- At NJP s/stn., 220/132KV 160 MVA TR#1 & 3 along with 220KV TLDP-III line and 220KV NJP-TLDP-IV #1 will be on 220 KV Main Bus #1. Switch OFF 220KV NJP-TLDPIV line#1 at both ends. TLDP-IV is now synchronized with grid via 220KV NJP line#2 via 220KV MB#2 of NJP and 220KV TLDPIV-TLDPIII inter connecting line.
- At NJP s/stn., 220/132KV 160MVA TR#2 along with 220KV TLDP-IV#2 will be on 220KV Main bus#2 and 220KV Bus-Coupler closed.
- 132 KV Mohitnagar will be shifted on Moynaguri & Chalsa s/stn. (Birpara source). 132 KV NJP –Mohitnagar D/C will be kept OFF & isolated at NJP end.
- 132KV Siliguri(WB) will be shifted on 132 KV NBU/Ujanu s/stn. 132KV SLG-NJP #1&2 OFF & isolated at NJP end.
- TCF PS–1 will remain on Islampur source. 132KV NJP-TCF ckt will be kept OFF & isolated at NJP end.
- 132 KV NJP-NBU ckt & 132KV NJP-SLG(PGCL) tie line will be kept off and isolated at NJP end.
- 132/33KV 50MVA TR#2 & 31.5 MVA Tr#3 of NJP S/S will be off (both sides). 33KV side will be kept off and isolated. Switch OFF 132KV C.B. of 160MVA TR#2. 132KV High Level Isolator (TR#2 side) at NJP will be opened to split 132KV main bus.
- NJP 33KV system will be fed by 132/33KV 50 MVA Tr#1 and 160MVA TR#1 & 3 (on 220KV M.B.#1).
- A couple of 33KV feeders may be shifted to alternate sources as stated in Table 1 below, in consultation with WBSEDCL.
- The Under Frequency Relays at NJP to be kept off.
- Inform TLDP-IV for total power interruption. 220KV TLDPIV-TLDPIII line will be switched off & isolated at TLDP-IV end
- Instruct Binnaguri (PGCIL) to switch off and isolate 220KV C.B. of NJP Extended Bus#2.
- 220 KV B/C Bkr. at NJP s/stn. will be made OFF & isolated.
- Thus 220KV M.B#2 will be islanded with NJP-TLDP-IV #2 and 160MVA TR#2.
- Switch OFF 220KV NJP-TLDP-IV#2 at NJP and TLDP-IV plant will be black out.

Part B: Now NJP s/stn. will inform TLDP-IV to start Black Start Operation of U#1.

- Before starting the unit of TLD-IV PS, NJP substation will close its 220KV CB of MB-2 iro TLDP-IV#2, 220KV & 132KV CB i.r.o. 160MVA TR-2 and 132KV CB of 31.5 MVA TR-3.
- 220KV CB of Line-2 and Unit of TLD-IV PS will also be closed before starting.
- Unit will be started in Line charging mode and Field excitation of Unit will be increased gradually after closing of GTCB to raise terminal voltage to rated value.
- Performance of island with 220KV MB#2, 160MVA Tr#2, 132KV bus-section (Mohitnagar D/C ,NBU,PGCIL side) and 31.5 MVA TR#3 (charged at HV only) of NJP will be observed for some time.
- If the black-started generator of TLDP-IV is ready to supply load, 33KV bus of NJP will be made dead by switching off 132/33KV TR#1 (both HV & LV) and also outgoing 33KV feeders will be made off.
- Now 132/33KV 31.5 MVA TR#3 (33KV side) will be made ON after closing of isolator to charge 33KV bus of NJP.
- TLDP-IV will be instructed to raise load of the generator in steps and outgoing 33KV feeders will be made on one by one. Thus load of NJP(approx. 25 MW after shifting of 33KV feeders) will be catered by TLDPIV in island mode and performance of island will be observed for 10 minutes.
- During this period, Nodal Officer of WBSETCL will be in constant touch with SLDC &TLDP-IV for proper co-ordination.

Part C: Synchronisation of TLDP-IV with grid

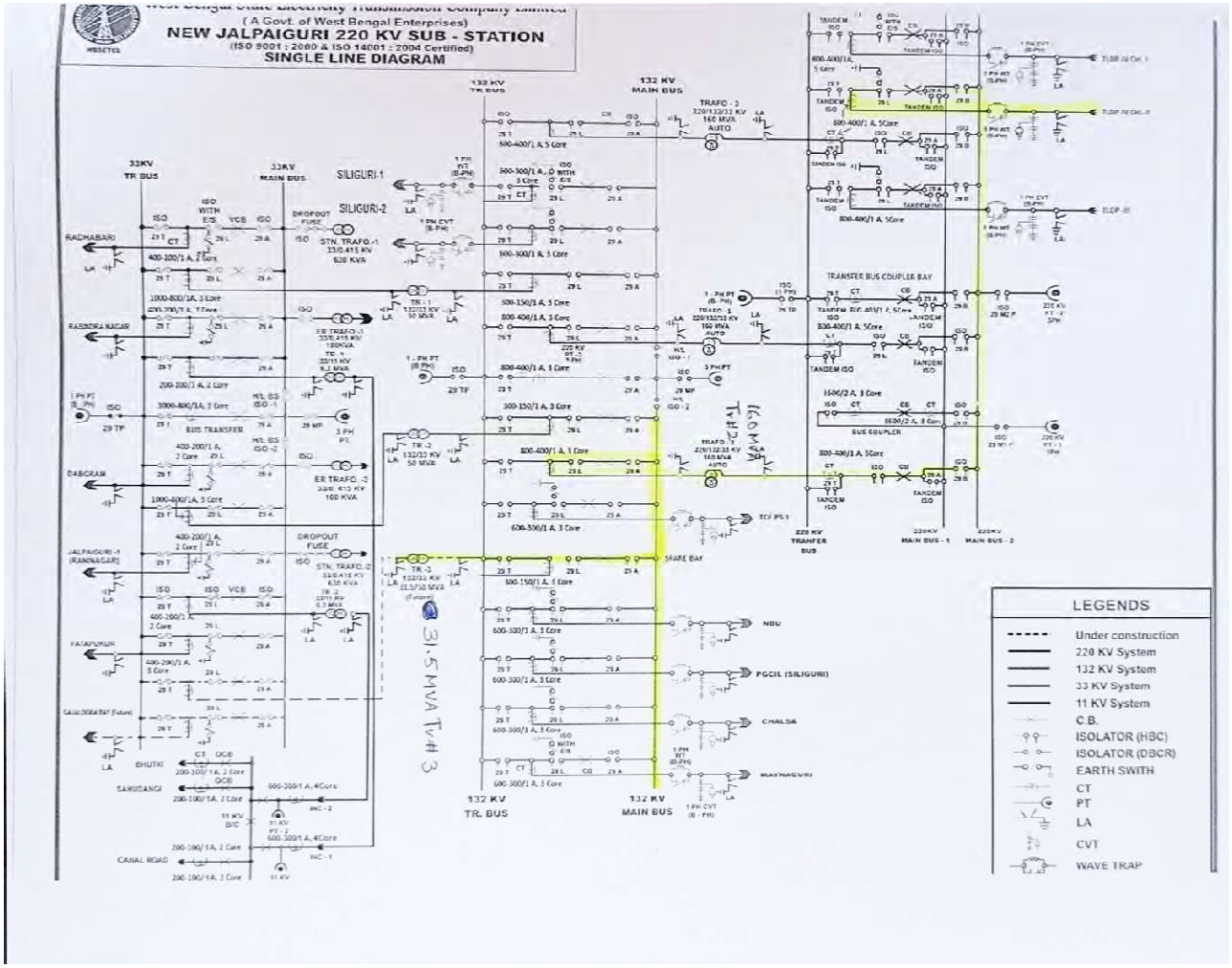
- SLDC will inform ERLDC about the successful black start of TLDP-IV HEP.
- Re-synchronization of this island with grid shall be attempted through 220KV TLDPIII-TLDPIV inter connecting line at TLDPIV power plant using synchroscope.
- After Re-synchronization of TLDPIV (Unit#1) with E.R. Grid is completed, Binnaguri (PGCL) will close 220KV C.B. of NJP Extended Bus#2 and at NJP S/S, 220KV B/C breaker will be closed .
- Now. At NJP, 132KV CB of 160MVA TR#1 & 3 will be made off and 132KV split main buses will be unified by closing high level isolator. Now both 160MVA TR# 1 & 3 , 132/33KV TR#1&2 and all 132KV outgoing circuits will be normalised to restore NJP system in all respect as was before Mock Black Start.

  WBSETCL coordinator at NJP S/S for this Mock Black Start Exercise is Sri Sandip Maity, In-Charge NJP 220 KV SS Mobile no.9434910260.

Demand of 33 KV & 11 KV Feeders of NJP 220 KV Substation in November'2021

Sl. No.	Feeder	Maxm. Demand	Remarks
1	33 KV Radhabari	150 A	Interruption for some time

2	33 KV Rabindranagar	80 A	**Can be shifted to Siliguri S/S**
3	33 KV Dabgram	170 A	**Can be shifted to TCF PS1 source**
4	33 KV Fatapukur	55 A	Interruption for some time
5	33 KV Raninagar	115 A	Interruption for some time
6	33 KV Gajoldoba	55 A	
	TOTAL	625 A or 35.7 MVA at 33 KV	**Interruption of 21.4 MVA in 33KV system**
1	11 KV Canal Road	116 A	11 KV BHUTKI can be shifted to alternate source
2	11 KV Sahudangi	67 A	
3	11 KV Dabur	30 A	
4	11 KV Bhutki	40 A	
5	11 KV Powergrid	ON CONDITION	
	TOTAL	342 A or 4.8 MVA at 11 KV	**Interruption of 4MW of 11KV system**


(A Govt. of West Bengal Enterprises)
NEW JALPAIGURI 220 KV SUB - STATION
(ISO 9001 : 2000 & ISO 14001 : 2004 Certified)
SINGLE LINE DIAGRAM
132 KV TR BUS
132 KV MAIN BUS
33KV TR BUS
33KV MAIN BUS
SILIGURI-1
SILIGURI-2
RADHABARI
RABINDRA NAGAR
DABGRAM
JALPAIGURI-1 (RANGNAGAR)
FATAPUKUR
CHALSA BAY (Future)
BHUTAN
SANKOSANGI
CANAL ROAD
TRANSFER BUS COUPLER BAY
BUS COUPLER
220 KV TRANFER BUS
220KV MAIN BUS - 1
220KV MAIN BUS - 2
SPARE BAY
NBU
PGCIL (SILIGURI)
CHALSA
MAYNAGURI
160 MVA
3.5 MVA Tr # 3
LEGENDS
Under construction
220 KV System
132 KV System
33 KV System
11 KV System
C.B.
ISOLATOR (HSC)
ISOLATOR (DBCR)
EARTH SWITH
CT
PT
LA
CVT
WAVE TRAP

Procedure for periodic exercise of blackstarting Chujachen HEP

A) Black-start and extension of power Gangtok 132kV

Step-1 : Chuzachen to keep one unit ready for black start & confirm the following switchyard configuration of its own to Rangpo, Gangtok and ERLDC:
Switchyard configuration at CHEP:-
1. Unit-1 : CB open, Bus1 & Bus2 isolators open.
2. Unit-2 : CB open, Bus1 isolator closed & Bus 2 isolator open.
3. Bus Coupler : CB open, bus1 & bus2 isolators open.
4. Chuzachen-Gangtok Line : (a) Chuzachen end - CB closed, Line isolator closed, Earth switch open, Bus1 isolator closed, Bus2 isolator open.
5. Chuzachen-Rangpo Line : (a) Chuzachen end - CB Closed, Line isolator closed, Earth switch open, Bus 1 isolator closed & Bus 2 isolator open.
6. Power Transformer: CB open, Bus1 & Bus 2 isolators open. **Station Power: On DG set**

Step-2 : On receipt of clearance from ERLDC, Chujachen to start the unit identified for Black Start capability demonstration from the station DG.
Excitation voltage to be built up in a gradual manner in steps of 3 KV so as to idle-charge 132kV Chujachen-Gangtok and 132 kV Chujachen-Rangpo line together till the open end voltage at Gangtok is around 128kV
Chujachen HPS should inform ERLDC as soon as it is ready to take up load. Chujachen should further confirm that the governor of the unit is in speed control mode and that its AVR is in auto mode.

Step-3 : On receipt of information from Chujachen, ERLDC would inform Gangtok to switch off 132kV Gangtok-Rangpo S/C line from Gangtok end and be ready to avail power at Gangtok from Chujachen HPS in islanded mode. Gangtok to confirm the following to ERLDC before availing power from Chujachen:
132kV Gangtok-Rangpo line : CB, line isolator and earth switch are open at Gangtok end.

Step-4 : On receipt of clearance from ERLDC, ERTS-II to close the Gangtok end line isolator and CB and charge the 132kV main bus. No load of Gangtok should be connected by Sikkim, only the 132kV bus voltage should be communicated to ERLDC and Chujachen. Chujachen and Gangtok to remain in constant contact with ERLDC

Step-5 : After Chujachen HPS conveys its readiness to pick-up load, Sikkim would be advised by ERLDC to connect balanced load at Gangtok in steps of about 5 MW in a gradual manner. Care should be taken at every step by all concerned to ensure that the island frequency remains as close as possible to 50 Hz.

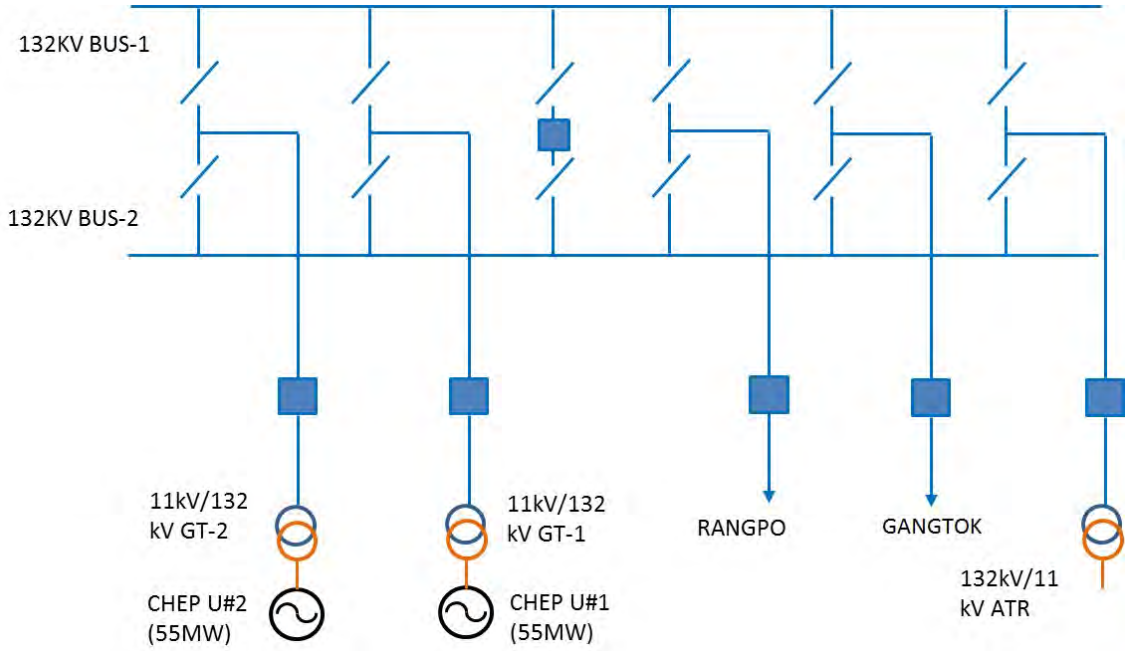
Step-6 : Total load to be connected to the 132/33kV ATRs at Gangtok should be less than 20MW as the forbidden operating zone of Chujachen unit is 20-40MW. Sikkim to maintain status-quo till further instructions from ERLDC

Step-7 : After running CHEP unit for around 10 minutes in islanded mode, ERLDC would advise Rangpo to synchronise the incoming 132kV line from Chujachen.

Step-8 : Rangpo to close Chuzachen line isolator & CB and synchronise 132 KV Chuzachen-Rangpo to 132 KV Rangpo GIS bus. For facilitating synchronization at Rangpo, Chujachen may adjust the excitation of its unit, so that the difference between open end voltage of the line and Rangpo 132kV bus voltage is minimized.

Step-9 : After successful synchronization of CHEP-Rangpo 132kV line at Rangpo, Sikkim has to restore the balance Gangtok load on its own. At the same time Sikkim would communicate to ERLDC and Siliguri(PG) its readiness for synchronizing 132kV Gangtok-Siliguri line at Gangtok.

Step-10 : 132kV Gangtok-Rangpo line to be synchronized by ERTS-II at Gangtok
Note : The exercise would be discontinued and normal operation would be restored at the earliest in case any operational exigency arises before completion of the test



SLD – Chujachen HEP

Procedure for periodic exercise of black-starting Teesta-III

Mock exercise for black start of Teesta-III units

In order to facilitate the mock black start exercise of Teesta-III Power house following switching operations are suggested at 400 kV Rangpo, 400kV Binaguri (POWERGRID), 220kV Binaguri and 132kV N. Jalpaiguri (WBSETCL).

The exercise will be undertaken during the period when the schedule of Teesta-III and Dikchu generation will be nil. During this exercise, about 150 MW load in N. Bengal comprising NJP, Siliguri, Moinaguri, Chalsa, and if required, Coochbehar is planned to be fed from the unit earmarked for black-starting at Teesta-III, in islanded mode. Thus, supply to the aforesaid sub-stations in W. Bengal would be disrupted for short durations during disconnection and reconnection to the main grid.

In order to carry out the exercise, an island would be created by splitting the 400kV bus at Rangpo, 400kV and 220kV buses at Binaguri(PG), and also switching off some of the 132kV lines from NJP 220kV (WBSETCL) S/Stn so that only the local load of NJP(WB), Siliguri(2nd Mile), Chalsa and Moinaguri get included within the island. Mock exercise would be carried out by supplying the island from the black-started unit of Teesta-III and then the island system would be synchronised back to the main grid. This exercise can be divided in three stages.

Stage-1

D. At Binaguri 400kV Bus

Distribute the feeders and ICTs on Bus-I & II as tabulated below.

Sl. No.	400 kV BUS-I	400 kV BUS-II
1	315 MVA 400/220kV ICT-1	315 MVA 400/220kV ICT-2
2	400kV Rangpo-I	400kV Rangpo-II
3		400 kV Purnea-I &II 400 kV Kishanganj-I &II
4		400 kV Tala I to IV
5		400 kV Bongaigaon I &II 400 kV Alipurduar I &II
6		125 MVAR Reactors I & II

E. At Binaguri 220kV – the various incoming / outgoing feeders to be distributed as follows:

Sl. No.	220 kV BUS-I	220 kV BUS-II
1	315 MVA 400/220kV ICT-1	315 MVA 400/220kV ICT-2
2	220kV NJP(W)-I (bus-to-bus connection)	220kV Birpara I & II
3		220kV Siliguri(PG) I & II

4		220kV NJP(W)-II

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F. At Rangpo 400kV – the various incoming / outgoing feeders to be distributed as follows:

Sl. No.	400kV kV BUS-I	400kV kV BUS-II
1	Rangpo-Teesta-III	Rangpo-Teesta-I &II
2	Rangpo-Binaguri-I	Rangpo-Binaguri-II
3	80MVAR Bus reactor-I	5X315MVA, 400/220kV ICTs
4		80 MVAR Bus reactor-II

This arrangement is suggested so that Teesta-V, Gangtok and Jorethang HEP, CHEP can still remain synchronized with the grid at Rangpo, while the black-start exercise of Teesta-III unit is being carried out.
At Teesta-III, all necessary preparatory actions to be taken to keep the unit(s) scheduled for the self-start exercise, ready.

Stage-2 –The Mock exercise

C. Switching at different substations:

- At NJP(W), WBSETCL to ensure that both the 160MVA, 220/132kV ICTs are in service and connected to Bus-II. The 220kV bus coupler CB is to be opened to isolate the two buses. 220kV Bus-I to remain connected to 220kV Binaguri (PG) Bus-I. For this purpose, no separate code will be given by ERLDC.
    - At NJP(W) 132kV : TCF-I feeder to be switched off
    - 132kV tie line to Siliguri(PG) and 132kV NJP(WB)-NBU S/C will be kept open from NJP(WB)
    - 132kV Siliguri(WB)-NBU to be also switched off so that NBU remains connected only to Siliguri(PG) , Rammam, Lebong and TCF-I
    - All other remaining 132kV feeders from NJP(WB) i.e. Siliguri (WB) I & II , Moynaguri-I & II (Chalsa) along with 33kV local load of NJP (WB) to remain on 220kV Bus-II
    - 66kV Kalimpong-Chalsa line may be opened by WBSETCL, with consent of Sikkim, so that Kalimpong load is supplied from Melli only, during the exercise.
    - Further, Jaldhaka units, if already generating, are to be desynchronized as they may be re-synchronized only after completion of the exercise when Chalsa S/Stn finally gets supply at main grid frequency.

SLDC , WBSETCL to inform ERLDC after completing the above switching operations.

- On receiving clearance from ERLDC, Rangpo to open the CBs and isolators of 400kV Teesta-III, Shunt Reactor-I and Binaguri-I; bus-coupler CB between 400kV Bus-1 and Bus-2 and shift Binaguri-II,Teesta-V D/C, Shunt Reactor-II and all the 400/220kV ICTs on 400kV Bus-II
- On receiving clearance from ERLDC, Binaguri to open
    - both main and tie CBs of 400/220kV ICT-I, Rangpo-I,
    - all CBs connected to Bus-I at Binaguri 400kV switchyard.

Accordingly, at Rangpo end the 400kV Bus-2 isolator and at Binaguri end the tie CB and 400kV Bus-2 CB of Rangpo-Binaguri-II line should remain closed to ensure that Jorethang-Rangit-Chujachen system remains synchronized with main grid through 400kV Rangpo-Binaguri-II.

- At Binaguri 220kV switchyard, after ensuring that 400/200kV ICT –I is connected to bus-I and all other feeders on bus-II, as already stated, the 220kV bus-coupler CB to be opened. Hence, 400/220kV ICT-I and Binaguri 220kV bus-I will now remain connected only to the 220kV Bus-I of NJP(WB) S/S.
- Thus Rangpo 400kV Bus-I, Binaguri 400kV Bus-I, 400/200kV ICT-I, Binaguri 220kV Bus-I and NJP(WB) 220kV bus-I will form a separate sub-system that remains dead / uncharged. Binaguri(PG) to confirm ERLDC when this status is achieved.
- ERLDC will now advise Teesta-III to self-start one of its units. It may be ensured by Teesta-III that auxiliary supply is taken from local DG set (as would be done during a real blackout). The 400kV bus voltage at Teesta-III may be maintained between 370-380 KV by controlling the excitation. A second unit may also be self-started at Teesta-III. The units would be on free governor mode of operation and their AVRs may be kept in AUTO mode.
- Rangpo to keep the Bus-I isolator of Teesta-III-1 line and Binaguri-I line closed. Binaguri to keep Bus-I isolator of Rangpo-I line closed.
- On receipt of clearance from Rangpo the dead 400 kV Bus–1 at Rangpo is to be charged, from Teesta-III using 400kV Teesta-III-Rangpo -I .
- On receipt of clearance from Binaguri, the dead 400 kV Bus–1 at Binaguri is to be charged from Rangpo using 400kV Rangpo-Binaguri-I line.

- Thereafter Binaguri(PG) is to close the 400kV side main CB and the 220kV side CB of ICT-I. This will charge the 220kV Main Bus-I at Binaguri(PG)
- In case of difficulty in extending power from Teesta-III upto Binaguri 400kV Bus-I due to high voltage problem, the 80MVAR shunt reactor-1 at Rangpo may be taken into service on Bus-I prior to idle-charging 400kV Rangpo-Binaguri-I from Rangpo
- In consultation with NJP(WB), Binaguri(PG) to close the CB connecting 220kV Bus-I extension to 220kV NJP(WB) Bus-I, thus making Teesta-III power available upto 220kV Main Bus-I of NJP(WB).
- 400kV and 220kV voltages at Binaguri to be controlled within permissible limits through excitation control of Teesta-III unit(s).
- Once the NJP(WB) 220kV Bus-I is found to be within limit and ready for loading, the 132kV feeders and loads connected to Bus-II will be switched off from NJP(WB) i.e.
    a. Siliguri I & II
    b. Moynaguri I & II (Chalsa)
    c. 33kV local load of NJP
- Following the above switching operations, NJP(WB) will give clearance to Binaguri and the CB connecting 220kV Binaguri (PG) bus-II extension to 220 NJP(WB) bus-II is to be switched off at Binaguri S/S, thus isolating the NJP(WB) 220kV Bus-II from Binaguri 220kV Bus-II.
- The 220kV Bus coupler at NP(WB) to be now closed to extend Teesta-III power from Bus-I to Bus-II. ERLDC should be informed after completion of these operations.

- ERLDC will now advise Teesta-III to be ready for taking up load. ERLDC will also give necessary clearance to NJP(WB) (through Binaguri) for re-connecting loads.

D. At 220 NJP(W) S/S

- On receiving clearance from Binaguri, WBSETCL to charge the 220/132kV ICTs one by one
- NJP(WB) local load, 132kV Siliguri I & II, 132kV Moynaguri & Chalsa to be switched on in steps of 20-25 MW
- After connecting a total load of 60 MW, the rest of the loads in the island are to be added rapidly , say within 3 minutes until the total load attains around 150MW. This is to avoid undesirable vibration of the Teesta-III unit.
- Frequency of the island may be kept close to 50Hz through proper coordination.

The islanded operation may be observed for about 15 minutes. During this period, the nodal personnel at Binaguri and Teesta-III should be in constant touch with ERLDC. Additionally, Binaguri should also be in touch with Rangpo and NJP(W) so that load increments and switching operations in WBSETCL system are properly coordinated with Teesta-III generation and action can be taken without delay in case of any exigency at Rangpo.

Stage-3 – The Restoration

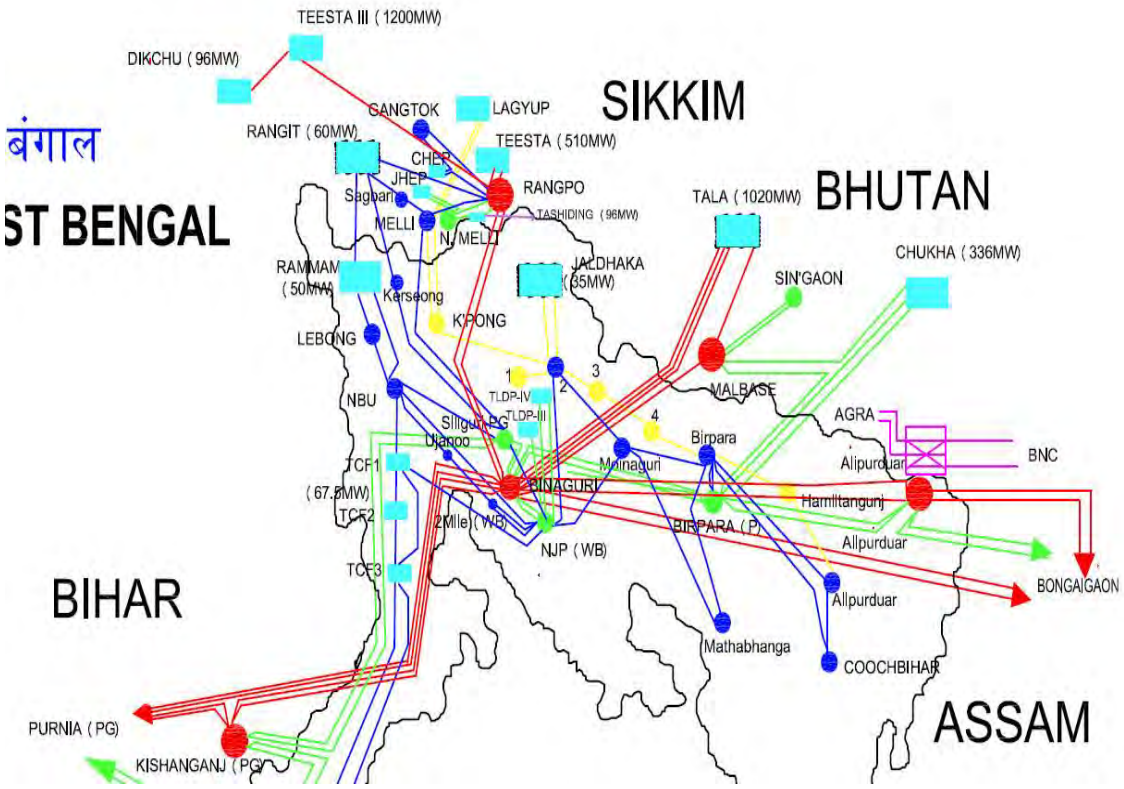
- On receipt of clearance from ERLDC, Teesta-III generation to be controlled so as to match the island frequency with the grid frequency.

- At Binaguri, 400kV Bus-I to be synchronised with Bus-II by closing the tie-CB of ICT-I when the voltage and frequency conditions permit. Main and tie CBs of other bays also to be closed. Similarly, the 220kV bus coupler and CB for 220kV NJP(W)-II should also be taken into service.

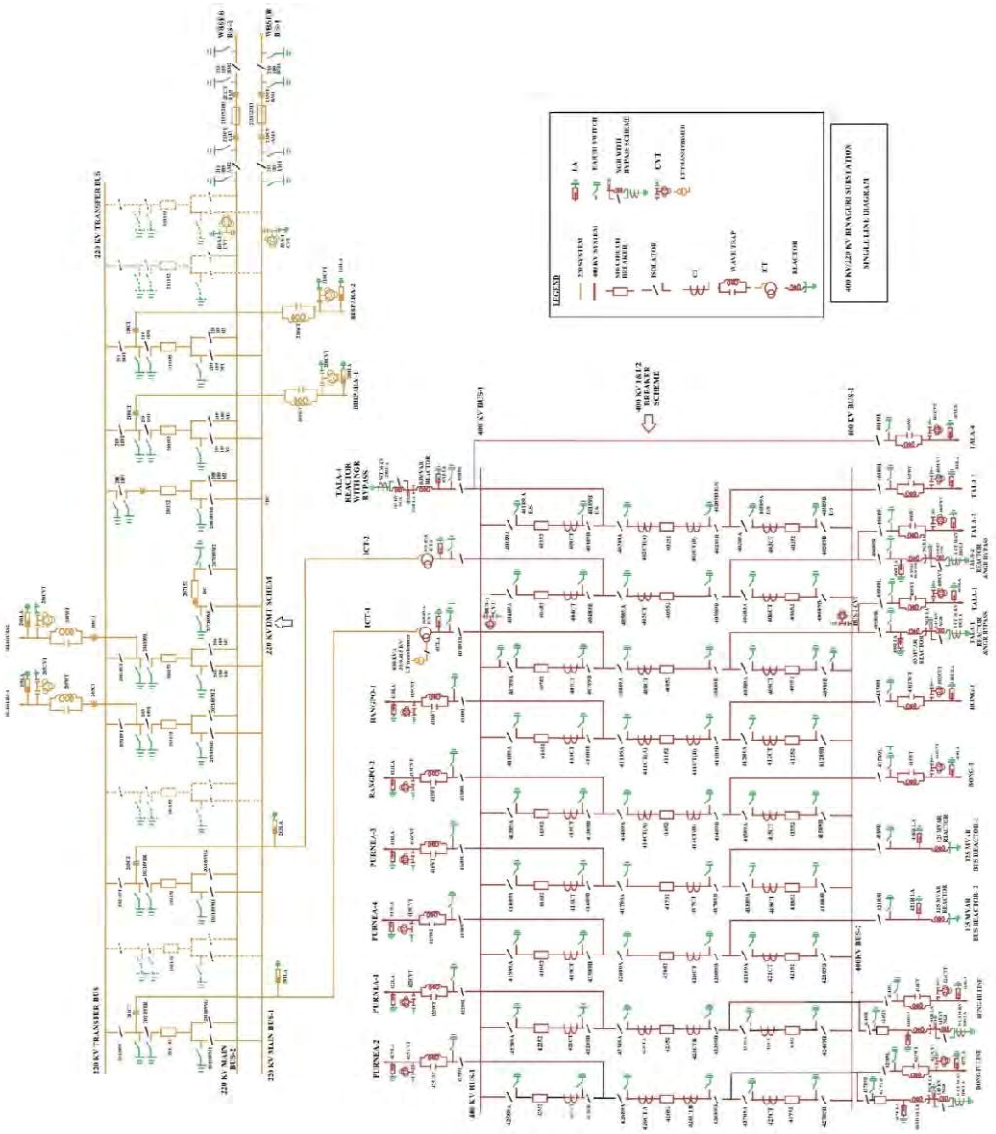
- At Rangpo, 400kV bus-coupler CB to be closed to ensure that Sikkim-Jorethang-Rangit-Chujachen system remains synchronized through 400kV Rangpo-Binaguri D/C line.

**However, at present simply black-starting Teesta-V and synchronizing evacuating lines at Rangpo is being practiced considering the risk involved in bus-splitting, due to lack of redundant evacuation path

Network Diagram for Teesta-III Mock Black start Exercise:



Switching Diagram of 400/220kV Binaguri S/Stn



Procedure for periodic exercise of blackstarting Subernarekha HPS, Sikidiri

1. **Steps :**
    1. Units of Inland Power Project (2 x 63 MW) at Tonagatu connected to Sikidri will be desynchronized
    2. 132 kV Sikidri-Hatia and 132 kV Sikidri-Namkum –I feeder will be made off from both the end
    3. 132 kV Sikidri-Namkum –II feeder will be made off resulting no power supply at unit Sikdri-11/33/132 kV switchyard.
2. **Chronological order**

Sl No.	Description of event
1	250 kVA DG set will be made “ON” at Power House-II to restore auxiliary power supply at unit no –II.
2	Unit will be made ready to start
3	Unit no –II will be started on no load and the dead 132 KV bus of Sikidri will be charged from the GT. Voltage and frequency of 132 KV Sikidri bus need to be made 132 kV & 50 Hz respectively.
5	Synchronizing breaker of unit no-II remain closed. The power extended automatically to Sikidri 132/33/11 kV switchyard. Unit loaded up to 5 MW by adding 33/11 KV substation load. Sikidiri-Hatia-I need to be made “ON” from Sikidiri end,thus power will be extended up to Hatia GSS
6	132 kV Namkum-Sikidri –II feeder will be made “ON” from Sikidri end thus power will be extended upto Namkum GSS
7	After running the unit in this condition for some time , say 30 minutes, the unit will be de-synchronized.

Procedure for mock-exercise of blackstarting TashidingHEP

In order to facilitate the mock black start exercise of Tashiding HEP following switching operations are suggested at 220 kV Tashiding , 220 kV New Melli, 220 kV/132 kV Rangpo & 132 kV Melli.

The exercise will be undertaken during the period when the schedule of Tashiding will be nil. To avoid any generation loss for N-1 contingency during the mock black start, it is also recommended that during the exercise the generation of Jorethang remains zero. During this exercise, about 45 MW load in Melli is planned to be fed from the unit earmarked for black-starting at Tashiding , in islanded mode. Thus, supply of Melli would be disrupted for short durations during disconnection and reconnection to the main grid.

In order to carry out the exercise, an island would be created by splitting the 220 kV New Melli bus, 220 kV and 132 kV buses at Rangpo. The local load of Melli gets included within the island. Mock exercise would be carried out by supplying the island from the black-started unit of Tashiding and then the island system would be synchronised back to the main grid. This exercise can be divided in three stages.

Stage-1(Preparation)

A. At New Melli 220 kV Bus

220 kV Bus-1	220 kV Bus-2
Tashiding- New Melli 1	Jorethang- New Melli 1
Tashiding- New Melli 2	Jorethang- New Melli 2
Rangpo- New Melli-1	Rangpo- New Melli-2
31.5 MVAR B/R-1	31.5 MVAR B/R-2

B. At Rangpo 220 kV Bus

220 kV Bus-1	220 kV Bus-2
1X100 MVA, 220/132 kV ICT-I	Rangpo-Rongnichu-I
Rangpo- New Melli-1	Rangpo-Rongnichu-II
	3X100 MVA, 220/132 kV ICT-II,III,IV
	5X315MVA, 400/220kV ICTs I, II,III,IV,V
	Rangpo- New Melli-2

C. At Rangpo 132 kV Bus

132 kV Bus-1	132 kV Bus-2
Rangpo Melli	Rangpo-Chuzachen-1
1X100 MVA, 220/132 kV ICT-I (To be kept off)	Rangpo- Chuzachen 2
Rangpo-Rangit	3X100 MVA, 220/132 kV ICT-II,III,IV
	Rangpo-Gangtok 1
	Rangpo-Gangtok 2

132 kV Rangpo, normally works in Bus split mode with Melli and Rangit circuit connected on one side while remaining circuits/elements connected on other side. For preparation of this mock black start one 220/132 kV ATR at Rangpo to be kept off.

Stage-2 –The Mock exercise

On receiving clearance from ERLDC,

- New Melli to open
  - Bus coupler of 220 kV Bus-1 and Bus-2
  - 220 kV Rangpo-New Melli 1 line breaker at their end
  - 220 kV Tashiding-New Melli line 1 & 2 breaker at their end

- Tashiding to open:-
  - 220 kV Tashiding-New Melli line 1 & 2 breaker at their end

With the opening of the above ckts 220 kV Tashiding will become dead

- Rangpo to open:-
  - 400 kV New Melli-Rangpo line breaker at their end

    - Bus coupler of 220 kV Bus-1 and Bus-2
    - 132 kV Rango-Melli
    - 132 kV Rangpo-Rangit
- Melli to open
    - 132 kV Melli- Silliguri
    - 132 kV Melli-Rangpo
- Silliguri to Open
    - 132 kV Silliguri-Melli

With the opening of the above circuits, 132 kV Melli will become dead.

- ERLDC will now advise Tashiding to self-start one of its units. It may be ensured by Tashiding that auxiliary supply is taken from local DG set (as would be done during a real blackout). The 220 kV bus voltage at Tashiding may be maintained between 198-200 KV by controlling the excitation.
- On receipt of clearance from New Melli the dead 220 kV Bus–1 at New Melli is to be charged, from Tashiding using 220kV Tashiding -New Melli
- On receipt of clearance from Rangpo the dead 220 kV Bus–1 at Rangpo is to be charged, from using 220 kV New Melli-Rangpo
- If required 31.5 MVAr bus reactor at New Melli may be charged to maintain voltage regulation.
- After this Rangpo(PG) is to close the 220 kV side main CB and the 132 kV side CB of ICT-I. This will charge the 132 kV Main Bus-I at Rangpo
- On receipt of clearance from Melli the dead 132 kV Bus–1 at Melli is to be charged, from Rangpo using 132 kV Rangpo-Melli line
- Tashiding HEP to regulate AVR such that voltage at 132 kV Rangpo or Melli remains close to its rated value.
- Now Sikkim SLDC is required to connect load at Melli substation in block of 5 MW.
- Load to be stepwise increased to 45 MW
- Frequency of the island may be kept close to 50Hz through proper coordination

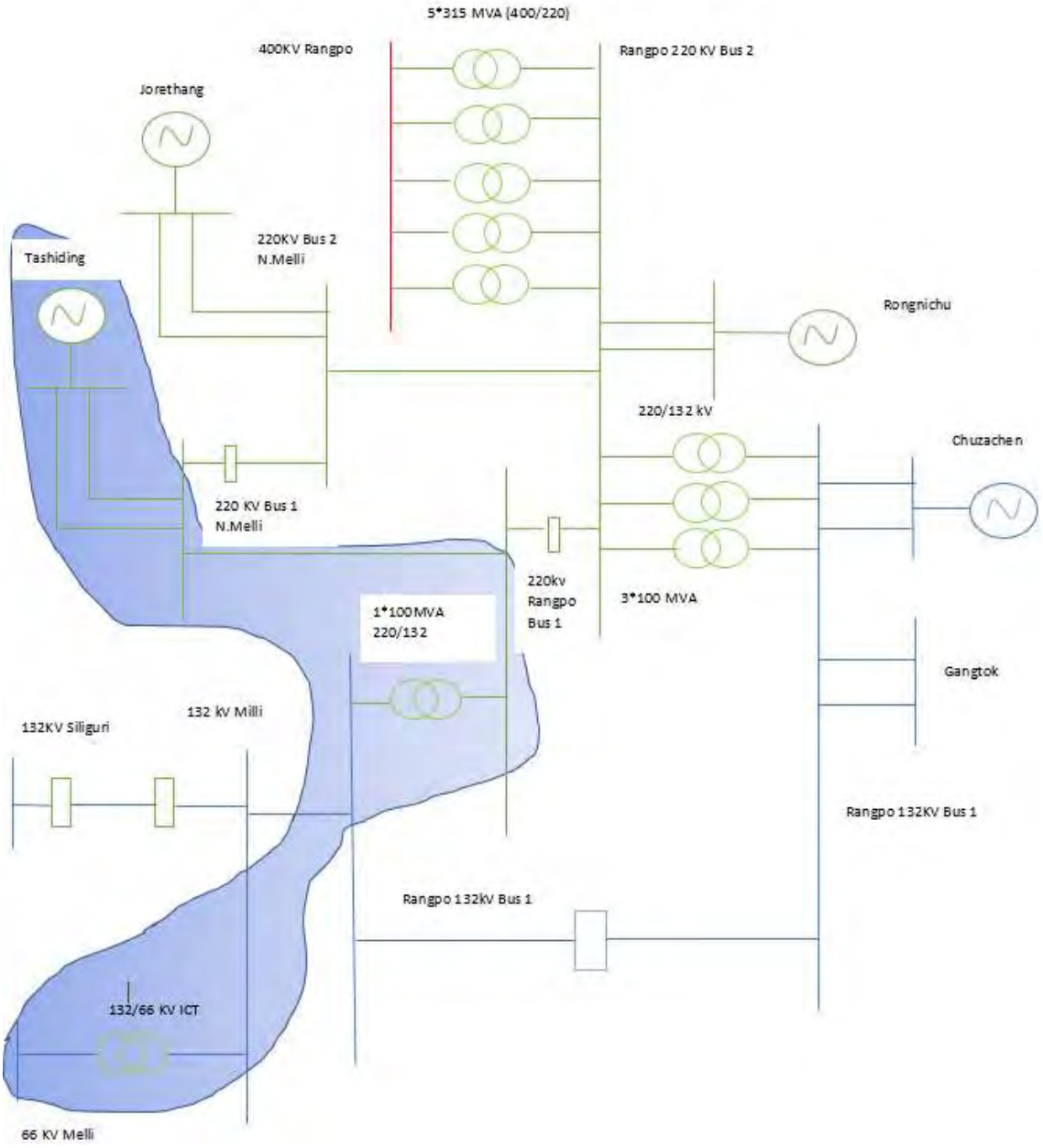
The islanded operation may be observed for about 15 minutes. During this period, the nodal personnel at Rangpo, New Melli and Tashiding should be in continuous touch with ERLDC. Additionally, Melli should also be in touch with Rangpo, Tashiding, New Melli and ERLDC so that load increments and switching operations in Sikkim system are properly coordinated with Tashiding generation and action can be taken without delay in case of any exigency at Rangpo and New Melli.

Stage-3 – The Restoration

- On receipt of clearance from ERLDC, Tashiding generation to be controlled so as to match the island frequency with the grid frequency.
- At Rangpo 220 kV Bus-I to be synchronised with Bus-II by closing the Bus coupler when the voltage and frequency conditions permit.
- Tashiding unit(s) may be desynchronized post synchronization of the Island with main grid

**In case of non availability of load at Melli simply black-starting Tashiding and synchronizing evacuating lines at New Melli may be considered.

Network Diagram for Tashiding Mock Black start Exercise:



Procedure for mock-exercise of blackstarting Rongnichu HEP

In order to facilitate the mock black start exercise of Rongnichu HEP following switching operations are suggested at 220 kV Rongnichu, 400/200 kV/132 kV Rangpo & 132 kV Melli.

The exercise will be undertaken during the period when the schedule of Rongnichu generation will be nil. During this exercise, about 45 MW load in Melli is planned to be fed from the unit earmarked for black-starting at Rongnichu, in islanded mode. Thus, supply of Melli would be disrupted for short durations during disconnection and reconnection to the main grid.

In order to carry out the exercise, an island would be created by splitting the 220 kV and 132 kV buses at Rangpo. The local load of Melli gets included within the island. Mock exercise would be carried out by supplying the island from the black-started unit of Rongnichu and then the island system would be synchronised back to the main grid. This exercise can be divided in three stages.

Stage-1(Preparation)

D. At Rangpo 220 kV Bus

220 kV Bus-1	220 kV Bus-2
1X100 MVA, 220/132 kV ICT-I	3X100 MVA, 220/132 kV ICT-II,III,IV
Rangpo-Rongnichu-I	5X315MVA, 400/220kV ICTs-I, II,III,IV,V
Rangpo-Rongnichu-II	Rangpo- New Melli-1
	Rangpo- New Melli-2

E. At Rangpo 132 kV Bus

132 kV Bus-1	132 kV Bus-2
Rangpo-Chuzachen-1	Rangpo Melli
Rangpo- Chuzachen 2	1X100 MVA, 220/132 kV ICT-I (To be kept off)
3X100 MVA, 220/132 kV ICT-II,III,IV	Rangpo-Rangit
Rangpo-Gangtok 1	
Rangpo-Gangtok 2	

132 kV Rangpo, normally works in Bus split mode with Melli and Rangit circuit connected on one side while remaining circuits/elements connected on other side. For preparation of this mock black start one 220/132 kV ATR at Rangpo to be kept off.

Stage-2 –The Mock exercise

On receiving clearance from ERLDC,

- Rongnichu to open:-
    - 220 kV Rongnichu -Rangpo 1 &2 line breaker at their end

With the opening of the above ckts 220 kV Rongnichu will become dead

- Rangpo to open:-
    - 220 kV Rongnichu-Rangpo 1 & 2 line breaker at their end
    - Bus coupler of 220 kV Bus-1 and Bus-2
    - 132 kV Rango-Melli
    - 132 kV Rangpo-Rangit

- Melli to open
    - 132 kV Melli- Silliguri
    - 132 kV Melli-Rangpo
- Silliguri to Open
    - 132 kV Silliguri-Melli

With the opening of the above circuits, 132 kV Melli will become dead.

- ERLDC will now advise Rongnichu to self-start one of its units. It may be ensured by Rongnichu that auxiliary supply is taken from local DG set (as would be done during a real blackout). The 220 kV bus voltage at Rongnichu may be maintained between 198-200 KV by controlling the excitation.
- On receipt of clearance from Rangpo the dead 220 kV Bus–1 at Rangpo is to be charged, from Rongnichu using 220 kV Rongnichu-Rangpo
- After this Rangpo(PG) is to close the 220 kV side main CB and the 132 kV side CB of ICT-I. This will charge the 132 kV Main Bus-I at Rangpo
- On receipt of clearance from Melli the dead 132 kV Bus–1 at Melli is to be charged, from Rangpo using 132 kV Rangpo-Melli line
- Dikchu HEP to regulate AVR such that voltage at 132 kV Rangpo or Melli remains close to its rated value.
- Now Sikkim SLDC is required to connect load at Melli substation in block of 5 MW.
- Load to be stepwise increased to 45 MW
- Frequency of the island may be kept close to 50Hz through proper coordination

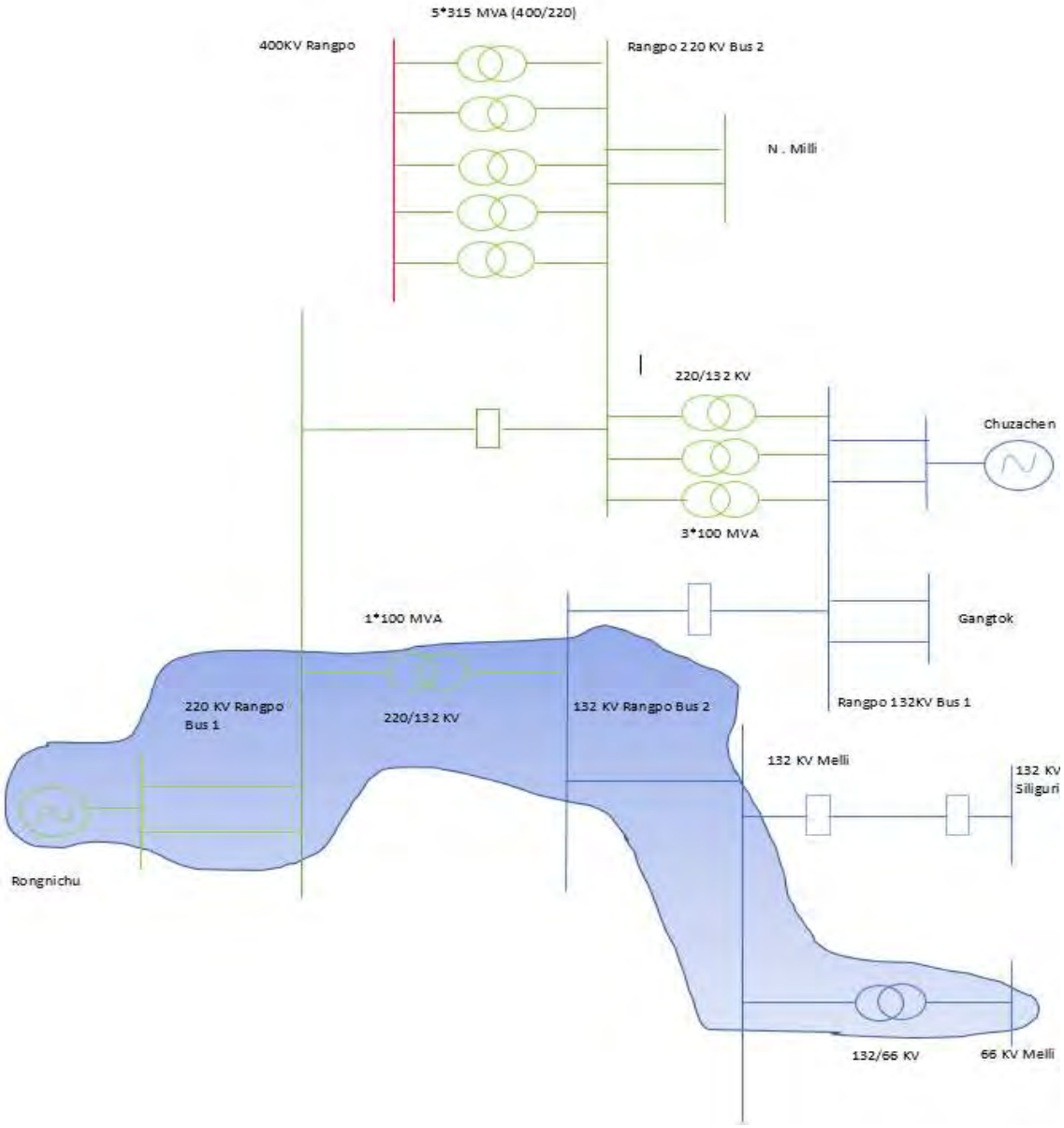
The islanded operation may be observed for about 15 minutes. During this period, the nodal personnel at Rangpo and Rongnichu should be in continuous touch with ERLDC. Additionally, Melli should also be in touch with Rangpo, Rongnichu and ERLDC so that load increments and switching operations in Sikkim system are properly coordinated with Rongnichu generation and action can be taken without delay in case of any exigency at Rangpo.

Stage-3 – The Restoration

- On receipt of clearance from ERLDC, Rongnichu generation to be controlled so as to match the island frequency with the grid frequency.
- At Rangpo 220 kV Bus-I to be synchronised with Bus-II by closing the Bus coupler when the voltage and frequency conditions permit.
- Rongnichu unit(s) may be desynchronized post synchronization of the Island with main grid

**In case of non availability of load at Melli simply black-starting Rongnichu and synchronizing evacuating lines at Rangpo may be considered.

Network Diagram for Rongnichu Mock Black start Exercise:



Procedure for mock-exercise of blackstarting Jorethang HEP

In order to facilitate the mock black start exercise of Jorethang HEP following switching operations are suggested at 220 kV Jorethang, 220 kV New Melli, 400/220 kV/132 kV Rangpo & 132 kV Melli.

The exercise will be undertaken during the period when the schedule of Jorethang will be nil. To avoid any generation loss for N-1 contingency during the mock black start, it is also recommended that during the exercise the generation of Tashiding remains zero. During this exercise, about 45 MW load of Melli is planned to be fed from the unit earmarked for black-starting at Jorethang , in islanded

mode. Thus, supply of Melli would be disrupted for short durations during disconnection and reconnection to the main grid.

In order to carry out the exercise, an island would be created by splitting the 220 kV New Melli bus, 220 kV and 132 kV buses at Rangpo. The local load of Melli gets included within the island. Mock exercise would be carried out by supplying the island from the black-started unit of Jorethang and then the island system would be synchronised back to the main grid. This exercise can be divided in three stages.

Stage-1(Preparation)

F. At New Melli 220 kV Bus

220 kV Bus-1	220 kV Bus-2
Jorethang- New Melli 1	Tashiding- New Melli 1
Jorethang- New Melli 2	Tashiding- New Melli 2
Rangpo- New Melli-1	Rangpo- New Melli-2
31.5 MVAR B/R-1	31.5 MVAR B/R-2

G. At Rangpo 220 kV Bus

220 kV Bus-1	220 kV Bus-2
1X100 MVA, 220/132 kV ICT-I	Rangpo-Rongnichu-I
Rangpo- New Melli-1	Rangpo-Rongnichu-II
	3X100 MVA, 220/132 kV ICT-II,III,IV
	5X315MVA, 400/220kV ICTs I, II,III,IV,V
	Rangpo- New Melli-2

H. At Rangpo 132 kV Bus

132 kV Bus-1	132 kV Bus-2
Rangpo Melli	Rangpo-Chuzachen-1
1X100 MVA, 220/132 kV ICT-I (To be kept off)	Rangpo- Chuzachen 2
Rangpo-Rangit	3X100 MVA, 220/132 kV ICT-II,III,IV
	Rangpo-Gangtok 1
	Rangpo-Gangtok 2

132 kV Rangpo, normally works in Bus split mode with Melli and Rangit circuit connected on one side while remaining circuits/elements connected on other side. For preparation of this mock black start one 220/132 kV ATR at Rangpo to be kept off.

Stage-2 –The Mock exercise

On receiving clearance from ERLDC,

- New Melli to open
  - Bus coupler of 220 kV Bus-1 and Bus-2
  - 220 kV Rangpo-New Melli 1 line breaker at their end

    - 220 kV Jorethang-New Melli line 1 & 2 breaker at their end

- Jorethang to open:-
    - 220 kV Jorethang-New Melli line 1 & 2 breaker at their end

With the opening of the above ckts 220 kV Jorethang will become dead

- Rangpo to open:-
    - 220 kV New Melli-Rangpo line breaker at their end
    - Bus coupler of 220 kV Bus-1 and Bus-2
    - 132 kV Rango-Melli
    - 132 kV Rangpo-Rangit
- Melli to open
    - 132 kV Melli- Silliguri
    - 132 kV Melli-Rangpo
- Silliguri to Open
    - 132 kV Silliguri-Melli

With the opening of the above circuits, 132 kV Melli will become dead.

- ERLDC will now advise Jorethang to self-start one of its units. It may be ensured by Jorethang that auxiliary supply is taken from local DG set (as would be done during a real blackout). The 220 kV bus voltage at Jorethang may be maintained between 198-200 kV by controlling the excitation.
- On receipt of clearance from New Melli the dead 220 kV Bus–1 at New Melli is to be charged, from Jorethang using 220kV Jorethang -New Melli
- On receipt of clearance from Rangpo the dead 220 kV Bus–1 at Rangpo is to be charged, from using 220 kV New Melli-Rangpo ckt-1
- If required 31.5 MVAr bus reactor at New Melli may be charged to control the voltage
- After this Rangpo(PG) is to close the 220 kV side main CB and the 132 kV side CB of ICT-I. This will charge the 132 kV Main Bus-I at Rangpo
- On receipt of clearance from Melli the dead 132 kV Bus–1 at Melli is to be charged, from Rangpo using 132 kV Rangpo-Melli line
- Jorethang HEP to regulate AVR such that voltage at 132 kV Rangpo or Melli remains close to its rated value.
- Now Sikkim SLDC is required to connect load at Melli substation in block of 5 MW.
- Load to be stepwise increased to 45 MW
- Frequency of the island may be kept close to 50Hz through proper coordination

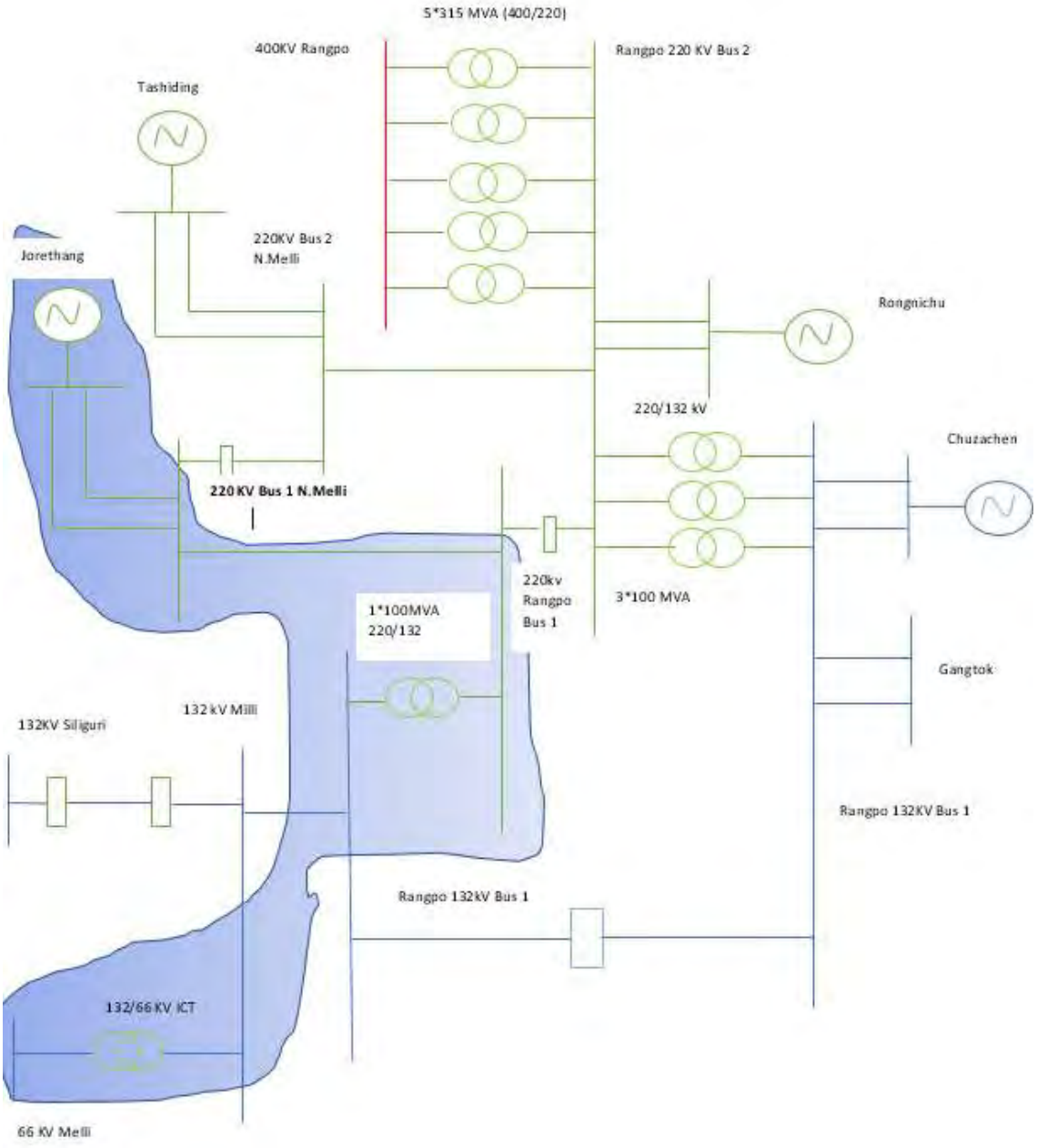
The islanded operation may be observed for about 15 minutes. During this period, the nodal personnel at Rangpo, New Melli and Jorethang should be in continuous touch with ERLDC. Additionally, Melli should also be in touch with Rangpo, Jorethang, New Melli and ERLDC so that load increments and switching operations in Sikkim system are properly coordinated with Jorethang generation and action can be taken without delay in case of any exigency at Rangpo and New Melli.

Stage-3 – The Restoration

- On receipt of clearance from ERLDC, Jorethang generation to be controlled so as to match the island frequency with the grid frequency.
- At Rangpo 220 kV Bus-I to be synchronised with Bus-II by closing the Bus coupler when the voltage and frequency conditions permit.
- Jorethang unit(s) may be desynchronized post synchronization of the Island with main grid

**In case of non availability of load at Melli simply black-starting Jorethang and synchronizing evacuating lines at New Melli may be considered.

Network Diagram for Jorethang Mock Black start Exercise:



Procedure for mock-exercise of blackstarting Dikchu HEP

In order to facilitate the mock black start exercise of Dikchu HEP following switching operations are suggested at 400 kV Dikchu, 400kV/200 kV/132 kV Rangpo & 132 kV Melli.

The exercise will be undertaken during the period when the schedule of Dikchu generation will be nil. To avoid any generation loss for N-1 contingency during the mock black start, it is also recommended that during the exercise the generation of Teesta-III remains zero. During this exercise, about 45 MW load in Melli is planned to be fed from the unit earmarked for black-starting at Dikchu, in islanded mode. Thus, supply of Melli would be disrupted for short durations during disconnection and reconnection to the main grid.

In order to carry out the exercise, an island would be created by splitting the 400kV, 220 kV and 132 kV buses at Rangpo. The local load of Melli gets included within the island. Mock exercise would be carried out by supplying the island from the black-started unit of Dikchu and then the island system would be synchronised back to the main grid. This exercise can be divided in three stages.

Stage-1(Preparation)

I. At Rangpo 400kV Bus

400 kV Bus-1	400 kV Bus-2
1X315MVA, 400/220kV ICT-I	Rangpo-Teesta-I
Rangpo- Dikchu	Rangpo-Binaguri-II
	Rangpo-Teesta-II
	4X315MVA, 400/220kV ICTs II,III,IV,V
	Rangpo-Binaguri-I
	80 MVAR Bus reactor-II
	Rangpo-Teesta-III
	Rangpo-Kishanganj
	80MVAR Bus reactor-I

J. At Rangpo 220 kV Bus

220 kV Bus-1	220 kV Bus-2
1X315MVA, 400/220kV ICT-I	Rangpo-Rongnichu-I
1X100 MVA, 220/132 kV ICT-I	Rangpo-Rongnichu-II
	3X100 MVA, 220/132 kV ICT-II,III,IV
	4X315MVA, 400/220kV ICTs II,III,IV,V
	Rangpo- New Melli-1
	Rangpo- New Melli-2

K. At Rangpo 132 kV Bus

132 kV Bus-1	132 kV Bus-2
Rangpo-Chuzachen-1	Rangpo Melli
Rangpo- Chuzachen 2	1X100 MVA, 220/132 kV ICT-I (To be kept off)
3X100 MVA, 220/132 kV ICT-II,III,IV	Rangpo-Rangit
Rangpo-Gangtok 1	
Rangpo-Gangtok 2	

132 kV Rangpo, normally works in Bus split mode with Melli and Rangit circuit connected on one side while remaining circuits/elements connected on other side. For preparation of this mock black start one 220/132 kV ATR at Rangpo to be kept off.

Stage-2 –The Mock exercise

On receiving clearance from ERLDC,

- Teesta-III to open
  - 400 kV Teesta-III-Dikchu line breaker at their end
- Dikchu to open:-
  - 400 kV Teesta-III-Dikchu line breaker at their end
  - 400 kV Dikchu-Rangpo line breaker at their end

With the opening of the above ckts 400 kV Dikchu will become dead

- Rangpo to open:-
  - 400 kV Dikchu-Rangpo line breaker at their end
  - Bus coupler of 400 kV Bus-1 and Bus-2
  - Bus coupler of 220 kV Bus-1 and Bus-2
  - 132 kV Rango-Melli
  - 132 kV Rangpo-Rangit
- Melli to open
  - 132 kV Melli- Silliguri
  - 132 kV Melli-Rangpo
- Silliguri to Open
  - 132 kV Silliguri-Melli

With the opening of the above circuits, 132 kV Melli will become dead.

- ERLDC will now advise Dikchu to self-start one of its units. It may be ensured by Dikchu that auxiliary supply is taken from local DG set (as would be done during a real blackout). The 400kV bus voltage at Dikchu may be maintained between 380-390 KV by controlling the excitation.
- On receipt of clearance from Rangpo the dead 400 kV Bus–1 at Rangpo is to be charged, from Dikchu using 400kV Dikchu-Rangpo
- Thereafter Rangpo(PG) is to close the 400kV side main CB and the 220kV side CB of ICT-I. This will charge the 220kV Main Bus-I at Rangpo
- After this Rangpo(PG) is to close the 220 kV side main CB and the 132 kV side CB of ICT-I. This will charge the 132 kV Main Bus-I at Rangpo
- On receipt of clearance from Melli the dead 132 kV Bus–1 at Melli is to be charged, from Rangpo using 132 kV Rangpo-Melli line
- Dikchu HEP to regulate AVR such that voltage at 132 kV Rangpo or Melli remains close to its rated value.
- Now Sikkim SLDC is required to connect load at Melli substation in block of 5 MW.
- Load to be stepwise increased to 45 MW
- Frequency of the island may be kept close to 50Hz through proper coordination

The islanded operation may be observed for about 15 minutes. During this period, the nodal personnel at Rangpo and Dikchu should be in continuous touch with ERLDC. Additionally, Melli should also be in touch with Rangpo, Dikchu and ERLDC so that load increments and switching operations in Sikkim

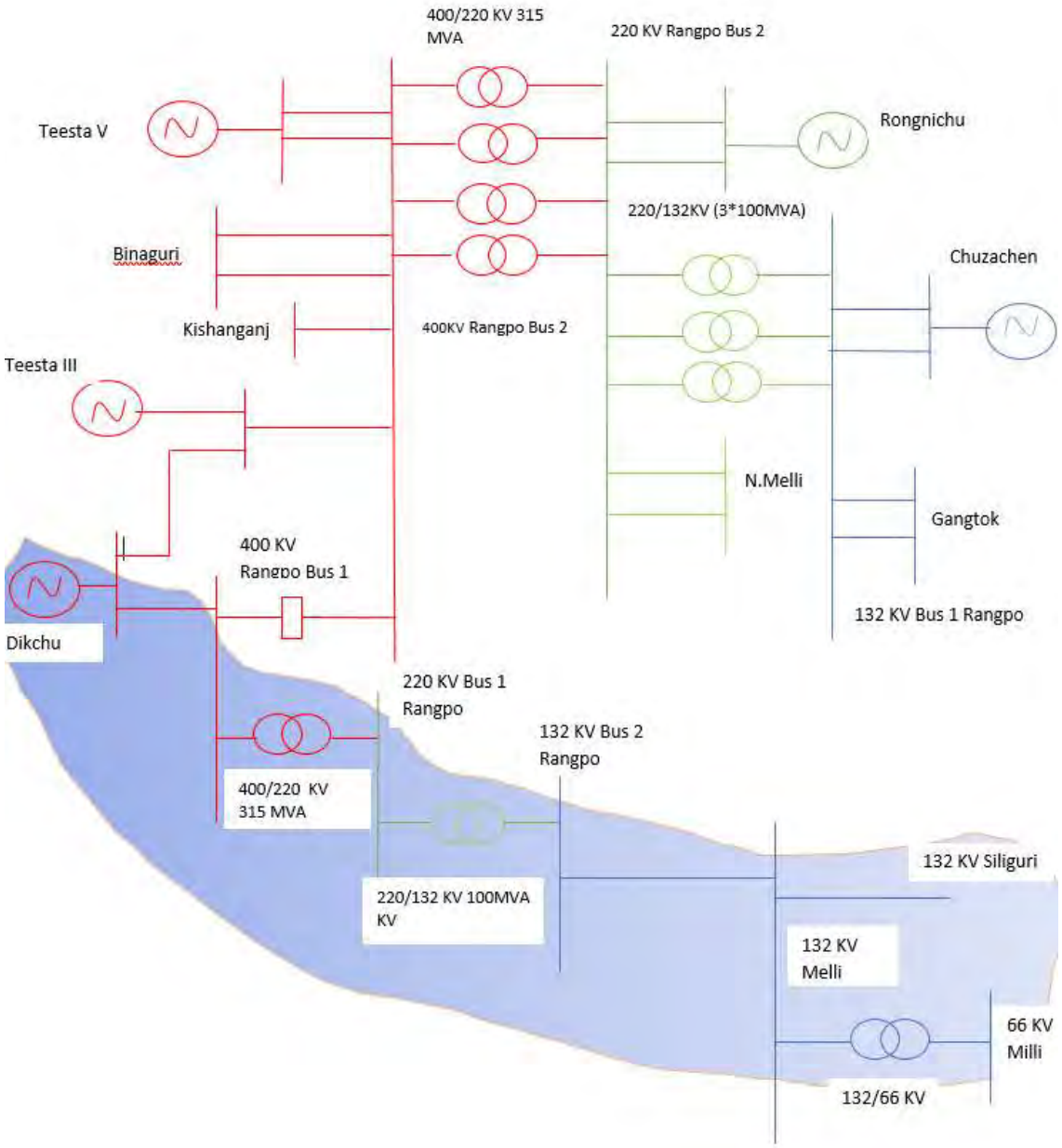
system are properly coordinated with Dikchu generation and action can be taken without delay in case of any exigency at Rangpo.

Stage-3 – The Restoration

- On receipt of clearance from ERLDC, Dikchu generation to be controlled so as to match the island frequency with the grid frequency.
- At Rangpo 400kV Bus-I to be synchronised with Bus-II by closing the Bus coupler when the voltage and frequency conditions permit. Post synchronization at 400 kV level other buses to be and lines to be closed.
- Dikchu unit(s) may be desynchronized post synchronization of the Island with main grid

**In case of non availability of load at Melli simply black-starting Dikchu and synchronizing evacuating lines at Rangpo may be considered.

Network Diagram for Dikchu Mock Black start Exercise:


400/220 KV 315 MVA
220 KV Rangpo Bus 2
Teesta V
Rongnichu
220/132KV (3*100MVA)
Binaguri
Chuzachen
Kishanganj
400KV Rangpo Bus 2
Teesta III
N.Melli
Gangtok
400 KV Rangpo Bus 1
132 KV Bus 1 Rangpo
Dikchu
220 KV Bus 1 Rangpo
132 KV Bus 2 Rangpo
400/220 KV 315 MVA
132 KV Siliguri
220/132 KV 100MVA KV
132 KV Melli
66 KV Milli
132/66 KV

Annexure D.1

Anticipated Peak Demand (in MW) of ER & its constituents for Oct 2022

1	BIHAR	Demand (MW)	Energy Requirement (MU)
	NET MAX DEMAND	6700	3164
	NET POWER AVAILABILITY- Own Sources	500	212
	Central Sector+Bi-Lateral	6500	3779
	SURPLUS(+)/DEFICIT(-)	300	827
2	**JHARKHAND**		
	NET MAXIMUM DEMAND	1650	975
	NET POWER AVAILABILITY- Own Source	430	195
	Central Sector+Bi-Lateral+IPP	1103	806
	SURPLUS(+)/DEFICIT(-)	-117	26
3	**DVC**		
	NET MAXIMUM DEMAND	3200	1940
	NET POWER AVAILABILITY- Own Source	5000	3319
	Central Sector+MPL	300	318
	Bi- lateral export by DVC	2180	1604
	SURPLUS(+)/DEFICIT(-) AFTER EXPORT	-80	93
4	**ODISHA**		
	NET MAXIMUM DEMAND (Own)	4800	2716
	NET MAXIMUM DEMAND (In Case of CPP Drawal)	6000	3350
	NET POWER AVAILABILITY- Own Source	3350	2465
	Central Sector	1850	1399
	SURPLUS(+)/DEFICIT(-) (OWN)	172	1148
	SURPLUS(+)/DEFICIT(-) (In Case, 600 MW CPP Drawal)	-800	514
5	**WEST BENGAL**		
5.1	**WBSEDCL**		
	NET MAXIMUM DEMAND	7110	4275
	NET MAXIMUM DEMAND (Incl. Sikkim)	7115	4282
	NET POWER AVAILABILITY- Own Source (Incl. DPL)	4881	2852
	Central Sector+Bi-lateral+IPP&CPP+TLDP	2620	1588
	EXPORT (To SIKKIM)	5	7
	SURPLUS(+)/DEFICIT(-) AFTER EXPORT	387	158
5.2	**CESC**		
	NET MAXIMUM DEMAND	1890	970
	NET POWER AVAILABILITY- Own Source	830	477
	IMPORT FROM HEL	540	352
	TOTAL AVAILABILITY OF CESC	1370	829
	DEFICIT(-) for Import	-520	-141
	WEST BENGAL (WBSEDCL+CESC+IPCL)		
	(excluding DVC's supply to WBSEDCL's command area)		
	NET MAXIMUM DEMAND	9000	5245
	NET POWER AVAILABILITY- Own Source	5711	3329
	CS SHARE+BILATERAL+IPP/CPP+TLDP+HEL	3160	1940
	SURPLUS(+)/DEFICIT(-) BEFORE WBSEDCL'S EXPORT	-129	24
	SURPLUS(+)/DEFICIT(-) AFTER WBSEDCL'S EXPORT	-134	17
6	**SIKKIM**		
	NET MAXIMUM DEMAND	114	51
	NET POWER AVAILABILITY- Own Source	8	3
	Central Sector	213	133
	SURPLUS(+)/DEFICIT(-)	107	85
	EASTERN REGION		
	NET MAXIMUM DEMAND	24965	14725
	NET MAXIMUM DEMAND (In Case of CPP Drawal of Odisha)	26141	14091
	BILATERAL EXPORT BY DVC (Incl. Bangladesh)	2156	1604
	EXPORT BY WBSEDCL TO SIKKIM	5	7
	EXPORT TO B'DESH & NEPAL OTHER THAN DVC	642	478
	NET TOTAL POWER AVAILABILITY OF ER	25945	16294
	(INCLUDING CS ALLOCATION +BILATERAL+IPP/CPP+HEL)		
	SURPLUS(+)/DEFICIT(-)	975	1562
	SURPLUS(+)/DEFICIT(-) (In Case, 600 MW CPP Drawal of Odisha)	-201	2196

ANNEXURE D2

Approved Maintenance Schedule of Thermal Generating Units of ER during 2022-23 in the month of September'2022												
System	Station	Unit No.	Capacity(MW)	Period (as per LGBR 2021-22)		No. of Days	Approved Period		No. of Days	Reason	Whether as per LGBR or not	Remarks
				From	To		From	To				
WBPDCL	Sagardighi TPS	3	500	27.10.2022	20.11.2022	25	-	-	-	COH	NO	NOT Availing
DVC	RTPS	1	600	01.12.2022	14.01.2023	45	25.10.2022	13.12.2022	50	AOH	NO	