



**AGENDA
FOR
216TH OCC MEETING**

Date : 21.06.2024

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

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EASTERN REGIONAL POWER COMMITTEE

AGENDA FOR 216TH OCC MEETING TO BE HELD ON 21.06.2024 (FRIDAY) AT 10:30 HRS

1. PART-A: CONFIRMATION OF MINUTES

1.1. Confirmation of Minutes of 215th OCC Meeting held on 22nd May 2024 virtually through Microsoft Teams online meeting platform

The minutes of 215th Operation Coordination Sub-Committee meeting held on 22.05.2024 was circulated vide letter dated 07.06.2024.

Members may confirm the minutes of 215th OCC meeting.

2. PART-B: ITEMS FOR DISCUSSION

2.1 Near Miss Event in Odisha System: ERLDC

Odisha system, especially Meramundali, Mendhasal, New Duburi, Pandiabilli, and Baripada pockets, were in extreme vulnerable condition from 09:00 Hrs to 19:30 hrs on 29th May 2024 due to tripping of the **400 kV Jamshedpur-TISCO line** while **400 kV Lapanga-Meramundali D/c** line was already under outage since **20th May 2024** due to a **tower collapse**. At that time, post-tripping of 400 kV Jamshedpur-TISCO, the mentioned pockets were hanging on three sources such as NTPC Talcher, Jamshedpur and Kharagpur.

To improve the reliability of the system, many actions were taken by SLDC as well as ERLDC in real-time including addl. backing down of Talcher generation to control line loading as Odisha demand progressively increased (Odisha met a demand of 6855 MW at 14:36 hrs on the same day).

As a last resort, it was suggested to restrict the loading of the relevant areas of the Odisha system to control the situation. But adequate quantum of load restriction could not be implemented due to the extreme heat wave situation and ongoing general election campaigning.

The situation was normalised after the restoration of 400 kV Jamshedpur-TISCO line at 19:31hrs on the same day.

2.1.1 Network rearrangement of Rourkela/Jharsuguda to enhance reliability & maximize Talcher generation: ERLDC

Post outage of the **400 kV Lapanga-Meramundali line** on tower collapse (**20th May'24**), heavy loading was observed in 400 kV-Talcher-Meeramundali (shorter circuit). A total of 1000MW (max) generation back down was implemented at the NTPC Talcher Stage 1 & 2 to control the overloading of the said line.

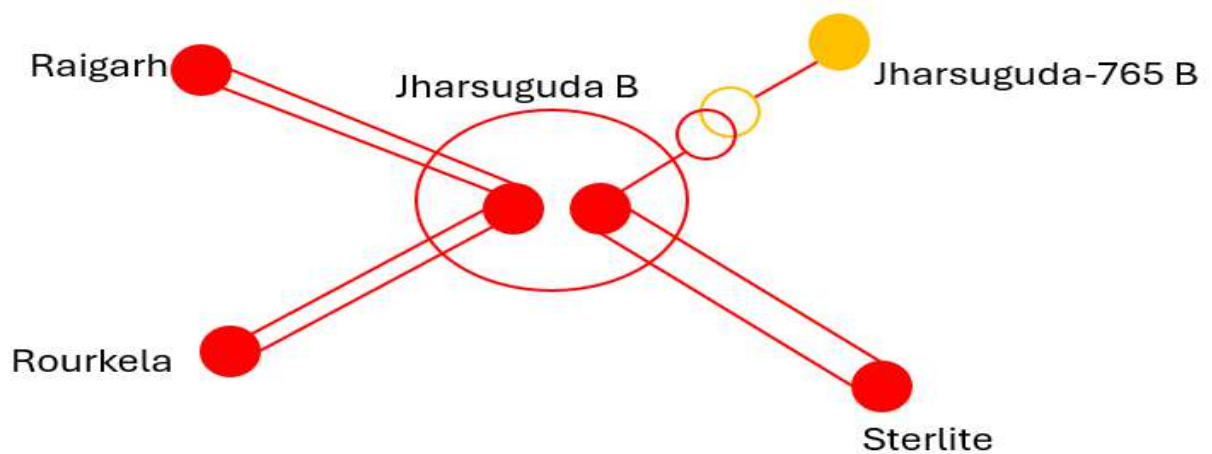
Immediately, to reduce loading of line and to withdraw curtailment of Talcher generation, Rourkela bypass arrangement was done by making 400kV-Jharsuguda-Rourkela-Ranchi & 400kV-Jharsuguda-Rourkela-Chaibasa link. With the implementation of this scheme, 80MW loading relieved was observed in 400kV-Talcher-Meramundali, and as a result 200MW talcher generation backing down withdrawn.

Later, it was informed from SLDC Odisha that, 400 kV Lapanga-Meramundali line which was supposed to be restored via ERS by 27th May 2024 couldn't be restored till by the end of June 2024.

On **29th May 2024**, the bypass arrangement at Rourkela was reverted due to the high loading of the 400kV Jamshedpur-Baripada link. In subsequent days, with high injection from WR, 400 kV Jharsuguda-Rourkela DC (1&2) started overloading and the loading reached beyond 1000MW in solar hours. POWERGRID has shared the thermo-vision scan report indicating hotspots in several locations.

In view of this situation, a bus-split scheme was envisaged at Jharsuguda-B, and the same was implemented on 12th June 2024 with the following configuration:

Elements in 400 kV Jharsuguda – B Bus – 1 after reconfiguration	Elements in 400 kV Jharsuguda – B Bus – 2 after reconfiguration
400 kV Jharsuguda – Sterlite D/C 2x1500 MVA, 765/400 kV ICT – 1&2	400 kV Jharsuguda – Rourkela 1 & 2 400 kV Jharsuguda –Raigarh D/C

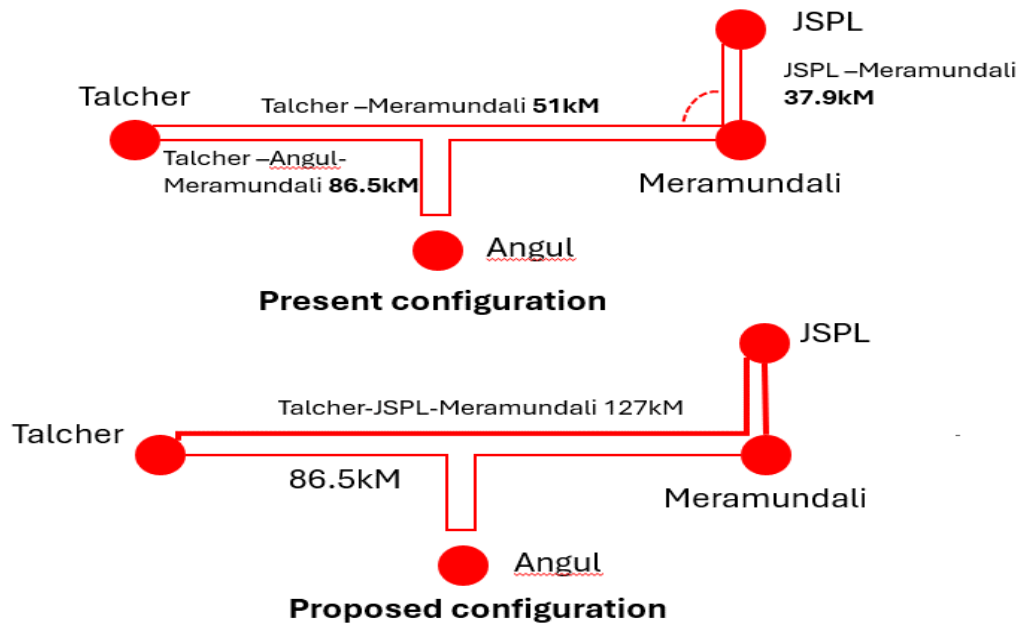


Post implementation of this scheme, a total 200MW Talcher generation backing down withdrawn. Parallely the loading of 400 kV Jharsuguda – Rourkela 1 & 2 was reduced significantly.

2.1.2 Proposal of Bypassing arrangement of 400kV-Talcher-Meramundali-JSPL at Meramundali for withdrawal of Additional Talcher generation backing down: ERLDC

To supplement the Talcher backing down after network re-arrangement at Jharsuguda, another network re-arrangement plan was proposed at Meramundali S/S.

At Meramundali S/S, the bay configuration is Talcher-Meramundali shorter line is in dia with one circuit of 400kV Meramundali- JSPL. It was suggested to open the main bays of both lines at Meramundali S/S to make 400kV Talcher-JSPL-Meramundali line by increasing line length which will help to create a margin in Talcher Meramundali line and to withdraw the Talcher generation backing down.



ERLDC may explain. Members may discuss.

2.2 Strengthening of CTU Network: SLDC Odisha

In the recent past, i.e during summer 2024 in the persisting high demand scenario, it was observed that inter – regional lines were running through high loading condition. In order to maintain system stability, ERLDC has taken several actions at their end. SLDC Odisha has also taken some action as per direction of ERLDC, Kolkata as and when required. Therefore, it is requested to re-visit the adequacy of Inter – regional & Inter – state power transfer capability & plan accordingly for enhancement of capacity of CTU Network keeping in view the future Power availability & Demand scenario of the Country / Region / States & power flow capability of transmission lines of CTU.

SLDC Odisha may update. Members may discuss.

2.3 Curtailment in schedule for NTPC Talcher station : ERPC

- TSTPS Station schedules are curtailed to **600 MW** in Stage-1 (Approx 330-340 MW each unit gross generation) and 1200 MW in Stage-2 since 20th May 2024. This is occurring on consistent basis due to power evacuation constraints in the grid due to collapse of Tower in 400KV Meramunduli-Lepanga double circuit Line. Also, there is power flow evacuation limitation of **1700MW in HVDC Bipolar Line** against design capacity of 2500 MW due to converter transformer problem at PGCIL Kaniha end. It is learnt that the low schedule regime will continue for longer duration due to **constraints in power evacuation**.
- It may be noted that power is being imported to TSTPS switchyard through 400KV Rourkela-1 and 2 and this imported power is being routed to SR region through HVDC and ER region through other transmission lines. Due to this rearrangement in power distribution, the scheduled generation at TSTPS is curtailed up to 1800 MW. In absence of this import power flow to TSTPS switchyard, TSTPS could have got scheduled to the extent of full generation capacity of 3000 MW.
- As the schedules are curtailed in TSTPS Stage-1, to prevent tripping of unit due to furnace disturbance, soot blowing operation is being carried out with oil support. In this process the daily consumption of around 200KL of LDO is used to carry out soot

blowing operation which has huge commercial implications and will increase the specific oil consumption much higher than the normative of 0.5ml/kWh.

- In view of the above OCC is requested to consider:

1. Rearrangement of power flow for full evacuation of TSTPS generated power of 3000 MW for both **Stage-1** and **Stage-2**.

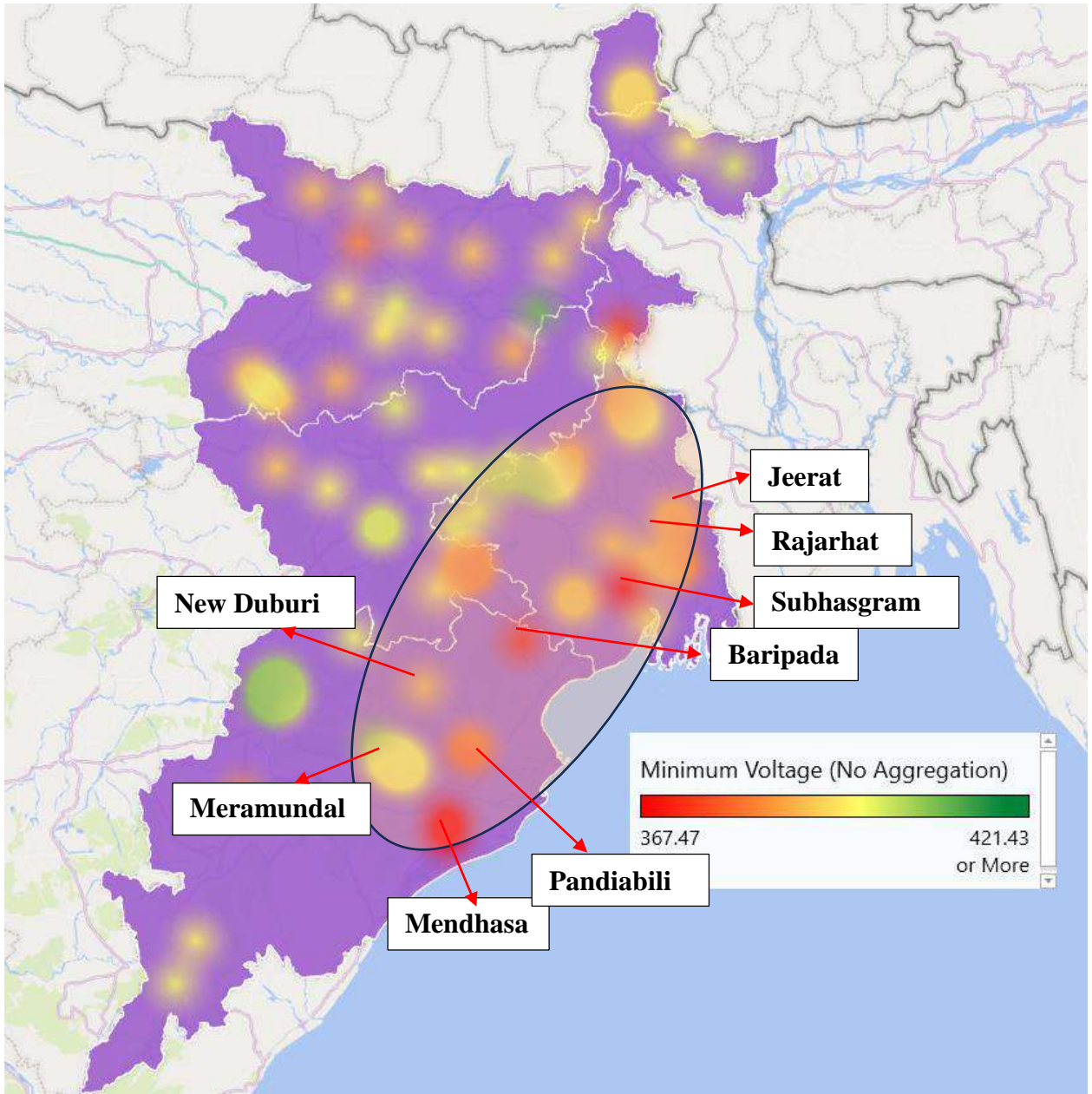
2. After proper rearrangement if power evacuation constraint still arises then TSTPS **Stage-1** may be considered for **full schedule** with curtailment in **Stage-2** units only.

3. If still curtailment is required, then a minimum schedule of **700-750MW** at least for a period of **9 hours (3 hours in each shift)** daily for the operation of wall blowers and long retractable soot blowers without oil support to prevent disturbance in the furnace and improve the reliability of unit & help the grid without any disturbance.

NTPC may update and ERLDC may explain. Members may discuss.

2.4 Voltage issue in Eastern region: ERLDC

Eastern region, as well as Indian Grid, is going through a high demand period, already met a record demand of **32GW** on **11-Jun-24**. This increase in demand is mainly contributed by space cooling load in urban areas, which also draws a considerable amount of reactive power from the Grid. Year-to-year demand growth is **8-10%** for the Eastern grid and it is expected to maintain the same growth pace for the next few years. A few pockets of the eastern region are experiencing low voltage due to increased space cooling load mainly in major urban areas in **West Bengal & Odisha**.



From the above heat map of voltage, it is observed low voltage issues observed in the southwestern part of the Eastern region due to mainly increased space cooling load with the increase of urbanization in this area.

Low voltage issues in Meeramundali, Mendhasal, New Duburi, Pandiabili & Baripada have been observed since last summer due to considerable growth in demand of Odisha. Voltage condition deteriorated further this year with the outage of 400kV-Lapanga-Meramundali-DC. Voltage reached as low as 375kV in some instances even after all reactors in this region were in open condition.

Whereas, in West Bengal, the voltage scenario voltage of Subhasgram, Rajarhat & Jeerat improved marginally after connectivity with 765kV New Jeerat. However, voltage as low as 375kV has been observed in this summer during solar peak hours. with a further increase in demand in this area, the voltage scenario is expected to deteriorate in the coming years.

A proper planning is needed to tackle the issue.

ERLDC may explain. Members may discuss.

2.5 Reliable Power Supply of Tenughat: ERLDC

In recent times, multiple disturbances occurred in Tenughat due to the loss of the evacuation path from Tenughat.



Tenughat was initially connected to Biharsariff & Patratu via 220kV S/C and to Govindpur via 220kV D/C. After reconfiguration of 220kV Patratu-Tenughat for extending start-up power to PVUNL, one evacuation path from Tenughat was reduced, which impacted the reliability of Tenughat. Now, with the outage of 220kV Biharsariff-Tenughat, the evacuation of the entire generation remains with Govindpur only.

Jharkhand needs to explore network strengthening at Tenughat to enhance reliability.

ERLDC may explain. Members may discuss.

2.6 Proposal for power evacuation scheme for proposed Rammam Stage-I Hydro Electric Project of WBSEDCL of capacity 48 MW (4x12MW) in Darjeeling Dist. through S/Ckt LILO of 132 kV Kurseong-Rangit S/Ckt transmission line:WBSETCL

- WBSEDCL has envisaged implementation of 48 MW (4x12MW) Rammam Stage-I H.E.P. in Darjeeling Dist. of West Bengal.
- The said project is in the vicinity of existing 51 MW Rammam Stage-II Hydrel Power Station..
- The details of the proposed project are as follows:

Name of Project	Rammam Stage-I Hydro Electric Project
Capacity of project	48 MW (4x12MW)
Location Coordinates	Lat : 27.1167 deg N Long : 88.0667 deg E
Generating Voltage	11 KV
Evacuation Voltage	132 KV
Generation Evacuation Connectivity	132 KV D/Ckt Transmission Line

- Initially it was proposed to terminate 132kV D/Ckt line from proposed Rammam Stage-I H.E.P. to Rammam Stage-II Hydel Power Station for evacuation of generated power at proposed Rammam Stage-II H.E.P.
- But the proposed evacuation scheme was not found feasible due to non availability of space required for construction of 02 nos of 132 kV feeder bays at switchyard of Rammam Stage-II H.P.S.
- In view of above it is proposed to explore the feasibility of evacuation of power from proposed Rammam Stage-I H.E.P. through S/Ckt LILO of 132 kV Kurseong-Rangit S/Ckt line through necessary system study by CTUIL for finalization of evacuation scheme for proposed Rammam Stage-I H.E.P.
- The matter is placed before the OCC Forum for necessary deliberation & consideration.

WBSETCL may explain. Members may discuss.

2.7 Shutdown proposal of generating units for the month of July'2024-ERPC

Maintenance Schedule of Thermal Generating Units of ER during 2024-25 in the month July '2024							
System	Station	Unit No.	Capacity (MW)	Period (as per LGBR 2024-25)		No. of Days	Reason
				From	To		
CESC	Southern TPS	1	67.5	24-07-2024	02-08-2024	10	PG Test/Boiler License Renewal
DVC	Mejja TPS	3	210	01-07-2024	25-12-2024	178	ESP upgradation
GMR	GMR	1	350	12-07-2024	20-08-2024	40	COH
JSEB	TENUGHAT TVNL	2	210	01-07-2024	14-08-2024	45	AOH

NTPC	FARAKKA	5	500	01-07-2024	30-07-2024	30	Boiler + LPT +Generator
	KhSTPS-I	2	210	05-07-2024	03-08-2024	30	Boiler + Boiler RLA + Generator
BRBCL	Nabinagar TPS	3	250	01-07-2024	04-08-2024	35	Boiler , LP OH & Generator rotor thread out
OPGC	IBTPS	4	660	15-07-2024	13-08-2024	30	Annual Maintenance
WBPDC	Bakreswar TPS	5	210	02-07-2024	05-08-2024	35	AOH/BOH
	Kolaghat TPS	6	210	08-07-2024	11-08-2024	35	AOH/BOH

Members may discuss.

2.8 Shutdown request of Kahalgaon units: NTPC ER-I

As per approved LGBR schedule Unit#2 (210 MW) of Kahalgaon was scheduled from 05-July-2024 to 03-August-2024 for a period of 30 days. Recently major defect has been identified in boiler of Unit#3 (210MW) of Kahalgaon. It is imperative to take Overhauling of Unit#3 at the earliest. As per approved LGBR plan it is scheduled from 10-Feb-2025.

Also as per approved 211th OCC minutes of meeting point no 2.10 (attached) : Unit#6 of Kahalgaon overhauling could not be taken due to high power demand in month of September 2023 and March 2024, and it was directed to propose plan for same in OCC of May 2024, as no overhauling was to be taken in June 2024 also, hence agenda is being presented in 216th OCC.

To urgently attend the problem, the overhauling of two units are proposed for interchanging and new date for Unit#6 overhauling. The new schedule will be as follows:

NTPC Kahalgaon Units	Capacity	Date as per Approved LGBR 2024-25	New proposed date	Last Overhauling date	Remarks
Unit # 2	210 MW	05-Jul-24 to 03- Aug- 24	10-Feb-25 to 11-Mar-25	29-Sep-22	Interchanged
Unit # 3	210 MW	10-Feb-25 to 11-Mar-25	05-Jul-24 to 08-Aug-24	10-Mar-23	Interchanged

Unit # 6	500 MW	12-Aug-23 to 25-Sep-23 / rescheduled to 01-Mar-24 to 30-Mar-24 (Not allowed)	20-Aug-24 to 23-Sep-24	08-Apr-22	As per 211 th OCC
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NTPC ER-I may update. Members may discuss.

2.9 Shutdown request of U#1 : APRNL

It is herewith informed Adhunik Power & Natural Resources Ltd. (APRNL) has now planned for execution of annual overhauling of Unit #1 from **16.08.2024 to 14.09.2024(29 days)** instead for **15.10.2024 to 13.11.2024(29 days)** as per earlier approved LGBR of FY 2024-25.

Submitted to OCC forum for approval of the shutdown during the proposed period.

APRNL may update. Members may discuss.

2.10 Shutdown request of U#2 : JITPL

Jindal India Thermal Power Limited (JITPL) has 2x600 MW thermal power plant located in the village of Derang, District Angul, State Odisha.

Annual overhauling of JITPL Unit #2 is already due as the Unit #2 **boiler licensee will expire on 06th Jul'24**. JITPL has already taken an **extension for the last 2 years** and now JITPL is obligated to take the annual overhauling due to Boiler Licensee expiry and its safety constraint. Also, the deployment of overhauling manpower, spares and other resources has been done accordingly.

All the Utilities have already been informed per the PPA terms and OCC is requested to kindly consider our request as all planning related to overhauling has been done from our end and that cannot be reversed or extended. So, requesting ERPC to consider our Annual Overhauling of Unit #2 from **01st July 2024 to 31st July 2024(31 days)**.

JITPL may update. Members may discuss.

2.11 Scheme for deployment of SDH equipment and amplifier at Alipurduar S/s of Eastern Region

MD, PHPA-II requested CEA to provide necessary communication to the concerned Authority so as to enable purchase and commissioning of OPGW based communication, control and protection system of transmission lines connecting Alipurduar substation and Bhutan, vide their letter reference no. PHPA- IUMD/CEA/2023/206 dated 04.12.2023.

CEA after deliberation with all stakeholders has directed POWERGRID to provide necessary equipments at Alipurduar end vide its file ref no. CEA-PS-12- 17(15)/1/2018-PSPA-II Division dtd. 14.03.2024(**Annexure B.2.11.1**)

CTU vide letter dated 06.06.2024 has sought ERPC views on the proposed scheme so that the same may be put up in NCT for necessary approval.

Objective / Justification of the scheme

a) OPGW has been installed on Alipurduar- Jigmeling and Punatsagnchhu-II/ Punatsagnchhu-I -Alipurduar 400 kV lines.

b) SDH technology based Fiber Optic Terminal Equipment (FOTE) is deployed in Indian Grid including Alipurduar substation, as it provides a highly reliable and synchronized communication infrastructure. However, Bhutan is implementing MPLS-TP in their whole system including at Punatsangchhu-II for data and teleprotection.

d) There will be issue in protection and data communication between SDH at one end i.e Alipurduar, India and MPLS-TP at other end i.e Punatsangchhu-II, Bhutan.

e) Considering the necessary capabilities to ensure the accurate coordination of devices between India and Bhutan as well as to cater to cybersecurity issue of the Indian Grid, the proposed scheme for Alipurduar S/s end needs to be implemented.

Further at the Alipurduar end, communication between the existing SDH equipment and the newly proposed equipment will occur over the EI Interface. This will provide a layer of isolation between interfacing node at landing location and ISTS Communication Network.

Scope of the scheme(Estimated cost: Rs. 65,00000/- (Sixty Five lacs) only)

- Deployment of FOTE(SDH Equipment) and amplifier solutions at Alipurduar S/s end for OPGW based communication and Teleprotection for 400kV lines from PHEP-II, PHEP-I and Jigmeling of Bhutan to Alipurduar, India:
- a) 1 set of STM-4 SDH equipment alongwith panel supporting minimum five directions with MSP(Multiplex Section Protection 1+1) & equipped with E1 and Ethernet interfaces.
- b) 6 sets of 175 km Amplifiers solutions: 2 directed towards Punatsangchhu-II(PHEP-II), 2 directed towards Punatsangchhu-I(PHEP-I) and 2 directed towards Jigmeling.
- POWERGRID to coordinate with Bhutan ends while procuring the equipment to avoid any non-compatibility issues.

POWERGRID (GA&C) vide mail dated **12.06.2024** & **13.06.2024** has confirmed the following:

“Deployment of STM-4 equipment freed on upgradation to STM-16 is feasible, however, the timeline shall be worked out in line with the approval of Upgradation scheme in NCT. Further, life of the equipment shall be taken from the actual date of commissioning of the equipment to be used at Alipurduar. In this case transportation cost as communicated earlier will be applicable.

- The 225 km solution proposed under the scheme shall work with STM-4 equipment freed on upgradation to STM-16.
- The STM-4 equipment freed on upgradation to STM-16 will be compatible with Bhutan end as suggested by CEA.”

Communication from CTU and CEA attached at **Annexure B.2.11.1**

Cost estimate for the proposed scheme as shared by Powergrid attached at **Annexure B.2.11.2**

Members may discuss.

2.12 Issuance of Trial Operation Certificate for commissioning of Communication System (Upgradation of SAS at 11 Stations in ER-I & 2 Stations in ER-II) : Powergrid ER-II

As per approval received in 39th ERPC meeting dated 17.11.2018, replacement & upgradation of SAS & RTUs in Eastern Region was approved under the RTM project "Upgradation of SCADA / RTUs / SAS in the Central sector stations and strengthening of OPGW network" (39th ERPC minutes attached). Accordingly, replacement & upgradation of SAS & RTUs has been carried out at various substations in ER as per approval in ERPC meeting.

ERLDC has been requested for issuance of Trial operation certificate vide letter dated 10.04.2024 (Letter enclosed at **Annexure B.2.8.1**) after successful commissioning of the SAS at 11 nos station in ER-I. ERLDC has been further requested vide letter dated 23.05.2024 for issuance of Trial operation certificate for 02 stations of ER-II. However, the certificate is yet to be received till date even after regular follow up and correspondences. Due to non-issuance of trial operation certificate, DOCO & petition filing is held up.

It is also to note that as per communication regulation 2017 and petition filed by NLDC regarding communication interfaces where SAS/RTU are considered as communication interfaces. In ULDC phase-I (RTM mode), POWERGRID has commissioned the SCADA-EMS Project on Aug-2005 which also includes RTUs at Central Sector & State locations alongwith Control Centers. Also similar trial operation certificates (**Annexure B.2.8.2**) have been issued by various States of Eastern Region upon successful commissioning of RTUs in respective Sector under SCADA-EMS Project (RTM Mode).

In view of the above, it is kindly requested to support regarding issuance of Trial operation certificate for SAS upgradation at 11 nos. station in ER-I & 02 nos. station in ER-II at the earliest.

CERC guidelines on Interfacing requirements attached at **Annexure B.2.8.3**.

ERPC approval for replacement of old RTUs in ER attached at **Annexure B.2.8.4**.

Powergrid ER-II and ERLDC may update. Members may discuss.

2.13 SCADA Data Non-availability of 400/220 kV Darbhanga Substation: ERLDC

400/220 kV Darbhanga (DMTCL) substation SCADA data is not available with ERLDC since 7th June 2024. Both main & back up communication channels are down. Due to non availability of SCADA data, real time grid operation is getting affected as this substation data is used for input for drawl calculation of Bihar and real time decision support.

DMTCL, ATIL and PGCIL(ER-I) may respond.

2.14 Updated Operating Procedures (SOP) of Eastern Region, 2024: ERLDC

As per IEGC, 2023 regulation 28(4), A set of detailed operating procedures for each regional grid shall be developed and maintained by the respective RLDC in consultation with the regional entities for the guidance of the staff of RLDC.

Accordingly, ERLDC has updated the Operating Procedure of the Eastern Region. The draft version of the same was uploaded to the ERLDC Website for stakeholders' comments, if any. The same can also be accessed through the following link:

<https://app.erldc.in/Content/Upload/System%20Study/Operating%20Procedure/Draft%20ER%20Operation%20Procedure%202024-25%20with%20Annex.pdf>

Changes in Operating procedure:

- Frequency response obligation (FRO), as calculated by NLDC for FY 2024-25, added.
- The list of units in ER mandated to provide PRAS updated, the List of Bus reactors /line reactors updated, the UFR feeder list updated, and SPS pertaining to Indbarath has been added
- Chapter 6: Reserve requirement as calculated by NLDC for FY 2024-25 added
- Chapter 11: Final procedure of FTC added.
- Chapter 12: GNA curtailment, DC revision limits (Partial Outage), Real-time GNA Contract creation and scheduling, MDTL restriction, Power Supply obligation in case of USD, and Power supply regulation as per LPS rules.
- Chapter 18: Cyber-Crisis Management Team CCMT team updated

ERLDC may update Members may discuss.

2.15 API integration of New WBES: ERLDC

The New **Web-Based Scheduling software (WBES)** is under development by Grid-India and is expected to go live soon. A DEMO session for familiarization with the New WBES was conducted on **3rd May 2024** with all the concerned officers engaged in scheduling activities using WBES in your control area and a DEMO session was conducted for API integration on **17th May 2024**.

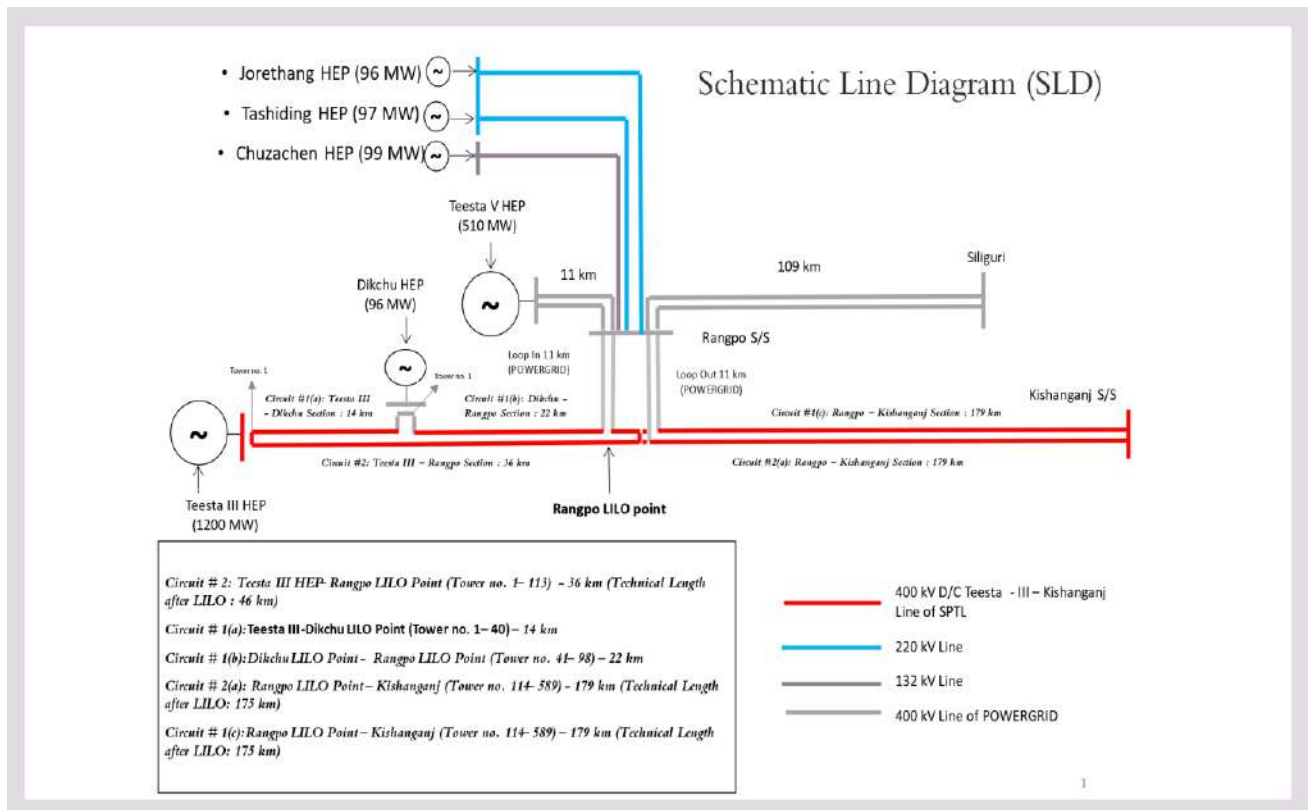
As per the information gathered, the details of scheduling by regional entities are being fetched through the API from the current WBES to your scheduling portal. To smoothly switch over from the current WBES to the new WBES there is need to make necessary changes at your end for fetching the detail of scheduling data from the **new WBES through API**.

Accordingly, API details of New WBES test server and production server was sent to all the entities. As per the information received from different entities, Present Status of API integration is attached in the **Annexure B.2.15**. Other beneficiaries who are using API in present WBES and yet to integrate are requested to configure New WBES API at the earliest.

ERLDC may update. Members may discuss.

2.16 Erosion of Riverbank of Teesta River in Mingley Village near Tower no. 91 of 400 kV Double Circuit Teesta III – Rangpo transmission Line: SPTL

Sikkim Power Transmission Limited (formerly, Teestavalley Power Transmission Ltd.) is entrusted with the responsibility to construct, maintain and operate the 400 kV Quad Moose Double Circuit Transmission Line from Teesta Stage-III Hydro Electric Project to Kishanganj Pooling Station of POWERGRID for evacuation of power from the large hydro generating complex of Sikkim of total capacity around 3000 MW including Teesta III HEP of 1200 MW capacity and Dikchu HEP of 96 MW capacity. The schematic of the transmission line is placed below:



The transmission line of length 215 km (589 towers) passes through Mangan, Gangtok & Namchi District of Sikkim, Darjeeling District of West Bengal and Kishanganj District of Bihar. The line passes through the difficult hilly terrain of altitude in the range of 1000m – 2600m and during monsoon period landslides & soil erosion occur in this range due to geological condition of the Eastern Himalayan Region. Also, the transmission line crosses chenga river in West Bengal & Bihar and Mahananda & Dauk River in Bihar which change their course often. The line was commissioned on 13.02.2019 and is under operation and maintenance since then.

As we all are aware that the state of Sikkim had witnessed Flash Flood in the month of October 2023 which caused damages to Teesta-III , Dikchu HEP & Teesta V HEP and also caused damages along the areas lying in basin of Teesta River. The flash flood resulted in depositing of huge riverbed material in the river basin causing the river to shift its course at multiple locations.

The said riverbank at Mingley Village was not affected before the flash flood event as the river flow was along the opposite bank. The Flash Flood of October 2023 had eroded a large portion of the riverbank. Further, due to deposition of huge riverbed material on the opposite riverbank because of the flood, the river has shifted its course and is now directly impacting the said riverbank.

It is being noticed at present that during the heavy rainfall since 12.06.2024, there has been floods across entire Gangtok District in Sikkim including Mingley Village. The Teesta River is also changing its course in certain areas and the high flow of the river has directly scoured the riverbank near the SPTL tower no. 91 (DD + 0 Mtr extension) of 400 kV Double Circuit Teesta III – Rangpo line (which is under anti-theft charged condition in both circuits from Rangpo S/s). The surrounding area and houses in the village are under threat in future in case of any slope

failure. The total height of slope is 40m approximately from the riverbed level. The newspaper cutting, Photographs of the tower and the eroded slope / riverbank are attached as **Annexure-B.2.16.**

SPTL is in coordination with the District Administration and Flood Control Department for slope protection measures to prevent further erosion of the riverbank. Alternatively, SPTL is also exploring other measures including shifting of tower, if necessitated due to further erosion.

This is for necessary information to OCC forum.

SPTL may update. Members may discuss.

3. PART-C: ITEMS FOR UPDATE/FOLLOW-UP

3.1. ER Grid performance during May 2024.

The average and maximum consumption of Eastern Region and Max/Min Demand (MW), Energy Export for the month May-2024 were as follows:

AVERAGE CONSUMPTION (MU)	MAXIMUM CONSUMPTION(MU)/ DATE	MAXIMUM DEMAND (MW)	MINIMUM DEMAND (MW)	SCHEDULE EXPORT	ACTUAL EXPORT
		DATE/TIME	DATE/TIME	(MU)	(MU)
602 MU	669.6 MU, 29.05.2024	31643 MW, 01.05.2024 at 00:00 Hrs.	18067 MW, 09.05.2024 at 17:20 Hrs.	1751	1457

ERLDC/ERPC may highlight the performance of the ER grid.

3.2. Update on restoration of NTPC Darlipalli Unit-1 under Forced outage

On **April 24, 2024**, Darlipalli informed the ERLDC that Unit-1 would be taken out of bar as an emergency measure on **April 26th** due to "Low LP turbine differential expansion". The unit finally went out of bar at 00:23hrs on April 27th, followed by an email stating a 60-day outage for repairs.

ERLDC immediately raised concerns about the significant deviation of the outage period from the initial notification. Subsequently, Darlipalli revised the estimated restoration time to 7 days. Further, on 07.05.2024, Unit-1 LPT-B preliminary inspection was done, and OEM/OES has suggested to do the complete inspection and overhauling of the TG and do the corrections similar to Unit-2. Accordingly, Darlipalli plant declared **TG overhauling** period **60 days** tentatively from the date of outage.

As per deliberation in **215th OCC**:

- NTPC Darlipalli representative submitted :
 - In-Situ **Rotor replacement of HP and IP turbines** is under progress.
 - The Unit-1 shall be tentatively restored within **26th June 2024**.
- **OCC decision**:
 - OCC advised NTPC Darlipalli to expedite repair works so that the Unit-1 can be positively reinstated to service as per the submitted timeline (i.e. **26th June 2024**).
 - NTPC Darlipalli was also advised to share weekly progress report with ERPC delineating proper timeframe of the planned repair activities.

NTPC Darlipalli may please update. Members may discuss.

3.3. Update on installation of 5th 400/220 KV 315 MVA ICT in place of existing age old 50 MVAR (3x16.6 MVAR single phase units) ISTS Reactor at Jeerat 400 KV SS of WBSETCL to maintain N-1 condition.: ERPC

- At present the total installed capacity of 400/220 KV ICTs at Jeerat 400 KV SS of WBSETCL is 4X315 MVA. The defective 4th 315 MVA ICT which was out of system for over

2 years has been replaced with a Regional pool spare 315 MVA ICT & put into service on 14th April-2024.

- Peak demand of Jeerat 400 KV SS in 2023-24 was 971 MVA (Jun-2023) i.e. more than full load capacity of the ICTs in service at that time i.e. 3X315 MVA.
- After recommissioning of the 4th ICT, it is evident from the load flow studies that the load shared by Jeerat SS with 4 nos of ICTs will increase considerably as compared to earlier load sharing with 3 nos of ICTs. The anticipated load during 2024-25 will increase further & may approach the full load capacity of all the four ICTs thus violating (N-1) criterion.
- So to cater the load growth at Jeerat 400 KV SS at 400/220 KV level maintaining (N-1) condition, augmentation of 400/220 KV ICT capacity from 4X315 MVA to 5X315 MVA is necessary at an early date.
- Clear space for construction of 220 KV bay for 5th ICT is available at Jeerat SS but there is no space for construction of new 400 KV bay & installation of 5th ICT.
- Due to space constraint, it is hereby proposed to use the 400 KV bay & equipment space of existing 50 MVAR (3X16.6 MVAR single phase units) Bus reactor which is at present operating with another 3-Ph 50 MVAR reactor in group control, both of which were installed under ISTS scheme a long time ago.
- Feasibility for keeping the 3-Ph 50 MVAR reactor in service by alternative arrangement is being explored by WBSETCL. WBSETCL is also considering the possibility for installation of a 3-Ph 125 MVAR Bus Reactor in place of the age old 50 MVAR 3-Ph Reactor depending on VAR compensation requirement as per system study.
- Considering the above facts proposal for installation of 5th ICT at Jeerat 400 KV SS was placed in the 29th CMETS-ER on 27.03.2024 Region for consideration and approval. It was decided that since the existing ISTS bus reactors (50MVA (3x16.67MVA single phase units) & 50MVA 3-Ph) are to be disconnected and the vacated ISTS bay and space is to be used for installation of 5th ICT, the matter needs stakeholder's consultation & needs to be placed before ERPC forum for further discussion.
- Accordingly the matter was deliberated in the 214th OCC and 215th OCC Meetings of ERPC.
- As per deliberation in **215th OCC:**
OCC decision:
 - OCC agreed for the urgent requirement of the 5th ICT at 400 kV Jeerat(WB) S/S in view of system reliability.
 - OCC advised Powergrid ER-II, CTU and WBSETCL to carry out joint site inspection at 400 kV Jeerat(WB) S/S by first week of June 2024 and share the report of the same with ERPC.
 - OCC also opined to explore all alternate avenues for accommodating the 5th ICT at Jeerat(WB) S/S without striking off the existing ISTS assets in healthy condition owned by Powergrid.
 - Upon finalization of the technical aspect of 5th ICT installation at Jeerat(WB) S/S, commercial settlement pertaining to asset relocation also needs to be suitably sorted out in compliance to extant provisions and regulations.
 - OCC observed that since the 5th ICT is being proposed to be installed in place of one no. of 50MVAR Bus Reactor, adequate reactive compensation also needs to be ensured at Jeerat(WB) S/S to prevent overvoltage conditions.
- The issue was also discussed in latest 31st CMETS-ER dated 30.05.2024 wherein the urgent requirement of the 5th ICT was acknowledged as well as importance of joint site

inspection at 400 kV Jeerat(WB) S/S by Powergrid ER-II, CTU and WBSETCL to explore all alternate avenues for accommodating the 5th ICT at Jeerat(WB) S/S was underscored.

WBSETCL and Powergrid ER-II may update the Status. Members may discuss.

3.4. Update on installation of 7th (Interim) 500 MVA ICT at 400 kV Subhasgram (PG)-ERPC

As per deliberation in **215th** OCC:

Powergrid ER-II updated:

- The 7th (interim) 500 MVA ICT has already reached 400 kV Subhasgram(PG) safely on 16.05.2024
- There may be slight delay in commencement of erection process of the ICT owing to inclement weather conditions as per weather forecast.
- The ICT shall be put to service latest by 15th June 2024.

OCC decision:

Considering the critical requirement of the 500 MVA ICT i.r.o system reliability, OCC requested Powergrid ER-II to expedite erection activities for the 7th (interim) 500 MVA ICT at Subhasgram(PG) to the best feasible extent.

Powergrid ER-II may please update. Members may discuss.

3.5. Update on Restriction of Talcher-Kolar HVDC Bi-pole: ERPC

On **20th April'24**, ERLDC received one mail from HVDC Talcher stating the requirement of replacement of the R-phase converter transformer necessitating restriction of the power order of HVDC Talcher bi-pole to 1500MW till the replacement. It was also informed that the spare Converter Transformer of HVDC Kolar is being diverted from HVDC Kolar to HVDC Talcher and is expected to reach HVDC Talcher by **31st May 2024**.

Since April'24, either pole of HVDC blocked 5 times out of which, in 4 times the other pole went to ground return mode instead of metallic return mode resulting in overloading of 400kV Talcher-Meeramundali D/C and generation backdown was done either manually or through operation of SPS.

Further, while availing the planned shutdown of Pole-2 on 28.04.2024, the other pole didn't go to metallic return mode as the automatic changeover sequence failed and remained in Ground return mode for around 15 minutes.

As per deliberation in **215th** OCC:

Powergrid Odisha updated:

- The R-phase converter transformer has already **started from Kolar** and expected to **reach Talcher by 25th June 2024** and the same shall be put to service by **mid of July 2024**.
- Fault in jurisdiction of southern region was cited as reason for frequent tripping of either pole and hot line washing of porcelain insulators has been taken up henceforth as a preventive measure.
- Failure of automatic changeover sequence from ground return to metallic return mode was attributed to overtravel of operating rod and auxiliary contacts in MR isolator and after adjusting the operating rod along with auxiliary contacts, metallic return changeover was done manually.

- Transportation route as well as associated challenges in shifting a bulky converter transformer was highlighted.

OCC decision:

- OCC advised Powergrid Odisha to expedite the commissioning of converter transformer at Talcher end of HVDC Talcher-Kolar Bipolar link as per submitted timelines so that the same can be utilized upto rated capacity for reliable grid operation.

Powergrid Odisha may update the present status of the Converter Transformer.

3.6. AMR extension from ERLDC to SLDCs – ERPC

As per deliberation in **215th OCC**:

- SLDC Odisha pitched for extension of SEM data in real time available via AMR at RLDCs to SLDCs to facilitate better grid operation. Additional expenditure in establishing the communication link from RLDC server to SLDCs may be borne by respective SLDCs.
- NTPC Darlipalli also raised the same issue of inherent mismatch as raised by SLDC Odisha and requested for remedial action.
- Powergrid ER-II submitted:
 - The possibility of sharing AMR data from RLDC to all SLDCs with structural modifications in existing framework is already under planning and the same **to be shared with the forum in subsequent OCC meeting(s) along with cost implications.**

Powergrid ER-II may update the Status. Members may discuss.

3.7. Unsatisfactory FRC performance by most of the entities & Non-Submission of FRC data: ERLDC

Adhering to **IEGC clauses 30.8** and 30.10.(a) to 30.10.(q), generating stations within the eastern region are required to submit essential data to ERLDC within two days of receiving a notification regarding a reportable frequency event. Additionally, according to clause 30.10.(n), all control areas within the eastern region must assess their frequency response characteristics and share the evaluation, along with high-resolution data, with the ERLDC. If any data is not received or is incomplete, ERLDC resorts to using Scada data (low resolution) to calculate the performance of the respective control area. Therefore, timely submission of primary response data is crucial for compliance with the **IEGC**.

As per the decision taken in the **214th OCCM**, all the regional generators as well as states were advised to send the high-resolution data to ERLDC for assessing their performance.

As per deliberation in **215th OCC**:

- All generators whose data submission against frequency events flagged by ERLDC is pending (detailed above in agenda) were advised to submit the necessary FRC data to ERLDC at the earliest.
- All generators were also advised to regularly share high resolution data against each reportable frequency event with ERLDC on time to facilitate accurate assessment of FRP for respective control areas.

In line with the provisions of IEGC 2023, GRID-INDIA has been assessing the **Frequency Response Characteristics (FRC)** for grid events involving load/generation loss of more than 1000 MW or change in frequency by more than 0.1 Hz. In the month of **April-2024 four such events were reported**. The Plant-wise average response as observed through 10 second SCADA data available at ERLDC & data received from generators is show in the table below. It may be noted that many power plants' performance was poor / below average and data received status also very poor from most of the plants. Respective plants/State control area may explain reasons behind deficiency in performance and all utilities may follow the timeline.

ENTITY NAME	Average FRP(Beta) for the month based on SCADA data	Average FRP(Beta) for the month based on Gen data	Grade
FSTPP #STG 1 & 2	0.94	DATA RECEIVED NOT	Good
North Karanpura	0.92	DATA RECEIVED NOT	Good
FSTPP #STG 3	0.77	DATA RECEIVED NOT	Average
TSTPP #STG 1	0.74	0.31	Average
NPGC	0.70	0.10	Below Average
GMR	0.70	0.61	Below Average
Barh stage-1	0.69	DATA RECEIVED NOT	Below Average
BRBCL	0.65	1.00	Below Average
MPL	0.52	0.37	Below Average
Darlipalli	0.51	0.33	Below Average
KhSTPP #STG 1	0.51	DATA RECEIVED NOT	Below Average
KhSTPP #STG 2	0.50	0.61	Below Average

ADHUNIK	0.33	0.25		Poor
Barh stage-2	0.25	DATA RECEIVED	NOT	Poor
JITPL	0.01	0.00		Poor
Bihar	0.63	DATA RECEIVED	NOT	Below Average
Jharkhand	0.45	DATA RECEIVED	NOT	Poor
DVC	0.53	DATA RECEIVED	NOT	Below Average
OPTCL	0.60	0.375		Below Average
WB	0.58	DATA RECEIVED	NOT	Below Average

3.8. Regarding Non-Submission of Forecasting Data from States: ERLDC

The **Clause 2 of Regulation 31 of IEGC 2023** has mandated all the SLDCs to timely submit the demand estimate data to the respective RLDC and RPC.

The demand estimation data provided by SLDCs will be required in resource adequacy planning and regional load forecasts conducted by the RLDC. Currently, Jharkhand SLDC regularly provides day ahead and weekly forecasts and West Bengal SLDC is submitting day-ahead forecasts. ERLDC has planned to visit all the SLDCs to sensitize them about the Forecasting. Following the visit by the ERLDC team, DVC has started sending day day-ahead forecasts to ERLDC. The latest Forecast receipt status is shown below:

AS ON 16-05-2024	Forecast Receipt Status		
Entity Name	Day ahead	Weekly	Monthly
JHARKHAND	REGULAR	REGULAR	NOT RECEIVED
WEST BENGAL	REGULAR	NOT RECEIVED	NOT RECEIVED
DVC	REGULAR	NOT RECEIVED	NOT RECEIVED
BIHAR	REGULAR	REGULAR	NOT RECEIVED
SIKKIM	NOT RECEIVED	NOT RECEIVED	NOT RECEIVED
ODISHA	NOT RECEIVED	NOT RECEIVED	NOT RECEIVED

Hence it is again requested to all the concerned for timely submission of demand estimation data to ERLDC. This collaboration is essential for effective planning and preparedness to meet the region's electricity demands efficiently and reliably.

As per deliberation in **215th OCC**:

OCC decision:

- OCC advised all SLDCs for strictly adhering to the schedule of demand estimation as mandated in IEGC 2023, timely sharing with ERLDC as well as uploading of forecasting error on their respective websites.
- West Bengal SLDC was advised to strive for resolving technical glitch of EMS portal in coordination with concerned vendor. If the issue still remains unresolved, the same may again be intimated to ERPC.
- SLDC Odisha was advised to expedite implementation of the forecasting software while in the meantime day ahead demand forecast must be submitted to ERLDC based on historical data.
- Sikkim SLDC was advised to immediately commence regular demand estimation and timely sharing with ERLDC.
- SLDCs who are submitting day ahead forecast were advised to also share the forecasting data on weekly as well as monthly basis with ERLDC.

ERLDC may please update. Members may discuss.

3.9. Finalization of dates for mock black start in capable units of Eastern region: ERLDC

As per **IEGC 2023** regulations, each user is required to carry out a mock trial run of the restoration procedure for different sub-systems including black-start of generating units along with grid forming capability of inverter-based generating station and VSC-based HVDC black-start support at least once a year under intimation to the concerned SLDC and RLDC.

As such a tentative list for the year 2024 is prepared for conducting mock Blackstart of capable hydro units in the Eastern Region, matching with the dates in which such tests were conducted in previous years. The same agenda was discussed in the 214th OCC meeting and it was deliberated that all hydro stations of ER to update the schedule of mock black start as prepared by ERLDC.

A few tentative dates, as received, have been highlighted in sky blue color.

SI No	Name of Hydro Station	2022 Actual Date of Test	2023 Actual Date of Test	Schedule of Mock Black Start	2024 Actual Date of Test
1	U. Kolab	23 rd , June 2022		June-2024	
2	Balimela	08 th Sep-2022		July-2024	
3	Rengali	08-December-2022	12 th July 2023	June-2024	
4	Burla	23-June-2022		July-2024	
5	U. Indravati	25-May-2022		May-2024	

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	14 th August 2023	Dec-2024	
7	TLDP-III			Oct-2024	
8	TLDP-IV			Oct-2024	
9	Subarnarekha	13 th December 2022		Sep-2024 4 th week	
10	Teesta-V			N/A	
11	Chuzachen			Oct-2024	
12	Teesta-III	08-April-2022		N/A	
13	Jorethang		19 th and 20 th December 2023	Dec-2024 3 rd week	
14	Tashiding		12 th December 2023	2 nd week of Dec 2024	
15	Dikchu			N/A	
16	Rongnichu			March 2024	18 th March and 20 th March 2024
17	Mangdechu				

The users, in this case mean includes generating company and they are requested to kindly respond and review the tentative dates specific to their plant units and update the list. For intra state blackstart capable hydro units, SLDCs are requested to respond on their behalf. So far , only **Tashiding, Jorethang** and **Subarnarekha(JUSNL)** have updated.

As per deliberation in **215th** OCC:

➤ ERLDC submitted :

- Tentative schedule of mock black starts in capable hydro generating units of Eastern region has been prepared based on available historical data.

- So far, relevant details have been received only from Tashiding, Jorethang and Subarnarekha(JUSNL).

OCC decision:

- OCC advised all black start capable hydro generating units of ER to update their schedule of mock black start to ERLDC at the earliest.
- OCC also opined to finalize this schedule of mock black start by next OCC meeting if no update on the same is received at ERLDC from concerned hydro generating units in the meantime.

ERLDC may update. Members may review and discuss.

3.10. Commissioning Status of ADMS: ERLDC

The automatic demand management scheme (ADMS) has been already commissioned in West Bengal, DVC, Odisha, and Jharkhand and partially implemented by Bihar.

It was deliberated by Bihar in the 214th OCC that an 80 MW load has already been implemented under ADMS while an additional 400 MW load is yet to be implemented. In the 215th OCC meeting, SLDC Bihar confirmed the submission of a list of 80MW load.

DVC deliberated in the 214th OCC meeting that after the implementation of the Chandrapura islanding scheme, the ADMS scheme has been changed and the revised feeder list is yet to be implemented. No further updates received so far.

Bihar & DVC may update the Status. Members may discuss.

4. PART-D: OPERATIONAL PLANNING

4.1. Anticipated power supply position during July-2024

The abstract of peak demand (MW) vis-à-vis availability and energy requirement vis-à-vis availability (MU) for the month of July 2024 were prepared by ERPC Secretariat (**Annexure D.1**) on the basis of LGBR for 2024-25 and feedback of constituents, keeping in view that the units are available for generation and expected load growth etc.

Members may update.

4.2. Major Thermal Generating Units/Transmission Element outages/shutdown in ER Grid (as on 13-06-2024)

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	Poor condenser vacuum	19-Jul-2023
2	BARAUNI TPS	BIHAR	NTPC	6	110	Low vacuum	22-Jul-2023
3	RTPS	DVC	DVC	2	600	Initially Unit was taken out due to very low lube oil pressure, later unit was taken under annual overhauling w.e.f 00.00 hrs of 27/02/2024, now under forced outage wef 23/03/2024 due to damage in turbine bearing.	26-Feb-2024
4	DARLIPALI	ODISHA	NTPC	1	800	Turbine related problem	27-Apr-2024
5	IBEUL	ODISHA	IBEUL	1	339.6	Clinker formation in boiler	29-May-2024
6	BARH	BIHAR	NTPC	2	660	Due to abnormal sound from Boiler	13-June-2024
7	HALDIA ENERGY LTD	WEST BENGAL	HEL, CESC	1	300	Failure of R-Ph bushing of GT	29-May-2024
8	TENUGHAT	JHARKHAND	TVNL	1	250	Excessive hydrogen leakage	12-June-2024

9	SAGARDIGHI	WEST BENGAL	WBPDC	4	500	Boiler Tube Leakage	12-June-2024
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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.

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

SL No	STATION	STATE	AGENCY	UNIT NO	CAPACITY (MW)	REASON(S)	OUTAGE DATE
NIL							

c) Hydro Unit Outage Report:

S. NO	STATION	STATE	AGENCY	UNIT NO	CAPACITY (MW)	REASON(S)	OUTAGE DATE
1	TEESTA STG III Hep	SIKKIM	TUL	1 to 6	200*6	Sudden cloudburst at glacier fed LOHNAK Lake followed by huge inrush of water in Teesta River and damage of Teesta III Dam & downstream Powerhouses	04-Oct-2023
2	DIKCHU Hep	SIKKIM	SKPPL	1	48	Sudden cloudburst at glacier fed LOHNAK Lake followed by huge inrush of water in Teesta River and damage of Teesta III Dam & downstream Powerhouses	04-Oct-2023
3	TEESTA HPS	SIKKIM	NHPC	1 to 3	170*3	Sudden cloudburst at glacier fed LOHNAK Lake followed by huge inrush of water in Teesta River and damage of Teesta III Dam & downstream Powerhouses	04-Oct-2023
4	INDRAVATI	ODISHA	OHPC	2	150	Capital Maintenance	23-Nov-2023
5	CHIPLIMA HPS / HIRAKUD II	ODISHA	OHPC	1	24	Capital Overhauling	15-Dec-2023
6	BALIMELA HPS	ODISHA	OHPC	2	60	High Turbine Vibration	14-Mar-2024

d) Long outage report of transmission lines (As on 15.04.2024):

Transmission Element / ICT	Outage From	Reasons for Outage
220/132KV 100 MVA ICT II AT LALMATIA	22.01.2019	Commissioning work of 220/132KV, 100MVA Transformer and its associated control Panel under progress.
220 KV PANDIABILI - SAMANGARA D/C	03.05.2019	Tower Collapsed during Cyclone FANI (Restoration project is entrusted upon PGCIL & 220kV Samangara-Pandiabili ckt-I&II are anti-theft charged from Pandiabili end from loc no.01 to loc no.74)
220/132KV 100 MVA ICT 3 AT CHANDIL	30.04.2020	Due to Fire hazard ICT damaged and burnt.
220KV-FSTPP-LALMATIA-I	21.04.2021	Transmission line is idle charged between Lalmatia GSS end up to Tower loc no 94 (50.30km)
220KV-WARIA-BIDHANNAGAR-1 & 2	08.06.2022	To control overloading of 220 kV Waria-DSTPS (Andal) D/C line
220KV-MUZAFFARPUR(PG)-GORAUL(BH)-1	11.06.2022	Main Bay is under breakdown due to flashing in GIS module at Muzaffarpur end
400/220KV 315 MVA ICT 2 AT PATRATU	27.09.2022	ICT tripped on few occasions due to Buchholz later DGA violation found, internal fault in transformer to be rectified. (DGA violation)
132KV-BARHI-RAJGIR-1	25.03.2023	Dismantling of tower no. 227, 228, and 229 crossing the premises of Mahabodhi Cultural centre along with Destraining of conductor of both circuits and Earth wire between tension tower no. 218-237 in same line.
132KV-NALANDA-BARHI(DVC)-1	25.03.2023	
400KV-RANGPO-TEESTA-V-1 & 2	04.10.2023	Tower near gantry of Teesta V powerhouse collapsed due to sudden cloudburst at glacier fed LOHNAK Lake followed by huge inrush of water in TEESTA river and damage of Teesta III Dam & downstream Powerhouses
400KV-TEESTA-III-RANGPO-1	04.10.2023	Hand tripped from Teesta-III end due to sudden cloudburst at glacier fed LOHNAK Lake followed by huge inrush of water in TEESTA river and damage of Teesta III Dam & downstream Powerhouses
400KV-TEESTA-III-DIKCHU-1	04.10.2023	
400KV-RANGPO-DIKCHU-1	04.10.2023	Hand tripped from Rangpo end due to sudden cloudburst at glacier fed LOHNAK Lake followed by huge inrush of water in TEESTA river and damage of Teesta III Dam & downstream Powerhouses
400KV-KHSTPP-BANKA (PG)-1	24.02.2024	Switchyard bay updation work

400KV-JHARSUGUDA-ROURKELA-3&4	01.04.2024	Reconductoring work
132KV-MADHEPURA (BH)-SAHARSA(PMTL)-1	04.04.2024	To control loading on 132kV Madhepura-Saharsa line
HVDC PUSAULI	06.05.2024	Inspection of HVDC Valve hall to inspect the VESDA alarm reason
400KV/220KV 315 MVA ICT 2 AT RENGALI	07.05.2024	Commissioning of ICT-2 at Rengali under ADD CAP 2019-24
132KV-RANGPO-GANGTOK-1	10-05-2024	Continuous Shutdown for Reconductoring Work
132KV-KHSTPP-SABOUR-1	19-05-2024	To control loading of 400/132kV ICT-2 to rectify hotspot problem on 132kV side
400KV-MERAMUNDALI-LAPANGA-1 &2	20-05-2024	Tower collapse at location no 51
220KV-RANGPO-NEW MELLI-2	21-05-2024	SF6 Gas leakage rectification by OEM Hyosung at Rangpo.
132KV-RANGPO-SAMARDONG-2	24-05-2024	Fault Rectification work for Line -I
220KV-KATAPALLI-BOLANGIR(PG)-1	28-05-2024	220KV Bolangir-Katapalli line tripped at 13:08 Hrs on 30/05/24 from Bolangir(PG) end
220KV-SUBHASGRAM(PG)-NEW TOWN-1	28-05-2024	Line Opened for reconfiguration of line to New town AAIII-Subhasgram(PG) TBC-Baruipur
400KV-RANCHI-RAGHUNATHPUR-2 &3	30-05-2024	Tower collapse at Loc no-195

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

4.3. Commissioning of new units and transmission elements in Eastern Grid in the month of May -2024.

The details of new units/transmission elements commissioned in the month of May-2024 based on the inputs received from beneficiaries:

NEW ELEMENTS COMMISSIONED DURING May, 2024							
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
1	SJVN Thermal Private limited	Buxar TPS	ST-1	400/11 kV	110	11-05-2024	
TRANSMISSION LINES							
SL. NO.	Agency/ Owner	Line Name	Length (KM)	Conductor Type	DATE	Remarks	
1	BSPTCL	400KV-BUXAR-NAUBATPUR-2	126.192	Twin Moose Conductor	11-05-2024	First Time Charged for drawing of startup power for BUXAR TPP.	
2	Power Deptt, Govt. of Sikkim	132KV-RANGPO-SAMARDONG-1	2.843(Twin Moose ACSR-2.312kms+220 kV Cable - 0.531km).	(Twin Moose ACSR-2.312kms+220 kV Cable - 0.531km).	18-05-2024	First Time Charged at NO LOAD Condition.	
3	Power Deptt, Govt. of Sikkim	132KV-RANGPO-SAMARDONG-2	2.843(Twin Moose ACSR-2.312kms+220 kV Cable - 0.531km).	(Twin Moose ACSR-2.312kms+220 kV Cable - 0.531km).	18-05-2024	First Time Charged at NO LOAD Condition.	
LILO/RE-ARRANGEMENT OF TRANSMISSION LINES							
SL. NO.	Agency/ Owner	Line Name/LILO at	Length (KM)	Conductor Type	DATE	Remarks	
1	PGCIL	400KV-BIHARSARIFF(PG)-SAHUPURI(CHANDAULI)-2	289.441	ACSR MOOSE	18-05-2024	400kV Biharshariff-Varanasi-2 line has been Liloed at Sahupuri (Chandauli) and is now designated as 400kV Biharshariff (PG)-Sahupuri (Chandauli)-2.	
2	BSPTCL	132KV-DMTCL(MOTIHARI)-BETTIAH-1	38.162	HTLS Conductor equivalent to ACSR Panther	28-05-2024	Following the reconductoring process, the High Temperature Low Sag (HTLS) conductor now has a capacity of 1050 A. However, the associated bays at both ends can only accommodate up to 800 A, thereby limiting the power flow capacity to 800 A	
3	BSPTCL	132KV-DMTCL(MOTIHARI)-BETTIAH-2	38.162	HTLS Conductor equivalent to ACSR Panther	28-05-2024		
BUS/LINE REACTORS							
SL. NO.	Agency/ Owner	Element Name	SUB-STATION	Voltage Level (kV)	DATE	Remarks	
NIL							
BUS							
SL. NO.	Agency/ Owner	Element Name	SUB-STATION	Voltage Level (kV)	DATE	Remarks	
1	SJVN Thermal Private limited	BUXAR - 400KV - Bus 1	BUXAR TPS(BTPS)	400	11-05-2024		
2	SJVN Thermal Private limited	BUXAR - 400KV - Bus 2	BUXAR TPS(BTPS)	400	11-05-2024		
BAYS							
SL. NO.	Agency/ Owner	Element Name	SUB-STATION	Voltage Level (kV)	DATE	Remarks	
1	SJVN Thermal Private limited	400KV MAIN BAY OF NAUBATPUR-2 AT BUXAR TPS	BUXAR TPS	400	11-05-2024		

2	SJVN Thermal Private limited	400KV MAIN BAY OF 110 MVA ST-1 AT BUXAR TPS	BUXAR TPS	400	11-05-2024	
3	SJVN Thermal Private limited	400KV TIE BAY OF NAUBATPUR-2 AND 110 MVA ST 1 AT BUXAR	BUXAR TPS	400	11-05-2024	
4	NTPC NORTH KARANPURA	400KV MAIN BAY OF 125MVAR 400KV B/R-1 AT NORTH KARANPURA	NORTH KARANPURA	400	25-05-2024	
5	NTPC NORTH KARANPURA	400KV TIE BAY OF (125MVAR 400KV B/R-1 AND 400KV/11KV 265 MVA GT 2) AT NORTH KARANPURA	NORTH KARANPURA	400	25-05-2024	

Members may note.

4.4. UFR operation during the month of May 2024.

Frequency profile for the month as follows:

MONTH	MAX	MIN	% LESS IEGC BAND	% WITHIN IEGC BAND	% MORE IEGC BAND
	(DATE/TIME)	(DATE/TIME)			
May, 2024	50.46 Hz on 07-05-2024 at 18:02 hrs	49.72 Hz on 11-05-2024 at 00:02 hrs	2.49	80.05	17.46

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

Members may note.

Annexure B.2.8.1

संदर्भ: ER-I/PAT/ULDC/F-19/

दिनांक: 10/04/2024

To
Sr. Deputy General Manager (SCADA)
Eastern Regional Load Dispatch Centre
Grid Controller Of India Ltd.
14 Golf Club Road, Tollygunge, Kolkata-700033

Kind Attn: Sh. D. Biswash

Sub: Issue of Trail Operation Certificate of Communication/ SCADA System for SAS upgradation system at 11nos. stations in ER-I for Package-Y for RTU replacement/SAS/Upgradation package for Eastern Region under Upgradation of SCADA/RTUs/SAS in Central Sector Stations and strengthening of OPGW network in Eastern Region.

Please find attached details of commissioning of SAS System at 11nos. stations in ER-I for which Trial operation certificate is to be issued. The details of links are as follows:

Sr. No.	Name of Equipment	Make/Details	Date & Time of Commissioning
1	Upgradation of SAS (Substation Automation System Hardware/License upgradation) at 09 locations (Chaibasa 400 KV, Gaya 765 KV, Kishenganj 400 KV, New Ranchi 765 kV, Chandwa 400 KV, Daltonganj 400 KV, Banka 400 kV, Lakhisarai 400 KV, Sasaram 765KV HVDC)	Siemens Make SAS	17.12.2023 (00:00 Hrs)
2	Implementation of BCU Based Substation Automation System (SAS) at 02 locations (Ara 220KV & Purnea 220KV)	Siemens Make SAS & BCU	

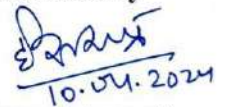
It is kindly requested for issuance of Trial Operation Certificate for the above-mentioned Communication/SCADA System as per attached details for further necessary action at our end.

Thanking you.

Enclosure:

- Duly signed format with details of equipment commissioned.
- Copy of Format for issuing trial operation certificate.

Yours faithfully


10.04.2024

(हंसराज प्रसाद)

उप महाप्रबंधक (ULDC/ER-I)

Documents to be submitted by POWERGRID to ERLDCs for certification of commissioning of Communication equipment

Annexure	Subject	Remarks
Annexure A1	Intimation regarding anticipated commissioning of New Communication equipments	As per Format I
Annexure A2	List of equipment to be powered on and equipment capacity details	As per Format I A
Annexure A3	Proposed Link connectivity with the existing network	
Annexure A4	Channel diagram for proposed data telemetry and voice communication and provision for redundant link	
Annexure A5	Approval details of the communication links being commissioned	
Annexure B1	Request for Commercial Operation of the new Equipment	As per Format III
Annexure B2	Undertaking in respect of Terminal Equipment	As per Format III A
Annexure B3	Undertaking in respect of Telemetry and voice communication	As per Format III B
Annexure B4	Undertaking in respect of Completion /SAT	As per Format III C

Format I

**Intimation regarding anticipated commissioning of New Communication equipments
(Fiber Optic Communication System, WAM, EMS/SCADA, Auxiliary Power Supply, RTU, EPABX, Radio)**

Power Grid Corporation of India Limited

Name of the communication system : Upgradation of Substation Automation System (SAS
Upgradation at 09 Stations- Chaibasa 400 KV, Gaya 765 KV, Kishenganj 400 KV, New Ranchi 765 kV,
Chandwa 400 KV, Daltonganj 400 KV, Banka 400 kV, Lakhisarai 400 KV, Sasaram 765KV HVDC and SAS
upgradation with BCU at 02 Stations- Ara 220KV & Purnea 220KV)

Point of interface with existing system : Chaibasa 400 KV, Gaya 765 KV, Kishenganj 400 KV,
New Ranchi 765 kV, Chandwa 400 KV, Daltonganj 400 KV, Banka 400 kV, Lakhisarai 400 KV, Sasaram
765KV HVDC, Ara 220KV & Purnea 220KV

Owner of the Transmission Asset : Power Grid Corporation of India Ltd

Owner of the Communication Asset : Power Grid Corporation of India Ltd

Likely Date and time of powering on : 01/09/2023; 00:00 hrs (Last Site considered)

Likely Date and time of start of Communication Asset: 17/12/2023; 00:00 hrs

Place: Patna

Date: 14/12/2023

(Name and Designation of the authorized person with official seal)

सांतनु रूद्रपाल / SANTANU RUDRAPAL
मुख्य प्रबंधक (पुनरावस्थापना) / Chief Manager (ULDC)
पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड
POWER GRID CORPORATION OF INDIA LIMITED
पूर्वी क्षेत्र प्रणाली - I / Eastern Region Transmission System-I
बोर्ड कॉलोनी, शास्त्री नगर, पटना - 800 023 / Board Colony, Shastrī Nagar, Patna - 800 023

Format I A

List of equipment to be commissioned

(Fiber Optic Communication System, WAM, EMS/SCADA, Auxiliary Power Supply, RTU, EPABX, Radio)

I. List of equipment Commissioned:

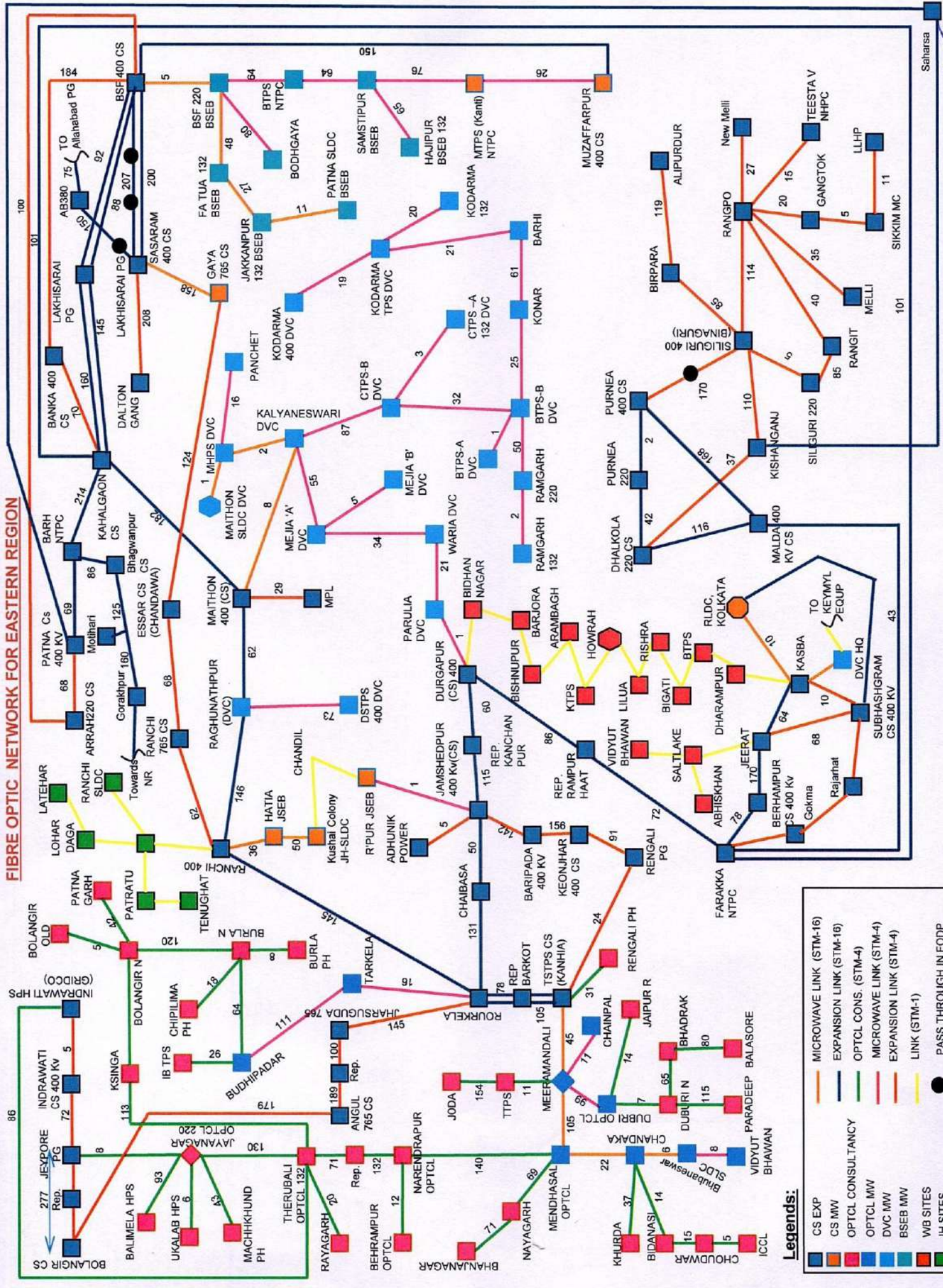
Sr. No.	Name of Equipment	Make/Details
1	Upgradation of SAS (Substation Automation System Hardware/License upgradation) at 09 locations (Chaibasa 400 KV, Gaya 765 KV, Kishenganj 400 KV, New Ranchi 765 kV, Chandwa 400 KV, Daltonganj 400 KV, Banka 400 kV, Lakhisarai 400 KV, Sasaram 765KV HVDC)	Siemens Make SAS
2	Implementation of BCU Based Substation Automation System (SAS) at 02 locations (Ara 220KV & Purnea 220KV)	Siemens Make SAS & BCU

सातनु

(Name and Designation of the authorized person with official seal)

सातनु रुद्रपाल / SAITANU RUDRAPAL
मुख्य प्रबंधक (स.एल.डी.सी.) / Chief Manager (ULDC)
पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड
POWER GRID CORPORATION OF INDIA LIMITED
पूर्वी क्षेत्र पर्याप्त प्रणाली - I / Eastern Region Transmission System-I
बोर्ड कॉलोनी, शास्त्री नगर, पटना - 800 023 / Board Colony, Shastri Nagar, Patna - 800 023

FIBRE OPTIC NETWORK FOR EASTERN REGION



Legends:

- CS EXP
- CS MW
- OPTCL CONSULTANCY
- OPTCL MW
- DVC MW
- BSEB MW
- WB SITES
- JH SITES
- MICROWAVE LINK (STM-16)
- EXPANSION LINK (STM-16)
- OPTCL CONS. (STM-4)
- MICROWAVE LINK (STM-4)
- EXPANSION LINK (STM-4)
- LINK (STM-1)
- PASS THROUGH IN FODD



भारत सरकार
विद्युत मंत्रालय
पूर्वी क्षेत्रीय विद्युत समिति
GOVERNMENT OF INDIA
MINISTRY OF POWER
EASTERN REGIONAL POWER COMMITTEE



No: ERPC/TCC&COMMITTEE/14/2018/ ६८३१-६८००

Date: 18.12.2018.

To,

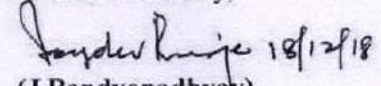
1. Members of Eastern Regional Power Committee.
2. Members of TCC.

Subject: Minutes of 39th ERPC & TCC Meetings.

Sir,

The minutes of the 39th TCC & ERPC meetings held on 16th & 17th November, 2018 respectively in Jaipur have been issued and uploaded on www.erpc.gov.in. As per the decision of ERPC distribution of hard copies of the Minutes of Meetings has been discontinued as a GO Green initiative.

Yours faithfully,


(J.Bandyopadhyay)
Member Secretary

Attach: As above.

POWERGRID emphasized that above figures are based upon received offer only from M/S TCS. Already negotiation process is going on with M/S TCS and once finalized, the value will be intimated during placement of LOA.

TCC may approve.

Deliberation in the TCC meeting

TCC agreed to implement 4th phase AMR at a cost of Rs 1.75 Cr in place of Rs. 93.56 lakhs approved earlier, considering the added requirement of meters, locations, additional functionality, AMC etc.

It was referred to ERPC for final concurrence.

ERPC may approve.

Deliberation in the ERPC Meeting

After deliberating in details regarding the added requirement of Meters, Locations, Additional functionalities etc. as detailed in the Agenda and taking into consideration the deliberations in the TCC meeting on the previous day, ERPC accorded the approval for procurement and installation of AMRs under 4th phase in the Eastern Region at an estimated cost of Rs. 1.75 Crore in place of Rs. 93.56 Lakh as approved earlier in the 37th ERPC Meeting. ERPC suggested that Power Grid should ensure reliability in data transmission by implementing LAN connectivity through OPGW Network wherever feasible.

ITEM NO. 3.3:	REPLACEMENT OF OLD RTUS IN EASTERN REGION FOR REPORTING OF RTU/SAS TO BACKUP CONTROL CENTRES (INCLUSION OF CHANDWA, KISHENGANJ & DALTONGANJ S/S)
----------------------	---

In 36th TCC/ERPC meeting, proposal of replacement of RTU (as per Committee constituted in 35th ERPC meeting), was approved. It was also advised that replacement of OPGW on older ULDC lines might be deliberated in lower forum before submitting for TCC/ERPC approval.

In 37th TCC/ERPC Meeting, ERPC authorized POWERGRID to undertake the works related to replacement of the old RTUs of the Eastern Region. It was also decided by the ERPC that the investment made in this regard shall be recovered by POWERGRID **through tariff**. However, subsequent O&M shall be the responsibility of the concerned constituents.

In 38th TCC/ERPC Meeting, ERPC accorded in-principle approval to undertake the works related to "Upgradation of SCADA / RTUs / SAS in the Central sector stations and strengthening of OPGW network" with the following scope:

A) Replacement of Old RTUs/SAS and Upgradation of SAS in Eastern Region.

- B) *Implementation of BCU based Substation Automation System at 05 nos. substations in Eastern Region.*
- C) *Replacement of Old DCPS & UPS in Eastern Region.*
- D) *Laying of OPGW (903 Km) in Eastern Region.*

The detailed scope of the project is enclosed in Annexure-B3.

In the meeting it was also decided that Power Grid would prepare necessary DPR for cost estimation and the same should be placed in the next ERPC Meeting for according the financial approval.

In 150th OCC, Powergrid requested to include 400kV Chandwa, Kishenganj & Daltonganj Substations of Powergrid ER-I in the above project. The total nos. of Substation of POWERGRID/ER-1 for RTU/SAS Upgradation under the aforementioned projects shall become 18 (namely Biharsharif, Jamshedpur, Purnea 400, Purnea 220, Sasaram HVDC, Muzaffarpur, Patna, Banka, Lakhisarai, Ranchi, New Ranchi, Chaibasa, Gaya, Sasaram 765, Ara, Chandwa, Kishenganj & Daltonganj).

OCC in principle agreed to include 400kV Chandwa, Kishenganj & Daltonganj Substations in the project.

OCC advised Powergrid to give a detailed presentation on scope of work of the project along with cost implication in 39th TCC Meeting.

In 22nd SCADA O & M meeting held on 30th October 2018, it has been clarified that as per Annexure-B3, POWERGRID's scope shall be limited to replacement / up-gradation of old RTUs / SAS only for POWERGRID sub-stations in the Eastern Region. Other utility/constituents have to take up the replacement / up-gradation activity of their own. However, utility/constituents can approach POWERGRID for the same on consultation basis through POWERGRID.

Powergrid may give a presentation.

Deliberation in the TCC meeting

Powergrid gave a presentation on scope of work under the project along with cost implication. Powergrid informed that total cost involvement would be around Rs. 88.57 Cr. with an implementation time of 36 months. This cost includes procurement and installation of 4 no. of PMUs for 4 STATCOM Projects in the Eastern Region.

During the presentation, ERPC Secretariat asked for clarification for the breakup of 1178 km length of OPGW which was earlier 903 km as approved in 38th TCC/ERPC meeting.

Powergrid could not furnish the details in the meeting.

TCC advised Powergrid to submit the clarification regarding the above to ERPC Secretariat.

TCC accepted the project and recommended that funding for this project shall be explored first from PSDF. If no fund is granted from PSDF, then the project would be taken as regional project and will be recovered through Tariff.

TCC authorised Powergrid to place the proposal for PSDF.

TCC referred to ERPC for approval.

ERPC may approve.

Deliberation in the ERPC Meeting

Powergrid clarified that the length of OPGW has been increased from 903 km to 1178 km due to inclusion of OPGW relating to "the last mile connectivity between Power grid S/s and the Switch yard Control room of Central Sector Generators" project as approved in the 38th ERPC Meeting (Item No. 3.4). Detail breakup of OPGW is enclosed at **Annexure-B3.1**.

After deliberation, ERPC decided the followings:

- i) ERPC approved the proposal of Power Grid for replacement of the old RTUs in the Eastern Region for reporting of RTU / SAS to backup control centres at an estimated cost of Rs. 88.57 Crore with an implementation time of 36 months.
- ii) Power Grid shall place a proposal before PSDF Committee for financing the above project from PSDF.
- iii) In case of non- availability of required funding from PSDF, the project shall be implemented by Power Grid and the cost shall be recovered by Power Grid through tariff.
- iv) Member Secretary, ERPC shall coordinate with Power Grid for implementation of the above project.

ITEM NO. 3.4:	ARRANGEMENT FOR AUXILIARY POWER SUPPLY OF MAKE-UP WATER PUMP HOUSE FOR TTPS-III PROJECT OF NTPC
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As informed by NTPC, a power project namely Talcher Thermal power Project Stage –III (TTPS-III) of NTPC with capacity of 2X660MW is coming up in the vicinity of existing TTPS station (460 MW). The make-up water for TTPS-III is proposed to be taken from reservoir of Samal barrage, which is at a distance of approximately 28 Km from the project. The route for laying the power supply for 28Km involves forest and densely populated residential /Agricultural land as such it would not be feasible to get ROW for laying the line.

The make-up water pump house of TTPS-III has three pumps with each having power rating of 600KW. During normal operation, two pumps would be running and one standby. The maximum power consumption would be 1.8MW. The pump house is in the vicinity (at a distance of 7 Km) of TSTPS-I.

Format II

Eastern Regional Load Dispatch Centre

Acknowledgement of Receipt by ERLDC

This is to acknowledge that the intimation of likely commissioning of _____ has been received from Power Grid Corporation of India Limited on 14.12.2023.

Kindly complete the technical formalities in connection with integration of the equipments, SAT of the equipment and establishment of real time data and voice communication facilities and inform us of the same three (3) days before Commissioning of the above communication equipment as per Formats III, IIIA, IIIB and IIIC.

Or

The intimation is incomplete and the following information may be submitted within three (3) days of issue of this acknowledgment receipt.

1. _____
2. _____
3. _____

.....

Place:

Date :

Signature

Name:

Designation:

ERLDC

Format III

Request for Commercial Operation the new Equipments

(Fiber Optic Communication System / SCADA System)

Past references : Intimation of Commissioning: Format-A1 dtd 14.12.2023

Name of the communication FO link / SCADA Equip. : Upgradation of Substation Automation System (SAS Upgradation at 09 Stations- Chaibasa 400 KV, Gaya 765 KV, Kishenganj 400 KV, New Ranchi 765 kV, Chandwa 400 KV, Daltonganj 400 KV, Banka 400 kV, Lakhisarai 400 KV, Sasaram 765KV HVDC and SAS upgradation with BCU at 02 Stations- Ara 220KV & Purnea 220KV)

Name of the transmission line on which FO link /Equip : Existing Substation of POWERGRID (11 stations)

Premises where the new equipment is installed : Chaibasa 400 KV, Gaya 765 KV, Kishenganj 400 KV, New Ranchi 765 kV, Chandwa 400 KV, Daltonganj 400 KV, Banka 400 kV, Lakhisarai 400 KV, Sasaram 765KV HVDC, Ara 220KV & Purnea 220KV

Interface point with the existing link / Interface details of the new equipment : --do--

Owner of the Transmission Asset / Owner of the premises Where the new equipment is installed : Power Grid Corporation of India Limited

Owner of the communication Asset : Power Grid Corporation Of India Ltd

Date and time of power-on : 01/09/2023; 00:00 hrs

Date and time of Commissioning : 26/12/2023; 00:00 hrs

Place: Patna

Date: 10/04/2024

(Name and Designation of the authorized person with official seal)

सांतनु रुद्रपाल
सांतनु रुद्रपाल / SANTANU RUDRAPAL
मुख्य प्रबंधक (यु.एन.टी.सी.) / Chief Manager (ULDC)
पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड
POWER GRID CORPORATION OF INDIA, LIMITED
पूर्व क्षेत्र प्रायमरी -1 / Eastern Region (Patna) Board
बॉर्ड कॉलोनी, शास्त्री नगर, पटना - 800 023 / Board Colony, Shastri Nagar, Patna - 800 023

Encl:

- Annexure B2 : Undertaking in respect of Terminal equipment as per Format III A
- Annexure B3 : Undertaking in respect of Telemetry and voice communication as per Format IIIB
- Annexure B4: Undertaking in respect of successful completion of SAT Format III C

Format IIIA

Undertaking in respect of Terminal Equipment

The following Communication systems / SCADA Equipments have been powered on and commissioned as per details given below:

Sr. No.	Name of Equipment	Make/Details
1	Upgradation of SAS (Substation Automation System Hardware/License upgradation) at 09 locations (Chaibasa 400 KV, Gaya 765 KV, Kishenganj 400 KV, New Ranchi 765 kV, Chandwa 400 KV, Daltonganj 400 KV, Banka 400 kV, Lakhisarai 400 KV, Sasaram 765KV HVDC)	Siemens Make SAS
2	Implementation of BCU Based Substation Automation System (SAS) at 02 locations (Ara 220KV & Purnea 220KV)	Siemens Make SAS & BCU

It is certified that all the systems as stipulated in the BOQ of the said asset have been commissioned & tested and found complied with the approved technical specification and have been put to service to cater requirement of data and voice communication.

Place: Patna

Date: 10-04-2024

(Name and Designation of the authorized person with official seal)

सांतनु रूद्रपाल / SANTANU RUDR PAL
 मुख्य प्रबंधक (ए.ए.टी.सी.) / Chief Manager (ULDC)
 पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड
 POWER GRID CORPORATION OF INDIA LIMITED
 पूर्वी क्षेत्र सारण प्रणाली - I / Eastern Region Transmission System-I
 बोर्ड कॉलोनी, शास्त्री नगर, पटना - 800 023 / Board Colony, Shastri Nagar, Patna - 800 023

Format IIIB

Undertaking in respect of data telemetry and voice communication

The following communication equipment has been commissioned to facilitate data and voice communication:

Name of communication link/SCADA System : Upgradation of Substation Automation System (SAS Upgradation at 09 Stations- Chaibasa 400 KV, Gaya 765 KV, Kishenganj 400 KV, New Ranchi 765 kV, Chandwa 400 KV, Daltonganj 400 KV, Banka 400 KV, Lakhisarai 400 KV, Sasaram 765KV HVDC and SAS upgradation with BCU at 02 Stations- Ara 220KV & Purnea 220KV)

Details of the telemetry equipment : SAS , SAS with BCU

Contact nos. for voice communication : Existing VOIP communication with all substations

The details of the channel connectivity through which data telemetry has been made available to ERLDC in real time had been indicated. It is certified that real time data is available to ERLDC through the newly commissioned equipment put to service and commissioned.

It is also certified that the data through main channel is made available to ERLDC as well as alternate communication channel is available for data transfer to ERLDC using the FO communication link to ensure reliable and redundant data as per IEGC (as amended from time to time). Also, Voice communication is established as per IEGC as mentioned above. The arrangements are of permanent nature. In case of any interruption in data in real time, the undersigned undertakes to get the same restored at the earliest.

It is hereby certified that relevant CERC Regulations and CEA standards / regulations and compliance of other Statutory Authorities regulations have been followed and complied with for commissioning of the aforesaid communication asset.

Place: Patna

Date: 10.04.2024

(Name and Designation of the authorized person with official seal)


मुख्य प्रबंधक (यु.एल.टी.सी.) / Chief Manager (ULDC)
पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड
POWER GRID CORPORATION OF INDIA LIMITED
पूर्वी क्षेत्र पारंपण प्रणाली - I / Eastern Region Transmission System-I
बोर्ड कॉलोनी, शास्त्री नगर, पटना - 800 023 / Board Colony, Shastri Nagar, Patna - 800 023

Annexure B4

Format III C

Undertaking in respect of Completion SAT

It is hereby certified that Site Acceptance Test has been carried out successfully for the following communication/SCADA equipment in compliance with the technical specification.

I. List of equipment charged:

Sr. No.	Name of Equipment	Make/Details
1	Upgradation of SAS (Substation Automation System Hardware/License upgradation) at 09 locations (Chaibasa 400 KV, Gaya 765 KV, Kishenganj 400 KV, New Ranchi 765 kV, Chandwa 400 KV, Daltonganj 400 KV, Banka 400 kV, Lakhisarai 400 KV, Sasaram 765KV HVDC)	Siemens Make SAS
2	Implementation of BCU Based Substation Automation System (SAS) at 02 locations (Ara 220KV & Purnea 220KV)	Siemens Make SAS & BCU

Note: The equipments are reporting to RLDC for centralized monitoring of the power network by RLDC.

Place: Patna

Date: 10.04.2024

(Name and Designation of the authorized person with official seal)

सांतनु रूद्रपाल / SANTANU RUDRAPAL
मुख्य प्रबंधक (यु.एल.डी.सी.) / Chief Manager (ULDC)
पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड
POWER GRID CORPORATION OF INDIA LIMITED
पूर्वी क्षेत्र पारंपर्य प्रणाली - I / Eastern Region Transmission System-I
बोर्ड कॉलोनी, शास्त्री नगर, पटना - 800 023 / Board Colony, Shastri Nagar, Patna - 800 023

<Eastern Regional Load Dispatch Centre>

Certificate Number: _____

Date: _____

Certificate of successful commissioning of Communication / SCADA System

Reference:

- i. Communication from POWERGRID to ERLDC dated 14.12.2023 in Format-I and IA.
- ii. Communication from POWERGRID to ERLDC dated 10.04.2024 in Format III, IIIA, IIIB and IIIC.

Based on the above reference, it is hereby certified that the following Communication/SCADA system has been successfully commissioned with the following elements:

I. List of elements charged/commissioned:

Sr. No.	Name of Equipment	Make/Details	Date & Time of Commissioning
1	Upgradation of SAS (Substation Automation System Hardware/License upgradation) at 09 locations (Chaibasa 400 KV, Gaya 765 KV, Kishenganj 400 KV, New Ranchi 765 kV, Chandwa 400 KV, Daltonganj 400 KV, Banka 400 kV, Lakhisarai 400 KV, Sasaram 765KV HVDC)	Siemens Make SAS	17.12.2023 (00:00 Hrs)
2	Implementation of BCU Based Substation Automation System (SAS) at 02 locations (Ara 220KV & Purnea 220KV)	Siemens Make SAS & BCU	

Note: The above equipments are commissioned and reporting at RLDC for monitoring of power network.

This certificate is being issued in accordance with Regulation 4 of CERC (Terms and Condition of Tariff) Regulations, 2014 to certify successful Commissioning of the communication link. Usage of this certificate for any other purpose is prohibited.

Place: Kolkata**Signature****Name and Designation of the issuing Officer with official seal****Copy to:**

1. Member Secretary, Eastern Region Power Committee, Tollygunge, Kolkata
2. Executive Director, Eastern Region -I, Power Grid Corporation Of India Ltd, Shastri Nagar, Patna

Annexure B.2.8.2



JHARKHAND URJA SANCHARAN NIGAM LIMITED

Office of the

Electrical Superintending Engineer (ULDC),

Kusai Colony, Ranchi-834002 Tele. No.-0651-2490894, Fax. No.0651-2490486

Letter no. 75 /ULDC, Ranchi

Date 12.07.2017

From,

**Electrical Superintending Engineer (ULDC),
Kusai Colony Doranda, Ranchi-834002.**

To,

**Asst. General Manager (ULDC/ER-II)
Power Grid Corporation of India Limited
CF-17, Action Area-1C, New Town,
Kolkata-700156.**

Sub: Issue of Trial Operation Certificates for ULDC system expansion in JUSNL.

Sir,

Kindly find herewith the Trail Operation Certificate for Integration of 15 nos. RTUs with SLDC, Kusai, Ranchi on IEC 60870-5101/104 protocol.

Encl: As above.

Yours Faithfully,

SK
12.07.17

**(Shobhana Kumari)
ESE (ULDC, JUSNL)**

Certificate Number: NIL

Date: 12-07-2017

Certificate of successful commissioning of Expansion/ UPgradation of existing

EMS/SCADA of SLDC's of JUSNL

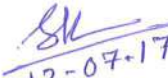
Based on the above reference, it is hereby certified that the 15 nos. of RTUs at JUSNL has successfully commissioned

I. List of equipment's commissioned:

	Capitalization summary pertaining to Expansion/UPgradation of existing	Date & Time
b.	Integration of 15 no RTUs with Main control center on IEC 60870-5101/104 protocol	27.06.2017
f.	RTUs for JUSNL (15 nos. of RTUs along with associated accessories)	27.06.2017

This certificate is being issued in accordance with Regulation 4 of CERC (Terms and Condition of Tariff) Regulations, 2014 to certify successful Commissioning of the Communication link. Usage of this certificate for any other purpose is prohibited.

Place: RANCHI


12-07-17


Signature

Name and Designation of the issuing Officer with official seal

E.S.E. (ULDC & Telecom)

Jharkhand Urja Sancharan Nigam Ltd.

Kusai Colony, Ranchi-834002


A.Ex.E. (ULDC)
Jharkhand Urja Sancharan Nigam Ltd.
Kusai Colony, Ranchi-834002

Certificate Number:

Date:


Certificate of successful commissioning of Expansion/Upgradation of existing EMS/SCADA of SLDC's of BSPTCL

Based on the above reference, it is hereby certified that the following Communication link has successfully commissioned

I. List of equipment's commissioned:

	Expansion/Up gradation of existing EMS/SCADA of SLDC's of BSPTCL	Date & Time
b	Integration of 44 no RTUs with Main control center on IEC 60870-5-101/104 protocol	27.06.2017
f	RTU's for BSPTCL (44 nos RTU's along with associated accessories)	27.06.2017

This certificate is being issued in accordance with Regulation 4 of CERC (Term and Condition of Tariff) Regulations, 2014 to certify successful Commissioning of the communication link. Usage of this certificate for any other purpose is prohibited.


27/08/17

Signature

Name and Designation of the issuing Officer with official seal



Annexure -B.2.8.3

**CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI**

No.- L-1/210/2016/CERC

CORAM:

**Shri Jishnu Barua, Chairperson
Shri I. S. Jha, Member
Shri Arun Goyal, Member
Shri P. K. Singh, Member**

Date of Order: 19th January, 2024

In the matter of:

Approval of Guidelines on “Interface Requirements” under the Central Electricity Regulatory Commission (Communication System for inter-State transmission of electricity) Regulations, 2017.

Order

The Central Electricity Regulatory Commission (Communication System for inter-State transmission of electricity) Regulations, 2017 (hereinafter referred to as the ‘Communication Regulations’) were published on 29.05.2017 in the Gazette of India Extraordinary (Part-III, Section-4, No. 218).

2. Regulation 7.4, read with Regulation 14.2 of the Communication Regulations requires NLDC to prepare Guidelines on “Interfacing Requirements” in consultation with the stakeholders and submit the same for approval of the Commission.

3. Accordingly, NLDC has submitted the Guidelines on “Interfacing Requirements” after stakeholder consultation for approval of the Commission.

4. The Commission has examined the Guidelines submitted by NLDC, and after incorporating suitable changes, the Commission hereby approves the Guidelines on “Interfacing Requirements”, which are enclosed as an Annexure to this Order.

Sd/-	Sd/-	Sd/-	Sd/-
(P. K. Singh)	(Arun Goyal)	(I. S. Jha)	(Jishnu Barua)
Member	Member	Member	Chairperson

GUIDELINES ON “INTERFACING REQUIREMENTS”

1. Introduction

- 1.1.** These Guidelines have been prepared in accordance with the Regulation 7.4 (i) of the CERC (Communication System for inter-State transmission of electricity) Regulation, 2017. The relevant extract of the same is as follows:

“The National Load Despatch Centre (NLDC) shall be responsible for preparation and issuance guidelines with the approval of the Commission on the “Interfacing Requirements” in respect of terminal equipment, RTUs, SCADA, PMUs, Automatic Generation Control (AGC), Automatic Meter Reading (AMR) Advanced Metering Infrastructure (AMI), etc. and for data communication from the User's point to the respective control centre(s) based on technical standards issued by CEA within 60 days of issuance of technical standards.”

- 1.2.** The Central Electricity Authority (Technical standards for Communication System in Power Systems Operations) Regulations, 2020 was issued by CEA on 27th February, 2020.

- 1.3.** The Guidelines on “Interfacing Requirements” focus on the general data acquisition systems for RTUs, SAS Gateway computers, communications and AMI metering systems required for reliable, secure and economic operations of the control centre(s).

- 1.4.** All Users, SLDCs (State Load Despatch Centres), RLDCs (Regional Load Despatch Centres), NLDC (National Load Despatch Centre), CTU (Central Transmission Utility), STUs (State Transmission Utilities), NHPTL (National High Power Test Laboratory), REMC (Renewable Energy Management Centre), FSP (Forecasting Service Provider), Power Exchanges and ISTS (inter State Transmission System) licensees etc. shall abide by these guidelines as applicable to them.

- 1.5.** Requirement mentioned herein under this document shall be applicable to Main and Backup Control Centre (wherever applicable) irrespective it is mentioned or not mentioned separately in subsequent sections.

2. Definitions

- 2.1. The words and expressions used in these guidelines shall have the same meaning assigned in the Electricity Act, CERC (Communication System for inter-State transmission of Electricity) Regulations, 2017, Indian Electricity Grid Code Regulations, 2023 and CEA (Technical Standards for Communication System in Power System Operations) Regulations, 2020, and amendments thereof.
- 2.2. "Remote Station" means transmission substations/ generating stations operated by the users from which data/real-time data is collected.

3. Real time data Telemetry

- 3.1. All entities as specified in Para 1.4 of these Guidelines, as applicable, shall provide Systems to telemeter power system parameter such as flow, voltage and status of switches/ transformer taps, Sequence of Events (SOE) etc. in line with interface requirements and other guideline made available by NLDC. While many of design details related to control systems are not included in these guidelines, the Users, who are getting connected to the ISTS, shall require to include functionalities and the interfaces compatible with the respective Control Centre data collection systems available and being maintained at NLDC / RLDCs and SLDC/Sub-LDC and other LDC level. Control Centre may request or transmit data periodically or "by exception" (periodically, as the need for information arises) on demand, or interactively.
- 3.2. A list showing the parameters to be telemetered from various sub-stations and generating stations with respect to various equipment is enclosed for reference as **Annexure-I**. This list shows minimum required parameters, however, some other parameters shall be provided as per Control Centre requirement. The analog signal sign convention shall be as per IEEE power flow convention and digital status shall be as per IEC standard. Digital status for circuit breaker must be double point while Isolator status can be either single point or double point as per end device. All users shall comply with interface requirements as specified and shall share interface details with respective control centre.
- 3.3. The typical layout diagram showing point of interface for real time telemetry is attached as **Annexure- II**.

- 3.4. The communication media being used for data transfer and data rate shall be in accordance with the Central Electricity Authority(Technical Standards for Communication System in Power System Operations) Regulations, 2020.

4. Communication Interface

The Users shall support at least the following facilities and plan for communication interfaces accordingly at the time of implementation:

1. Real time data exchange including AGC/Control signal with Control Centre (Main & Backup).
2. Phasor data exchange
3. Meter data exchange
4. Protection signal transmission (SPS, Direct Tripping and Permissive Tripping Carrier Signal etc.)
5. Voice communication
6. Video Communication

Other requirements, if any, users may include while designing the local communication interface requirement.

The required communication interfaces shall be provided for both sending and receiving ends based upon jurisdiction/ownership. All the interfaces shall be provided with audio-visual status indication to indicate its normal operation as per relevant standards.

Users shall have functionality to support any of the interfaces given below based on requirement of data flow as per CEA/CERC guidelines from their respective end to control centres.

Interfaces are classified as following: -

1. Remote Station Interfaces
2. Control Centre Interfaces
3. Terminal Equipment Interfaces

4.1. Remote Station

“Interfacing Requirements” in respect of terminal equipment, Remote Terminal Unit (RTUs)/ Substation Automation System (SAS), Supervisory Control and Data Acquisition System (SCADA), Phasor Measurement Unit (PMU) /Phasor Data Concentrators (PDC), Automatic Generation Control

(AGC), Station Protection / System Protection Schemes (SPS), Automatic Meter Reading (AMR), Advanced Metering Infrastructure (AMI), etc. and for data communication is decided based on communication protocol used for transfer of data between user and respective control centres through dedicated and redundant communication channel with route diversity.

Remote end equipment like RTUs, PMUs, SAS, Metering Gateways, Meter Data Collection Unit, PLCs for AGC etc. shall report through communication protocol which is supported at the reporting Control Centre.

While designing the interface requirement of the remote locations, all the interfaces required for data (power system parameter, meter data, AGC/Control Signal), voice, video, protection signal shall be considered and shall be compatible with respective control centre as well as intervening Communication System equipment.

A typical General Arrangement drawing for a Remote Station is enclosed as **Annexure-III**.

The interfaces shall be designed to operate under single contingency failure condition. Equipment should support interfaces with multiple ports, cards, gateways etc. and configured in redundant mode so that failure of single hardware element, i.e. communication port, card, gateway etc. of the users shall not lead to failure of data communication. Communication system shall be designed as per planning criterion to be notified by CEA.

Availability of communication links shall be maintained as per the CERC Communication Regulations, 2017. Further, the communication channel provided/configured for the real time data communication shall be made error free and shall not lead to intermittency in real time data at respective Control Centre.

4.1.1. Remote Terminal Unit (RTU)/Substation Automation System (SAS)/PLCs

“Remote Terminal Units” (RTU) / Substation Automation System (SAS) is the device suitable for measuring, recording and storing the consumption of electricity or any other quantity related with electrical system and status of the equipment in real time basis and exchanging such information with the data acquisition system for display and control.

The RTU/SAS System /device should communicate with Control Centre front end system in either

IEC-60870-5-101 or IEC-60870-5-104 protocol.

- i) IEC - 101 works on serial communication between site and control centre and it requires serial interface. Different Physical interface that can be used for 101 communications which are:
 - a) RS-232 / RS 422 / RS 485.
- ii) IEC 104 works on TCP/IP based communication and it can use following Physical interface:
 - a) Ethernet (IEEE 802.3 / IEEE 802.3u)
 - b) Optical communication Port
 - c) 10/100 BaseT(Electrical) or 100BaseFX(Optical) Ethernet Link

The communication interface equipment at the remote (RTU/SAS) location shall support the interfaces as mentioned above and the communication provider shall ensure the proposed data sharing protocol by the stations so that the compatible interface is provided.

4.1.2. Phasor Measurement Unit

PMU (Phasor Measurement Unit) provides phasor information (both magnitude and phase angle) for one or more phases of AC voltage or current waveforms including positive sequence phasors-and analog quantities like MW, MVAR, frequency, Rate of Change of Frequency (ROCOF) in real time.

Control Centre shall exchange phasor information between their respective Synchrophasor systems via high-speed real-time data acquisition networks, using the protocol specified in latest IEEE C37.118 communication standard preferably.

PMU shall report on C37.118 2011 or higher protocol with configuration Frame 3 or better for data communications. Different Physical Interface for PMU includes:

1. Ethernet (IEEE 802.3 / IEEE 802.3u)
2. Optical Interface (100 BASE-FX Multimode 850 nm/1300nm nm)
3. 10/100/1000 BaseT(Electrical) or 100/1000 BaseFX(Optical) Ethernet Link

All data items, regardless of type, are generally collected and disseminated at a frequency of 25 samples per second (can be higher rate of samples per second in future) and should be sent to Control Centre with the associated data quality codes in compliance with latest IEEE C37.118 communication standards.

4.1.3. Metering gateway

Automatic Meter Reading system uses its front end for transferring meter data from interface meters' gateway / Meter Data Collection Unit to control centre. It uses DLMS protocol for data communication. Different types of interface required are:

1. Ethernet (IEEE 802.3 / IEEE 802.3u) or Ethernet VLAN IEEE 802.1 P/Q).
2. 10/100/1000 BaseT(Electrical) or 100/1000 BaseFX(Optical) Ethernet Link.
3. For Meters-Three ports accessible only through optically isolating modules
4. RS 485/LAN port for communication with Local PC

The internal communication with the main meter data gateway and other meters in a particular location may use available communication and interface may be decided based on local available communication protocol.

4.1.4. Tele-protection/Control

Equipment protection, Tele-protection /control interface shall be used for transmitting control signal from one end to other, it can be from one sub-station to other sub-station or control centre to sub-station/generating station. Interface requirement for tele-protection devices are given below:

1. E1 G.703 Interface Option for transmission over E1 Link
2. 10/1000BaseT (Electrical) or 100/1000BaseFX (Optical) Ethernet Link
3. Optical interface
4. IEEE C37.94, ITU-T G.703 interface.
5. 4W Analog / Digital PLCC
6. IEC 61850 GOOSE Interface

4.1.5. Voice communication

Voice communication interface shall have following network interface for voice communication between user location to Control Centre:

- a. 2-wire FXO/2-wire FXS

- b. 4- wire E&M.
- c. VOIP system uses TCP/IP communication and it can use Ethernet (IEEE 802.3 / IEEE 802.3u) or Ethernet VLAN IEEE 802.1 P/Q).
- d. 10/100BaseT (Electrical) or 100BaseFX (Optical) Ethernet Link
- e. EPABX exchange to be interfaced with Wide-band network

There shall be provision for establishing voice communication to main and backup control Centre. The user end communication equipment shall be compatible with respective Control Centres.

4.1.6. Video Communication

Video communication interface shall be provided on TCP/IP communication and it can use Ethernet (IEEE 802.3 / IEEE 802.3u) or 10/100/1000BaseT (Electrical) or 100/1000BaseFX (Optical) Ethernet Link.

4.2. Control Centre

The communication interfaces to be provided at the control centre end shall support all the interfaces that is required at the remote end. Apart from interface requirements of the remote stations, high bandwidth links are required for inter control centre protocol (ICCP) communication and proprietary protocol like ISD / Multisite for Main & Backup operation. Configurable Ethernet ports supporting up to 1 Gbps may be provided at the control centre end.

The communication equipment shall also support internal VLAN configuration to optimise the communication with the remote end.

Different types of interface required at Control Centre are:

- a) E1/ G.703 Interface Option for transmission over E1 Link
- b) 10/100/1000BaseT(Electrical) or 100/1000BaseFX(Optical) Ethernet Link
- c) Optical interface
- d) IEEE C37.94, ITU-T G.703 interface.
- e) Gigabit Ethernet or Gigabit optical interface

4.3. Communication Equipments

The various types of Interfaces required in communication equipment at Remote Station and ControlCentre shall be governed in accordance with Schedule II of CEA (Technical Standards for Communication System in Power System Operations) Regulations, 2020, as applicable.

5. Cross-Border Power System Connections

The Regulation 18 (Data and Communication Facilities) of the CERC (Cross Border Trade of Electricity) Regulations 2019 stipulates as follows:

“Reliable and efficient voice and data communication systems shall be provided to facilitate necessary communication and data exchange, and supervision or control of the grid by the NLDC or RLDC, under normal and extraordinary conditions. Such communication system must be established from generating station or concerned grid substation(s) to control room of System Operator of a neighbouring country and from there to control room of System Operator of India. Provided that the Cross Border Transmission Link shall necessarily have reliable and efficient voice and data communication systems with the System Operators on both the sides.”

Accordingly, at each point of interconnection on Indian side; respective transmission licensee should ensure facilitating interface requirement for cross border interconnections and shall take necessary measures to comply with the aforesaid regulation and the interface guidelines issued by NLDC in this regard.

From Network Security point of view, at Landing Locations (in India Side) a layer of isolation shall be made between interfacing point/node & ISTS (Inter State Transmission System) Communication Network node. Further complete separation shall also be maintained for configuring End-to-End connectivity of Identified Data & Voice Channels.

The provisions mentioned under this Clause 5 shall comply with the cyber security requirements outlined in Clause 6 of this document.

6. Cyber Security Requirements

The communication service provider while providing the interfaces for the data exchange between the control centres, between the user station and the Control Centre must comply with CERT-In, NCIIPC (National Critical Information Infrastructure Protection Centre) guidelines for the interface

being provided to the end user in accordance with CEA (Technical Standards for Communication System in Power System Operations) Regulations, 2020.

Necessary firewall/router as per requirement shall be provided by the respective users while connecting the remote equipment with the control centre network. Direct connectivity with the operational network be avoided while connecting the remote station and shall be through firewall with necessary VLAN configuration.

A typical diagram related to the cyber security requirements is attached at ***Annexure – IV***.

7. Maintenance, Validation and Testing

Users shall facilitate for periodic maintenance and testing of interface equipment owned by them in accordance with procedure for maintenance and testing to be prepared by CTU in accordance with CERC Communication Regulations, 2017.

8. Document Revision

The interface requirement is based on current protocols implemented at different control centres and remote end equipment and the available protocols and communication interfaces available based on the available communication technology. The documents shall be revised as and when there is change in technology, and as and when any deficiency is noticed with approval of CERC.

Annexure B.2.8.4.



भारत सरकार
विद्युत मंत्रालय
पूर्वी क्षेत्रीय विद्युत समिति

GOVERNMENT OF INDIA
MINISTRY OF POWER
EASTERN REGIONAL POWER COMMITTEE



No: ERPC/TCC&COMMITTEE/14/2018/ 6731-6800

Date: 18.12.2018.

To,

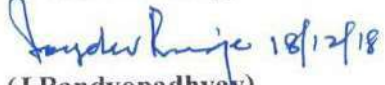
1. Members of Eastern Regional Power Committee.
2. Members of TCC.

Subject: Minutes of 39th ERPC & TCC Meetings.

Sir,

The minutes of the 39th TCC & ERPC meetings held on 16th & 17th November, 2018 respectively in Jaipur have been issued and uploaded on www.erpcc.gov.in. As per the decision of ERPC distribution of hard copies of the Minutes of Meetings has been discontinued as a GO Green initiative.

Yours faithfully,


(J.Bandyopadhyay)
Member Secretary

Attach: As above.

POWERGRID emphasized that above figures are based upon received offer only from M/S TCS. Already negotiation process is going on with M/S TCS and once finalized, the value will be intimated during placement of LOA.

TCC may approve.

Deliberation in the TCC meeting

TCC agreed to implement 4th phase AMR at a cost of Rs 1.75 Cr in place of Rs. 93.56 lakhs approved earlier, considering the added requirement of meters, locations, additional functionality, AMC etc.

It was referred to ERPC for final concurrence.

ERPC may approve.

Deliberation in the ERPC Meeting

After deliberating in details regarding the added requirement of Meters, Locations, Additional functionalities etc. as detailed in the Agenda and taking into consideration the deliberations in the TCC meeting on the previous day, ERPC accorded the approval for procurement and installation of AMRs under 4th phase in the Eastern Region at an estimated cost of Rs. 1.75 Crore in place of Rs. 93.56 Lakh as approved earlier in the 37th ERPC Meeting. ERPC suggested that Power Grid should ensure reliability in data transmission by implementing LAN connectivity through OPGW Network wherever feasible.

ITEM NO. 3.3:	REPLACEMENT OF OLD RTUS IN EASTERN REGION FOR REPORTING OF RTU/SAS TO BACKUP CONTROL CENTRES (INCLUSION OF CHANDWA, KISHENGANJ & DALTONGANJ S/S)
----------------------	---

In 36thTCC/ERPC meeting, proposal of replacement of RTU (as per Committee constituted in 35th ERPC meeting), was approved. It was also advised that replacement of OPGW on older ULDC lines might be deliberated in lower forum before submitting for TCC/ERPC approval.

In 37th TCC/ERPC Meeting, ERPC authorized POWERGRID to undertake the works related to replacement of the old RTUs of the Eastern Region. It was also decided by the ERPC that the investment made in this regard shall be recovered by POWERGRID **through tariff**. However, subsequent O&M shall be the responsibility of the concerned constituents.

In 38thTCC/ERPC Meeting, ERPC accorded in-principle approval to undertake the works related to “Upgradation of SCADA / RTUs / SAS in the Central sector stations and strengthening of OPGW network” with the following scope:

- A) Replacement of Old RTUs/SAS and Upgradation of SAS in Eastern Region.*

- B) Implementation of BCU based Substation Automation System at 05 nos. substations in Eastern Region.
- C) Replacement of Old DCPS & UPS in Eastern Region.
- D) Laying of OPGW (903 Km) in Eastern Region.

The detailed scope of the project is enclosed in **Annexure-B3**.

In the meeting it was also decided that Power Grid would prepare necessary DPR for cost estimation and the same should be placed in the next ERPC Meeting for according the financial approval.

In 150th OCC, Powergrid requested to include 400kV Chandwa, Kishenganj & Daltonganj Substations of Powergrid ER-I in the above project. The total nos. of Substation of POWERGRID/ER-1 for RTU/SAS Upgradation under the aforementioned projects shall become 18 (namely Bihar Sharif, Jamshedpur, Purnea 400, Purnea 220, Sasaram HVDC, Muzaffarpur, Patna, Banka, Lakhisarai, Ranchi, New Ranchi, Chaibasa, Gaya, Sasaram 765, Ara, Chandwa, Kishenganj & Daltonganj).

OCC in principle agreed to include 400kV Chandwa, Kishenganj & Daltonganj Substations in the project.

OCC advised Powergrid to give a detailed presentation on scope of work of the project along with cost implication in 39th TCC Meeting.

In 22nd SCADA O & M meeting held on 30th October 2018, it has been clarified that as per Annexure-B3, POWERGRID's scope shall be limited to replacement / up-gradation of old RTUs / SAS only for POWERGRID sub-stations in the Eastern Region. Other utility/constituents have to take up the replacement / up-gradation activity of their own. However, utility/constituents can approach POWERGRID for the same on consultation basis through POWERGRID.

Powergrid may give a presentation.

Deliberation in the TCC meeting

Powergrid gave a presentation on scope of work under the project along with cost implication. Powergrid informed that total cost involvement would be around Rs. 88.57 Cr. with an implementation time of 36 months. This cost includes procurement and installation of 4 no. of PMUs for 4 STATCOM Projects in the Eastern Region.

During the presentation, ERPC Secretariat asked for clarification for the breakup of 1178 km length of OPGW which was earlier 903 km as approved in 38th TCC/ERPC meeting.

Powergrid could not furnish the details in the meeting.

TCC advised Powergrid to submit the clarification regarding the above to ERPC Secretariat.

TCC accepted the project and recommended that funding for this project shall be explored first from PSDF. If no fund is granted from PSDF, then the project would be taken as regional project and will be recovered through Tariff.

TCC authorised Powergrid to place the proposal for PSDF.

TCC referred to ERPC for approval.

ERPC may approve.

Deliberation in the ERPC Meeting

Powergrid clarified that the length of OPGW has been increased from 903 km to 1178 km due to inclusion of OPGW relating to “the last mile connectivity between Power grid S/s and the Switch yard Control room of Central Sector Generators” project as approved in the 38th ERPC Meeting (Item No. 3.4). Detail breakup of OPGW is enclosed at **Annexure-B3.1**.

After deliberation, ERPC decided the followings:

- i) ERPC approved the proposal of Power Grid for replacement of the old RTUs in the Eastern Region for reporting of RTU / SAS to backup control centres at an estimated cost of Rs. 88.57 Crore with an implementation time of 36 months.
- ii) Power Grid shall place a proposal before PSDF Committee for financing the above project from PSDF.
- iii) In case of non- availability of required funding from PSDF, the project shall be implemented by Power Grid and the cost shall be recovered by Power Grid through tariff.
- iv) Member Secretary, ERPC shall coordinate with Power Grid for implementation of the above project.

ITEM NO. 3.4:	ARRANGEMENT FOR AUXILIARY POWER SUPPLY OF MAKE-UP WATER PUMP HOUSE FOR TTPS-III PROJECT OF NTPC
----------------------	--

As informed by NTPC, a power project namely Talcher Thermal power Project Stage –III (TTPS-III) of NTPC with capacity of 2X660MW is coming up in the vicinity of existing TTPS station (460 MW). The make-up water for TTPS-III is proposed to be taken from reservoir of Samal barrage, which is at a distance of approximately 28 Km from the project. The route for laying the power supply for 28Km involves forest and densely populated residential /Agricultural land as such it would not be feasible to get ROW for laying the line.

The make-up water pump house of TTPS-III has three pumps with each having power rating of 600KW. During normal operation, two pumps would be running and one standby. The maximum power consumption would be 1.8MW. The pump house is in the vicinity (at a distance of 7 Km) of TSTPS-I.

Annexure B.2.11.1

सेंट्रल ट्रांसमिशन यूटिलिटी ऑफ इंडिया लिमिटेड
CENTRAL TRANSMISSION UTILITY OF INDIA LIMITED
(Wholly Owned Subsidiary of Power Grid Corporation of India Limited)
(A Government of India Enterprise)

Ref. No. CTU/COMM/ERPC/ALPRDWR/EQPMT

Date: 06.06.2024

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

Kind Attn: Shri N.S Mondal

Sub: Scheme for deployment of SDH equipment and amplifier at Alipurduar S/s of Eastern Region.

Dear Sir,

MD, PHPA-II requested CEA for commissioning of OPGW based communication, control and protection system of transmission lines connecting Alipurduar substation and Bhutan, vide their letter reference no. PHPA-IUMD/CEA/2023/206 dated 04.12.2023.

CEA after deliberation with all stakeholders has directed POWERGRID to provide necessary equipments at Alipurduar end vide its file ref no. CEA-PS-12-17(15)/I/2018-PSPA-II Division dtd.14.03.2024.

In view of above, the following scheme is proposed:

'Deployment of FOTE(SDH Equipment) and amplifier solutions at Alipurduar S/s end for OPGW based communication and Teleprotection for 400kV lines from PHEP-II, PHEP-I and Jigmeling of Bhutan to Alipurduar, India'.

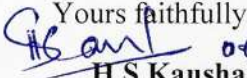
In line with MoP office order no. 15/03/2017-Trans-Pt (1) dated 09.03.2022 regarding "Guidelines on Planning of Communication System for Inter-State Transmission System (ISTS)- reg", as per clause 5 for Category (B) Communication Schemes/Packages proposed by CTUIL for upgradation/modification of existing ISTS Communication System shall be put up to RPC for their views. RPC to provide their views on the Schemes/Packages proposed by CTUIL within 45 days of receipt of the proposal from CTUIL.

Clause 5 for category (B) is stipulated below:

"Communication Schemes/Packages proposed by CTUIL for upgradation/modification of existing ISTS Communication System, standalone projects, adoption of new technologies shall be put up to RPC for their views. RPC to provide their views on the Schemes/Packages proposed by CTUIL within 45 days of receipt of the proposal from CTUIL".

In consideration of above, it is requested that ERPC may forward their views in respect of the scheme attached at **Annexure-I** at the earliest, so that the scheme may be taken up promptly for consideration in the NCT meeting along with the views of ERPC.

Thanking you,

Yours faithfully,

H S Kaushal

Sr. General Manager (CTUIL)

Annexure I

Deployment of FOTE(SDH Equipment) and amplifier solutions at Alipurduar S/s end for OPGW based communication and Teleprotection for 400kV lines from PHEP-II, PHEP-I and Jigmeling of Bhutan to Alipurduar,India

S. No.	Items	Details
1.	Scope of the scheme	<p>Deployment of FOTE(SDH Equipment) and amplifier solutions at Alipurduar S/s end for OPGW based communication and Teleprotection for 400kV lines from PHEP-II, PHEP-I and Jigmeling of Bhutan to Alipurduar,India:</p> <p>a)1 set of STM-4 SDH equipment alongwith panel supporting minimum five directions with MSP(Multiplex Section Protection 1+1) & equipped with E1 and Ethernet interfaces.</p> <p>b)6 sets of 175 km Amplifiers solutions: 2 directed towards Punatsangchhu-II(PHEP-II), 2 directed towards Punatsangchhu-I(PHEP-I) and 2 directed towards Jigmeling.</p> <p>POWERGRID to coordinate with Bhutan ends while procuring the equipment to avoid any non-compatibility issues.</p>
2.	Depiction of the scheme on FO Map	NA
3.	Objective / Justification	<p>a)OPGW has been installed on Alipurduar- Jigmeling and Punatsagnchhu-II/ Punatsagnchhu-I -Alipurduar 400 kV lines</p> <p>b) SDH technology based Fiber Optic Terminal Equipment (FOTE) is deployed in Indian Grid including Alipurduar substation, as it provides a highly reliable and synchronized communication infrastructure. However, Bhutan is implementing MPLS-TP in their whole system including at Punatsangchhu-II for data and teleprotection.</p> <p>d)There will be issue in protection and data communication between SDH at one end i.e Alipurduar,India and MPLS-TP at other end i.e Punatsangchhu-II,Bhutan.</p> <p>e) Considering the necessary capabilities to ensure the accurate coordination of devices between India and Bhutan as well as to cater to cybersecurity issue of the Indian Grid, the proposed scheme for Alipurduar S/s end needs to be implemented.</p> <p>f) Further at the Alipurduar end, communication between the existing SDH equipment and the newly proposed equipment will occur over the E1 Interface. This will provide a layer of isolation between interfacing node at landing location and ISTS Communication Network.</p>

4.	Estimated Cost	Rs. 65,00000/- (Sixty Five lacs) only
5.	Implementation time frame	06 months from date of allocation.
6.	Implementation mode	To be implemented by POWERGRID in RTM mode.
7.	Deliberations	<p>MD, PHPA-II requested CEA to provide necessary communication to the concerned Authority so as to enable purchase and commissioning of OPGW based communication, control and protection system of transmission lines connecting Alipurduar substation and Bhutan, vide their letter reference no. PHPA-IUMD/CEA/2023/206 dated 04.12.2023.</p> <p>CEA after deliberation with all stakeholders has directed POWERGRID to provide necessary equipments at Alipurduar end vide its file ref no. CEA-PS-12-17(15)/1/2018-PSPA-II Division dtd. 14.03.2024 (attached as Annexure A).</p> <p>In view of above, this scheme is prepared and put up to ERPC for review. Post ERPC review, this scheme shall be put up to NCT for approval.</p>



भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

केंद्रीय विद्युत प्राधिकरण

Central Electricity Authority

विद्युत प्रणाली योजना एवं मूल्यांकन प्रभाग-II

Power System Planning & Appraisal Division-II

To,

- | | |
|---|--|
| 1. Mr. Rajesh Kumar Chandel (Managing Director),
Punatsangchhu-II Hydroelectric Project Authority, Bjimthangkha,
Wangduephodrang, Bhutan
Email : md@phpa2.gov.bt | 2. Mr. S.K. Yadav
(Managing Director),
Punatsangchhu-I Hydroelectric Project Authority, Bjimthangkha,
Wangduephodrang, Bhutan |
| 3. Director (Projects)
Power Grid Corporation of India Limited
Saudamini, Plot No.2, Sector 29,
Gurgaon (Haryana) - 122001, India | |

Subject: OPGW based Communication and Tele-protection system for 400 kV lines from PHEP-II, PHEP-I and Jigmeling to Alipurduar, India – reg.

Sir,

This has reference to Managing Director, PHPA-II letter No. PHPA-II/MD/CEA/2023/206 dated 04.12.2023 requesting CEA to provide necessary communication to the concerned Authority so as to enable purchase and commissioning of OPGW based communication, control and protection system of transmission lines connecting Alipurduar substation and Bhutan.

The matter has been examined and following is mentioned:-

- 1) OPGW has been installed on Alipurduar – Jigmeling and Punatsagnchhu-II/Punatsagnchhu-I – Alipurduar 400 kV lines.
- 2) Bhutan is implementing MPLS-TP in their whole system including at Punatsangchhu-II for data and teleprotection.
- 3) SDH technology based Fiber Optic Terminal Equipment (FOTE) is deployed in Indian Grid including Alipurduar substation, as it provides a highly reliable and synchronized communication infrastructure. In the integrated Indian Grid, precise timing and synchronization are crucial for grid operations, which is being successfully catered to by SDH.
- 4) There will be issue in protection and data communication between SDH at one end (Alipurduar) and MPLS-TP at other end (Punatsangchhu-II).

Considering the necessary capabilities to ensure the accurate coordination of devices as well as to cater to cybersecurity issue of the Indian Grid, following solution needs to be implemented:

I/34462/2024

1. Deployment of STM-4 – SDH equipment (STM-4) (4 Nos.) alongwith panel/s supporting minimum five (5) directions with MSP (Multiplex Section Protection – 1+1), equipped with E1 and Ethernet interfaces at following locations:

- Punatsangchhu-II – 1 Set
- Punatsangchhu-I – 1 Set
- Jigmelling – 1 Set
- Alipurduar – 1 Set

2. Further, following Amplifier Solution would also be required:

S. No.	Generating station/ substation	Required amplifiers solutions	Remarks
1.	Punatsangchhu-II	2 sets of 175 km	All directed towards Alipurduar
2.	Punatsangchhu-I	2 sets of 175 km	
3.	Jigmelling	2 sets of 175 km	
4.	Alipurduar	6 sets of 175 km	2 directed towards Punatsangchhu – II, 2 towards Punatsangchhu – I and 2 towards Jigmeling

3. The SDH equipment (STM-4) along with Amplifier Solutions in Bhutan need to be procured and installed by the respective project authority or BPC. The equipment at Alipurduar would be provided by POWERGRID. Both side entities to coordinate while procuring the equipment to avoid any non-compatibility issues.

4. Network Traffic Plan:

- At the Punatsangchhu-II, Punatsangchhu-I and Jigmeling end: MPLS-TP traffic originating from the Bhutan Network will be routed through the Ethernet interface (EoS) of the newly proposed SDH equipment.
- At the Alipurduar end: Communication between the existing SDH equipment and the newly proposed equipment will occur over the E1 Interface. This will provide a layer of isolation between interfacing node at landing location and ISTS Communication Network node.

5. Redundant path of data & teleprotection shall be routed through PLCC link between Punatsangchhu-II/ Punatsangchhu-I – Alipurduar and Jigmeling – Alipurduar.

Yours faithfully,


(B.S. Bairwa)
Director

Copy to:

1. Director, Department of Energy, Ministry of Energy and Natural Resources, Bhutan
2. Chief Operating Officer, Bhutan Power Corporation, Thimpu
3. Member Secretary, Eastern Regional Power Committee (ERPC), Kolkata
4. Chief Operating Officer, CTUIL

Annexure B.2.11.2

Cost Estimate For Equipment at Alipurduar

Sl. No.	Description	Amount (in Lakhs (Rs.))
	Equipment Cost	
A	Supply	42.00
	Sub- Total A	
B	Services/Installation incl training, testing and commissioning	0.55
C	Inland Freight and Insurance	4.20
	Subtotal (A to C)	46.75
D	Taxes and Duties	
i	GST on Supply	7.56
ii	GST on Service / Installation incl. Training	0.10
	Subtotal (D)	7.66
	Subtotal (A to D)	54.41
E	Incidental Expenditure during Construction	5.85
F	Contingency	1.63
	Total (A to F)	61.89
G	Interest During Construction (IDC)	3.09
	Grand Total	64.98
H	Annual maintenance charges for 1 year during warranty period and 6 years after warranty period incl. GST*	0.71

S.No	Items	Units	Quantity	Supply (Rs)	Total	F&I (Rs)	Services(Rs.)	Total price (Rs.)	
1	SDH EQUIPMENT (STM-4 MADM UPTO 5 MSP PROTECTED DIRECTIONS)-BASEEQUIPMENT (COMMON CARDS, CROSS CONNECT/CONTROL CARDS, OPTICAL BASECARDS, POWER SUPPLY CARDS, POWER CABLING, OTHER HARDWARE ANDACCESSORIES INCLUDING SUB	EA	1	700012	700012		52434	52434	752446
2	SFP S16.1	EA	2	15120	30240		136	272	30512
3	optical Line interface card- STM4 - 225 KM	EA	6	446784	2680704		120	720	2681424
4	TRIBUTARY INTERFACE- E1 INTERFACE (MINIMUM 16 NOS.)	Set	2	71876	143752		72	144	143896
5	ETHERNET INTERFACE 10/100 BASE T WITH LAYER-2 SWITCHING (MIN 8 INTERFACES PER TRIBUTARY INTERFACE-GIGABIT ETHERNET INTERFACES 10/100 MBPS WITH LAYER-2 SWITCHING	EA	2	94740	189480		124	248	189728
6	(MINIMUM 2 NOS.)	SET	1	35223	35223		72	72	35295
7	Equipment Cabinets For SDH	EA	1	463714	463714		1188	1188	464902
					4243125		54146		4298203

Annexure B.2.15

Generators	Region	Beneficiary currently using API from existing WBES	RLDC have send new API details of New WBES	API integration done for New WBES	Expected date of integration, if due	Remarks
APNRL	ER	No	YES			
BARH	ER	YES	YES	No	30.06.24	
BARH-I	ER	YES	YES	No	30.06.24	
BRBCL	ER		YES			
CHUKHA	ER	No	YES			
CHUZACHEN	ER	No	YES			
Darlipali_NTPC	ER	YES	YES	No	30.06.24	
DIKCHU	ER	No				
FSTPP_I & II	ER	YES	YES	No		
FSTPP-III	ER	YES	YES	No		
GMRKEL	ER	No	YES	No	31.08.24	
IND_BHARAT	ER	No	YES			
JITPL	ER	No	YES			
JLHEP	ER	No	YES	No	07.06.24	
KHSTPP-I	ER	YES	YES	No	08.06.24	
KHSTPP-II	ER	YES	YES	No	08.06.24	
KURICHU	ER	No	YES			
MANGDECHU	ER	No	YES			
MPL	ER	No	YES	No		
MTPS-II	ER	YES	YES	No	05.06.24	
Nikacchu_Bhutan	ER	No				
North_Karanpura_STPS	ER		YES			
NPGC	ER		YES			
RANGIT	ER	YES	YES	No		
Rongnichu	ER	No				
TAL_SOLAR	ER		YES			
TALA	ER		YES			
Teesta_III	ER	No				
Teesta_V	ER	YES	YES	No		
THEP	ER	No	YES	No	07.06.24	
TPTCL_DHPPB	ER	No				
TSTPP-I	ER		YES			
	ER					
Beneficiaries	Region	Beneficiary currently using API from existing WBES	RLDC have send new API details of New WBES	API integration done for New WBES	Expected date of integration, if due	Remarks
BIHAR_STATE	ER	YES	YES	No	07-06-2024	
JHARKHAND_STATE	ER	No	YES	No		No plans as of now
E	ER	No	YES			
WB_STATE	ER	YES	YES	YES	05-06-2024	
BANGLADESH_NVVN	ER		YES			
						Will be required upon samast implementation expected within 6 months
DVC_STATE	ER	No	YES	No		
ODISHA_STATE	ER		YES			
SIKKIM_STATE	ER	No	YES	No		
HVDC_APD_State	ER	No	YES			
NEPAL_NVVN	ER	No	YES			
ECR_State	ER	No	YES			

ANNEXURE-B.2.16

River Bank photos at tower no 91



Annexure D.1

Anticipated Peak Demand (in MW) of ER & its constituents for July 2024

1	BIHAR	Demand (MW)	Energy Requirement (MU)
	NET MAX DEMAND	8057	4745
	NET POWER AVAILABILITY- Own Sources	429	313
	Central Sector+Bi-Lateral	5867	3771
	SURPLUS(+)/DEFICIT(-)	-1760	-661
2	JHARKHAND		
	NET MAXIMUM DEMAND	2150	1271
	NET POWER AVAILABILITY- Own Source	307	108
	Central Sector+Bi-Lateral+IPP	1137	658
	SURPLUS(+)/DEFICIT(-)	-710	-505
3	DVC		
	NET MAXIMUM DEMAND	3573	2215
	NET POWER AVAILABILITY- Own Source	5604	3188
	Central Sector+MPL	367	226
	Bi- lateral export by DVC	2393	1781
	SURPLUS(+)/DEFICIT(-) AFTER EXPORT	4	-582
4	ODISHA		
	NET MAXIMUM DEMAND (OWN)	5600	3162
	NET MAXIMUM DEMAND (In Case of CPP Drawal of 950 MW(peak) and average drawl of 700 MW)	6372	3497
	NET POWER AVAILABILITY- Own Source	4220	3193
	Central Sector	1461	1070
	SURPLUS(+)/DEFICIT(-) (OWN)	81	766
	SURPLUS(+)/DEFICIT(-) (In Case of CPP Drawal of 950 MW(peak) and average drawlm of 700 MW)	-691	1101
5	WEST BENGAL		
	WBSEDCL		
5.1	NET MAXIMUM DEMAND	9468	5980
	NET MAXIMUM DEMAND (Incl. Sikkim)	9478	5987
	NET POWER AVAILABILITY- Own Source (Incl. DPL)	5041	3020
	Central Sector+Bi-lateral+IPP&CPP+TLDP	2302	1245
	EXPORT (To SIKKIM)	10	7
	SURPLUS(+)/DEFICIT(-) AFTER EXPORT	-2135	-1722
5.2	CESC		
	NET MAXIMUM DEMAND	2230	1199
	NET POWER AVAILABILITY- Own Source	830	556
	IMPORT FROM HEL	541	392
	TOTAL AVAILABILITY OF CESC	1371	948
	DEFICIT(-) for Import	-859	-251
		830	-251
	WEST BENGAL (WBSEDCL+CESC+IPCL) (excluding DVC's supply to WBSEDCL's command area)		
	NET MAXIMUM DEMAND	11698	7179
	NET POWER AVAILABILITY- Own Source	5871	3576
	CS SHARE+BILATERAL+IPP/CPP+TLDP+HEL	2843	1637
	SURPLUS(+)/DEFICIT(-) BEFORE WBSEDCL'S EXPORT	-2984	-1966
	SURPLUS(+)/DEFICIT(-) AFTER WBSEDCL'S EXPORT	-2994	-1973
6	SIKKIM		49
	NET MAXIMUM DEMAND	93	315
	NET POWER AVAILABILITY- Own Source	378	90
	Central Sector	137	356
	SURPLUS(+)/DEFICIT(-)	423	
	EASTERN REGION		
	NET MAXIMUM DEMAND	31171	18887
	NET MAXIMUM DEMAND ((In Case of CPP Drawal of 800 MW(peak) and average drawl of 700 MW)	31971	19222
	BILATERAL EXPORT BY DVC (Incl. Bangladesh)	2393	1781
	EXPORT BY WBSEDCL TO SIKKIM	10	7
	EXPORT TO B'DESH & NEPAL OTHER THAN DVC	642	478
	NET TOTAL POWER AVAILABILITY OF ER (INCLUDING CS ALLOCATION +BILATERAL+IPP/CPP+HEL)	26228	16365
	SURPLUS(+)/DEFICIT(-)	-7988	-4787
	SURPLUS(+)/DEFICIT(-) (In Case of CPP Drawal for Odisha)	-8788	-5122