



सत्यमेव जयते

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
पूर्वी क्षेत्रीय विद्युत समिति

Eastern Regional Power Committee

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युद्धेय कुटुम्बकम्
ONE EARTH - ONE FAMILY - ONE FUTURE



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NO. ERPC/OPERATION/2023/16

DATE: 10.04.2023

To,

As per list enclosed.

Sub: Minutes of 13th Telecommunication, SCADA and Telemetry (TeST) Sub-Committee Meeting held on 13.03.2023 (Monday) at ERPC Conference Hall, Kolkata.

Sir,

Please find the minutes of the 13th TeST meeting of ERPC held on 13.03.2023(Monday) at ERPC Conference Hall, Kolkata available at ERPC website (<http://www.erpc.gov.in/>).

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

Regards,

Yours faithfully,

अलीक 10.04.23

(A.De)

Executive Engineer (Operation)

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**MINUTES
OF
13th TeST MEETING**

Date:10.04.2023

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

EASTERN REGIONAL POWER COMMITTEE

MINUTES OF 13th TeST MEETING HELD ON 13.03.2023(MONDAY) AT 10:30 HRS

Member Secretary, ERPC chaired the meeting.

List of participants is attached at **Annexure A**.

PART – A

ITEM NO. A.1: Confirmation of Minutes of 12th TeST Meeting held on 9th November 2022 at ERPC Conference Hall, Kolkata

The minutes of 12th Telecommunication, SCADA and Telemetry Sub-Committee meeting held on 09.11.2022 circulated vide letter dated 20.12.2022.

Members may confirm the minutes of 12th TeST meeting.

Deliberation in the meeting

Members confirmed the minutes of 12th TeST Meeting.

PART B: ITEMS FOR DISCUSSION

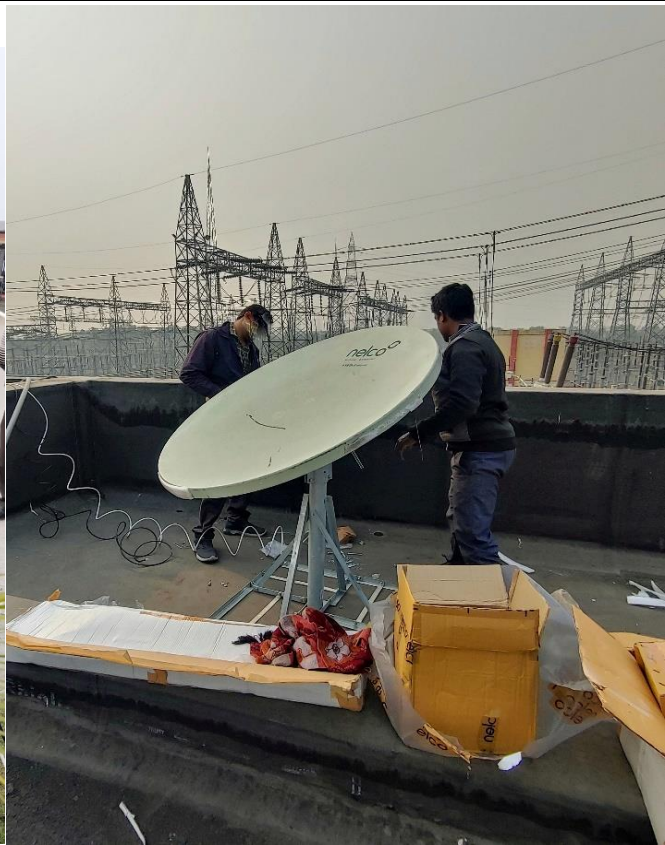
ITEM NO. B.1: Integration of VSAT communication technology with AMR system

Necessity of VSAT: Currently GPRS technology is used to retrieve data from locations inaccessible by fiber optic network. This is outdated and dependent on public IP for data transfer. In order to minimize risk of data intrusion and also increase reliability of data transfer VSAT technology is proposed. As per CEA/CERC guideline, IT and OT network should be completely isolated so removal of GPRS communication over public IP will ensure compliance.

POC Details: POC was conducted from 18th to 25th Jan'23 with Subhashgram PG as central hub and Rajarhat PG as remote SS.

Activities performed during POC:

- 1.) Installation of VSAT hardware (Antenna with base, BUC and LNB units)
- 2.) Connect with VSAT modem (connected to DCU)
- 3.) Data was transmitted from Rajarhat PG and received at Subhashgram PG using VSAT network. Further the data was routed to existing PGCIL LAN network and sent to existing AMR servers.



Vsat Location Table:

Central

Hub:

PGCIL-Subhasgram

S.No	Utility	Vsat Count	Sub Stations (with vsat count)	
1	IPP	7	ADHUNIK(APNRL)	2
			CHUZACHEN(CZN)	1
			JITPL(Jindal)	1
			STERLITE(SEL)	2
			IND-BARATH(IBR)	1
2	DVC	1	TISCO(TIS)	1
3	GRIDCO	4	BALASORE(BLS)	1
			BANGRIPOSHI	1
			GMR(GMR)	1
			JINDAL(JIN)	1
4	JHARKHAND	8	DALTONGANJ	1
			DEOGARH(DEO)	1
			GARWA(GAR)	1
			JAMTARA(JMT)	1
			JAPLA(JAP)	1
			KENDOPOS(KEN)	1
			NAGARUNTARI	1
PATRATU(PTJ)	1			
5	NTPC	3	NABINAGAR	1
			TALCHER SOLAR(TLS)	2
6	SIKKIM	3	DIKCHU	2

Actual VSAT Count is 26 sharing one central hub.

Note: Here 4 locations (Adhunik, Sterlite, Solar TLS, Dikchu) require multiple VSAT setup as distance between DCUs are significantly more and cannot be connected to a single VSAT unit.

Timeline:

From date of placing order, 6 months for installation, 1 year warranty and 2 years AMC

VSAT Cost (tentative):

Item	Unit Price	Qty	Total Price
Site survey	9223	26	239798
VSAT HW Supply with 512 kbps bandwidth	449533	26	11687858
Inst Service	82205	26	2137330
2 years AMC, after installation and 1yr warranty	204488	26	5316688

Total Cost (without Tax): 1,93,81,674

Unit Cost / location for VSAT Implementation: 7,45,449

Utility wise VSAT cost breakup:

Utility	Vsat Count	Unit price	Price	Price Including POWERGRID O/H Charges @15%
IPP	7	745449	5218143	6000864/-
DVC	1	745449	745449	857266/-
GRIDCO	4	745449	2981796	3429065/-
JHARKHAND	8	745449	5963592	6858130/-
NTPC	3	745449	2236347	2571799/-
SIKKIM	3	745449	2236347	2571799/-

Tentative projection of timeline:



Terms & Conditions

1. Respective SS must provide basic infrastructure facilities & site readiness for VSAT I&C. VSAT antenna will be installed on rooftop and needs clear line of sight towards south south-east (155 degrees) for proper communication.
2. Civil works like flattening the surface, Platform creation at rooftop will be under SS scope of work.
3. Earthing for power source of VSAT electronics and VSAT Antenna (2 separate pits for Antenna) will be under Respective SS scope of work.
4. Respective SS would be responsible to arrange 230 V AC power, all earthing, Lightening arrester, at every site.
5. Bandwidth proposed is on ExC band with double hop solution.
6. The complete network is in CUG network and will not be provided or can be accessed via Internet.
7. The complete network will be provided with a Private IP segment for each site in different subnet.
8. BUC and LNB units are main components of VSAT and are of significant cost. Therefore, it will be the responsibility of respective SS to ensure its security.

Recommendation / Cost Recovery Mechanism: -

1. Total cost including POWERGRID O/H charges are given in details, and billing will be done against individual entity (One time billing/NON-POC Billing).
2. Final rate shall be decided only after due negotiation with TCS & after placement of LOA to M/S.TCS on Single Tender basis.

In 200th OCC Meeting, Representative of ERPC briefly explained the agenda.

MS, ERPC was of the view that technicalities such as issues of cyber security etc. may be discussed in TeST Meeting.

OCC referred the agenda to the upcoming TeST Committee Meeting.

Members may discuss.

Deliberation in the meeting

Powergrid representative informed that currently GPRS technology is used to retrieve data from locations inaccessible by fiber optic network which is outdated and dependent on public IP for data transfer. In order to minimize risk of data intrusion and also to increase reliability of data transfer, VSAT technology is proposed. As per CEA/CERC guideline, IT and OT network should be completely isolated so removal of GPRS communication over public IP will ensure necessary compliance.

He further added that all slave substations not connected by fiber optic network can implement VSAT at their end which will be connected to VSAT at Master Station and from Master Station connection to ERLDC will be through LAN with firewall in between.

On enquiry from committee regarding cyber security, Powergrid representative replied that VSAT implementation is totally secure and is compatible too provided that LMV system is protected. On enquiry from MS, ERPC regarding its life he informed that VSAT has life span of minimum 7 years. He further added that in case fiber optic network is implemented at these S/s then, VSAT can be removed.

DVC representative informed that they do not require VSAT at mentioned S/s as OPGW is already implemented.

GRIDCO representative informed that ports are available at Balasore, Bangriposhi and GMR S/s as mentioned in the list.

Powergrid representative informed that implementation of OPGW is already in process at Chuzachen (time line – Dec 2023) and JITPL. That of Adhunik, Sterlite and Ind-Barath is not required.

Jharkhand representative informed that OPGW is already implemented at Daltongunj S/s, however OPGW will not be required at Patratu substation due to change in configuration.

TeST committee advised that meter data of these S/s(which are not connected through LAN) can be shared through mail to ERLDC instead of through GPRS connectivity and hands on training regarding the same, will be given to site engineers of each SLDCs preferably by 15th April'2023. Further, utilities have to make sure they send the weekly meter data strictly by Tuesday.

Further, TeST Committee referred the issue to 49th TCC & ERPC Meeting for information and further discussion, if any.

ITEM NO. B.2: Commissioning of tie line FO links and integration of intra state tie lines with existing communication system: ERLDC

It is advised by ERLDC that by integrating some of tie-line FO links b/w states with existing communication system a ring network b/w states can be formed that will increase redundancy in the system. Please find below details of these lines-

OPTCL- Jharkhand

- a. Joda-Ramachandrapur

Jharkhand- DVC

- a. Patratu-Patratu

Bihar- Jharkhand

- a. Tenughat- Biharshariff

In 12th TeST Meeting, ERLDC representative informed that by integrating tie FO links between states, ring network b/w states can be formed which in turn will increase redundancy in the communication system.

For providing tie link between Jharkhand -OPTCL, Powergrid informed that commissioning of Joda-Ramachandrapur link is in progress and link would be completed by March 2023.

For providing tie link between Jharkhand -DVC, DVC informed that proposal for implementing Joda-Jamshedpur had been already been placed before TeST Meeting. So, there may not be any need for implementing Patratu- Patratu.

For providing tie link between Bihar and Jharkhand, TeST committee enquired whether any other link can be proposed except Tenughat- Biharshariff for which Powergrid representative informed that Lalmatia- Kahalgaon tie link can be implemented to provide redundancy between Bihar - Jharkhand communication system. TeST committee advised concerned utility to explore possibility of Lalmatia-Kahalgaon in order to improve redundancy of Bihar- Jharkhand communication system.

Regarding tie link between West Bengal and Jharkhand, TeST committee advised concerned utility to explore possibility of Chandil – Santaldih link to improve redundancy of WB- Jharkhand communication system.

In addition to above links, following links are proposed by ERLDC to improve redundancy of communication system

Bihar- DVC

- Rajgir – Barhi line

West Bengal - DVC

- Kolaghat (DVC) – Kolaghat (West Bengal) line

Members may discuss.

Deliberation in the meeting

ERLDC representative briefly explained the agenda. He informed that by integrating some of tie-line FO links b/w states with existing communication system a ring network b/w states can be formed that will increase redundancy in the system. He further added that ring topology of network can be used instead of star topology for improving redundancy of system.

Regarding status of commissioning of Joda-Ramachandrapur link, Powergrid representative informed that link had been commissioned and FOTE integration at both ends is pending and expected to be completed by March 2023.

*ERLDC representative proposed list of tie links that can be commissioned for improving redundancy of communication system which is attached at **Annexure B.2.1**. He further explained agenda with help of presentation which is attached at **Annexure B.2.2**.*

MS, ERPC suggested that instead of implementing FO for interstate tie lines as proposed by ERLDC, it will be better to provide redundancy through central links (links commissioned by Powergrid).

DVC representative proposed that strengthening of newly commissioned North Karanpura S/s(DVC) may be done through Latehar- North Karanpura line.

Representative of ERPC apprised the forum that Joda- Jamshedpur link had already been approved in 47th ERPC Meeting so further any link between DVC – Jharkhand network may not be required .

TeST committee advised all utilities to share proposed redundant connectivity of their state network through existing central OPGW links to ERPC/ERLDC so that system redundancy can be improved in a better way.

ITEM NO. B.3: Agenda by WBSETCL

As discussed in the 12th TeST Meeting and in the 3rd ER-ISTS communication system meeting conducted by CTU regarding the integration of Interstate communication links with the existing ER communication network to form a ring network thereby increasing redundancy in the system effectively for SLDC and RLDCs, it is proposed that cost sharing for establishing of the OPGW may be discussed.

Members may discuss.

Deliberation in the meeting

TeST committee was of the view that cost sharing for implementing OPGW will be discussed once list

of links for OPGW implementation is finalized.

ITEM NO. B.4: Strengthening of last mile connectivity to SLDCs of ER: ERLDC

Redundant FO link from ERLDC – Subhasgram had been commissioned in the 2nd week of December 2022 which is back up link for existing UGFO link ERLDC – Kasba, there by last mile connectivity to ERLDC is strengthened.

As per discussion held in 3rd ISTS meeting, it is proposed that strengthening of last mile connectivity to SLDC need to be implemented on priority considering that total outage of real time data /voice to SLDC/ RLDC can be avoided in case of failure of existing link. Moreover, proposed connectivity needs to be done with next communication node and form a ring connectivity at last mile connectivity

Members may discuss.

Deliberation in the meeting

ERLDC representative informed that as per discussion held in 3rd ER-ISTS Communication planning meeting, it is proposed that strengthening of last mile connectivity to SLDC need to be implemented on priority basis considering that total outage of real time data /voice to SLDC/ RLDC can be avoided in case of failure of existing link. Moreover, proposed connectivity needs to be done with next communication node and form a ring connectivity at last mile connectivity.

BSPTCL representative informed that as per their record, three paths are available for last mile connectivity to SLDC Bihar through Jakkanpur, Digha and Karbighaia.

ERLDC representative advised BSPTCL to submit the updated data to ERLDC.

Regarding last mile connectivity, representative of DVC submitted the following:

Source	Destination	Ownership	Link Type	Equipments
SLDC Howrah (Main)	Link-1 - Belmuri Sbtn.	DVC	OPGW	SDH/ECI
	Link-2 - Kolaghat Sbtn.	DVC	OPGW	SDH/ECI
Maithon ALDC (Backup)	Link-1 - Maithon Hydel	DVC	OPGW	SDH/CORIAN
	Link-2 - Patherdih Sbtn.	DVC	OPGW	SDH/ECI

TeST committee advised other utilities to update status of last mile connectivity to SLDC to ERPC/ERLDC.

ITEM NO. B.5: Manpower availability at SLDCs for Cyber Security activities: ERLDC

Dedicated manpower availability at SLDCs is crucial for carrying out the activities related to Cyber Security. Presently SLDCs are operating with very skeletal manpower for Cyber Security activities as can be seen from given details-

Constituents	CISO	Alt. CISO	Number of Manpower dedicatedly engaged for cyber security related works (other than CISO/Alt CISO)
Bihar	Sh. Nishant Kumar	Rahul Kumar	

	Singh		
Jharkhand	Sh. Arun Kumar	Sh. Ashish Kumar	
Odisha	Sh. K.T. R. Achari	Mr. Prasanta Kumar Beura	(5 manpower with additional responsibility)
West Bengal	Sh. Sandip Basak	Sh. B. Mohanta	0
DVC	Sh. Manowar Ismail	Shri Abhijit Chakraborty	
Sikkim	Sh. Sonam Wongchuk	Sh. Ravi Pradhan	

Members may discuss.

Deliberation in the meeting

ERLDC representative informed that at least 2 no. of persons should be dedicatedly engaged for cyber security related works other than CISO/ Alt CISO at each SLDCs.

BSPTCL representative informed that basic training for cyber security had been already given to all persons posted at SLDCs by NPTI and advance training for cyber security will be given batch wise for these persons in due course of time by NPTI.

Jharkhand and West Bengal representatives also confirmed that training for cyber security by NPTI is under progress and will be done for all officers posted at SLDCs in batch wise schedule.

MS ERPC advised that representative from NPTI may be invited in 49th TCC Meeting in order to discuss about status of cyber security training conducted by them till date for Eastern Region and future planning.

TeST committee advised concerned utilities to nominate at least 2 officers who will be dedicatedly engaged for cyber security related works other than CISO/ Alt CISO at each SLDCs.

ITEM NO. B.6: CII and CCMP Implementation: ERLDC

Identification of CII i.e., Critical Information and Infrastructure had been completed for Bihar, Jharkhand, WB, Odisha, and DVC SLDC while it is under vetting by Sikkim SLDC.

Sikkim may update.

Deliberation in the meeting

Sikkim representative was not available in the meeting.

CCMP document had been approved for Bihar, DVC, and West Bengal. It is under vetting for Odisha, Jharkhand, and Sikkim SLDC. Odisha has submitted the document to CERT-IN after doing necessary modifications as suggested.

Concerned utilities may update.

Deliberation in the meeting

ERLDC representative submitted that CCMP document had been approved for Bihar, DVC and West Bengal. He further added that Odisha had already submitted the document to CERT-IN.

JUSNL representative submitted that CCMP document will be submitted to CERT-IN by next week.

ITEM NO. B.7: SOC Implementation at SLDCs: ERLDC

As per Information Technology (Information Security Practices and Procedures for Protected System) Rules, 2018, all constituents whose assets have been declared as CII/protected systems need to implement SOC.

Bihar has already floated tender for SOC Implementation. All other SLDCs are requested to expedite the process for SOC Implementation.

Members may update.

Deliberation in the meeting

*ERLDC representative informed that as per Information Technology (Information Security Practices and Procedures for Protected System) Rules, 2018, all constituents whose assets have been declared as CII/protected systems need to implement SOC(Security Operation Center) for which dedicated manpower will be assigned for 24*7 for security of IT and OT system. He further added that a meeting was already conducted among all utilities in Feb 2023 in order to discuss the same. Regarding funding, he added that utilities may approach PSDF for 100 % funding for which DPR need to be prepared at the earliest.*

BSPTCL representative submitted that tender had been already floated for SOC implementation with internal fund. MS ERPC suggested that request may be given to PSDF for funding.

TeST committee advised ERLDC to share draft DPR to all constituents so that tender can be floated at earliest.

ITEM NO. B.8: Implementation of ISO 27001: ERLDC

As per CEA (Cyber Security in Power Sector) Guidelines 2021, all the entities should be ISO 27001 certified.

LOA for ISO 27001 implementation had been placed for DVC, Bihar and West Bengal. Other SLDCs are requested to expedite the process.

Members may update.

Deliberation in the meeting

ERLDC representative submitted that LOA for ISO 27001 implementation had been placed by DVC, Bihar, West Bengal and Odisha.

JUSNL representative submitted that they are in process of placing tender.

Sikkim representative was not available in the meeting.

ITEM NO. B.9: VA-PT for OT(SCADA, URTDSM etc) and IT Network and its compliance: ERLDC

As per the amendment in CEA (Cyber Security in Power Sector) Guidelines 2021, VA-PT for OT system (SCADA, URTDSM etc.) needs to be carried out at least once a year and for IT system at least once for every 6 months.

Constituents have reported that submission of VA-PT reports (conducted during Jan 22- June 22) is pending from SCADA vendor end. Further, it is reported that VA-PT for 2023 is pending for all the constituents.

Concerned utilities may update.

Deliberation in the meeting

Utilities submitted that VA-PT report for 2022 had not been received from M/s Chemtrols. Further, they added that VA-PT for 2023 is pending for all the constituents.

MS, ERPC stressed upon the fact that cyber security compliance is being monitored at Ministry level as this is an issue of national importance for security hence strict action will be taken if audit and its compliance is not done in proper timeline. Further he advised M/s Chemtrols to share VA-PT report for 2022 by next week, complete VA-PT for 2023 at earliest and share VA-PT report for 2023 by April 2023.

ITEM NO. B.10: Upgradation of SCADA OS: ERLDC

As per recommendation by MoP in various meetings, end of support devices/software should be either upgraded or replaced. Accordingly, ERLDC has upgraded its OS in SCADA desktops to Windows 10 Pro.

All the SLDCs are requested to upgrade the OS in their SCADA systems to the latest version.

Members may discuss.

Deliberation in the meeting

BSPTCL representative informed that at present Windows 7 operating system is present in SCADA system at SLDC however they are planning to upgrade the OS.

Odisha, West Bengal and JUSNL representatives informed that they are also planning to upgrade OS to Windows 10 Pro.

DVC representative informed that they had already communicated issue to M/s Chemtrols and they are in process of cost negotiation.

On query from utilities whether it is necessary to upgrade their OS through M/s Chemtrols or they can assign different vendors for the same work, representative of ERLDC representative informed that they had upgraded the OS in SCADA system at ERLDC through M/s Chemtrols but it is not necessary to get it done by Chemtrols.

Representative of M/s Chemtrols submitted that in case work is assigned to different vendor and if any

problem arises in future related to OS, in that case it would be difficult for M/s Chemtrols to provide necessary support.

TeST committee advised that it will be better if OS upgradation work is done by M/s Chemtrols for all utilities, thus increasing the number of OS required to be installed and subsequently total cost will be reduced which will benefit every utility and total cost can be shared among all utilities in proportion to their requirement of OS. Further in accordance with the requirement of Graphic cards, RAM etc by utilities additional cost would be added.

ITEM NO. B.11: Status of Implementation of ULDC SCADA Phase-III by Powergrid

ERLDC had submitted that after submission of BOQ and technical specifications from Powergrid, Meeting on BoQ was held on 16.02.23 following which first round discussion on finalization of technical specifications was held on 06.03.23 with Powergrid, ERLDC & all SLDCs of ER.

The upgradation project process needs to be expedited by Powergrid.

Powergrid may update.

Deliberation in the meeting

Powergrid representative replied that NIT for upgradation work of SCADA will be floated by April 2023.

ITEM NO. B.12: Status of procurement of new DCPS for ERLDC: ERLDC

Current DCPS at ERLDC was installed in ULDC phase – I nearly 17 years back, and it could not cater the present load at ERLDC in 1+1 mode hence replacement of the same needs to be done on priority basis. Same had been intimated to PG in the month of June 2022.

In 12th TeST Meeting, ERLDC representative informed that the existing DCPS at ERLDC was installed in ULDC phase – I i.e., nearly 17 years back and it is unable to cater the present load at ERLDC in 1+1 mode hence replacement of the same needs to be done on priority basis. He further added that at present DCPS of 40 A + 40 A is present however present load at ERLDC is around 50 A and considering load growth for next 15 years, it is proposed to install DCPS of 100 A + 100 A capacity so that no issue can be observed for next 15 year.

Powergrid representative informed that procurement of DCPS is under approval stage and it will be installed by May 2023.

MS ERPC advised Powergrid to place order through GeM portal if possible and install DCPS by March 2023.

TeST committee agreed for the same and advised Powergrid to expedite the procurement of DCPS and install DCPS at ERLDC by March 2023.

Powergrid may update.

Deliberation in the meeting

Powergrid representative informed that tender was floated earlier however no parties had participated in the tender and subsequently fresh tender is planned for which bidding will be opened on 20th March 2023 and it is expected that DCPS will be installed at ERLDC by June 2023.

ITEM NO. B.13: Replacement /Upgradation of old RTUs in eastern region: ERLDC

The report on “Replacement/up-gradation of old RTUs in Eastern Region” for Real Time data transfer to ERLDC Main and Back-up Control Center over IEC104 protocol was approved by ERPC in 36th ERPC meeting held at Bhubaneswar on 14th September 2017.

The contract for replacement/up-gradation of old RTUs in Eastern Region was awarded subsequently to Powergrid on 31st December, 2020.

As per the reference of Minutes of Meeting of 8th TeST Meeting of ERPC attached at **Annexure B13.1**, Powergrid had agreed to replace the old RTUs on priority basis as per the list submitted by ERLDC. However, few old S-900 RTUs mentioned in the priority list (like Jamshedpur, Bihar Shariff, Muzaffarpur etc.) had not been replaced yet.

The Real time Grid Operation at ERLDC is getting adversely affected on account of frequent failure of SCADA data from above mentioned old S-900 RTUs which had completed their life span. Apart from this, it had been observed that the poor maintenance of the these old RTUs is affecting the availability of Telemetry.

Please find below required details:

Total number of S/s where SAS upgradation to be done: 22. List is attached at **Annexure B13.2**.

Total number of S/s where SAS upgradation completed:7

Total number of S/s where RTUs to be replaced:17. List is attached at **Annexure B13.3**.

In 12th TeST Meeting, Powergrid representative informed that due to covid pandemic, upgradation work got delayed; however, upgradation work of SAS had been already completed at various substations and pending SAS upgradation work will be completed by March 2023. Regarding RTU upgradation, he informed that supply of new RTUs would be done for all substations by Dec 2022 and commissioning at all substations would be completed by June 2023.

MS, ERPC advised Powergrid to expedite the process and complete work by March 2023.

TeST committee advised Powergrid to complete the upgradation work of SAS by March 2023 and upgradation work of RTU by June 2023.

Powergrid may update.

Deliberation in the meeting

Powergrid representative informed that SAS upgradation work of 15 substations had been completed out of 21 and remaining SAS upgradation work will be completed by April 2023.

ITEM NO. B.14: Update regarding status of upgradation of SCADA/RTUs/SAS in central sector stations of Eastern Region

Under the project Upgradation of SCADA/RTUs/SAS in Central Sector Stations of Eastern Region approved in 36th & 39th ERPC Meeting, RTU replacement at total 17 no. of sites and SAS Upgradation at 22 no. of stations was approved for Eastern Region. FAT for RTU has been completed and material is currently being dispatched to various sites. Supply for SAS Upgradation work has been completed at all sites and presently installation is going on at various sites. In this regard, this is to inform that SAT for SAS Upgradation work at Birpara (PG) had been completed on 22/08/2022 and presently data of entire Birpara (PG) (220/132 kV) is reporting at ERLDC on IEC 104 protocol. Further, SAS upgradation work is going on in New Melli SS and is near final stage for SAT and database has been developed for Behrampore SS where validation work shall commence soon.

In the subject package, RTU Replacement work at Malda and Dalkhola and BCU based SAS upgradation work at Siliguri was envisaged. In this regard, it is to be noted that under ADDCAP 2019-24 Tariff block, the entire Malda, Dalkhola and Siliguri substations are considered for conversion to SAS based Substations with complete renovation including entire control/protection system and switchyard items. Therefore, after conversion of protection system from conventional to SAS, automatically data transmission part to ERLDC will be taken care through new SAS. In view of above, the RTU to be supplied under subject project at Malda and Dalkhola shall cease to be of any usage. Therefore, it would be prudent to de-scope the RTU replacement work at Malda and Dalkhola under RTU Replacement/SAS Upgradation project. Further, the SAS already supplied at Siliguri SS under subject project (RTU Replacement/SAS Upgradation project) is proposed to be diverted to Durgapur Substation for conversion of existing conventional 400/220 kV system to SAS based system. In this regard, necessary techno-commercial discussion is being explored with OEM-M/s Siemens Ltd. and details shall be shared subsequently.

Powergrid may explain.

Deliberation in the meeting

Powergrid representative informed that under ADDCAP 2019-24 Tariff block, the entire Malda, Dalkhola and Siliguri substations are considered for conversion to SAS based Substations with complete renovation including entire control/protection system and switchyard items. Therefore, after conversion of protection system from conventional to SAS, automatically data transmission part to ERLDC will be taken care through new SAS. In view of above, the RTU to be supplied under subject project at Malda and Dalkhola shall cease to be of any usage therefore it is prudent to de-scope the RTU replacement work at Malda and Dalkhola under RTU Replacement/SAS Upgradation project. Further, the SAS already supplied at Siliguri SS under subject project (RTU Replacement/SAS Upgradation project) is proposed to be diverted to Durgapur Substation for conversion of existing conventional 400/220 kV system to SAS based system. In this regard, necessary techno-commercial discussion is being explored with OEM-M/s Siemens Ltd.

Thus, RTU upgradation work had been finally updated to 14 S/s instead of 17 S/s. Powergrid further informed that update of LOA with such modifications in project will be shared in upcoming OCC / TeST Meeting.

ITEM NO. B.15: Telemetry outage of Farakka STPS: ERLDC

Telemetry issues associated to Farakka STPS (i.e. unavailability of data of 50 nos. of digital and 25 nos. of Analog data) is long pending. The matter was taken up in the 197th OCC Meeting where NTPC representative submitted that offer from M/s GE has been received and contract is under awarding stage and the work is expected to be completed within 3 months, i.e., by the end of February 2023.

NTPC may update.

Deliberation in the meeting

NTPC representative was not available in the meeting.

TeST committee referred the agenda to 201st OCC Meeting.

ITEM NO. B.16: Intermittent telemetry data from Rangit HPS: ERLDC

Rangit HPS had upgraded their old RTU to report it over IEC 104 protocol. On completion of upgradation of the said RTU, most of the feeder side data from Rangit HPS were not updating at ERLDC. After continuous effort with Rangit HPS, most of the telemetry data had been restored.

Further the Real Time Telemetry for Rangit HPS is highly intermittent in nature. Most of the time, data is getting stuck and not reporting to ERLDC.

In 12th TeST Meeting, ERLDC representative informed that real time telemetry for Rangit HPS is highly intermittent in nature. It is observed that most of the time, data is getting stuck and not reporting to ERLDC.

NHPC representative was not available in the meeting.

TeST committee referred the agenda to 197th OCC Meeting however no representative from NHPC was present in 197th OCC Meeting.

NHPC may update.

Deliberation in the meeting

NHPC representative was not available in the meeting.

TeST committee referred the agenda to 201st OCC Meeting.

ITEM NO. B.17: Deviation in SCADA vs SEM data: ERLDC

It is observed that tie-lines data of SCADA system has more than 5 % error while comparing with SEM meter data every week.

Below mentioned feeders are having erroneous SCADA data while comparing with SEM since long.

- a. 220 kV Ramchandrapur – Jamshedpur - 3
- b. 220 kV Rengali SS – Rengali (PG) – 1&2
- c. 400 kV Muzaffarpur – Dhalkebar
- d. 220 kV Purnea – Khagaria.

In 12th TeST Meeting, ERLDC representative informed that as per guideline, SCADA data and SEM data comparison is done every week and it is noticed that above mentioned feeders have erroneous SCADA since long. It is observed that around 7-8% error is present for these feeders while comparing SEM data with SCADA data.

Regrading 220 kV Ramchandrapur – Jamshedpur – 3, JUSNL representative informed that CT ratio issue was present at Ramchandrapur end which might had caused the deviation; however, it had been rectified. ERLDC representative submitted that the error is persisting.

TeST committee advised JUSNL to investigate reason behind erroneous SCADA data while comparing with SEM at Ramchandrapur end and submit report to ERPC/ERLDC. TeST Committee further advised JUSNL to take corrective measure so that the issue can be resolved.

For 220 kV Rengali SS – Rengali (PG) – 1&2, OPTCL representative informed that new RTU had been commissioned at Rengali end and Panel data is matching with switchyard data. ERLDC representative informed that around 8% error is present for this feeder while comparing SEM data with SCADA data.

TeST committee advised OPTCL to investigate reason behind erroneous SCADA data while comparing with SEM at Rengali end and submit report to ERPC/ERLDC. TeST Committee further advised OPTCL to take corrective measure so that the issue can be resolved.

For 400 kV Muzaffarpur – Dhalkebar and 220 kV Purnea – Khagaria., Powergrid representative informed that error might had been observed due to old transducer present in RTU at mentioned ends which will be replaced soon, and it is expected that no error will be there after replacement work of transducer.

ERLDC had further submitted that mentioned feeders are having erroneous SCADA data while comparing with SEM since long.

1. Bihar

- 132 kV LAKHISARAI(BH)_LAKHISARAI(PG)_2
- 132 kV LAKHISARAI(BH)_LAKHISARAI(PG)_1

2. Jharkhand

- 220 kV RAMCHANDRAPUR(JH)_JAMSHEDPUR(PG)_3
- 132 kV LALMATIA(JH)_KAHALGAON(BH)_1

3. Odisha

- 400 kV MENDHASAL(GR)_PANDIABILI(PG)_1
- 220 kV RENGALI S/S(GR)_RENGALI(PG)_2

4. Powergrid

- 400 kV TALCHER(PG)_MERAMANDALI(GR)_1

Concerned utilities may update.

Deliberation in the meeting

ERLDC representative informed that as per guideline, SCADA data and SEM data comparison is done every week and it is noticed that mentioned feeders have erroneous SCADA since long. It is observed that around 7-8% error is present for these feeders while comparing SEM data with SCADA data.

Regarding 400 kV Muzaffarpur – Dhalkebar and 220 kV Purnea – Khagaria, Powergrid representative informed that issue had been resolved.

For 220 kV Ramchandrapur – Jamshedpur – 3 and 220 kV Rengali SS – Rengali (PG) – 1&2, ERLDC representative submitted that the error is persisting.

Representative of ERLDC further submitted that mentioned feeders are having erroneous SCADA data while comparing with SEM since long.

Bihar

- 132 kV LAKHISARAI(BH)_LAKHISARAI(PG)_2
- 132 kV LAKHISARAI(BH)_LAKHISARAI(PG)_1

Jharkhand

- 220 kV RAMCHANDRAPUR(JH)_JAMSHEDPUR(PG)_3
- 132 kV LALMATIA(JH)_KAHALGAON(BH)_1

Odisha

- 400 kV MENDHASAL(GR)_PANDIABILI(PG)_1
- 220 kV RENGALI S/S(GR)_RENGALI(PG)_2

Powergrid

- 400 kV TALCHER(PG)_MERAMANDALI(GR)_1

SLDC Bihar representative replied that deviation of SCADA vs SEM data for concerned lines will be checked and rectified.

JUSNL representative replied that deviation of SCADA vs SEM data for concerned lines will be checked and rectified.

OPTCL representative submitted that deviation of SCADA vs SEM data is within limit for 400 kV MENDHASAL(GR)_PANDIABILI(PG)_1. ERLDC representative replied that as per their record there is huge deviation of 7-8% of SCADA vs SEM data for mentioned line.

TeST committee advised all utilities to coordinate with ERLDC and resolve the issue.

TCC further advised ERLDC to provide list of lines where deviation, if any, of SCADA vs SEM data is observed to be more than 3 % in upcoming TeST Meetings.

ITEM NO. B.18: Issues related to OPGW installation in Teesta III – Kishanganj Line: Powergrid

Powergrid is implementing OPGW on Teesta III-Kishanganj TL under Fiber Optic Expansion Package (Additional Requirement). Out of total 215 Km, 179 Km work has been completed. However following

issues are causing hindrance towards completion of the work.

A) Non-availability of A/R in non-auto mode: A/R permission was not allowed from 25/02/2023 to 03/03/2023 due to Circuit Breaker Replacement work in Bay associated with other circuit at Dikchu end. Therefore, work was kept on hold in mentioned period.

B) ROW issues / Old compensation issues: Severe ROW issues are being faced during execution of the work because of which work is getting delayed. In all locations, local villagers are demanding payment of old pending compensation or compensation for shifting of houses due to induction. ROW issues occurred till date is detailed as under:

Sl. No.	ROW Tower No.	ROW affected Drum No.	ROW Person details	ROW issue
5	Tower No. 115/0	17	Name of the landowner: Gajendra Chettri (Mob: 8436105960). Village: Mamley PS: Namchi PO: Namchi Dist.: South Sikkim	Boulders kept near wall of landowner which hadn't been removed by M/s TPTL Induction related problems faced by landowner
12	Tower No. 122 to 126	16B	Name of the landowner: Purna Bahadur Rai (Mob: 9593739944) Village: Lower Tingrithang PW PS: Namchi PO: Namchi Dist.: South Sikkim Pin: 737126	Induction related issues. Land owner claims wires too close to house and therefore claims compensation for housing property.
13	Tower No 55 to 60	9	Phal Bahadur (Mob: 8001630095/9647872113) Village: Tumin & Kokaley P.S: Singtam P.O: Tumin Dist: East Sikkim	Previous Compensation related issues during Construction
14	Tower No 68 to 74	11	9) Person didn't disclose name Village: Singbel P.S: Singtam P.O: Makha Dist.: East Sikkim	
15	Tower No. 74 to 81	12	10) Person didn't disclose name Village: Ralap P.S: Singtam P.O: Makha Dist.: East Sikkim	
16	Tower No. 195-197/1	27B	11) Satish Pokhrun (Mob.: 7872446069) Village:Relling P.S: Relling Dist.: Darjeeling	Previous Compensation related issues during Construction
17	Tower No. 197/1 - 201/1	28		
18	Tower No. 201/1 -	29		

Several Meetings has been done with District administration and M/s TPTL (being owner of the line) for resolving the above issues. District Administration at Sikkim is providing support for resolving the issue.

The above is for information and record of all concerned.

Members may note.

Deliberation in the meeting

Powergrid representative informed that OPGW installation work for 36 km of line is pending and it is expected that work will be completed by June 2023.

Members Noted.

TeST Committee referred the issue to 49th TCC & ERPC Meeting for information.

ITEM NO. B.19: Issues related to OPGW installation in 132 kV Rangpo - Chuzachen Line: Powergrid

Power Grid had been entrusted with establishing Fiber Optic network (OPGW) over 132 kV Rangpo - Chuzachen TL of EPDS, Sikkim under Eastern Region Fibre Optic Expansion Project (Additional Requirement) for smooth communication of Chuzachen HEP power generating station to Regional Load Dispatch Centre (ERLDC) at Kolkata. The ownership of said transmission line 132 kV Rangpo - Chuzachen TL belongs to Energy & Power Dept., Govt of Sikkim. Out of 20.727 km of scope of work, Fiber Optic Installation of 17.912 km had been completed till April 2020 after which work had been

stopped by villagers of village Kamarey Bhasmey, Pendam, East Sikkim. The ROW details in between T.no. 37 to 42 falling under Kamarey village is tabulated below.

List of Agitating Landowners in Kamarey village with details

S.No	Name & Contact of Landowner	Location No. details
1	Name: Ashok chettri S/o L.t. shiva lall chettri Contact.No: 9593223955	Village kamarey PW PO & PS - Rangpo, Pendam East Sikkim-737132
2	Name: Nandu kumarpradhan Contact.No: 9635686942	
3	Name: kumar chetari Contact.no: 9635664370	
4	Name: Mani Kr. Pradhan	

5	Name: Mangal Singh S/o Singh Bir Tamang	
6	Name: Tularam Sharma S/o Gauri Shankar	
7	Name: Dili Ram S/o Lt. Pushpa Lall Khatiwara	
8	Name: Dhan Maya W/o Chandra Bahadur Tamang	
9	Name: Bharat Laxuman	
10	Name: Dhiraj Sharma S/o Tika Ram Sharma	

After multiple meeting with District Authorities and local villagers of Kamarey, work finally resumed in January 2023 with help and support of Energy & Power Dept., Govt of Sikkim. After completing 19.327 km OPGW installation, work was again stopped in Padamchay village due to public complaint over induction problem faced between tower no. 35 and 36 of 132 kV Rangpo-Chuzachen TL due to very ground low clearance issue. The list of agitating landowner in Padamchay village is tabulated below.

List of Agitating Landowners in Padamchay village with details

I.No.	ROW Person details	ROW Issue
1.	Bishnu Lall Sharma	Low ground clearance from conductors in between T.no. 35 and 36 of 132 kV Rangpo-Chuzachen TL.
2.	Punya Pd. Sharma	
3.	Bharat Kumar Sharma	
4.	Yogendra Sharma	
5.	Ram Pd. Sharma	
6.	Gyan Pd. Sharma	

The matter was informed to Energy & Power Dept., Govt of Sikkim. The Officials of Energy & Power Dept., Govt of Sikkim held meeting with local landowners and public representatives to resolve the issue. However, matter is yet to be resolved.

In this regard, it is requested that, Energy & Power Dept., Govt of Sikkim (being owner of the line) may provide necessary support for resolving the ROW issue. It may be noted that now only 1.4 km OPGW installation is pending in the said Link.

Powergrid may explain. Sikkim my update.

Deliberation in the meeting

Powergrid representative intimated that after multiple meetings with District Authorities and local villagers of Kamarey, OPGW installation work has finally resumed in January 2023 with help and support of Energy & Power Dept., Govt of Sikkim. However, after completing 19.327 km OPGW installation, work was again stopped in Padamchay village due to public complaint over induction problem faced between tower no. 35 and 36 of 132 kV Rangpo-Chuzachen line due to very ground low clearance issue subsequently the matter was informed to Energy & Power Dept., Govt of Sikkim, however matter is yet to be resolved. He further added that only 1.4 km OPGW installation is pending in the said link so it is requested that, Energy & Power Dept., Govt of Sikkim (being owner of the line) may provide necessary support for resolving the ROW issue.

Sikkim representative was not available in the meeting.

On enquiry from TeST committee about time required to complete the pending work, Powergrid

representative replied that 3 week time including time for shifting of manpower will be sufficient to complete the pending work.

TeST committee refer this agenda to 49th TCC & ERPC Meeting for further discussion.

ITEM NO. B.20: Issues related to M/S Chemtrols

A. JUSNL

- 1. Non-functioning of ADMS application:** The ADMS application is not operating properly. It has been observed that appropriate feeders do not cut off even when the implemented ADMS logic gets satisfied. There are occasions when feeders associated with GSS reporting through GPRS operate but those reporting through OPGW do not operate or vice-versa. Furthermore, there are occasions when neither feeders associated with GSS reporting through GPRS nor those reporting through OPGW operate.
- 2. Unavailability of spare parts for rectification of fault:** Due to faulty SMPS; LDMS at most of the sites is also not working. Even after the assurance of M/s Chemtrols regarding supply of spare materials by the end of November 2021, the said issues are still not resolved.
- 3. Replacement of UPS and Battery Bank:** Two nos. of UPS installed at SLDC is in non-working condition for last several months. Out of two UPSs, one has been replaced on rent basis but another is still in faulty condition.
- 4. Fault in one screen of VPS:** One no. screen of VPS is not working since 01.02.2023. M/s Chemtrols has been informed and requested for rectifying the issue urgently, but the same is yet to be rectified.
- 5. Cyber Security Audit:** The report of cyber security Audit conducted during 14.06.2021 to 13.06.2022 has not been submitted to SCADA, SLDC till date. Requests for the same as well as intimation about the tentative date for next Audit to be conducted in 2022-23 has been made to M/s Chemtrols however no reply had been given from M/S Chemtrols.

JUSNL may explain. M/S Chemtrols may update.

B. WBSETCL

1. Report of Cyber security audit which was conducted on February 2022 is still pending.
2. Return of all nodes which were collected from different RTU for repairing purposes is still pending. In Special meeting held on 26.04.2022, M/S Chemtrols representative informed that nodes taken by them would be returned by the end of June 2022 but still they had not returned them.
3. Battery Bank-1 of UPS1 installed at Abhikshan Bhavan (BCC) has been defective since long.

WBSETCL may explain. M/S Chemtrols may update

Deliberation in the meeting

Regarding ADMS, JUSNL representative submitted that even when logic conditions are getting satisfied, ADMS is not functioning all the time. M/s Chemtrols apprised that logic conditions need to be satisfied continuously for 3 minutes for successful operation of ADMS and it may so happen that logic conditions are getting changed within 3 minutes itself leading to non-functioning of ADMS.

ERLDC representative advised JUSNL to plot logic conditions vs data for 3 minutes of time using playback command and these plots may be shared to M/s Chemtrols for further analysis regrading

nonfunctioning of ADMS.

TeST committee advised M/s Chemtrols to resolve ADMS issue at the earliest by coordinating with JUSNL.

TeST Committee advised M/s Chemtrols to complete cyber security audit for 2023 of all utilities at earliest and share report of audit by April 2023.

ITEM NO. B.21: Improper Support from M/S OSI, OEM of SCADA Application

ERLDC SCADA/EMS system was installed in Eastern Region and OSI Monarch application is being used as core SCADA/EMS applications.

In ERLDC SCADA/EMS system, several functionalities of SCADA/EMS system are not functioning in SCADA/EMS system, for which support is required from OEM i.e. OSI.

Followings are the few lists of such critical functions:

1. BMR (bare metal recovery) on Spare server: license is required from OSI.
2. Denial of support from OSI support team when it is required to resolve OSI application related issues.
3. Restoration of Data archival in HRS application for the period w.e.f 00:00 Hrs dated 01-04-2021 to 03:00 Hrs dated 02-04-2021.

In 11th TeST Meeting, M/S OSI representative was not available the meeting.

Test committee opined that this agenda would be discussed in a separate special meeting with ERPC, ERLDC, M/S Chemtrols, M/s OSI and concerned utilities to be held on 26th April'2022 in physical mode.

In special meeting with M/S Chemtrols held on 26th April 2022, M/S OSI representative was not available in the meeting.

ERLDC representative informed that they are facing several issues with M/S OSI that are already listed; however, they are not getting any support from them.

M/S Chemtrols representative informed that as per their communication with M/S OSI, service level agreement (SLA) duly signed by POSOCO is required by M/S OSI.

ERLDC representative submitted that they do not have any issue in signing the SLA and for that M/s OSI has to visit ERLDC office at Kolkata. ERLDC further added that M/S OSI representatives have not been attending the meetings too.

Member Secretary, ERPC mentioned that a letter would be given to M/S OSI from ERPC regarding their absence in TeST Meetings and the special meeting. He further informed that strict action would be taken against M/S OSI if proper support is not provided to ERLDC by them.

ERLDC vide email dated 03/11/2022 placed additional issues with M/S OSI which are as follows-

Restoration of Data archival in HRS application for the period w.e.f 00:00 Hrs dated 01-04-2021 to 03:00 Hrs dated 02-04-2021.

Restoration of Data archival in HRS application for the period w.e.f 08:00 Hrs dated 30-05-2022 to 15:00 Hrs dated 30-05-2022.

In the last meeting held on 14.07.2022, M/S Chemtrols informed that SLA (Service Level Agreement) has been signed between ERLDC & M/s OSI and accordingly data archiving issue is escalated higher management of M/s OSI and it will be resolved by mid of August 2022 but the problem is still persisting.

In 12th TeST Meeting, ERLDC representative informed that signed Service Level Agreement between ERLDC and M/S OSI had been already communicated to M/S OSI however resolution of issues regarding restoration of Data archival in HRS application is still pending from M/S OSI.

M/S OSI was not available in the meeting.

MS ERPC advised that M/S Chemtrols to take up this matter with M/S OSI and resolve the issue at the earliest.

TeST committee advised ERLDC to communicate the issue to NLDC and subsequently notice can be issued from NLDC against M/S Chemtrols if the issue is not resolved in timely manner.

M/S OSI may update.

Deliberation in the meeting

TeST Committee advised M/S Chemtrols to take up this matter with M/S OSI and resolve the issue at the earliest.

ITEM NO. B.22: Additional agenda by DVC for extension of AMC of SCADA/EMS

AMC of SCADA/EMS for DVC is expiring in few months so it is proposed by DVC that detailed discussion regarding extension of SCADA/EMS may be done that will help them in further planning.

Members may discuss.

Deliberation in the meeting

DVC representative informed that they had initiated action regarding extension of SCADA AMC for two years and sought some clarification regarding enhancement of 35% of AMC charges as agreed in TCC/RPC forum.

Member Secretary, ERPC stated that decision taken in ERPC forum should be the guiding factor for all utilities to the decision in this regard.

Executive Director, ERLDC stated that extension of AMC has to be done invariably by all the SLDCs as well as ERLDC. He pointed out that date of expiry of AMC pertaining to different utilities were as below.

S.No.	Name of the Control Centre	Date of expiry of AMC
1	ERLDC	31 st March 2023
2	BIHAR	02 nd July 2023
3	DVC	30 th June 2023
4	WEST BENGAL	26 th October 2023
5	JHARKHAND	13 th June 2023
6	SIKKIM	13 th June 2023
7	ODISHA	31 ST March 2024

Hence, SLDCs of ER would have minimum three months' time for enforcing the extension. However, in case of ERLDC, there was urgency in view of paucity of time. Taking this into account ERLDC had initiated discussion with M/s Chemtrols. He further added that in case of each control centre, as per design there were two numbers of internal firewalls and two numbers of external firewalls mandatory for ensuring cyber security. Two internal firewalls in the control centre would approach end of life by July 2023. ERLDC having its back up control centre (BCC) at New Delhi, would require four internal firewalls including BCC to be replaced by July 2023. Same was discussed with M/s Chemtrols, but they did not agree to replace the firewalls with 35% enhancement. But as there could not be any compromise on cyber security, it was agreed that M/s Chemtrols, would agree to extend AMC of ERLDC for two more years with the same rate, terms and conditions (as there was no RTU in case of ERLDC) and ERLDC would get the four firewalls which will be purchased and installed through M/s Chemtrols as existing firewall would reach end of life after 7 years of contract period. Also it was clarified that cost of VA-PT by M/s Chemtrols would be reimbursed separately as earlier rate/offer was applicable for 7 years.

The SLDCs of ER were told that they had ERPC forum agreed decision as well as the modality followed by the ERLDC to take care of cyber security issue. Taking these into account, the constituents should engage in discussion with M/s Chemtrols and take action regarding extension of SCADA, AMC.

After discussion, it was agreed that in case of SLDCs of ER, the 35% enhancement would include maintenance of RTUs pertaining to M/s Chemtrols. However, for integration of RTUs, rate should be separate and payable to M/s Chemtrols. Bihar representative requested for standardization of rate pertaining to integration of new RTU.

PART C: ITEMS FOR UPDATE

ITEM NO. C.1: Status of implementation of AGC for ISGS stations

In 2nd Test Meeting, NLDC informed that, as a part of pilot project of AGC, all generating stations' AGC data would be directly reporting to NLDC for first 3 years and the same would be diverted to respective RLDCs after SCADA up gradation.

NLDC informed that all generating stations must make arrangement for extending the AGC data signals to the nearest Powergrid node and Powergrid shall make available two Ethernet ports (main & its redundant) so that AGC signal from generating stations should reach to NLDC.

ERLDC suggested that firewalls should be available at both end i.e. at Generator end as well as NLDC end. NLDC informed that they have a firewall at their end in their system.

All generating stations agreed to install adequate level of firewall at their end for extending the AGC signals.

In 12th TeST Meeting members updated the status is as follows:

SI No	Station	Status of Communication link from plant substation to PGCIL node	Status of communication system integration from unit to plant substation	Target date for implementation of AGC at plant
1	Farakka STPS - I & II	Both links established	Completed and Running.	
2	Kahalgaon STPS – II	Both links established	Installed	Completed and running since Dec 2020
3	Barh STPS	Both links established	Installed	Running since August 2019
4	NPGC, Nabinagar	Links from Gaya and Patna has been established.	Completed and Running.	
5	Maithon Power Limited	One link established. Other link, Ranchi-Maithon(RB) would complete by March, 2020.	Completed	
6	Talcher STPS – I	Both links established.	Talcher STPS-I representative informed that material has been received and erection is also completed, however	

			commissioning of AGC is pending due to difficulties faced by ABB Engineers to visit the site due to Covid-19 pandemic.	
7	Kahalgaon STPS – I	Both links established.	NTPC representative informed that they had already applied CERC for exemption. He further submitted that hydraulic units are present in Kahalgaon stage 1, so it is quite difficult to implement AGC at Kahalgaon stage – 1	
8	Nabinagar Thermal Power Project – BRBCL	Only one link Sasaram-Nabinagar OPGW installation is pending. It would take two years for completion.	Powergrid representative informed that for OPGW installation, NIT had been floated and two packages are under technical evaluation right now. In 10 th TeST Meeting, Powergrid representative informed that package would be awarded by Nov 2021	
9	Darlipalli STPS	Communication established.	Darlipalli representative informed that material has been received however due to Covid-19 pandemic, ABB Engineers are unable to visit S/S and hence commissioning of AGC is pending.	
10	Teesta – V	One link established		
11	Farakka STPS – III	Link established	Completed and Running	
12	MTPS Stage – II (Kanti)	Link established		
13	Rangit HPS	One link established		

Members may update.

Deliberation in the meeting

TeST committee advised concerned utilities to share updated status of AGC implementation for ISGS stations to ERPC/ERLDC at earliest.

ITEM NO. C.2: Mapping of Feeders of Automatic under Frequency Load Shedding (AUFLS) Scheme

In 8th NPC held on 30th November 2018, it was decided that each RPC would submit the details / progress of feeder mapping to NPC secretariat on a regular basis (quarterly).

In 154th OCC, DVC informed that mapping of the UFR feeders had already been implemented in DVC system.

In 40th TCC, Bihar and Jharkhand have confirmed that mapping of the UFR feeders has been implemented.

In 155th OCC Meeting, ERLDC informed that acquiring the UFR feeder data from SLDCs to ERLDC is in process.

In 10th NPC Meeting held on 09.04.2021, it was decided that each RPC would submit the present status/progress of feeder mapping to NPC secretariat.

In 10th TeST Meeting, DVC representative informed that status of mapping of pending UFR feeders along with issue and plan of execution would be shared to ERPC/ERLDC.

West Bengal representative informed that status of mapping of pending UFR feeders would be shared to ERPC/ERLDC at the earliest.

Jharkhand representative informed that status of mapping of pending UFR feeders as per the Annexure is not updated. The updated status would be shared with ERPC/ERLDC at the earliest.

TeST Committee advised West Bengal, Odisha, DVC and Jharkhand to send the status of mapping of pending UFR feeders to ERPC and ERLDC at the earliest.

In 11th TeST Meeting, TeST Committee advised West Bengal, Odisha, DVC and Jharkhand to send the status of mapping of pending UFR feeders to ERPC and ERLDC at the earliest.

The present status of mapping of UFR feeders as available with ERLDC is given at **Annexure C2**.

In 12th TeST Meeting, TeST committee advised concerned utilities to share updated status of mapping of UFR feeders to ERPC/ERLDC at earliest.

Members may update.

Deliberation in the meeting

TeST committee advised concerned utilities to share updated status of mapping of UFR feeders to ERPC/ERLDC at earliest.

ITEM NO. C.3: Non availability of SCADA in Eastern Region

SCADA/EMS system has been installed at SLDC and RLDC and real time operator are performing grid management activity based on real time data available with this SCADA system. But, it is observed that several important stations under state SLDC jurisdiction in Eastern Region are not reporting to respective state SLDC (as shown in table below) and hence ERLDC is also not getting data through ICCP.

Area of Responsibility	No of station without telemetry	No of station commissioned without data integration
OPTCL	10	08
WBSETCL	06	01
JUSNL	12	00
BSPTCL	06	00

Table: Area wise no of station without data telemetry as on 10-03-2021.

In 9thTeST Meeting, members updated status as follows:

AOR	Station level (In kV)	Current Status	Deliberation in 9thTeST meeting	Comments
WBSETCL	Dharampur 220	Yet to be	WBSETCL representative	

	Kv	integrated.	informed that M/s Schneider engineers are unable to come to Dharampur due to Covid-19 pandemic.		
	Egra 220 kV	Yet to be integrated	WBSETCL representative informed that discussion related to cost estimate is in progress with M/S Chemtrols.		
	Bantala 220kV	Not Available	WBSETCL representative informed that some technical issues of SDH are observed at Bantala.	M/s Commtel informed that data is not available due to breakdown of their equipment.	
	Alipurduar 220kV	Yet to be integrated	WBSETCL representative informed that ROW issues had been resolved and communication link has been established. He further informed that commissioning work would be completed once M/S Siemens Engineer would visit the site after lockdown restriction eases.		
	Rishra 220kV	Not Available since July 2020			
	DPL TPS_WB 220 kV	Not Available since Jan 2021			
JUSNL	Hatia New 220 kV	Not Available	JUSNL representative informed that issue at Hatia has been resolved.		
	Patratu 220 kV	Not available since Feb 2020	JUSNL representative informed that control room issue present at Patratu would be rectified soon.		
	Tenughat 220kV	Not available since Feb 2020	JUSNL representative informed that the work had been completed on 31 st March 2021.		
	Chandil 220 kV	Not available since Sept 2019	JUSNL representative informed that PLCC installation is under progress at Chandil, Jamtara ,Garwa, Deoghar and Kendposi and the issue would be rectified by July'2021	30 th July 2021	
	Jamtara 132kV	Not Available			
	Garwa 132kV	Yet to be integrated			
	Deoghar 132kV	Not Available			
	Kendposi 132 kV	Not Available			
	Lalmatia 220 kV	Not Available	JUSNL representative informed that issue at Lalmatia would be rectified by June'2021.	June 2021	
Giridih 220 kV	Not Available	JUSNL representative informed that link issue is present at Giridih and would be	June 2021		

			rectified soon.	
	Godda 220 kV	Not available since Jan 2021	JUSNL representative informed that issue at Godda would be rectified by June '2021.	June 2021
	Jasidih 220 kV	Not available since August 2020	JUSNL representative informed that issue at Jasidih has already been solved.	
OPTCL	Malkangiri 220 kV	Data integration and database creation not yet done.	OPTCL representative informed that data base creation has been completed for Malkangiri, Jeypatna and Kashipur substations.	
	Jaypatna 220			
	Kasipur 220			
	Damanjodi 220			
	Cuttack 220			
	Utkal AI 220			OPTCL representative informed that the issues would be resolved by Sep' 2021.
	Narsingpur 220kV	Station commissioned at 220kV without data telemetry	OPTCL representative informed that pending issues at Narsingpur S/S would be resolved by May' 2021	
	Bargarh 220	Station commissioned at 220kV without data telemetry	OPTCL representative informed that the issues would be resolved by Sep' 2021.	
	Paradeep 220 kV	Not available		
Vedanta 220 kV	Not available since Nov. 2020			
BSPTCL	Gopalganj 220	No available since July 2019	BSPTCL representative informed that issue at Gopalganj has already been solved.	
	Samastipur New 220	Not available since 22-02-2021	BSPTCL representative informed that they had already informed M/S GE regarding issues at Samastipur.	
	Khagaul 220 kV	No available since Jan 2021	BSPTCL representative informed that issue at Khagaul has already been solved.	
	Motipur 220 kV	No available since 05-03-2021	BSPTCL representative informed that they had already informed M/S GE regarding issues at Motipur.	
	Laukhai 220 kV	No available since 13-02-2021	BSPTCL representative informed that they had already informed M/S GE regarding issues at at Laukhai.	
	Dumraon 220 kV	No available since 22-01-2021	BSPTCL representative informed that M/S ABB was also informed regarding issue at Dumraon and issues would	

			be solved at the earliest.	
DMTCL	Motihari 400 kV	Not available since Sept 2019	ERLDC representative informed that work had been completed.	

In 10th TeST Meeting, ERLDC representative informed that Dharampur, Egra and Alipurduar S/S were commissioned long back however SCADA system had not been integrated at these S/S till date due to which their data are not reporting to respective state SLDCs and hence ERLDC is also not getting data through ICCP.

Regarding Alipurduar, it was informed that the work would be delayed as M/S Siemens' quotation is quite high and negotiation is under process. It was further informed that earlier RTU was commissioned however communication link was absent and after approval of communication link new order for integrating SCADA system would be placed.

Regarding Bantala, West Bengal representative informed that due to high pollution level SDH breakdown is frequently observed at Bantala because of which it is quite difficult to integrate SCADA system.

TeST Committee opined that West Bengal could try to integrate SCADA system at Bantala S/S by exploring some alternative ways, and if required, the issue can be discussed at higher level.

In 11th TeST Meeting, TeST committee advised concerned utilities to share updated status along with target date to ERPC/ERLDC at earliest.

In 12th TeST Meeting, TeST committee advised concerned utilities to share updated status along with target date to ERPC/ERLDC at earliest.

Members may update the latest status.

Deliberation in the meeting

TeST committee advised concerned utilities to share updated status along with target date to ERPC/ERLDC at earliest.

Annexure A

Participants in 13th TeST Meeting of ERPC

Venue: ERPC Conference Hall, Kolkata

Time: 10:30 hrs

Date: 13.03.2023(Monday)

Sl No	Name	Designation/ Organization	Contact Number	Email	Signature
1	N. S. Mondal	Member Secretary ERPC	9958389967	mserpc-power@nic.in	
2	R. Sutradhar	Executive Director, ERLDC	9436302714		
3	Amarush Mallick	CCM, ERLDC	9436302220	amarushmallick @grid-india.in	
4	M. VISWANADH	Sr. DGM ERLDC	9433041871	mviswanadh@ grid-india.in	
5	L. Mondal	Sr. DGM, ERLDC	9831338524	lmondal@erlpc.in	
6	BISWAJIT MONDAL	Manager	9903329271	biswajit.mondal@ grid-india.in	
7	Santanu Rudrapal	CM (ULDC)	9434735848	Santanu.rudrapal @powergrid.in	
8	ANJAN KR DAS	GM (ULDC)	9434740029	anjanddas@powergrid.in	
9	Jayanta Banerjee	CE (Communication)	9333138761	jayanta.banerjee@ dvc.gov.in	
10	Tavun Kr. Mondal	DCE (Comm)	7001691104	tavun.mondal@ dvc.gov.in	
11	Hindal Dhar	Chemtrols	9831805753	hindal.dhar@chemtrols.com	
12	Roshan Jaiswal	ERLDC, Engineer	9007184569	roshan.jaiswal@grid-india.in	
13	Bibek Aggarwal	ERLDC, Engineer	9903071910	bibek@grid-india.in	
14	Aniket Choudhury	ERLDC, Dy. Mgr	8944834926	aniketchoudhury@grid-india.in	
15	SHIVAJI DEWANJEE	CHEMTROLS	9748704685	shivaji.dewanjee@ chemtrols.com	
16	Amirudhya Saha	CHEMTROLS	6290942597	amirudhya.saha@ chemtrols.com	
17	Shambhu Das	DVC, SLDC	7980161164	shambhu.das@ dvc.gov.in	
18	SOURAV BERA	TCS, KOL	9123801884	bera.sourav@tes.com	
19	Ayush Raj	ERLDC, Asst Mgr	9958484030	ayush.raj@grid-india.in	
20	Rishav Kumar	ERLDC, ET	8709903303	rishav@grid-india.in	

"Coming together is a beginning, staying together is progress, and working together is success." -Henry Ford

Participants in 13th TeST Meeting of ERPC

Venue: ERPC Conference Hall, Kolkata

Time: 10:30 hrs

Date: 13.03.2023(Monday)

Sl No	Name	Designation/ Organization	Contact Number	Email	Signature
21	Partha Ghosh	Gen. Mgr/ER-2	9434748263	partha.ghosh@powergrid.in	P. Ghosh
22	Anup Das	EE, ERPC	9681214774	anupdas@mc.in	Anup Das
23	Srijit Mukherjee	EE, ERPC	8744277306	srijit.mukherjee@gov.in	S. Mukherjee
24	Anupam Kamal	EEE, ULDC/Tele BSPTCL	9262696769	anupam.kamal99@bsptcl.bihar.gov.in	Anupam
25	Rimil Topno	Sr. Manager (SCAD) TUSNL	9835715518	uldc.jusnl@gmail.com	Rimil Topno
26	Biswajit Madhu	Add. C.E (E)	9163550747	biswajit_madhu@yahoo.co.in	B. Madhu
27	Pranab Kumar Nayak	GM, Telecom	9437347287	pranab94@gmail.com	Pranab
28	Soumyakanti Das	Sr GM (Telecom)	9438907477	soumya.66.51@gmail.com	Soumya
29	Prasanta Kumar Behera	DGM, SLDC Odisha	9438907472	tel.pkbehera@optel.co.in	P. K. Behera
30	Diksha Kumari	AM, ERLDC	9608578757	diksha.kumari@grid-india.in	Diksha Kumari
31	Tapobrata Paul	Manager, ERLDC	7085012850	paul.tapobrata@grid-india.in	T. Paul
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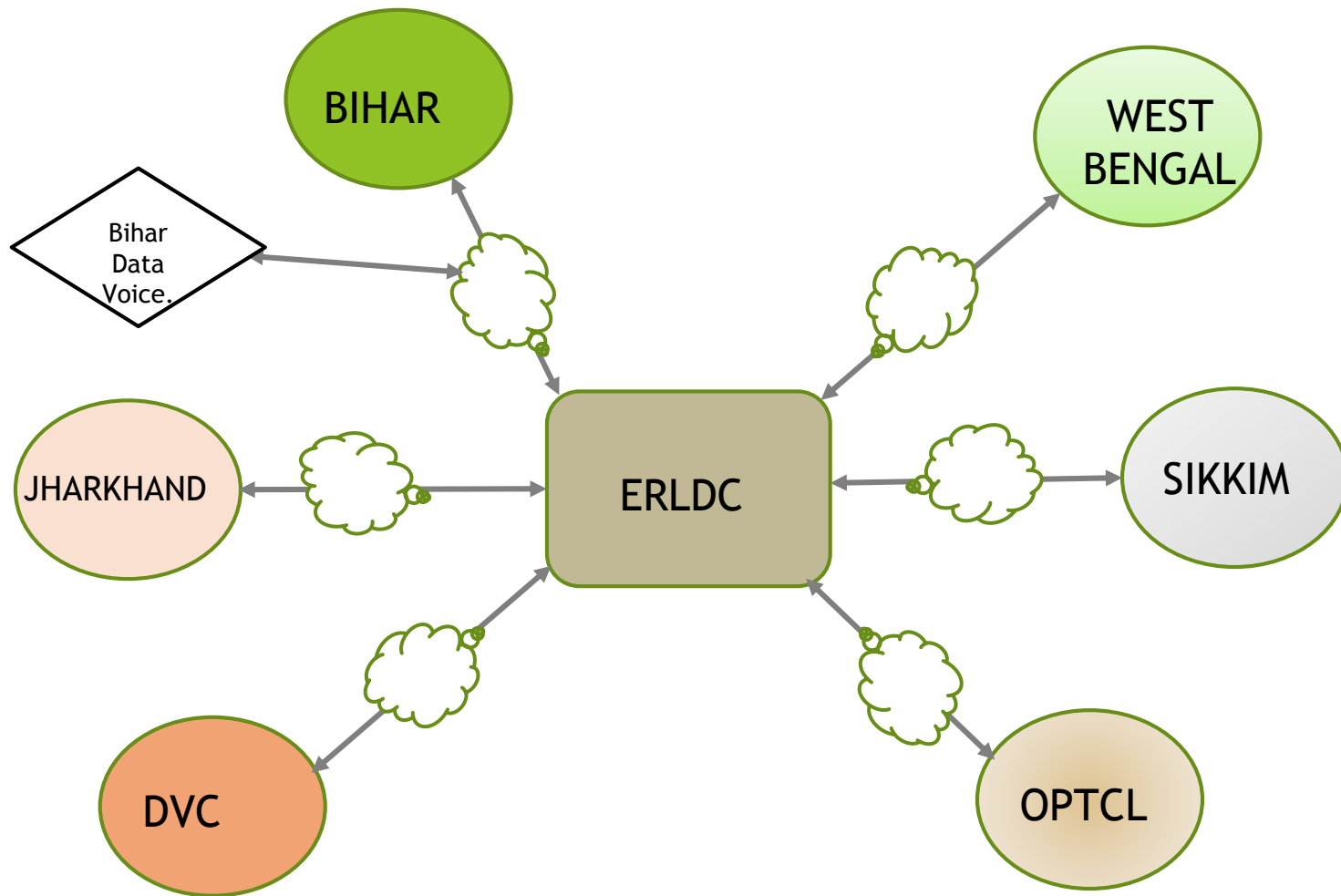
"Coming together is a beginning, staying together is progress, and working together is success." –Henry Ford

Annexure B.2.1

S/n	Line name	Line Length
01	220 KV JODA (GRIDCO)-RAMCHANDRAPUR (JSEB)	130 km
02	220 KV SANTALDIH (WBSETCL) - CHANDIL(JSEB)	98 Km
03	132 KV PATRATU (JSEB) - PATRATU (DVC) -1	6 Kms
04	132 KV LALMATIA (JSEB) - KAHALGAON (BSPHCL)	34 Km
05	220 KV JAMSHEDPUR (DVC) – JINDAL - JODA (GRIDCO)	150 Kms
06	66 KV KALIMPONG (WBSETCL) - MELLI (SIKKIM)	15 Km
07	132 KV KOLAGHAT(DVC) - KOLAGHAT (WBSETCL)	50 Meters
08	220 KV BIDHANNAGAR (WBSETCL)-WARIA(DVC)	10 Kms.
09	132 KV DALKHOLA (WBSETCL)-BAISI(BSPHCL)	
10	132 KV RAJGIR (BSPHCL) - BARHI (DVC)	138 Kms.

ER Communication Network Strengthening

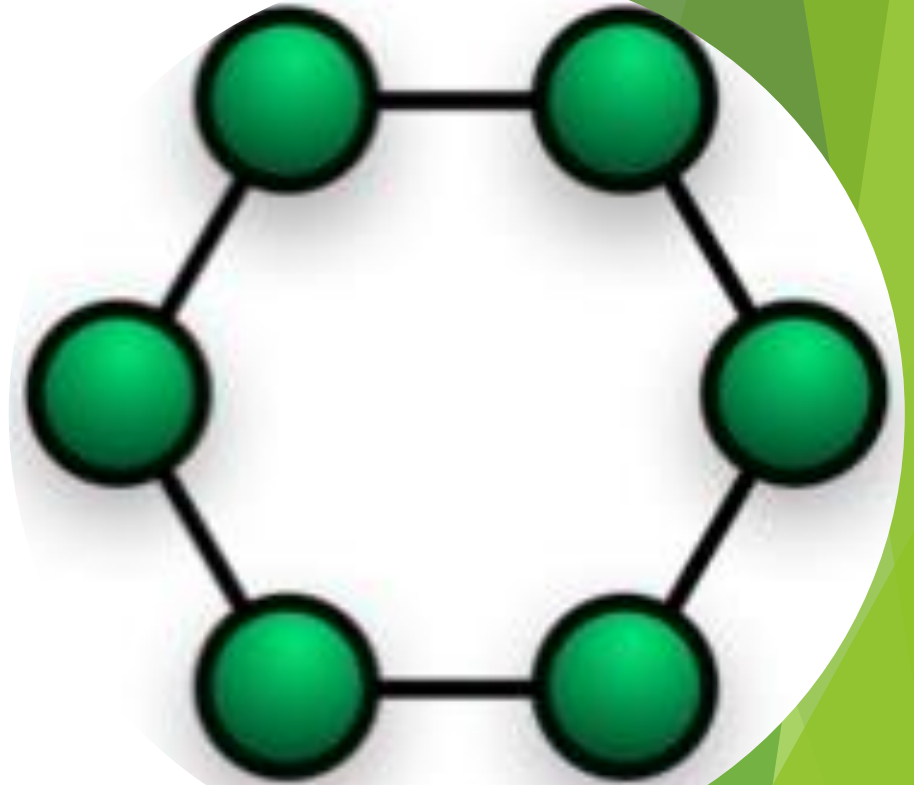
Present scenario of reporting of Data/voice-SLDC - RLDC



- ▶ Presently all Data/voice reporting to concerned SLDC through linear network topology.
- ▶ SLDC to RLDC is in star mode connection.
- ▶ At present, most of communication nodes has no route, FOTE (SDH) and DC power supply Redundancy .
- ▶ If any single failure in the system viz equipment fault or DC power supply , OPGW fault etc. leads to outage of multiple data/voice.

Ring Topology

- ▶ A ring network is a network topology in which each node connects to exactly two other nodes, forming a single continuous pathway for signals through each node
- ▶ Ring Network Topology provides redundancy for single failure in the entire line and avoids multiple Data / Voice outage in the system very effectively.
- ▶ Ring network is practically very much adopted topology since single failure in a system is more probable than multiple failures in system at a time.

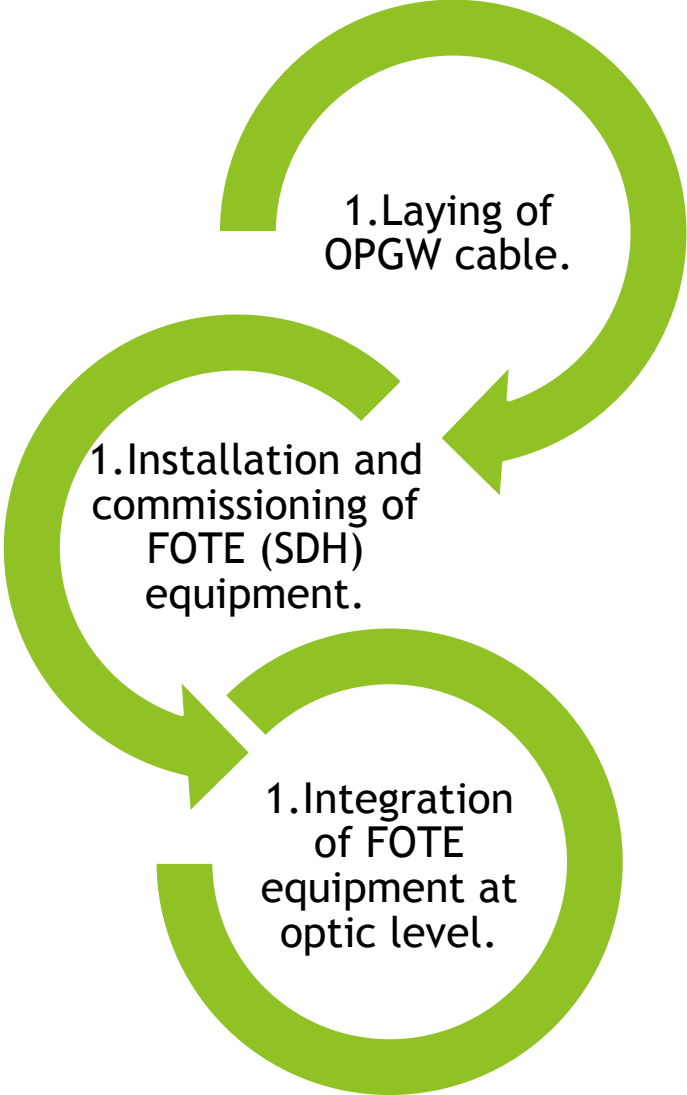


Proposed tie line FO links to be interconnected

S/n	Line name	Line Length
01	220 KV JODA (GRIDCO)-RAMCHANDRAPUR (JSEB)	130 km
02	220 KV SANTALDIH (WBSETCL) - CHANDIL(JSEB)	98 Km
03	132 KV PATRATU (JSEB) - PATRATU (DVC) -1	6 Kms
04	132 KV LALMATIA (JSEB) - KAHALGAON (BSPHCL)	34 Km
05	220 KV JAMSHEDPUR (DVC) - JINDAL - JODA (GRIDCO)	150 Kms
06	66 KV KALIMPONG (WBSETCL) - MELLI (SIKKIM)	15 Km
07	132 KV KOLAGHAT(DVC) - KOLAGHAT (WBSETCL)	50 Meters
08	220 KV BIDHANNAGAR (WBSETCL)-WARIA(DVC)	10 Kms.
09	132 KV DALKHOLA (WBSETCL)-BAISI(BSPHCL)	
10	132 KV RAJGIR (BSPHCL) - BARHI (DVC)	138 Kms.

[OPEN EASTERN REGIONAL OPGW MAP](#)

Activities to be carried out for interconnecting Identified OPGW links to form Ring Topology



9/3/20XX



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THANK YOU

Presentation Title

ITEM NO. B.10: Replacement of old RTU in Eastern Region for reporting of RTU / SAS to back-up Control Centre

Present status of RTU/SAS replacement / up-gradation: -

Utility	Status	Deliberation in last TeST meeting	Target
POWERGRID	Pending	<i>In 7th TeST Meeting, POWERGRID intimated that LOA for the old RTUs replacement project would be floated by Dec '2020.</i> <i>POWERGRID agreed to replace the old S-900 RTUs on priority basis as per the list submitted by ERLDC.</i>	
Maithon Right bank (MPL)	RTU/SAS Upgraded		
NTPC, Farakka (Stage I & II)	Pending		April, 2020
Talcher STPS	RTU Upgraded		
Kahalgaon STPS	Pending		February, 2020
Chuzachen HEP	Pending	<i>ERLDC informed that Chuzachen up - graded their RTUs for reporting it to IEC 104 but the same could not be operationalized due to non-availability of last mile fibre connectivity and in absence of standby link to ERLDC BCC.</i>	With the availability of OPGW between Chuzachen - Rangpo.
JITPL	Pending	<i>POWERGRID informed that OPGW related work at JITPL will be completed by April 2021.</i>	December 2020
GMR	Pending	<i>POWERGRID informed that OPGW related work at GMR will be completed by April 2021.</i>	December 2020
JUSNL	Pending	<i>JUSNL informed that they have already replaced the RTUs of Hatia new and Sikiidri. JUSNL added that remaining RTUs would be replaced by Jan, 2021.</i>	October 2020
OPTCL	Pending	<i>OPTCL informed that out of 78 nos. of RTUs to be replaced, despatch instruction for 52 nos of RTUs has already been placed. OPTCL added that RTU replacement work would be completed by June, 2021.</i>	March 2021
WBSETCL	Pending		

Annexure B13.2

Status of SAS Upgradation Project at POWERGRID Eastern Region

S.N.	Name	REGION	VOLTAGE LEVEL	STATUS
1	GAYA 765kV	ER-I	765/400/220KV	SAT Done
2	Ranchi (765 kV)	ER-I	765/400KV	SAT Done
3	Chaibasa	ER-I	400/220KV	SAT Done
4	BOLANGIR	Odisha Projects	400/220KV	Under Progress
5	Angul (765 kV)	Odisha Projects	765/400KV	Under Progress
6	Jharsugda (765 kV)	Odisha Projects	765/400KV	SAT Done
7	KEONJHAR	Odisha Projects	400/220KV	Under Progress
8	Pandiabilli	Odisha Projects	400/220KV	SAT Done
9	kishenganj	ER-I	400/220KV	SAT Done
10	Talcher HVDC	ER-II	400KV	Planned
11	Chandwa	ER-I	400KV	Under Progress
12	Sasaram 765	ER-I	765/400KV	Planned
13	BANKA	ER-I	400/132 KV	Planned
14	Lakhisarai	ER-I	400/132KV	Planned
15	Behrampur	ER-II	400KV	Under Progress
16	NEW MELLI	ER-II	220 kV	Under Progress
17	Daltonganj	ER-I	400/220/11KV	Under Progress
18	SILIGURI	ER-II	200/132KV	Not yet started
19	BIRPARA	ER-II	200/132KV	SAT Done
20	Purnea	ER-I	220/132KV	Planned
21	ARA	ER-I	220/132KV	Planned
22	Rangpo	ER-II	400KV	Planned
			220KV	
			132KV	

Annexure B13.3

Status of RTU Replacement Project in Eastern Region			
Sl.No.	Name of Substation	Region	Status
1	Durgapur	ER-II	Planned
2	Malda	ER-II	Planned
3	Binaguri	ER-II	Planned
4	Subhasgram	ER-II	Planned
5	Dalkhola	ER-II	Planned
6	Ganktok	ER-II	Planned
7	Maithon	ER-II	Planned
8	Biharsharif	ER-I	Planned
9	Jamshedpur	ER-I	Planned
10	Purnea400	ER-I	Planned
11	Sasram HVDC	ER-I	Planned
12	Muzaffarpur	ER-I	Planned
13	Jeypore	Odisha Projects	Planned
14	baripada	Odisha Projects	Planned
15	Indrawati	Odisha Projects	Planned
16	Rourkela	Odisha Projects	Planned
17	Rengali	Odisha Projects	Planned

UFR MONITORING DISPLAY_OPTCL

UFR_BIHAR

UFR_JH

FREQ 49.94

UFR_DVC

UFR_WB

STAGE-1 U/F RELAY SETTING :49.2HZ			STAGE-2 U/F RELAY SETTING :49.0HZ			STAGE-3 U/F RELAY SETTING :48.8HZ			STAGE-4 U/F RELAY SETTING :48.6HZ		
FEEDER'S NAME	MW	STATUS	FEEDER'S NAME	MW	STATUS	FEEDER'S NAME	MW	STATUS	FEEDER'S NAME	MW	STATUS
KESINGA - 33KV NARIA	↑ 0.0	■ #	JAYANAGAR - 33KV BORIGUMA	↑ 0.0	■ #	BHADRAK - 33KV CHANDBALI	↑ 0.0	■ #	KHARIAR - 33KV KHARIAR FEEDER-2	↑ 0.0	■ #
JUNAGARH - 33KV CHATRAHAL	↑ 0.0	■ #	SUNABEDA - 33KV LAKMIPUR(NANDOPUR)	↑ 0.0	■ #	DHENKANAL - 33KV GONDA	↑ 0.1	■ #	SUNABEDA - 33KV NANDAKUMAR FEEDER	↑ 0.0	■ #
BHARANJANAGAR - 33KV KIBPUR	↑ 0.0	■ #	THERJUBALI - 33KV BISAM KATAK	↑ 0.0	■ #	SAMBALPUR - 33KV BENGALI	↑ 0.0	■ #	BARKOTE - 33KV MAHELDHIA	↑ 0.0	■ #
ASKA - 33KV BUDUDA	↑ 0.0	■ #	PHULSARI - 33KV KALINGA	↑ 0.4	■ #	BARAGARH - 33KV TURUNG	↑ 0.0	■ #	PODLAPONJA - 33KV KECOHAR	↑ 0.4	■ #
BERHAMPUR - 33KV CHILITI	↑ 0.0	■ #	KENDRAPARA - 33KV LUNA	↑ 0.0	■ #	NAYAGARH - 33KV BINDIPARA	↑ 0.0	■ #	ASKA - 33KV KABISURYANAGAR	↑ 0.0	■ #
BALUGAON - 33KV FANGI	↑ 0.0	■ #	PATTAMUNDAL - 33KV RAJNAGAR	↑ 0.0	■ #	BRAJIRA NAGAR - 33KV SAROIPALI	↑ 0.0	■ #	SUNDERGARH - 33KV SARBEDA	↑ 0.3	■ #
KHURDA - 33KV BANKI	↑ 0.0	■ #	CHATRAPUR - 33KV TARATARNIRAMBHA	↑ 0.0	■ #	PATNAGARH - 33KV KHAPRAKOL	↑ 0.0	■ #	BHARANJANAGAR - 33KV PHULBANI	↑ 0.0	■ #
NAYAGARH - 33KV KHEUDAPADA	↑ 0.7	■ #	CHANDIKHOLE - 33KV KASALABANDHA	↑ 0.0	■ #	PALASPONGA - 33KV REBULI	↑ 0.0	■ #	KENDRAPARA - 33KV PATAMUND	↑ 0.0	■ #
BONGA - 33KV JHARPADA	↑ 0.0	■ #	NIMAPARA - 33KV KAKATPUR	↑ 0.2	■ #	BGINDA - 33KV AHIRALIK	↑ 0.0	■ #	JAIPIUR ROAD - 33KV ANANDAPUR	↑ 0.0	■ #
BHADRAK - 33KV DHAMNAGAR	↑ 0.0	■ #	KHURDA - 33KV DELANGA	↑ 0.0	■ #	CHANPAL - 33KV PALGANJ	↑ 0.0	■ #	BOLANGIR NEW - 33KV PATNAGARH	↑ 0.0	■ #
BALASORE - 33KV SRUJANG	↑ 0.0	■ #	DHENKANAL - 33KV HINDOL RD	↑ 0.0	■ #	KALARANGI - 33KV GODA	↑ 0.0	■ #	JAYANAGAR - 33KV TENTULIKHU	↑ 0.0	■ #
BOLANGIR - 33KV OMERBAHAL	↑ 0.0	■ #	CHAMPAL - 33KV BANARFAL	↑ 0.0	■ #	KESINGA - 33KV TITLAGARH	↑ 0.0	■ #			
BARAGARH - 33KV DINGIRI	↑ 0.0	■ #	JAIPIUR ROAD - 33KV FANNIKOLEI	↑ 0.0	■ #	NIMAPARA - 33KV KONERK	↑ 0.1	■ #			
ROURKELA - 33KV LATHIKATA	↑ 0.0	■ #	BHARANJANAGAR - 33KV BELAGUNTI	↑ 0.0	■ #	ASKA - 33KV NUAGAON	↑ 0.0	■ #			
KHARIAR - 33KV KHARIAR RE	↑ 0.0	■ #	SUNDERGARH - 33KV BARSOAN	↑ 0.0	■ #	JAIPIUR ROAD - 33KV KJAKIRA	↑ 0.3	■ #			
JAGATSINGHPUR - 33KV BALIKUNDA	↑ 0.0	■ #	ASKA - 33KV RUDAMBA	↑ 0.0	■ #						

DETAILS REQUIRED FOR PMU-1

Annexure-1

SIGNALS REQUIRED FOR CONFIGURATION OF PMU & SWITCH	DETAILS REQUIRED FOR PMU INTEGRATION WITH LDC	REMARK	
SUBSTATION NAME		Name of substaion, example: for Kankroli it is KNKRL_PG, for Rihand it is RIHND_NT	
REPORTING LDC		Name of control station where PMU data is require to report	
NO OF PMU		No. of PMU as per architecture, considering 1 PMU can accomodate 2 no. of line data	
VLAN ID			
PMU IP		This IP is to be provided by PGCIL considering no conflict from all other PMU's reporting to RLDC	
SUBNET MASK			
SWITCH IP		Switch IP will be in same series as PMU IP, it is same for all PMU's	
GATEWAY IP		Gateway IP will be in same series as PMU IP, it is same for all PMU's	
PDC-1 IP		PDC at control center-1	
PDC-2 IP		PDC at control center-2 if pmu reporting to 2 LDC's	
VT-1 Ratio		VT/CT ratio of Bay-1 connected in PMU-1	
CT-1 Ratio			
VT-2 Ratio		VT/CT ratio of Bay-2 connected in PMU-2	
CT-2 Ratio			
STREAM 1 ID CODE		PMU id code	
PMU 1 ID CODE		Virtual PMU-1 id code for bay -1	
PMU 2 ID CODE		Virtual PMU-2 id code for bay-2	
PORT DETAIL OF SDH PANEL		port available in SDH panel where PMU switch is required to connect for sending data to LDC	
CHANNEL NAMING			
SUBSTATION NAME		CHANNEL NAMING OF ALL ANALOG SIGNALS OF BAY-1 IN PMU, ALL MUST BE OF 16 CHARACTER	
V1A			
V1B			
V1C			
V1 POS			
I1A			
I1B			
I1C			
I1 POS			
WATT			
VAR			
DIGITAL 1			CHANNEL NAMING OF ALL DIGITAL SIGNALS OF BAY-1 & BAY-2 REQUIRED IN PMU-1, ALL MUST BE OF 16 CHARACTER
DIGITAL 2			
DIGITAL 3			
DIGITAL 4			
DIGITAL 5			
DIGITAL 6			
DIGITAL 7			
DIGITAL 8			
DIGITAL 9			
DIGITAL 10			
DIGITAL 11			
DIGITAL 12			
DIGITAL 13			
DIGITAL 14			
DIGITAL 15			
DIGITAL 16			
V2A		CHANNEL NAMING OF ALL ANALOG SIGNALS OF BAY-2 IN PMU, ALL MUST BE OF 16 CHARACTER	
V2B			
V2C			
V2 POS			
I2A			
I2B			
I2C			
I2 POS			
WATT			
VAR			

DETAILS REQUIRED FOR PMU-2

SIGNALS REQUIRED FOR CONFIGURATION OF PMU & SWITCH	DETAILS REQUIRED FOR PMU INTEGRATION WITH LDC	REMARK	
SUBSTATION NAME		Name of substaion, example: for Kankroli it is KANKRL_PG, for Rihand it is RIHND_NT	
REPORTING LDC		Name of control station where PMU data is require to report	
NO OF PMU		No. of PMU as per architecture, considering 1 PMU can accomodate 2 no. of line data	
VLAN ID			
PMU IP		This IP is to be provided by PGCIL considering no conflict from all other PMU's reporting to RLDC	
SUBNET MASK			
SWITCH IP		Switch IP will be in same series as PMU IP, it is same for all PMU's	
GATEWAY IP		Gateway IP will be in same series as PMU IP, it is same for all PMU's	
PDC-1 IP		PDC at control center-1	
PDC-2 IP		PDC at control center-2 if pmu reporting to 2 LDC's	
VT-1 Ratio		VT/CT ratio of Bay-1 connected in PMU-2	
CT-1 Ratio			
VT-2 Ratio		VT/CT ratio of Bay-2 connected in PMU-2	
CT-2 Ratio			
STREAM 1 ID CODE		PMU id code	
PMU 1 ID CODE		Virtual PMU-1 id code for bay -1	
PMU 2 ID CODE		Virtual PMU-2 id code for bay-2	
PORT DETAIL OF SDH PANEL		port available in SDH panel where PMU switch is required to connect for sending data to LDC	
CHANNEL NAMING			
SUBSTATION NAME		CHANNEL NAMING OF ALL ANALOG SIGNALS OF BAY-1 IN PMU, ALL MUST BE OF 16 CHARACTER	
V1A			
V1B			
V1C			
V1 POS			
I1A			
I1B			
I1C			
I1 POS			
WATT			
VAR			
DIGITAL 1			CHANNEL NAMING OF ALL DIGITAL SIGNALS OF BAY-1 & BAY-2 REQUIRED IN PMU-1, ALL MUST BE OF 16 CHARACTER
DIGITAL 2			
DIGITAL 3			
DIGITAL 4			
DIGITAL 5			
DIGITAL 6			
DIGITAL 7			
DIGITAL 8			
DIGITAL 9			
DIGITAL 10			
DIGITAL 11			
DIGITAL 12			
DIGITAL 13			
DIGITAL 14			
DIGITAL 15			
DIGITAL 16			
V2A		CHANNEL NAMING OF ALL ANALOG SIGNALS OF BAY-2 IN PMU, ALL MUST BE OF 16 CHARACTER	
V2B			
V2C			
V2 POS			
I2A			
I2B			
I2C			
I2 POS			
WATT			
VAR			