AGENDA

FOR

209TH OCC MEETING

Date: 23.11.2023

Eastern Regional Power Committee

14, Golf Club Road, Tollygunge

Kolkata: 700033

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EASTERN REGIONAL POWER COMMITTEE

AGENDA FOR 209TH OCC MEETING TO BE HELD ON 23.11.2023 (THURSDAY) AT 10:30 HRS

1. PART-A

1.1 Confirmation of Minutes of 208th OCC Meeting held on 17th October 2023 physically at ERPC Secretariat, Kolkata

The minutes of 208th Operation Coordination sub-Committee meeting held on 17.10.2023 was circulated vide letter dated 26.10.2023.

Members may confirm the minutes of 208th OCC meeting.

2. PART-B: ITEMS FOR DISCUSSION

2.1 Direction to all GENCOs including Independent Power Producers (IPPs) for timely Import of Coal for blending purposes and maximizing production in captive coal mines-ERPC

Ministry of Power issued an advisory dated 01.09.2023 regarding blending of imported coal @ 4% by weight till March, 2024.

The status of Power Supply position has been reviewed by Govt and it has been observed that there is consistent rising trend in the Power demand in the country coupled with inadequate supply of domestic coal which has resulted in rapid depletion of coal stocks at Domestic Coal Based (DCB) Plants across the country. The gap between receipt of domestic coal and consumption of coal (domestic + equivalent domestic of imported coal) during 01st September to 09th October, 2023 was to the tune of 12 MT.

About 11% fall of Hydro Generation has been recorded in H1 of FY 24 compared to the corresponding period of FY 23 due to variable monsoon rainfall. Approximately 2 GW of hydro capacity is out because of recent floods in Sikkim. The Reservoir levels in Northern, Eastern and Southern regions are less compared to the previous year as on 9th Oct' 2023, which has resulted in lower reservoir energy content at pan India level. This has put additional burden on Coal Based Thermal Generation.

Therefore, in order to ensure uninterrupted power supply across the country, after careful consideration and in consultation with Central Electricity Authority (CEA) and Grid India, it has been decided blending of imported coal @ 6% (by weight) minimum may be continued till March 2024. The Gencos may continuously review their stock position and opt for blending as per the requirements if the shortfall in domestic coal supply is more than 6 per cent. Letter from Ministry of Power in this regard dated 25.10.2023 attached at **Annexure B.1**

GENCOs may update. Members may discuss.

2.2 Seeking Project Appraisal from ERPC for PSDF Grant against Implementation of SAMAST –DVC

Implementation of SAMAST at the state-level is a prerequisite today in order to ensure the transparency and accountability in the Scheduling and other real-time activities & timely compliance of the regulatory norms in a smooth manner. With the growing complexities in the network management and publication of stringent norms and procedures, it has become essential to automate the operational activities of LDCs. The SAMAST Scheme, conceptualised and recommended by the FoR (Forum of Regulators), appears to provide a comprehensive solution to address all these issues related to load despatch activities.

DVC has planned to implement the complete SAMAST project through the Entrepreneur Resource Planning (ERP) project of DVC under a separate head as 'SLDC module'. The scope pertaining to the project is mainly on the procurement of an Integrated Software for SLDC, covering automation in Scheduling, Open Access, Deviation Settlement, Energy Accounting, Outage Management etc. and its associated Communication and IT infrastructure.

In this regard, a DPR has been prepared exclusively for the SLDC module for grant of funding from PSDF under category 3(f), as mentioned of the attached letter (**Annexure-B.2)** of the Under Secretary (OM), MoP Dtd. 04-07-2023. The in-principal approval of the competent authority of DVC has already been obtained.

The DPR has been placed before ERPC on 31-10-2023 for appraisal on the project as per the requirement under PSDF Application Format-A5.

DVC may update. Members may discuss.

2.3 Shutdown proposal of generating units for the month of December'2023-ERPC

Maintenance Schedule of Thermal Generating Units of ER during 2023-24 in the month of December'2023							
System	Station	Unit No.	Capacity (MW)	Period (as per LGBR 2023-24)		No. of Days	Reason
				From	To		

DVC	DSTPS	2	500	01.12.2023	28.12.2023	28	AOH-Blr, FGD & De-NOx Burner & LPT
WBPDCL	Bakreswar TPS	2	210	16.11.2023	05.12.2023	20	AOH/BOH
	Bakreswar TPS (**Already approved in 208th OCC**)	2	210	**08.12.2023**	**27.12.2023**	20	AOH/BOH
	Bakreswar TPS (**Not availed in 208th OCC)**	3	210	23.11.2023	02.12.2023	10	PG Test/ Boiler License Renewal
	Bandel TPS	5	215	09.12.2023	28.12.2023	20	AOH/BOH
	Bandel TPS (**Already approved in 208th OCC**)	5	215	**03.01.2024**	**22.01.2024**	20	AOH/BOH
CESC	BUDGE-BUDGE	2	250	23.11.2023	19.12.2023	27	Not Specified
	BUDGE-BUDGE (**Already approved in 208th OCC**)	2	250	**28.12.2023**	**03.01.2024**	27	Not Specified
	BUDGE-BUDGE	3	250	21.12.2023	27.12.2023	7	Not Specified
	BUDGE-BUDGE (**Already approved in 208th OCC**)	3	250	**04.01.2024**	**31.01.2024**	7	Not Specified
NTPC	FSTPP (**Already availed earlier,so Not Availed in 208th OCC)**	4	500	01.11.2023	15.12.2023	45	BLR +HP +IP +Gen + LPT insitu PAUT & MPI+All brg insp+ FGD damper installation
	KhSTPS	4	210	01.12.2023	04.01.2024	35	Boiler + HP + IP + Generator

	KhSTPS	5	500	01.12.2023	14.01.2024	45	Boiler+LP+Gen.+ Combustion Modification (Approved in LGBR 2022-23)
BRBCL	Nabinagar TPS	4	250	01.12.2023	09.01.2024	40	Boiler+ LPT O/H + Generator rotor thread out and checking +NOX Work
MPL	MPL	2	525	17.12.2023	25.01.2024	40	AOH/COH
GMR	GMR	1	350	10.11.2023	19.12.2023	40	COH
	GMR **(Already approved in 208th OCC subject to consent from NR beneficiaries**)	1	350	**10.11.2023**	**19.12.2023**	40	COH

Members may discuss.

2.4 Rescheduling of Overhauling of 660 MW Unit-2 of NPGC Nabinagar-NTPC

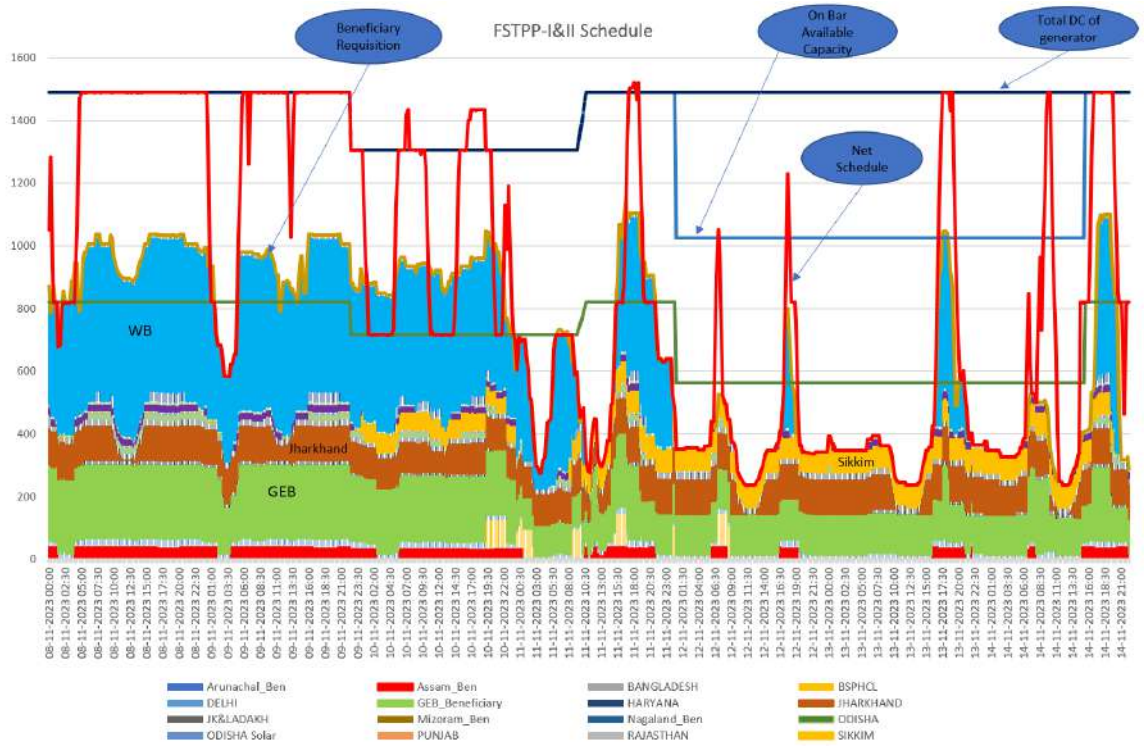
As decided in 207th OCC meeting the Boiler modification works along with Overhauling of Unit-2 of NSTPS is to start from **25th Nov' 2023** for a duration of **80 days**.

However, due to contractual issues of OEM, the sub-agency responsible for conducting the boiler modification job is yet to mobilise the manpower & tools/tackles at site. Since boiler modification job requires adding of extra coils in economiser, reheater, shortening and In-situ shot peening of superheater coils, which cannot be completed within the approved time frame without adequate pre-shutdown preparations & mobilization of resources(manpower/tools/tackles). In view of above, it is proposed to defer the start date of Overhauling of **NPGC Unit-2** to **16th Dec'2023**.

NTPC may update. Members may discuss.

2.5 Aspects to be considered by generating stations in case of USD- ERLDC

Recently a few generating units of Barh, FSTPP-1&2 and FSTPP-3 had gone under USD due to less requisition from their respective beneficiaries. In all the cases, the generating stations were supposed to meet the supply obligations of their beneficiaries as per provisions of IEGC 2023 and Suo-moto order from Hon'ble CERC in petition no. 14/SM/2023. The pattern of DC, requisition, and schedule for FSTPP-1&2 for 08-11-2023 to 14-11-2023 is shown below:



It may be observed that the net schedule of the generator may be more than the available capacity On-bar as the generator shall ensure to meet their supply obligations i.e., requisitions from beneficiaries as per total DC of the plant, which may vary throughout the day. Further, SCED and TRAS-Shortfall dispatch may also be up to the total DC. Following aspects may be considered by generating stations for ensuring that their schedule remains within the actual available capacities On-bar and actual generation in case of USD of one or more generating unit:

2.5.1 Scheduling of power procured through bilateral transactions by generating station from alternate sources in case of USD to meet its supply obligations in line with cl. 47.2(b) of IEGC 2023

a. The power procured through bilateral transactions by generating station from alternate sources to meet supply obligations shall have to be scheduled under TGNA by applying for exigency TGNA in NOAR.
b. The application, approval, scheduling process and timelines shall be as per GNA Regulations.
c. Applicants cannot revise Exigency TGNA as per GNA Regulations.
d. Transmission charges and losses shall not be applicable for such transactions.

2.5.2 Scheduling of generating station upto Total DC including capacity of the unit(s) under USD

a. Generating stations may provide email request in such cases in order to temporarily exclude the plant from SCED.
b. However, if the plant is excluded from SCED, they may not receive SCED support as per clause 47.2(c) of IEGC 2023.

ERLDC may update. Members may discuss.

2.6 Declaration of OFF Bar DC against RSD as per clause 47 th of IEGC 2023-NTPC

As per clause 47, 1) of IEGC 2023, in case the schedule is less than technical minimum then generating station may go under unit shutdown, however obligation of supply of power to beneficiaries who had given schedule prior to going USD will be with generating station.

As per prevailing practice, in case of USD generating stations were allowed to declare off bar DC. However same is not being allowed after enforcement of IEGC 2023.

Further as per point 2 of clause 47, the detailed procedure to deal with USD has to be developed by NLDC.

Since till date no such procedure exists. Hence generating stations may be allowed to declare OFF Bar DC.

NTPC may update. Members may discuss.

2.7 LILO arrangement/Power evacuation of IBEUL and implementation of SPS - IBEUL

This has reference to the discussions held during the meeting dated **8th November** convened by the **CEA** regarding interim connectivity and injection of power from 700 MW Ind Barath Utkal Energy Ltd(IBEUL)

The meeting was chaired by the CEA Chairperson and attended by representatives from CEA,CTU,JSW(Ind-Barath),GRIDCO,ERPC and OPTCL.

During this meeting it was directed by CEA that connectivity to IBEUL would be provided as a LILO between OPGC and ISTS Jharsuguda D/C Transmission line. Furthermore, the meeting concluded that LILO and SPS scheme(if required) should be finalized expeditiously to facilitate commissioning of Ind-Barath's 1st unit at the earliest.

In a bid to effectively meet the crucial timeline for commissioning, OCC is kindly requested to finalise the scheme, subsequent activities such as executing the connection agreement and procuring necessary equipment for the scheme shall take considerable time.

IBEUL may update. Members may discuss.

2.8 Non-Receipt of signals for remote monitoring from 220 kV Bays at Muzaffarpur Substation- Powergrid ER-I

Remote monitoring and operation of all sub-stations in Eastern region-I is being ensured from RTAMC Patna. For smooth operation/monitoring, proper data reporting of switchgear status, analog values and alarms to control center is essential. However, there is issue in reporting of few critical signals at Muzaffarpur due to issues in bays/equipment owned by BSPTCL:

a. 220kV bays 210 & 211(Amnour-2 & 1) at Muzaffarpur ::

The bays belong to BSPTCL and are being maintained by BSPTCL. Due to communication issue in few IEDs,the signals pertaining to the bays are reporting partially to RTAMC.

b. Non-reporting of GIS bus duct signals of 220 kV BUS-1&2 ::

There are 03 bays at Muzaffarpur Sub-station on 220 kV side i.e 212-Goroul-2 & 213(Goroul-1)-owned by BSPTCL and 214-(ICT-IV LV side) owned by POWERGRID.As per our signal monitoring policy for GIS,grouping of compartment wise signals is being done to optimize the number of signals reporting to local and remote SCADA. However, BSPTCL bay number 213 is under breakdown due to flashing in GIS module on 11th June 2022. BCU pertaining to Bay 213 has also become faulty. Further, BCU of Bay 212 goes into error mode frequently and thus needs to be replaced. Therefore, the grouped signals i.r.o 220 kV GIS BUS DUCT AT Muzaffarpur are not reporting to RTAMC for remote supervision.

Owing to the above, remote monitoring stands affected i.r.o Muzaffarpur Substation and we have to locally monitor for the same.

The matter has been persistent for long duration and thus needs to be deliberated in OCC forum for its time bound resolution.

Powergrid ER-I may update. Members may discuss.

2.9 Update on installation of 7th (Interim) 500 MVA ICT at 400 kVSubhasgram(PG)-WBSETCL

In a special meeting with higher authorities of WBSEDCL, WBSETCL in presence of authorities of CESC, ERLDC, ERPC, Power Grid, it was decided to use the reserve 500 MVA ICT at Maithon(PG) to install in Subhasgram(PG) as 6th ICT, to handle the urgency arose from the fact that the new 500 MVA ICT of CESC will not come before 2024 Summer. Detail discussion was held in 208th OCC meeting where WBSETCL (SLDC and CPD / STU) has requested Power Grid to inform the status and expected timelines in steps for progress of the transformer transportation and installation. Since last OCC meeting almost (17.10.23 to 23.11.23) one month one week time has elapsed in between. Within this period neither the

400 Kv reactor at Subhasgram(PG) has gone to shutdown, nor any further update of movement of the said ICT from Maithon (PG) is informed to WBSETCL. Under these circumstances, this may please be noted that every passing day will be expensive, if the ICT is not commissioned by March 2024 and huge network congestion will result around Subhasgram (PG) point.

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

2.10 Update on replacement of one 315MVA, 400/220KV ICT from Regional Pool for replacement of one no of defective 315 MVA ICT (4th) at Jeerat 400 KV S/S(WB)–WBSETCL

In view of extremely high growth of load in North Kolkata and associated districts including the state capital, Jeerat 400 kV sub-station is in need of one (400/220 KV) 315 MVA ICT to replace the damaged 4th ICT of Jeerat. Already huge difficulties faced in the summer of 2023. Hence the Company has requested Power Grid to give the 315 MVA ICT kept at spare in Malda to use in Jeerat (WBSETCL) sub-station as an immediate measure. WBSETCL will execute the required works including transportation of the ICT from Malda PG S/Stn.

This is the way to bring 4th ICT at Jeerat within shortest possible time, so that summer load on Jeerat can be handled. /Stn of WBSETCL In 208th OCC it was requested to Power Grid to inform WBSETCL on each step involved starting from the initiation of the official process needed for shifting of the ICT(transportation is on the part of WBSETCL) to commission the ICT before summer 2024. But no information received as yet since last OCC (more than 5 weeks time elapsed already). This may please be noted that if the said transformer is not installed in Jeerat 400 kV sub-stn before summer 2024, then total north 24 parganas and associated districts including the state capital will face huge congestion and more power interruption may result even before and during the vital election 2024.

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

2.11 Update on installation of 3rd ICT at Rajarhat (PG)-WBSETCL

In view of the forthcoming New Town AA IIC 220 / 132 kV sub-station (will be commissioned shortly), the need of 3rd ICT at Rajarhat (PG) was agreed by WBSETCL in 21st CMETS-ER meeting held on 28.07.2023. But no headway is achieved afterwards on this count as yet. **Power Grid may please update the status and / or may please inform, if anything to initiate further from WBSETCL end in this regard.**

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

2.12 Replacement of conductor and earth-wire in 220kV Lines (more than 35 years in service) commissioned under CTS.- POWERGRID ER-II

The transmission network build under CTS scheme was commissioned in mid of 1980's. List of lines are tabulated below :-

Sl. No.	Name of TL	Total Length of Line (in KM)	Length of Line(in KM) under POWERGRID	Name of conductor	Yr of commissioning	Remarks
1	220kV D/C Birpara-Chukha TL	70	36	Zebra	1986	
2	220kV D/C Birpara-Alipurduar TL	57.5	57.5	Zebra	1987	
3	220kV D/C Siliguri-Kishanganj TL	108.26	108.26	Zebra	1986	
4	220kV D/C Dalkhola-Kishangnaj TL	30.96	30.96	Zebra	1986	
5	220kV D/C Malda-Gazole TL	18.41	16.49	Zebra	1986	
6	220kV D/C Dalkhola-Gazole TL	99.24	97.52	Zebra	1986	
7	220kV D/C Birpara- Binaguri TL	80	80	Zebra	1986	
8	220kV D/C Siliguri-Binaguri TL	6	6	Zebra	1986	
9	220kV S/C Birpara-Malabase TL	41	38	Zebra	1988	
10	220kV D/C Alipurduar-Salakati TL	101	101	Zebra	1987	Re-conductoring work is in progress under NERSS-XII

In most of the above mentioned lines, the conductor damage from VD, MSCJ and repair sleeve,jumper ,dead ends etc. have been noticed at several places. The damage might be occurring due to ageing of the conductors & earth-wire due to natural wear & tear. Also conductor and earthwire getting snapped during seasonal temperature changes. Some snaps of sections of lines where breakage has been reported are enclosed at **Annexure-B.12.1.**

The line tripping due to conductor & earth-wire snapping are gradually increasing. (2 Nos. conductor snapping incident occurred in 220kV Birpara-Binaguri Ckt-2 in the month of October-23 itself) In addition to the line outages which is severely deteriorating the transmission availability, it creates potential risk of any severe accident/hazard in the nearby area due to snapping of Conductor/Earth-wire. Further, any incident of conductor/earth-wire snapping at major crossings (Railway, NH X-ings) may lead to undesired safety hazard as well as damage to public/national property. List of tripping in said lines due to conductor & earth-wire breakage are enclosed at **Annexure-B.12.2.**

All the above mentioned lines are more than 35 years in service so have completed useful life as per CERC regulation.

Considering the increase in conductor & earth-wire snapping, it is proposed to consider the re-conductoring of 220kV Lines commissioned under CTS under the ADDCAP 2024-2029 tariff block of Chukha Transmission System. Technical approval in this regard may be approved by the OCC forum please. A tentative cost for carrying out the re-conductoring work with HTLS conductor in above mentioned 9(Nine) lines 470.73 KM route length is detailed at **Annexure-B.12.3.**

POWERGRID ER-II may update. Members may discuss.

2.13 Reconstruction of Residential/Non-residential buildings at Durgapur S/S , Maithon S/S- POWERGRID ER-II

Durgapur S/S, Maithon S/S & Malda S/S of ER-II are more than 25 years in service as per details given below:-

Sl No.	Name of Sub-station	Seismic Zone	DOCO	Package
a	Maithon	3	1992	KTPS
b	Malda	4	1986	CTS
c	Durgapur	3	1987	FSTPP

Due to natural ageing/wear and tear the condition of Residential Quarters for employees and control room at above mentioned sub-station have got seriously damaged. Buildings in the locations mentioned are of load bearing type structure (non RCC frame) and are in use for 30 years. These buildings are in dilapidated and non-usable condition which may lead to accident any time. Any accident may cause damage / loss of manpower and equipment which may affect the stability and reliability of the Grid. With the passage of time, the said constructions have suffered severe structural and non-structural damage like cracks in wall, roof slab, spalling, differential settlement, seepages, scaling, popping out etc. Any accident due to such dilapidated condition will not only cause damage to stored materials / equipment but may also cause danger to the residing personnel. From last few years the buildings are somewhat kept under operation by time to time minor repair and painting works from inside and outside but now the condition of those buildings have deteriorated to such an extent that further repairing is not possible. Repairing of buildings at this stage will result in huge financial expenditure and will not provide any significant structural strength. Thus, repairing of these building at this stage is not viable. Also condition of associated services like roads, drains etc have also damaged due to ageing. Sample photographs showing the condition of the buildings are enclosed at **Annexure-B.13.1.**

As per schedule-II of the Companies Act 2013, the useful life of non-RCC framed structure is 30 years. Further, as per National Building Code Volume-1 (2016), the dilapidated or the civil structures whose useful/service life is over, are required to be demolished. Availability of residential/ non residential buildings in good condition is essential for healthy of employees.

Accordingly, health assessment studies of the buildings have been carried out through third party reputed institute NIT Patna at POWERGRID Durgapur SS, Maithon SS & Malda SS.

Health Analysis Report of NIT Patna enclosed at **Annexure-B.13.2.**From the report it is evident that the condition of the buildings at the above mentioned sub-station is in very poor condition and based on the assessment, the institute indicated that repairing of said buildings is not feasible and recommended for demolition and re-construction of new buildings.

In view of above, it is proposed to OCC forum for according in-principle approval for incurring ACE during 2024-29 tariff block towards re-construction of residential / non residential buildings and associated services under clause © of sub-clause 2 of Regulation 25 of the expenditures (ACE and de -capitalization), if any, towards replacement of the said buildings. A tentative cost for carrying out the work is detailed at **Annexure-B.13.3.**

POWERGRID ER-II may update. Members may discuss.

2.14 Outage of one pole in Talcher HVDC without prior information- ERLDC

The shutdown of HVDC Talcher-Kolar Bipole was taken on 29.10.2023 for execution of girders works on main carriageway in development of six lane of Korlam - Kantakapalle Section of NH-130CD Road by NHAI. However, Pole-2 could not be brought back in service after the completion of shutdown as some maintenance work was done and problem found in OLTC of converter transformer of Pole-2 at Talcher end.

In this scenario, only 1000 MW could be transmitted through the remaining Pole-1 in metallic return mode. As an operational requirement, NLDC had decided to increase power order up to 1250 MW from ER to SR through this link for 10 hours as per its technical design. But there was no readiness from the site, despite several request from NLDC/RLDC, to increase power order up to 1250 MW citing the increased winding temperature of Y_ph converter transformer at Talcher end and aging of the assets.

Powergrid Odisha is requested to furnish the reason behind availing shutdown of Talcher HVDC pole-2 without informing ERLDC. It is also requested to furnish the action plan to restore the capability to carry 1250MW as per the design.

ERLDC and POWERGRID Odisha may update. Members may discuss.

2.15 Winter preparedness plan- ERLDC

A Winter Preparedness meeting 2023 has been scheduled on 30th Nov 2023 from 10:30 hrs. onwards at ERPC hall, Kolkata. Various issues like Resource planning, Safe and secure operation of the grid, Outage planning and voltage management including tap optimization and generator reactive performances for the ensuing winter months will be discussed. Review will be taken in respect of performance of generating units for controlling network voltage during last winter.

You are requested to nominate representee from your organization.

ERLDC may update. Members may discuss.

2.16 Monitoring Day ahead resource Adequacy-ERLDC

Monitoring of resource adequacy at every time horizon is important for timely action. ERLDC has started monitoring day ahead resource adequacy for all the sate as well as for eastern region. Day ahead resource adequacy report is prepared by 16:00 hours of D-1. This report shows state wise shortage or surplus scenario. Based on which we can sensitize state to participate in RTM/ T-GNA market for purchasing of power (in case of shortfall) or sell (in case of surplus). This will help in better utilization of unused power in state generators as well. Real time DC of state generating units can provide acute picture. ERLDC already has taken up to integrate the real time DC & schedule data with Real Time Generation monitoring portal of GRID-INDIA. Bihar, DVC, Odisha & West Bengal are in process to develop a system to integrate the data. States may please continue to push the data to ERLDC and start preparing resource adequacy report on day ahead basis to handle the upcoming crunch period.

ERLDC may update. Members may discuss.

2.17 Furnishing of data for interconnection study-ERLDC

As per new IEGC, interconnection study is to be performed at SLDC, RLDC and NLDC level which involves analyzing the impact of all elements to be commissioned within six months on a rolling basis each month and evaluating the impact these elements on the transfer capability of import/export of state, at interstate, intra and inter regional levels.

'**Procedure for carrying Out Inter-Connection Studies of New Power System Elements**' published by Grid-india in September,2023, lays down the guidelines for data submission and performing the interconnection studies for new power system elements to be integrated into the Indian grid.

All Users ,which may include, Concerned Transmission Licensee (s)/ Settlement Nodal Agency (SNA), ISTS Licensee, Intra- state (InSTS) Licensee through SLDC, Generation Entity/ Load Serving Entity / Connectivity Grantee responsible for providing the necessary data for first time integration of elements shall furnish the information each month on a rolling basis within the specified timelines in the table below to the concerned SLDCs/RLDCs/NLDC responsible for carrying out the inter-connection studies.

S. No.	Power System Element	Data Submission Responsibility	Data to be submitted to	Data/Information Submission Deadline
1.	Transnational links (including HVDC) and associated elements (irrespective of voltage level)	Concerned Transmission Licensee (s) / Settlement Nodal Agency (SNA)	NLDC	15th Day of "M-7" month (NLDC to share the consolidated information of all such elements with the concerned RLDCs by 20th Day of "M-7" month)

2.	Inter-regional transmission system (including HVDC) and associated elements (irrespective of voltage level)	Concerned Transmission Licensee (s)	Concerned RLDCs	15th Day of "M-7" month (RLDCs to share the consolidated information of all such elements with the concerned SLDCs and NLDC by 20th Day of "M-7" month)
3.	ISTS elements within the region including HVDC, FACTS devices, any other transmission element (irrespective of voltage level)	Concerned ISTS Licensee	Concerned RLDC	15th Day of "M-7" month (RLDC to share consolidated information of all such elements with the concerned SLDCs and NLDC by 20th Day of "M-7" month)
4.	Intra-state transmission system including HVDC, FACTS devices, any other transmission element	Concerned ISTS Licensee / Concerned Intra-state (InSTS) Licensee through SLDC	Concerned SLDC	15th Day of "M-7" month (SLDC to share consolidated information of all elements at 132 kV and above voltage level with the concerned RLDC by 20th Day of "M-7" month. RLDC to further share the information with NLDC)
5.	GeneratingPlants,Bulk Consumers or Load Serving Entities and Combined (Load & Captive) generation complex, Energy Storage Systems, and Synchronous Condensers connected to the ISTS network *(includingdetailsofassociated dedicated transmission lines)*	Concerned Generation Entity/ Load Serving Entity / Connectivity Grantee	Concerned RLDC	15th Day of "M-7" month (RLDC to share consolidated information of all such elements with the concerned SLDCs and NLDC by 20th Day of "M-7" month)
6.	Generating Plants, Bulk Consumers or Load Serving Entities and Combined (Load & Captive) generation complex, Energy Storage Systems, and SynchronousCondensers connected to the intra-state network *(including details of associated dedicated transmission lines)*	Concerned Generation Entity / Load Serving Entity / Connectivity Grantee	Concerned SLDC	15th Day of "M-7" month (SLDC to share consolidated information of all elements at 132 kV and above voltage level with the concerned RLDC by 20th Day of "M-7" month. RLDC to further share the information with NLDC.)

The role specified in the interconnection procedure for SLDCs, RLDCs and NLDC after receipt of the above data is as below.

- Respective SLDC, in consultation with respective RLDC and STU, shall carry out a joint study on the impact of new elements to be energized in the intra-state system within its jurisdiction in the next six (6) months and shall share the results of the studies with the concerned RLDC by 21st day of the “M-6” month where “M” is the month of expected first time energization of the new elements.

- Respective RLDC, in consultation with concerned SLDCs, STUs, NLDC and CTU, shall carry similar joint study in (a) the ISTS of the region and (b) the intra-state system on the inter-state system and shall share the results of the studies with NLDC by 26th day of the “M-6” month.

- NLDC, in consultation with concerned RLDCs and CTU, shall carry out similar study on the impact of new for (a) inter-regional system, (b) cross-border links and (c) intra-regional system on the inter-regional system and shall complete the inter-connection study by the end of “M-6” month.

The common all India case for this purpose shall be shared by RLDCs/NLDC with SLDCs (based on the inputs received from stakeholders including SLDCs by 15th day of “M-6” month. The format specified for submitting the data is given at **Annexure-I** of the interconnection procedure mentioned. The necessary technical and modelling data of all the elements expected to be energized in the “M” month shall be submitted in the formats specified in Grid-India/NLDC’s procedure for ***“First Time Charging /Energization (FTC) and Integration of New or Modified Power System Element”***, as amended from time to time, for carrying out the necessary studies.

On 208th OCC, under ITEM NO. B.22, the timelines of submission of node-wise load and generation data & sharing of network simulation models for upcoming intrastate elements in the next six months and requirement of sharing their study results for evaluating the impact on transfer capability was highlighted, which is reproduced below along with timelines specified for RLDC and NLDC taken from **Procedure for transfer capability capability assessment methodology**.-

Purpose	**Sl No**	**Action of Stakeholder**	**Responsibility**	**Submission to**	**Data/Information Submission Time line**
	2(a)	Submission of node-wise load and generation data & sharing of network simulation models for intra-state elements coming in	SLDC	RLDC	8th Day of ‘M- 6’ month

2. Interconnection Studies for elements to be integrated in the month 'M'		the next six months			
	2(b)	Sharing of inter-connection study results			21st Day of 'M-6' month
	2(c)	Updating state and regional load & generation & modelling of inter-state & intra-state elements coming in the next six months in the regional system base case	RLDCs	NLDC	13th Day of 'M-6' month
	2(d)	Sharing of inter-connection study results			26th Day of 'M-6' month
	2(e)	Update the All-India network model for interconnection studies	NLDC	RLDCs	15th Day of 'M-6' month
	2(f)	Completion of inter-connection study for elements coming in the next six months			Last Day of 'M-6' month

ITEM NO. B.23 and annexure B.23 of 208th OCC dealt with changes in operating procedure in line with IEGC 2023 regulations, where the requirement of coordination between STU and SLDC for collection and studying the impact of upcoming elements in next six months, furnishing of those data, updation in the base case and sharing of study results to evaluate impact in TTC by SLDCs to RLDC was deliberated.

Previously, all state planning agencies(STUs) and SLDCs were requested to furnish such data on an email dated 6th September,2023 for facilitation of transfer capability assessment and interconnection study which will then be integrated at NLDC for evaluating the overall impact upto inter regional level. However, so far no inputs in form of raw data of upcoming elements upto six months, modelling such data for base case, sharing of study results of their impact in transfer capability and updated case incorporating them has been received from any of the agencies involved. A separate email to ISTS licensees and regional generation entities has also been sent.

In this context, it is requested to share these data at the earliest and then on a rolling basis every month as per the timelines mentioned in 208th OCC and in 'Procedure for Transfer Capability Assessment Methodology', 'Procedure for carrying Out Inter-Connection Studies of New Power System Elements' published by Grid India on September 2023 such that relevant provisions in IEGC are complied.

ERLDC may update. Members may discuss.

2.18 Outage Planning procedure- ERPC

As per clause No. 32(4) of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2023 under Operating Code, it has been envisaged "To facilitate coordinated planned outages of grid elements, a common outage planning procedure shall be formulated by each RPC in consultation with the NLDC, concerned RLDC and concerned users".

Accordingly, a draft outage procedure had been prepared . All stakeholders had been requested to go through the procedure and submit their views/comments/observations, if any, latest by 17th October'2023. The same had been shared vide mail dated 13.10.2023.

Comments have been received from NLDC vide mail dated 19.10.2023 suggesting some modifications in the Draft Outage procedure. The modified draft outage planning procedure incorporating alterations suggested by NLDC attached at **Annexure-B.18**

ERPC may update. Members may discuss.

2.19 Operating Procedure in compliance with IEGC-2023- ERLDC

Hon'ble commission has notified the Indian Electricity Grid Code-2023(IEGC-2023). IEGC 2023 clause no 28(4) mandates

QUOTE

Detailed Operating Procedures for each regional grid shall be developed, maintained.

and updated by respective RLDCs in consultation with NLDC, concerned RPC and regional entities and shall be kept posted on the respective RLDC's website.

UNQUOTE

Accordingly in compliance with the IEGC 2023 clause no 28(4), Operating Procedure for Eastern Region has been developed by ERLDC. The **operating procedure is available in the link:**

https://app.erldc.in/Content/Upload/System%20Study/Operating%20Procedure/Operating%20Procedure%20ERLDC%20290923.pdf

The annexures are available in the link:

https://app.erldc.in/Content/Upload/System%20Study/Operating%20Procedure/Annexures%201-%20Operating%20Procedure%20IEGC%202023.pdf

The same has been circulated among the stakeholders vide mail dated 29.09.23 and 02.11.23 respectively for comments. The draft procedure has been further discussed at 208th OCC meeting held on 7th October'2023 for stakeholders' consultations. The final operating procedure shall be sent to CERC for intimation by the end of November'23. Members may please note.

ERLDC may update. Members may discuss.

2.20 Digital proof of downward DC revision- ERLDC

As per CERC order no 14/SM/2023 dated 30.09.2023, ISGS are permitted to revise DC due to partial outage, twice in a day. Generating station may submit the digital proof to respective RLDC for verification of the proof independently to avoid any kind of misdeclaration. However, it is observed that the generators have provided digital proof only for few cases. Instances with & without digital proof have been tabulated below:

Row Labels	No	Yes	Grand Total
BARH	1		1
BARH-I	13	1	14
BARH-II	10		10
BRBCL	4		4
DARLIPALI	9	1	10
FSTPP-I&II	22	7	29
FSTPP-III	18	7	25
KHSTPP-I	24	9	33
KHSTPP-II	3	4	7
MPL	2		2
NPGC	11		11
TSTPP-I	11	1	12
Grand Total	128	30	158

It is also observed that proof submitted by generators are not adequate to identify the reason properly. All generators are requested to follow the CERC direction in this regard.

ERLDC may update. Members may discuss.

2.21 Update- Status of pending augmentation/upgradation- ERLDC

Status of following transmission elements need to be updated:

1. 400/220kV 500MVA Subhasgram ICT -7
2. Upgradation of 220kV S'gram-S'gram-DC, 220kV- S'gram-Kasba-DC
3. 400/220kV 315MVA ICT-2 at New Patratu
4. 125MVAR Bus reactors at Kharagpur, New PPSP

Members may update.

2.22 Implementation of free governor mode of operation as per IEGC 2023 and PFR testing status of State generating units:

IEGC-2023 has laid down detail provision of Primary frequency response ancillary services in clause 30.10.(a) to 30.10.(q). IEGC-2023 has come into effect from 1st October. As per the clause 30.10.(d), all generating units as per the eligibility under clause 30.10.(h) need to run in Free governor mode and they should have electronically controlled governing system.

All generating units are requested to share the status of implementation of provisions of IEGC-2023 and timeline for completing the implementation. Also, owner of generating units which are still run by mechanical governing system may share their plan for retrofitting the system with electronic governing system.

As per the provision of the IEGC-2010 (latest amendment) Primary frequency response testing was carried out for 240 ISGS Units. As per IEGC-2023 this test needs to be carried out periodically and therefore keeping track of last PFR testing of all units including state generating station is necessary. Also For preparing a comprehensive report at national level the status of PFR of State generating units is required, therefore you are requested to kindly share the latest status of the PFR testing in the prescribe format.

ERLDC may update. Members may discuss.

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

3.1 ER Grid performance during October 2023.

The average and maximum consumption of Eastern Region and Max/Min Demand (MW), Energy Export for the month October-2023 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)
507 MU	570 MU 11-10-2023	26208 MW, 11-10-2023 at 21:19 Hrs.	16614MW, 24-10-2023 at 03:49 Hrs.	3974	4554

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

3.2 Real time operational planning study using SCADA EMS tools-ERLDC

As per IEGC-2023, real time operation planning studies needs to be carried out by SLDC, RLDC and NLDC. If telemetry issue causes any error in such study, the same needs to be flagged in operational planning meeting and utility needs to update the progress in data restoration. If any issue remains pending for any quarter, the same may be reported to commission by RPC. ERLDC already used to do such study and used to highlight telemetry related issues in TEST meeting. However, as per IEGC-2023, the telemetry related issue is recorded specifically in regards non-satisfactory result of state estimator.

Issues observed during 1st 10 days of Oct-2023 are as follows:

Date	Name of the element going for S/D	Remarks	Reason
05-11-2023	400KV-FSTPP-KHSTPP-1	**Not Satisfactory**	Data Issue (Bad Quality Data) at FSTPP
08-11-2023	400KV/220KV 315 MVA ICT 1 AT LAPANGA	**NOT SATISFACTORY**	Lapanga data is highly intermittent, and it has already been flagged to Odisha.
10-11-2023	400KV-MEERAMUNDALI-MENDHASAL-II	**Flow is both circuits 0 in EMS**	Status Points are suspected at ERLDC END; Data is intermittent, and it has been flagged to ODISHA as well.

14-11-2023	765KV/400KV 1500 MVA ICT 1 AT NEW RANCHI	**ICT #2 FLOW IS ZERO IN EMS**	L1 isolator data (both 765KV end and 400KV end at New Ranchi) is Showing "OPEN" although there is a flow.

SLDC may also start similar studies and recording of telemetry issue causing error in SCADA EMS studies for discussion in monthly operational planning meeting.

ERLDC may update. SLDCs may respond and other members may discuss.

3.3 Ensuring the healthiness of ADMS

State	Criteria for ADMS operation	Number of instances for which ADMS criteria satisfied	Number of instances for which detail received	Discussion regarding previous month performance	Update in 206th OCC meeting
West Bengal	1. System Frequency < 49.7 Hz 2. WB over-drawl > 150 MW 3. Delay = 4 min	2	Nil	-	-
Jharkhand	1. System Frequency < 49.9 Hz 2. Jharkahnd over-drawl > 25 MW 3. Delay = 3 min	152	Nil	-	-
DVC	1. System Frequency < 49.9 Hz 2. DVC over-drawl > 150 MW 3. Delay = 3 min	55	Nil	-	-
Odisha	1. System Frequency < 49.9 Hz 2. Odisha over-drawl > 150 MW 3. Delay = 3 min	26	Nil	-	-

Members may note.

3.4 Commissioning status of ADMS

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

Sl No	State/Utility	Logic for ADMS operation	Target Date
1	Bihar	F <49.7 AND deviation > 12 % or 150 MW	

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

Members may note.

4. PART-D: OPERATIONAL PLANNING

4.1 Anticipated power supply position during December 2023

The abstract of peak demand (MW) vis-à-vis availability and energy requirement vis-à-vis availability (MU) for the month of December 2023 were prepared by ERPC Secretariat (**Annexure D.1**) on the basis of LGBR for 2023-24 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 13-11-2023)

a) Thermal Generating Stations outage report:

SL No	STATION	STATE	AGENCY	UNIT NO	CAPACITY (MW)	REASON(S)	OUTAGE DATE
1	KHSTPP	BIHAR	NTPC	7	500	Annual overhauling	14-Oct-2023
2	KODERMA	DVC	DVC	2	500	For enabling hooking of FGD, Combustion modification (De NOx system installation) along with AOH for 28 days	28-Oct-2023
3	SOUTHERN	WEST BENGAL	CESC	2	67.5	Unit survey	25-Oct-2023
4	DPL	WEST BENGAL	WBPDCL	7	300	Poor Coal Stock	22-Oct-2023
5	BARAUNI TPS	BIHAR	NTPC	6	110	Low vacuum	22-Jul-2023
6	BARAUNI TPS	BIHAR	NTPC	7	110	Poor condenser vacuum	19-Jul-2023

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
1	FSTPP	WEST BENGAL	NTPC	5	500	Reserve shutdown	12-Nov-2023

2	BARH	BIHAR	NTPC	5	660	Reserve shutdown	13-Nov-2023
3	MEJIA TPS	DVC	DVC	1	210	Earlier out due to boiler Tube Leakage. After that unit under reserve shutdown wef 22:00 hrs of 11/11/2023.	07-Nov-2023
4	SOUTHERN	WEST BENGAL	CESC	1	67.5	Reserve Shutdown	24-Oct-2023

c) Hydro Unit Outage Report:

S. NO	STATION	STATE	AGENCY	UNIT NO	CAPACITY (MW)	REASON(S)	OUTAGE DATE
1	BALIMELA HPS	ODISHA	OHPC	2	60	Annual Maintenance	08-Nov-2023
2	BALIMELA HPS	ODISHA	OHPC	4	60	The unit taken out under R&M since 08/07/2022 for 18 months.	08-Jul-2022
3	BALIMELA HPS	ODISHA	OHPC	3	60	The unit taken out under R&M since 08/07/2022 for 18 months.	08-Jul-2022
4	U. KOLAB	ODISHA	OHPC	2	80	Rotar earth Fault	25-Aug-2023
5	TEESTA HPS	SIKKIM	NHPC	1	170	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
6	TEESTA HPS	SIKKIM	NHPC	2	170		
7	TEESTA HPS	SIKKIM	NHPC	3	170		
8	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
9	DIKCHU Hep	SIKKIM	SKPPL	2	48		
10	TEESTA STG III Hep	SIKKIM	SUL	1	200	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
11	TEESTA STG III Hep	SIKKIM	SUL	2	200		
12	TEESTA STG III Hep	SIKKIM	SUL	3	200		

13	TEESTA STG III Hep	SIKKIM	SUL	4	200		
14	TEESTA STG III Hep	SIKKIM	SUL	5	200		
15	TEESTA STG III Hep	SIKKIM	SUL	6	200		

d) Long outage report of transmission lines (As on 12.10.2023):

Transmission Element / ICT	Outage From	Reasons for Outage
400 KV IBEUL JHARSUGUDA D/C	29.04.2018	As information gathered, around 40-50 nos of towers were collapsed and conductor theft more than 400Ckm and restoration work is in progress
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.
400/220KV 315 MVA ICT 4 AT JEERAT	09.04.2021	Due to Fire hazard ICT damaged and burnt. New Transformer procurement under pipeline and shall be replaced in the near future.
220KV-FSTPP-LALMATIA-I	21.04.2021	Conductor stringing 12.965 km has been completed and Stringing between Tower Loc. no. 152 to 159 is under progress. Transmission line is idle charged between Lalmatia GSS end to Tower Loc.no.169
220KV-MUZAFFARPUR(PG)-GORAUL(BH)-1	11.06.2022	To rectify the CVT voltage missing issue

220KV-WARIA-BIDHANNAGAR-1 & 2	08.06.2022	To control overloading of 220 kV Waria-DSTPS (Andal) D/C line
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)
220/132KV 160 MVA ICT 1 AT MALDA	04.01.2023	For 132 KV GIS Commissioning work (GIB erection of ICT-I)
132KV-BARHI-RAJGIR-1	25.03.2023	Dismantling of tower no. 227, 228, and 229 crossing the premises of Mahabodhi Cultural centre along with Destringing of conductor of both circuits and Earthwire between tension tower no. 218-237 in same line.
132KV-NALANDA-BARHI(DVC)-1	25.03.2023	
220KV-TSTPP-MEERAMUNDALI-2	10.06.2023	Tower collapse at loc no 41, 42 (from Meramundali end). Ckt1 charged through ERS.
400KV-KHSTPP-BARH-1	04.08.2023	Upgradation of Bay equipments at KHSTPP
400/220KV 315 MVA ICT 1 AT TSTPP	09.08.2023	Acetylene violation in ppm during routine DGA analysis
400KV/220KV 315 MVA ICT 3 AT BIDHANNAGAR	31.08.2023	FOR JUMPERING OF 220KV DROPPER FROM STRUNG BUS AT 315MVA ICT-3
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	
400KV JHARSUGUDA-ROURKELA-1 &3	26.10.2023	RECONDUCTORING WORK
400KV/220KV 315 MVA ICT 1 AT INDRAVATI HEP	06.11.2023	PAINTING WORK OF THE ICT

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 October -2023.

The details of new units/transmission elements commissioned in the month of October -2023 based on the inputs received from beneficiaries:

NEW ELEMENTS CHARGED DURING OCTOBER, 2023							
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	PVUNL	400/11.5/11.5 kV 144 MVA ST-3 along with associated bay number 416 at PVUNL SS.	ST-03	400/11.5/11.5 kV	144	08-10-2023	
TRANSMISSION LINES							
SL. NO.	**Agency/Owner**	**LINE NAME**		**Length (KM)**	**Conductor Type**	**DATE**	**Remarks**
1	JUSNL	400KV-TENUGHAT-PVUNL-1		64	ACSR Twin Moose	06-10-2023	
LILO/RE-ARRANGEMENT OF TRANSMISSION LINES							
SL. NO.	**Agency/Owner**	**Line Name/LILO at**		**Length (KM)**	**Conductor Type**	**DATE**	**Remarks**
NIL							
BUS/LINE REACTORS							
SL. NO.	**Agency/Owner**	**Element Name**	**SUB-STATION**		**Voltage Level (kV)**	**DATE**	**Remarks**
1	PVUNL	400 kV 125 MVAR Bus Reactor #2 along with associated bay number 415 at PVUNL SS	PVUNL SS		400	10-10-2023	

HVDC /AC Filter bank / FACTS DEVICE associated System						
SL. NO.	**Agency/Owner**	**Element Name**	**SUB-STATION**	**Voltage Level (kV)**	**DATE**	**Remarks**
NIL						
BAYS						
SL. NO.	**Agency/Owner**	**Element Name**	**SUB-STATION**	**Voltage Level (kV)**	**DATE**	**Remarks**
1	JUSNL	400 kV Main Bay of Latehar-2 (Bay Number 401)	PVUNL SS	400	26-10-2023	
2	JUSNL	400 kV Main Bay of Latehar-1 (Bay Number 404)	PVUNL SS	400	26-10-2023	
3	JUSNL	Tie bay of [Latehar-2 and 400/220 kV 315 MVA ICT-1] (Bay Number 402) at Patratu SS (PTPS)	PVUNL SS	400	26-10-2023	
4	JUSNL	Tie bay of [Latehar-1 and 400/220 kV 315 MVA ICT-2] (Bay Number 405) at Patratu SS (PTPS)	PVUNL SS	400	26-10-2023	
5	PVUNL	400 kV Main Bus I	PVUNL SS	400	07-10-2023	
6	PVUNL	400 kV Main Bus II	PVUNL SS	400	07-10-2023	
7	PVUNL	400KV MAIN BAY OF 400KV 125MVAR B/R-2 AT PVUNL	PVUNL SS	400	10-10-2023	
8	PVUNL	400KV MAIN BAY OF 400/11.5KV 144MVA ST 3 AT PVUNL	PVUNL SS	400	08-10-2023	
9	PVUNL	400KV MAIN BAY OF 400KV 125MVAR B/R-2 AT PVUNL	PVUNL SS	400	07-10-2023	
10	PVUNL	400KV MAIN BAY OF TENUGHAT 1 AT PVUNL	PVUNL SS	400	06-10-2023	

Members may note.

4.4 UFR operation during the month of October 2023.

Frequency profile for the month as follows:

MONTH	MAX (DATE/TIME)	MIN (DATE/TIME)	% LESS IEGC BAND	% WITHIN IEGC BAND	% MORE IEGC BAND
Oct, 2023	50.30 Hz on 27-10-2023 at 16:03 hrs	49.47 Hz on 16-10-2023 at 14:56 hrs	8.9	74.4	16.7

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

Members may note.

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Annexure B.1

सत्यमेव जयते

File No. FU-21/2020-FSC (Vol-IV)
Government of India
(भारत सरकार)
Ministry of Power
(विद्युत मंत्रालय)

नई दिल्ली, दिनांक 25 अक्टूबर, २०२३
New Delhi, dated the 25th October, 2023

To

I. **Principal Secretaries/Secretary (Power/Energy) of all State Governments/ UTs**
II. **CMDs, Thermal Generating Stations (Central, State GENCOs/lPPs)**

Subject: Direction to all GENCOs including Independent Power Producers (IPPs) for timely Import of Coal for blending purposes and maximizing production in captive coal mines — reg.

Sir/Madam,

As you are already aware, Ministry of Power issued an advisory dated 01.09.2023 regarding blending of imported coal @ 4% by weight till March, 2024.

2. The status of Power Supply position has been reviewed by Govt and it has been observed that there is consistent rising trend in the Power demand in the country coupled with inadequate supply of domestic coal which has resulted in rapid depletion of coal stocks at Domestic Coal Based (DCB) Plants across the country. The gap between receipt of domestic coal and consumption of coal (domestic + equivalent domestic of imported coal) during 01st September to 09th October, 2023 was to the tune of 12 MT.

3. About 11% fall of Hydro Generation has been recorded in H1 of FY 24 compared to the corresponding period of FY 23 due to variable monsoon rainfall. Approximately 2 GW of hydro capacity is out because of recent floods in Sikkim. The Reservoir levels in Northern, Eastern and Southern regions are less compared to the previous year as on 9th Oct' 2023, which has resulted in lower reservoir energy content at pan India level.This has put additional burden on Coal Based Thermal Generation.

4. Therefore, in order to ensure uninterrupted power supply across the country, after careful consideration and in consultation with Central Electricity Authority (CEA) and Grid India, it has been decided blending of imported coal @ 6% (by weight) minimum

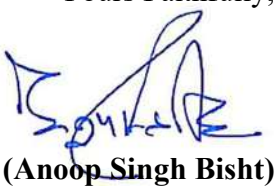
Contd/-

may be continued till March 2024. The Gencos may continuously review their stock position and opt for blending as per the requirements if the shortfall in domestic coal supply is more than 6 per cent.

5. The other conditions mentioned at Para 3 & 4 of advisory dated 01.09.2023 will remain the same.

6. This issues with the approval of Hon'ble Minister of Power & NRE.

Yours Faithfully,

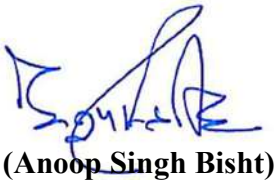


(Anoop Singh Bisht)
Deputy Secretary to the Government of India
Ph. 011-23752497
Email: anoopsingh.bisht@nic.in

@Endorsement
No. FU-21/2020-FSC (Vol-IV)

Copy to,

1. **Secretary, Ministry of Coal**
2. **Chairman, Railway Board**
3. **Chairman, Central Electricity Authority**
4. **Secretary (CERC)/All SERCs**



(Anoop Singh Bisht)
Deputy Secretary to the Government of India
Ph. 011-23752497
Email: anoopsingh.bisht@nic.in

Copy also to: NIC with the request to upload the same on MoP Portal

Annexure B.2

सं. 22/22/2023- ओ एम [268631]
भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power

F-Wing, 2nd Floor, Nirman Bhawan,
New Delhi, dated 4th July, 2023

To,

1. Chairperson, Central Electricity Authority, New Delhi.
2. Principal Secretary/Secretary (Energy) of State Governments/UTs.
3. Secretary, Ministry of New and Renewable Energy, CGO Complex, Lodhi Road, New Delhi
4. Secretary, CERC New Delhi.
5. Secretary, State Electricity Regulatory Commissions.
6. Chairman, State Power Utilities/SEBs.
7. Chairman, CPSUs under Ministry of Power.
8. Chairman, CPSUs under Ministry of New and Renewable Energy.
9. Member Secretary, Regional Power Committees
10. CMD, Grid-India, New Delhi.
11. ED, NLDC, New Delhi

Subject: Continuation of Scheme for "Operationalization of the Power System Development Fund (PSDF) for the 15th Finance Commission cycle from FY 2021-22 to FY 2025-26"- reg.

Sir/Madam,

Sanction of the President is conveyed for continuation of scheme for 'Operationalization of the Power System Development Fund (PSDF) for the 15th Finance Commission Cycle from FY 2021-22 to FY 2025-26'. An outlay of Rs.11,000 crores (Rupees Eleven Thousand crores) has been approved to facilitate execution of Projects through PSDF from FY 2021-22 to FY 2025-26. In addition, Rs.2,000 crores (Rupees Two Thousand crores) have been kept for meeting contingent requirements.

2. The objective of the PSDF is to utilize the funds to bring improvement in the Security & Reliability of the Indian Power System. The funding from PSDF will be utilized for the projects which are primarily aimed for maintaining the reliable and secure operation of the grid and for the removal of congestion in the transmission corridors which will finally lead to overall development of the power sector in the country.

3. Following types of the projects will be funded from PSDF :

(a) Creating necessary support for integration of Renewable (RE) Energy like solar, wind, hybrid system and creation of adequate energy storage capacity;
(b) Installation of reactive energy generators for improvement of voltage profile in the Grid;
(c) Installation of standard and special protection schemes, pilot and demonstrative projects;
(d) Renovation and Modernization (R&M) of transmission and distribution systems for relieving congestion;
(e) Creating necessary transmission systems of strategic importance; and
(f) Any other scheme/project in furtherance of the above objectives, such as conducting technical studies and capacity building, etc.

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4. The illustrative list of new projects to be funded from PSDF is as under :

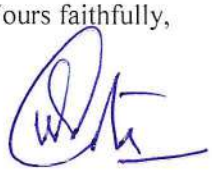
(a) Battery Energy storage system at least till the cost of storage is high.
(b) Supporting Renewable Energy project development through market mechanisms by national agencies like SECI.
(c) Offshore wind project – underwater sea cable transmission portion.
(d) SLDC cum REMC at Ladakh, REMCs at 3 more locations & Disaster Recovery Center at RLDC-3 nos& NLDC-1 nos to be funded through PSDF.
(e) Security Operation Centre at SLDCs for real-time cyber security monitoring.
(f) Pilot project for dynamic line rating in each region
(g) Communication scheme for AMR and real time telemetry for 100% grid visibility.
(h) Supporting new technology development needed for power sector.
(i) Supporting Grid/feeder monitoring

5. Following entities are eligible for availing support under PSDF :
(a) Generating Companies,
(b) Transmission Licensees,
(c) Distribution Licensees,
(d) Load Despatch Centers and
(e) Regional Power Committees.
(f) Public Sector Undertaking (PSUs) primarily working in power and Renewable Energy sector

6. Private Sector Entities are not eligible to avail of this fund.

7. The revised guidelines for implementation of the PSDF scheme will be issued shortly.

Yours faithfully,



(Hausuanthang Guite)
Under Secretary (OM)
Telefax: 23062492
Email : opmonitor-power@nic.in

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Contd/- from pre-page.

Copy to:

1.Secretary, Department of Economic Affairs, Ministry of Finance, North Block, New Delhi.
2. Secretary, Department of Expenditure, Ministry of Finance, North Block, New Delhi.
3.Chief Executive Officer (CEO), Niti Aayog, Sansad Marg, New Delhi.

Copy for information to: PPS to Secretary (Power)/PSO to SS&FA(AU)/Sr. PPS to AS(AT)/All Joint Secretaries/Economic Adviser/Directors/Dy. Secretaries of Ministry of Power.

Copy to: Incharge, NIC, Ministry of Power for uploading the letter on the website of Ministry of Power under 'New Notices' with heading "Continuation of scheme for Operationalization of the Power System Development Fund (PSDF) for the 15th Finance Commission cycle from FY2021-22 to FY2025-26".

(Hausuanthang Guite)
Under Secretary (OM)
Telefex: 23062492
Email : opmonitor-power@nic.in

Photos of Damage Conductor in 35 Years old lines:-

Annexure B.12.1

Photos of snapped Conductor snapped in 35 Years old lines:-

Annexure B.12.2

Sl. No	**Name of Line**	**Tripping Date**	**Tripping Details**	**Remarks**
1	220KV SILIGURI-DALKHOLA-2	11-07-2019	Line tripped. R/I at Siliguri end: R-Y fault, F/C: Ir:1.87KA, Iy: 1.56KA, F/D: 121.2KM;R/I at Dalkhola: R-Y fault, F/C: Ir:8.182KA, Iy: 8.515KA, F/D: 9.85KM.	Y-Phase conductor snapping between Loc. No. 329 - 330 during heavy rain & thunderstorm.
2	220KV SILIGURI-KISHANGANJ-1	05-05-2020	Tripped at Siliguri end only and remain charged from Kishanganj end. R/I at Siliguri end:- B-N, F/C-3.0KA, F/D-39.42KM.	Bottom phase conductor at loc 125, had been snapped.
3	220KV BIRPARA-CHUKHA(BHUTAN)-1	09-04-2022	TRIPPED FROM CHUKHA END ONLY, A/R OPERATED SUCCESSFULLY AT BIRPARA END AT 22:43 HRS. ON 09.04.2022. R/I AT BIRPARA: B-N FAULT, F/C: 2.65 KA, F/D: 31.49 KM.	E/W snapped in the span -70-71
4	220KV BIRPARA-CHUKHA(BHUTAN)-2	09-04-2022	TRIPPED FROM CHUKHA END ONLY, A/R OPERATED SUCCESSFULLY AT BIRPARA END AT 22:43 HRS. ON 09.04.2022. R/I AT BIRPARA: B-N FAULT, F/C: 2.65 KA, F/D: 30.55 KM.	E/W snapped in the span -70-71
5	220KV BIRPARA-MALBASE(BHUTAN)	21-07-2023	R-N fault. Birpara_ais_gis: 10.7kA/2.74km/31.38deg.	Earthwire snapped in the span of 112-114
6	220KV BIRPARA-BINAGURI-2	17-10-2023	TRIPPED ON Y-B-N FAULT:- R/I at BINAGURI M1: F/D: NA, F/C: Iy-2.985 kA; Ib-2.056 kA , MAIN -2: F/D: 46.13 KM, F/C: Iy-3.824 kA; Ib-4.246 kA R/I at BIRPARA M1: F/D: 27.74 KM, F/C: Iy-3.625 kA; Ib-6.063 kA, M2: F/D:100 % F/C: Iy-3.787 kA; Ib-6.457 kA	Top (B) phsae conductor snapped in the span 85-86.
7	220KV BIRPARA-BINAGURI-2	30-10-2023	TRIPPED ON Y-B-N FAULT:- Tripped at 17:50 Hrs on 30.10.2023 due to snapping of B-Phase conductor between Loc. 128-129 R/I at Binaguri (Site) : M1: Y-B-N, Z1, F/D: 36.08KM, F/C: Iy-4.61KA, Ib-6.87KA; M2: Y-B-N, Z1, F/D-36.25KM, F/C- Iy-4.53KA, Ib-6.74KA. R/I at Birpara (Site) : M1: Y-N, Z1, F/D: 47.14 KM, F/C: 2.183 KA; M2: Y-N, F/D-41.354 KM, F/C- 2.183 KA.	Top (B) phsae conductor snapped in the span 128-129.

Annexure B.12.3

Expenditure for Re-conductoring of old CTS 220kV lines with HTLS conductor in ER-II

Sl. No.	Name of TL	Length of Line(in KM) under POWERGRID	Supply (in Rs.)	Erection (in Rs.)	Total (in Rs.)
1	220kV D/C Birpara-Chukha TL	36	181132344.00	31935240.00	213067584.00
2	220kV D/C Birpara-Alipurduar TL	57.5	289308605.00	51007675.00	340316280.00
3	220kV D/C Siliguri-Kishanganj TL	108.26	544705210.04	96036363.40	640741573.44
4	220kV D/C Dalkhola-Kishangnaj TL	30.96	155773815.84	27464306.40	183238122.24
5	220kV D/C Malda-Gazole TL	16.49	82968676.46	14628114.10	97596790.56
6	220kV D/C Dalkhola-Gazole TL	97.52	490667394.08	86509016.80	577176410.88
7	220kV D/C Birpara- Binaguri TL	80	402516320.00	70967200.00	473483520.00
8	220kV D/C Siliguri-Binaguri TL	6	30188724.00	5322540.00	35511264.00
9	220kV S/C Birpara-Malabase TL	38	191195252.00	33709420.00	224904672.00
Total			**2368456341.42**	**417579875.70**	**2786036217.12**

Approx. Expenditure -278 Crores

PHOTOGRAPHS OF OLD STATIONS (COMMISSIONED UNDER CTS, FSTPS & KTPS)QUARTER ER-II

MALDA SS (CTS)

Annexure B.13.1

DURGAPUR SS (FSTPS)

MAITHON SS (KTPS)

Annexure B.13.2

राष्ट्रीय प्रौद्योगिकी संस्थान पटना
NATIONAL INSTITUTE OF TECHNOLOGY PATNA
(An Autonomous Institute under Ministry of HRD, Govt of India)
Ashok Raj Path, Patna-800005,Bihar

STRUCTURAL HEALTH ASSESSMENT REPORT OF RESIDENTIAL AND ADMINISTRATIVE BUILDINGS OF SUB- STATION AT DURGAPUR

DEPARTMENT OF CIVIL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY PATNA
(An institution under Ministry of Education, Govt. of India)
Ashok Rajpath, Patna-800005, Bihar

Report on Structural health of residential and non-residential buildings at Durgapur Sub-Station

Durgapur Sub-station has been commissioned in the year of 1987 and almost completed 36 years of service. Admin building, Control room, Transit camp and Township colony were constructed during that period. The area of the Sub-Station is around 36 Acres. The Sub-Station consists of Switchyard area and Township Colony. The various non-residential units present in the Sub-Station are Control room, Fire fighting room, DG Room, Overhead water tank, Administrative Office, transit camp, recreation centre etc, Security post etc. The colony township consists of Quarters like A-type quarters (36/ 1987), B-type quarters (20/ 1987 + 12 / 1992), C-type quarters (4 /1987 + 8 /1992), D-type quarters (3 /1987).

INFORMATION REGARDING BUILDING:

TYPOLOGY OF STRUCTURE: URM (Unreinforced Masonry)

Residential structures are one/ two storey load bearing unreinforced masonry buildings with reinforced concrete slabs, chajja and porch.

USAGE OF BUILDING: RESIDENTIAL / Administrative

SEISMIC ZONE: Zone III

MULTI HAZARD AREA: Yes as per Vulnerability Atlas by BMTPC, New Delhi

DEPTH OF WATER TABLE: Generally available upto 3 to 4 m depth of ground surface.

AGE OF STRUCTURE: MORE THAN 30 YEARS. (As per information conveyed at site, it was constructed in year 1987 / 1992).

DRAWINGS AND STRUCTURAL DOCUMENTS: Drawings and construction related documents were not available.

NUMBER OF STOREY: One/Two storey

BUILDING MATERIAL USED: Brick Masonry with RCC beams and Slab.

REPAIR, RENOVATION OR ANY OTHER MAINTENANCE DETAIL: As per detail available at site with some Letter of awards and maintenance register, the entire repair are cosmetic in nature which included painting, plastering, distempering, tile works, plumbing repair, electrical repair etc.

PLANNING FOR THE CONDITION ASSESSMENT:

Masonry structures are popular in residential, commercial, and industrial construction. The materials and technology used in masonry add to the strength, durability, energy efficiency, fire-resistance, sound-proofing, and thermal mass of a building. Despite these advantages, masonry damage can occur due to several reasons. Assessment strategy must find the causes of such damage and find appropriate solution. It has been planned that as the quarters are prototype, hence only randomly selected quarter of each type has been inspected extensively. The structures are constructed with similar building material. Similar design system and constructed at the same time, hence the results of the findings are valid for all the structures.

The visual assessment was based on measurements, hammering, visual observation of distress, exploratory observation by removing cover, photographic exploration, and interview of residents, Engineers and officials. The visual and documentation investigation has been carried during 29.10.2023 to 4.11.2023. The scope intended for assessing safety aspect related to the structure and person using it. Structural Health Assessment covered following:

Observe Deflection

Observe Moisture ingress

Observe Present Health Status

Observe Settlement

Observe Crack propagation

Durability Assessment

Structural Stability Assessment

Environment Impact Assessment

Structural Adequacy Assessment

Load carrying capacity Assessment

FINDINGS OF HEALTH ASSESSMENT:

CHAJJAS, PARAPETS: Diagonal cracks were distinctly visible which were continuously making ingress of water inside.

SLAB: The joints of wall to slab were with cracks at several places. Dampness, spalling of concrete, corrosion to reinforcement and peel offs are present. Minor cracks were seen in slabs. Heavily cracked slab wall junction has been observed. It clearly speaks of delamination. This makes slab vulnerable to shear action by lateral loads like earthquake and wind load. Heavily corroded steel bars were found when cover was removed. Spalling of concrete has been found. It has been reported to be occurring for years. Spalling of concrete is indication of third level of corrosion in reinforcement. It is to mention that corrosion is taken as cancer to reinforcement. Steel reinforcement was exposed by removing cover and was found to be highly corroded. More than 50% of cross section area of steel was found to be lost. Falling chunks of concrete is risk to lives of occupants.

LOAD BEARING WALLS: (vertical load carrying structural element)

Have been found cracked and delaminated for long time. Cosmetic repairs could not take care of the continual distress. The extent of cracks inside kept on increasing. Re-plastering may have covered cracks but the weakened walls went under progressive cracking and crack propagation went unhindered during last several years. Now, it has become very risky for structural stability. Extensive Cracks, Seepage of water and subsidence in wall were clearly visible. Cracks are through the wall thickness as evident from observing it from both sides of wall. As the structure is old hence its water absorbance is high. Bulging and unevenness have also been noticed at some places. Cracks due to Inadequate bearing between slab wall junctions have been noticed. Provisions of seismic band and steel have been not followed.

OPENINGS: All the openings have been noticed with diagonal cracks.

FOUNDATION:

FOUNDATION DIFFERENTIAL SETTLEMENT: Differential Settlement of Foundation has been noticed. Subsidence is obvious due to cracked floor and separation at wall floor junction. The pattern of crack is similar to subsidence crack; however, the cracks are widest at the base of the wall. The most common cause of ground heave is expansion of sub-soils. On older properties with shallow foundations the soil can expand and contract dependent upon the weather conditions. If the clay becomes waterlogged it can expand and push the foundations upwards causing the cracks. Cracks in walls under gravity load, subsidence of floor, separation at wall-floor junction are due to inadequate strength of foundation. Moisture movement in soil may also have affected soil bearing capacity.

FLOORING: Cracked at places. Although floor was covered with tiles but still cracks were there on floor tiles. It may be due to heaving.

STAIRCASES: Cracks were noticed on staircases.

PLUMBING CONDITION: Seepages due to old pipelines.

ELECTRICAL CONNECTIONS: Seepages were noticed on wall with conduit of electricity.

Condition of wires, switchboards etc are under risk due to dampness and peel offs.

DETAILS OF MAINTENANCE:

Maintenance happened intermittently. The work such as repair with cement mortar, painting, distempering, floor changed with vitrified tile, plumbing repair, electrical repair.

Maintaining a building is not just the servicing of equipment, though this is a large part of it. It also includes monitoring its continual performance, fine-tuning (tweaking) and continuous improvement. A building needs to be thought of as a living organism. It changes over time, with the weather, use, as systems begin to age, as modifications are made. Appropriate maintenance scheme should be installed and all such interventions should be recorded for future reference. It will help enormously in safety o occupants and operation meant for the building. A pro-active maintenance regime right from the start using updated documentation is requirement for all buildings in general. This means to adopt a planned or scheduled maintenance strategy, which is based on regular monitoring and repairing or replacing components when necessary.

MOISTURE PENETRATION

One of the biggest threats to a masonry structure is moisture. Masonry walls exposed to the elements can easily absorb water, and this compromises their structural integrity. Water leaking into a brick wall will deteriorate due to alternate wetting and drying, leading to delamination. Water penetration poses a danger not only to the masonry materials but the adjacent assemblage including wood, metal, doors, and windows. These have been noticed in the buildings.

CRACKING

Walls are affected by temperature and moisture change. Materials can suffer from initial shrinkage and/or subsequent expansion and contraction. This movement gives rise to the expansion cracks in masonry walls. Cracks are a common problem with masonry construction. They can occur when a building settles or because of moisture penetration. Poor preparation of mortar can also cause cracking in the joints. Natural disasters such as earthquakes and floods can also exert pressure on a masonry wall or foundation, leading to cracks. Cracks never got addressed in cosmetic maintenance. There has been thus progressive cracking in load bearing vertical structural members leading to appreciable degradation in load carrying capabilities of these important structural members in load transfer mechanism.

STAINING

Staining is a big problem for masonry walls. It poses a costly problem for property. Staining occurs when masonry materials or mortar come into contact with the deleterious elements. Water seepage and aging walls are the main causes of masonry staining. This has been observed in buildings.

BOND FAILURE

Bricks in masonry have to stay intact to guarantee the strength of a masonry structure. However, the loss of adhesion is a common problem in such construction. It leads to bulging or peeling, hollow patches, and raking of top layers. This has been noticed in buildings.

Control Room Building (CRB); Extensive seepage dampness was witnessed from the roof. Walls and roof are covered with false panels or ceiling and not exposed to visual inspection. But, seepage and

lowered false ceiling were observed. Cracks in columns and walls were visible on external side of building. Since CRB is very old and entire control and Protection system, Substation auxiliaries are housed in that building only hence even minor issue will cause major damage to the safety and security of system which in turn may badly affect GRID security

Roads and drainage system in campus were found to be in bad shape. Water logging creates problem to buildings and equipments. This causes moisture ingress to walls due to damaged damp proofing course. Roads are recommended to be laid keeping this aspect in consideration.

Representative photographs have been placed at the end of this report.

DISCUSSION AND CONCLUSION

The buildings are in Seismic Zone III and exposed to multi hazard situation as per Vulnerability Atlas. The structures are load bearing unreinforced masonry structures, and in present case without proper bands and steel, which is deficient in resisting anticipated design structural loads. Drawings and structural documents are not available. As per the information given at site, repair has been done in recent times to some buildings. The renovation work has not taken any strengthening measures and is of cosmetic nature. As the structure is old enough, hence moisture movement, popping and scaling again resurfaced.

As buildings are highly distressed, further adding more loads to structures due to retrofit actions is not advisable as the foundation already is showing settlements and the existing building material is having dull sound on hammering which indicates voids and degradation. Due to the stage of deficiency, distress, multi hazard exposure replacement should be preferred. Moreover, buildings have lived almost its useful life. The useful age of load bearing structures as per literature is 30 years. As the vertical load carrying structures are badly damaged and with visible cracks hence there is no need to carry any further tests on any wall and roof. From visual inspection it was very unambiguous that structure has lost its load carrying capacity appreciably. There is no benefit to carry these structures with repair or retrofitting.

Technically there is no point to keep the structures which are deficient in resisting earthquake that too in active seismic zone that is Zone III, retrofitting is not recommended as the existing structure has been found weak to carry additional load. Safety of residents must be first priority. Visual inspection has been found sufficient enough to reach to the conclusion that structure is heavily distressed, seismically deficient and hence not safe for people to live in. When it comes to safety, reliability factors like users' safety and structural safety prevail. As per the techno-economic feasibility, these existing buildings residential and administrative should be demolished and reconstruction with disaster resilient features as per NBC 2016 and relevant byelaws is suggested.

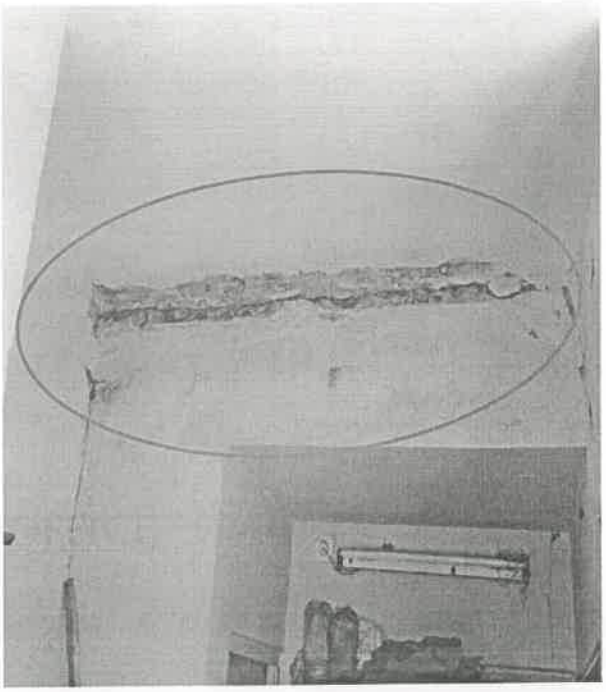
9.11.23

(Prof Ajay Kumar Sinha)
Professor &
Centre Director cum Nodal Officer
Earthquake Safety Centre and Clinic
Civil Engineering Department, NIT Patna

प्राध्यापक/Professor
जनपदीय अभियांत्रिकी विभाग
Civil Engineering Department
राष्ट्रीय प्रौद्योगिकी संस्थान पटना-5
National Institute of Technology Patna-5

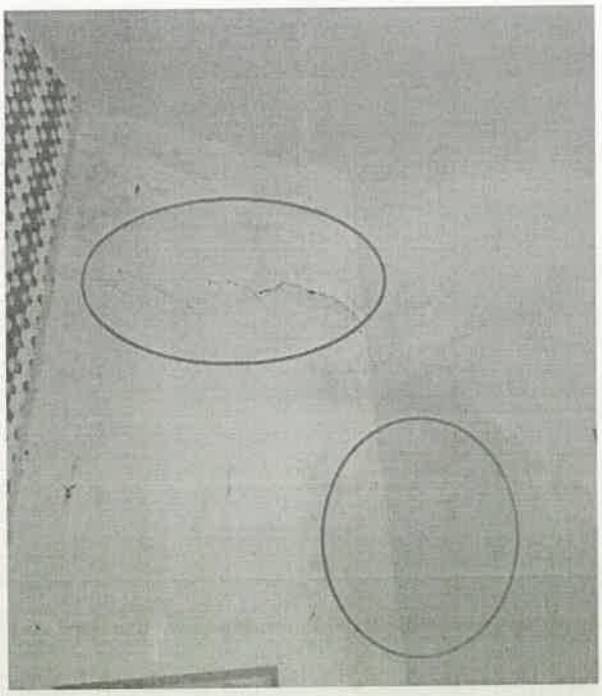
GROUP OFFICE

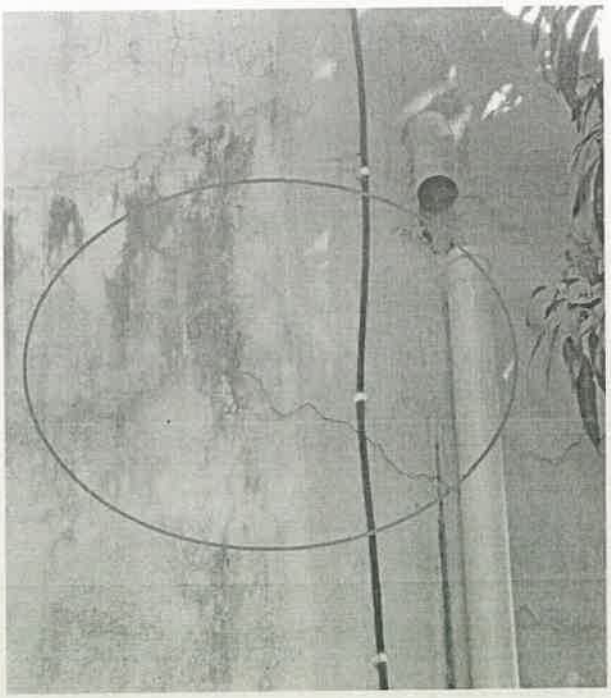
Diagonal cracks in walls



Horizontal cracks where wall meets Ceiling

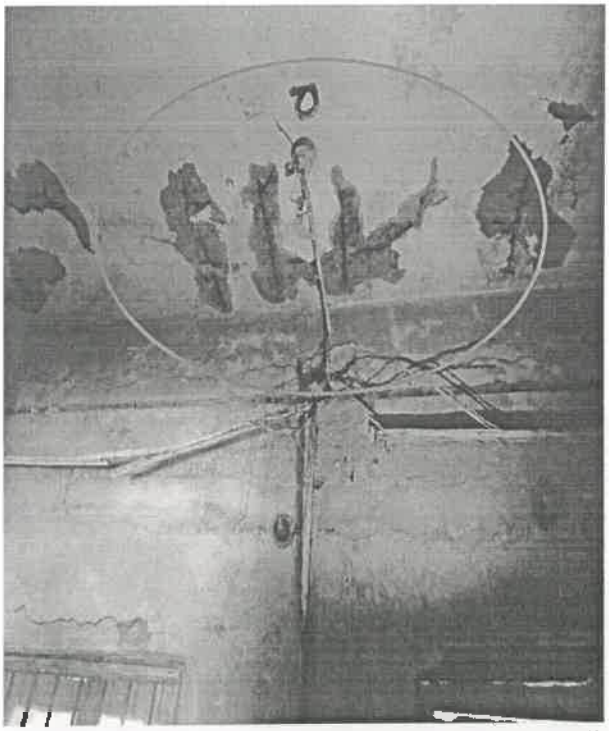
RECRETION CENTER





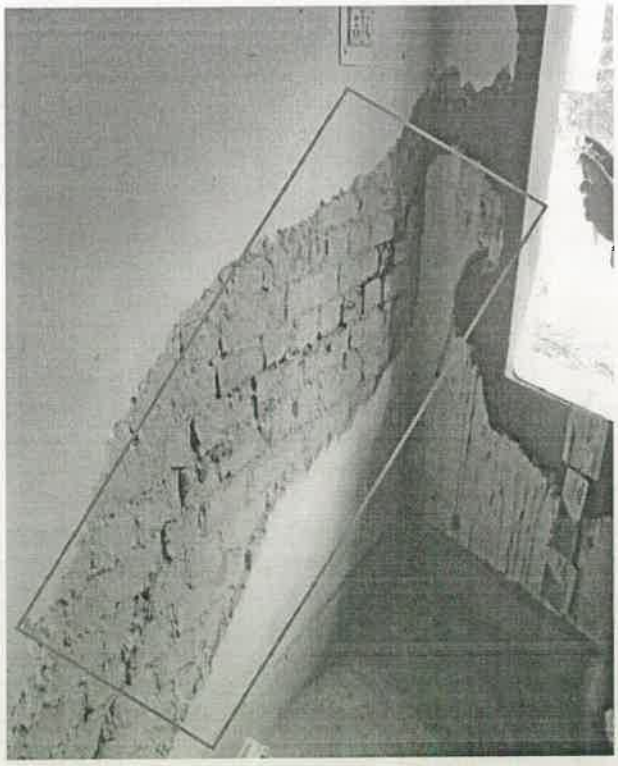
Crack and dampness

A TYPE QUARTER



Spalling in Concrete and Continuous cracks in walls

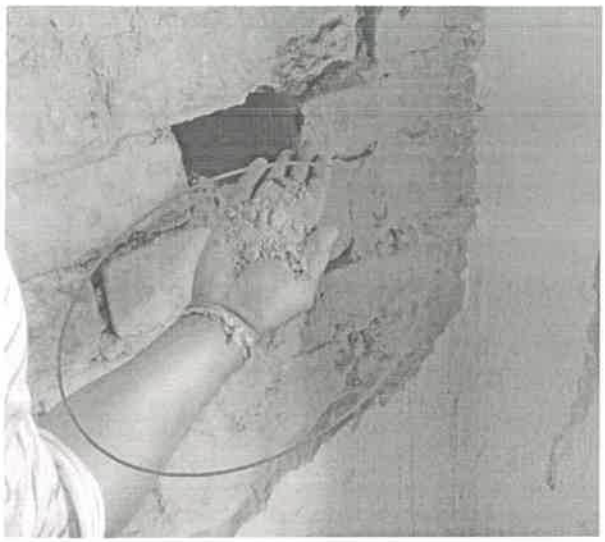
Spalling in ceiling Concrete



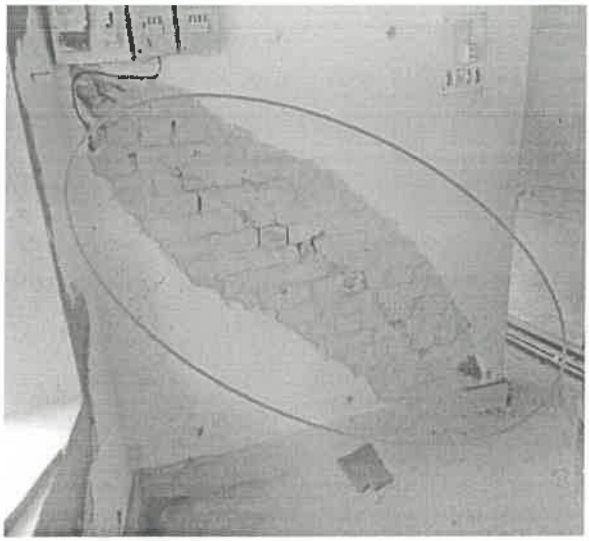
Diagonal crack in wall

Dampness and vegetation

NEW B- TYPE QUARTER

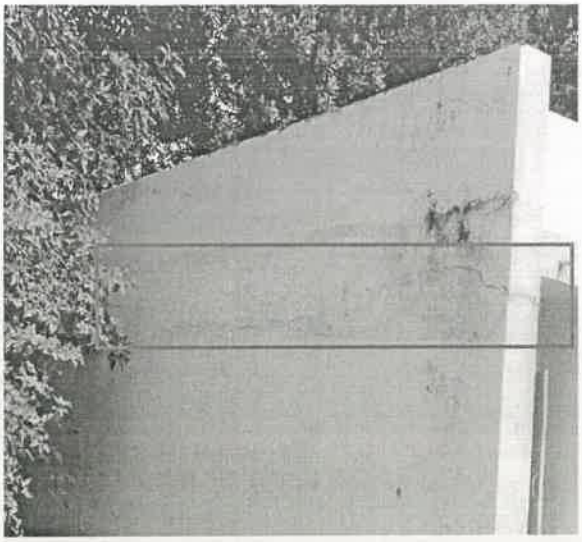


Mortal has lost its strength

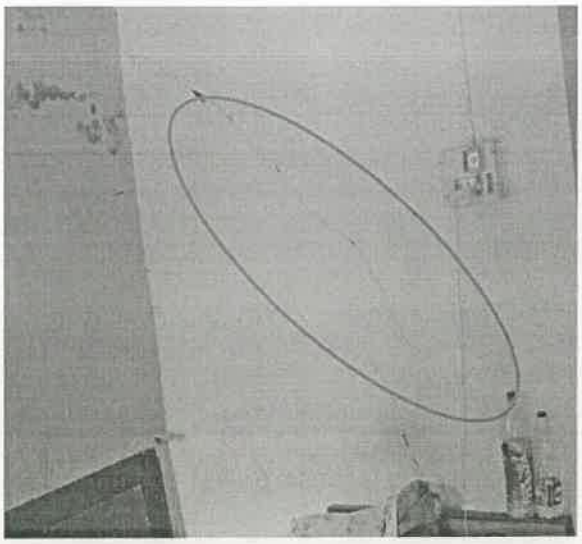


Continuous severe diagonal cracks in the wall

OLD B- TYPE QUARTER

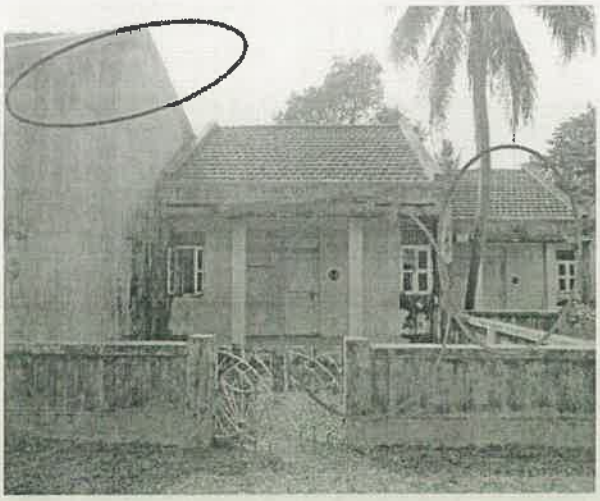


Horizontal cracks in wall

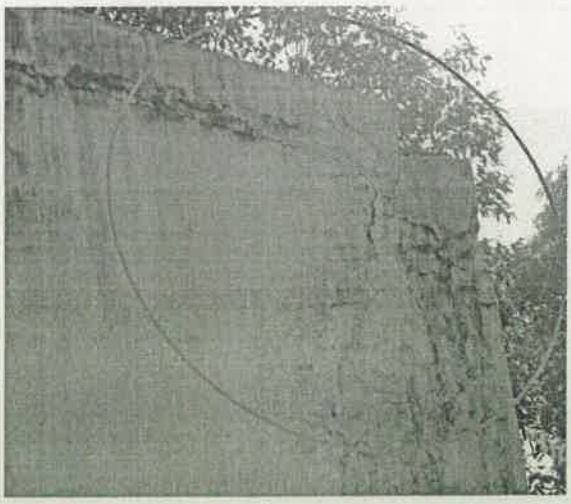


Severe diagonal cracks in the wall

OLD C- TYPE QUARTER



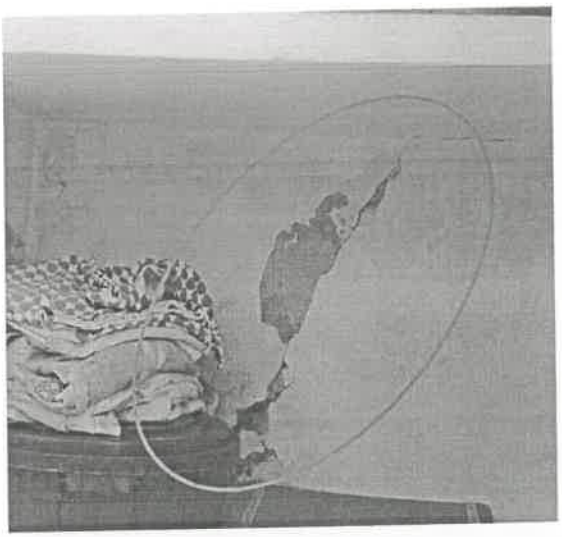
Continuous diagonal cracks where the wall meets the roof



Severe Zig-Zag cracks in walls

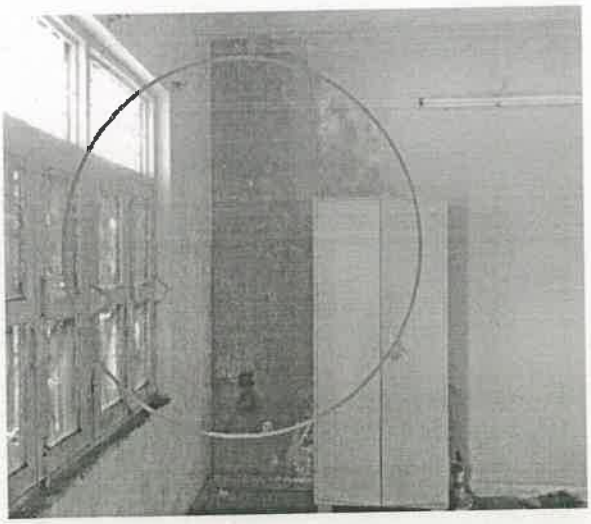
NEW C- TYPE QUARTER

Horizontal cracks in the wall and seepage

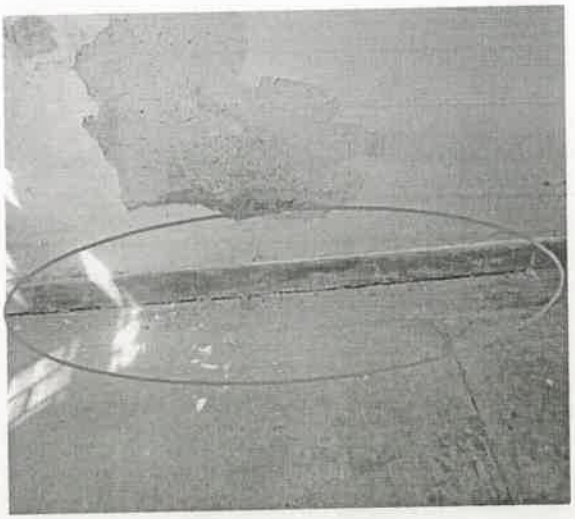


Severe diagonal cracks in the wall

D- TYPE QUARTER

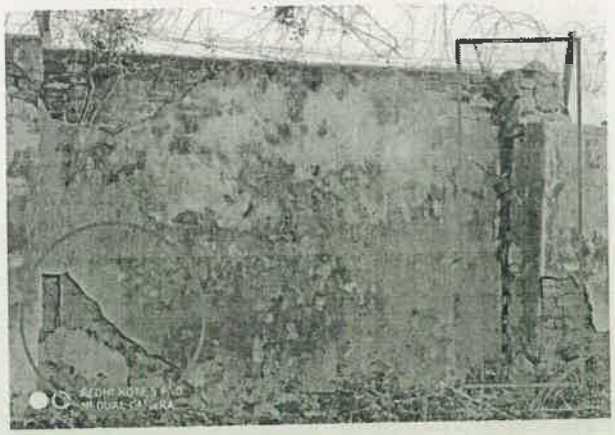


Major Seepage in wall



Settling of concrete floor

BOUNDARY WALL



Boundary wall is tilted and severe wall cracks

DRAIN

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(An Autonomous Institute under Ministry of HRD, Govt of India)
Ashok Raj Path, Patna-800005,Bihar

STRUCTURAL HEALTH ASSESSMENT REPORT OF RESIDENTIAL AND ADMINISTRATIVE BUILDINGS OF SUB- STATION AT MAITHON

DEPARTMENT OF CIVIL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY PATNA
(An institution under Ministry of Education, Govt. of India)
Ashok Rajpath, Patna-800005, Bihar

Report on Structural health of residential and non-residential building at Maithon Sub-Station

Maithon SS has been commissioned in the year of 1992 and almost completed 31 years of service.. The Sub-Station consists of Switchyard area and Township Colony. The various non-residential units present in the Sub-Station are Control room, Fire fighting room, 11 KV ACB Building, Fire fighting water tank, Administrative Office, Closed and Semi-closed Store Buildings etc. The colony township consists of Overhead water tank, underground water storage tank, Transit camp with Ladies club ,Community hall and Township Quarters like A-type quarters (08), B-type quarters (34), C-type quarters (08), D-type quarters (02), garage and Control hut.

INFORMATION REGARDING BUILDING:

TYPOLOGY OF STRUCTURE: URM (Unreinforced Masonry)

Residential structures are one/ two storey load bearing unreinforced masonry buildings with reinforced concrete slabs, chajja and porch.

USAGE OF BUILDING: RESIDENTIAL / Administrative

SEISMIC ZONE: Zone III

MULTI HAZARD AREA: Yes as per Vulnerability Atlas by BMTPC, New Delhi

DEPTH OF WATER TABLE: Generally available upto 3 to 4 m depth of ground surface.

AGE OF STRUCTURE: MORE THAN 30 YEARS. (As per information conveyed at site, it was constructed in year 1992).

DRAWINGS AND STRUCTURAL DOCUMENTS: Drawings and construction related documents were not available.

NUMBER OF STOREY: One/Two storey

BUILDING MATERIAL USED: Brick Masonry with RCC beams and Slab.

REPAIR, RENOVATION OR ANY OTHER MAINTENANCE DETAIL: As per detail available at site with some Letter of awards and maintenance register, the entire repair are cosmetic in nature which included painting, plastering, distempering, tile works, plumbing repair, electrical repair etc.

AKS

PLANNING FOR THE CONDITION ASSESSMENT:

Masonry structures are popular in residential, commercial, and industrial construction. The materials and technology used in masonry add to the strength, durability, energy efficiency, fire-resistance, sound-proofing, and thermal mass of a building. Despite these advantages, masonry damage can occur due to several reasons. Assessment strategy must find the causes of such damage and find appropriate solution. It has been planned that as the quarters are prototype, hence only randomly selected quarter of each type has been inspected extensively. The structures are constructed with similar building material. Similar design system and constructed at the same time, hence the results of the findings are valid for all the structures.

The visual assessment was based on measurements, hammering, visual observation of distress, exploratory observation by removing cover, photographic exploration, and interview of residents, Engineers and officials. The visual and documentation investigation has been carried during 29.10.2023 to 4.11.2023. The scope intended for assessing safety aspect related to the structure and person using it. Structural Health Assessment covered following:

Observe Deflection

Observe Moisture ingress

Observe Present Health Status

Observe Settlement

Observe Crack propagation

Durability Assessment

Structural Stability Assessment

Environment Impact Assessment

Structural Adequacy Assessment

Load carrying capacity Assessment

FINDINGS OF HEALTH ASSESSMENT:

CHAJJAS, PARAPETS: Diagonal cracks were distinctly visible which were continuously making ingress of water inside.

SLAB: The joints of wall to slab were with cracks at several places. Dampness, spalling of concrete, corrosion to reinforcement and peel offs are present. Minor cracks were seen in slabs. Heavily cracked slab wall junction has been observed. It clearly speaks of delamination. This makes slab vulnerable to shear action by lateral loads like earthquake and wind load. Heavily corroded steel bars were found when cover was removed. Spalling of concrete has been found. It has been reported to be occurring for years. Spalling of concrete is indication of third level of corrosion in reinforcement. It is to mention that corrosion is taken as cancer to reinforcement. Steel reinforcement was exposed by removing cover and was found to be highly corroded. More than 50% of cross section area of steel was found to be lost. Falling chunks of concrete is risk to lives of occupants.

LOAD BEARING WALLS: (vertical load carrying structural element)

Have been found cracked and delaminated for long time. Cosmetic repairs could not take care of the continual distress. The extent of cracks inside kept on increasing. Re-plastering may have covered cracks but the weakened walls went under progressive cracking and crack propagation went unhindered during last several years. Now, it has become very risky for structural stability. Extensive Cracks, Seepage of water and subsidence in wall were clearly visible. Cracks are through the wall thickness as evident from observing it from both sides of wall. As the structure is old hence its water absorbance is high. Bulging and unevenness have also been noticed at some places. Cracks due to inadequate bearing between slab wall junctions have been noticed. Provisions of seismic band and steel have been not followed.

OPENINGS: All the openings have been noticed with diagonal cracks.

FOUNDATION:

FOUNDATION DIFFERENTIAL SETTLEMENT: Differential Settlement of Foundation has been noticed. Subsidence is obvious due to cracked floor and separation at wall floor junction. The pattern of crack is similar to subsidence crack; however, the cracks are widest at the base of the wall. The most common cause of ground heave is expansion of sub-soils. On older properties with shallow foundations the soil can expand and contract dependent upon the weather conditions. If the clay becomes waterlogged it can expand and push the foundations upwards causing the cracks. Cracks in walls under gravity load, subsidence of floor, separation at wall-floor junction are due to inadequate strength of foundation. Moisture movement in soil may also have affected soil bearing capacity.

FLOORING: Cracked at places. Although floor was covered with tiles but still cracks were there on floor tiles. It may be due to heaving.

STAIRCASES: Cracks were noticed on staircases.

PLUMBING CONDITION: Seepages due to old pipelines.

ELECTRICAL CONNECTIONS: Seepages were noticed on wall with conduit of electricity.

Condition of wires, switchboards etc are under risk due to dampness and peel offs.

DETAILS OF MAINTENANCE:

Maintenance happened intermittently. The work such as repair with cement mortar, painting, distempering, floor changed with vitrified tile, plumbing repair, electrical repair.

Maintaining a building is not just the servicing of equipment, though this is a large part of it. It also includes monitoring its continual performance, fine-tuning (tweaking) and continuous improvement. A building needs to be thought of as a living organism. It changes over time, with the weather, use, as systems begin to age, as modifications are made. Appropriate maintenance scheme should be installed and all such interventions should be recorded for future reference. It will help enormously in safety o occupants and operation meant for the building. A pro-active maintenance regime right from the start using updated documentation is requirement for all buildings in general. This means to adopt a planned or scheduled maintenance strategy, which is based on regular monitoring and repairing or replacing components when necessary.

MOISTURE PENETRATION

One of the biggest threats to a masonry structure is moisture. Masonry walls exposed to the elements can easily absorb water, and this compromises their structural integrity. Water leaking into a brick wall will deteriorate due to alternate wetting and drying, leading to delamination. Water penetration poses a danger not only to the masonry materials but the adjacent assemblage including wood, metal, doors, and windows. These have been noticed in the buildings.

CRACKING

Walls are affected by temperature and moisture change. Materials can suffer from initial shrinkage and/or subsequent expansion and contraction. This movement gives rise to the expansion cracks in masonry walls. Cracks are a common problem with masonry construction. They can occur when a building settles or because of moisture penetration. Poor preparation of mortar can also cause cracking in the joints. Natural disasters such as earthquakes and floods can also exert pressure on a masonry wall or foundation, leading to cracks. Cracks never got addressed in cosmetic maintenance. There has been thus progressive cracking in load bearing vertical structural members leading to appreciable degradation in load carrying capabilities of these important structural members in load transfer mechanism.

STAINING

Staining is a big problem for masonry walls. It poses a costly problem for property. Staining occurs when masonry materials or mortar come into contact with the deleterious elements. Water seepage and aging walls are the main causes of masonry staining. This has been observed in buildings.

BOND FAILURE

Bricks in masonry have to stay intact to guarantee the strength of a masonry structure. However, the loss of adhesion is a common problem in such construction. It leads to bulging or peeling, hollow patches, and raking of top layers. This has been noticed in buildings.

Control Room Building (CRB); Extensive seepage dampness was witnessed from the roof. As stated at site roof treatment of Control Room building has been done minimum 2-3 times. But these

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measures proved as temporary in nature. While carrying out roof treatment various cracks were appearing, and agency which did work recently asked for grouting of such cracks prior to execution of roof treatment. Since CRB is very old and entire control and Protection system, Substation auxiliaries are housed in that building only hence even minor issue will cause major damage to the safety and security of Maithon system which in turn may badly affect GRID security.

Roads and drainage system in campus were found to be in bad shape. Water logging creates problem to buildings and equipments. This causes moisture ingress to walls due to damaged damp proofing course. Roads are recommended to be laid keeping this aspect in consideration.

DISCUSSION AND CONCLUSION

The buildings are in Seismic Zone III and exposed to multi hazard situation as per Vulnerability Atlas. The structures are load bearing unreinforced masonry structures, and in present case without proper bands and steel, which is deficient in resisting anticipated design structural loads. Drawings and structural documents are not available. As per the information given at site, repair has been done in recent times to some buildings. The renovation work has not taken any strengthening measures and is of cosmetic nature. As the structure is old enough, hence moisture movement, popping and scaling again resurfaced.

As buildings are highly distressed, further adding more loads to structures due to retrofit actions is not advisable as the foundation already is showing settlements and the existing building material is having dull sound on hammering which indicates voids and degradation. Due to the stage of deficiency, distress, multi hazard exposure replacement should be preferred. Moreover, buildings have lived almost its useful life. The useful age of load bearing structures as per literature is 30 years. As the vertical load carrying structures are badly damaged and with visible cracks hence there is no need to carry any further tests on any wall and roof. From visual inspection it was very unambiguous that structure has lost its load carrying capacity appreciably. There is no benefit to carry these structures with repair or retrofitting.

Technically there is no point to keep the structures which are deficient in resisting earthquake that too in active seismic zone that is Zone III. Retrofitting is not recommended as the existing structure has been found weak to carry additional load. Safety of residents must be first priority. Visual inspection has been found sufficient enough to reach to the conclusion that structure is heavily distressed, seismically deficient and hence not safe for people to live in. When it comes to safety, reliability factors like users' safety and structural safety prevail. As per the techno-economic feasibility, these existing buildings residential and administrative should be demolished and reconstruction with disaster resilient features as per NBC 2016 and relevant byelaws is suggested.

9.11.23

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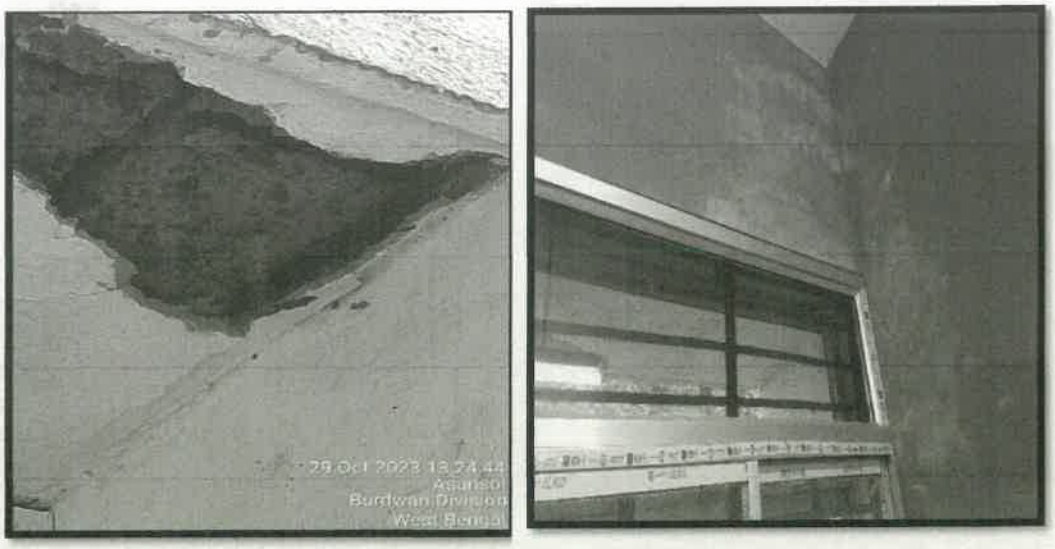
राष्ट्रीय प्रौद्योगिकी संस्थान पटना-5
National Institute of Technology Patna-5

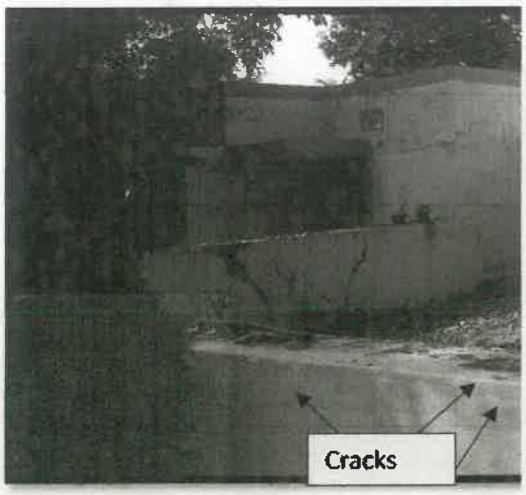
Cracks on front and back portion walls of Transit camp

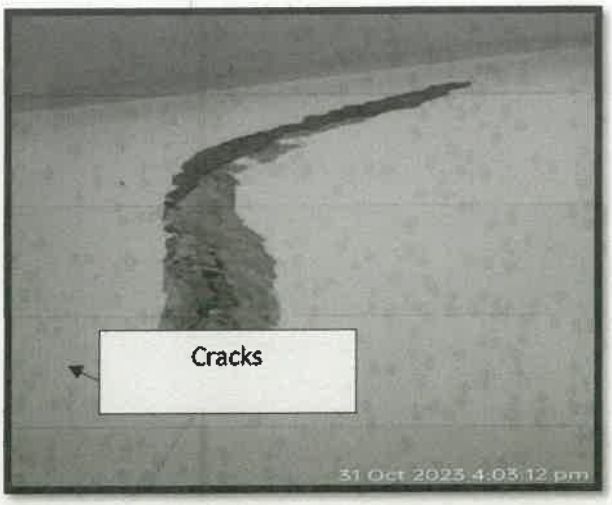


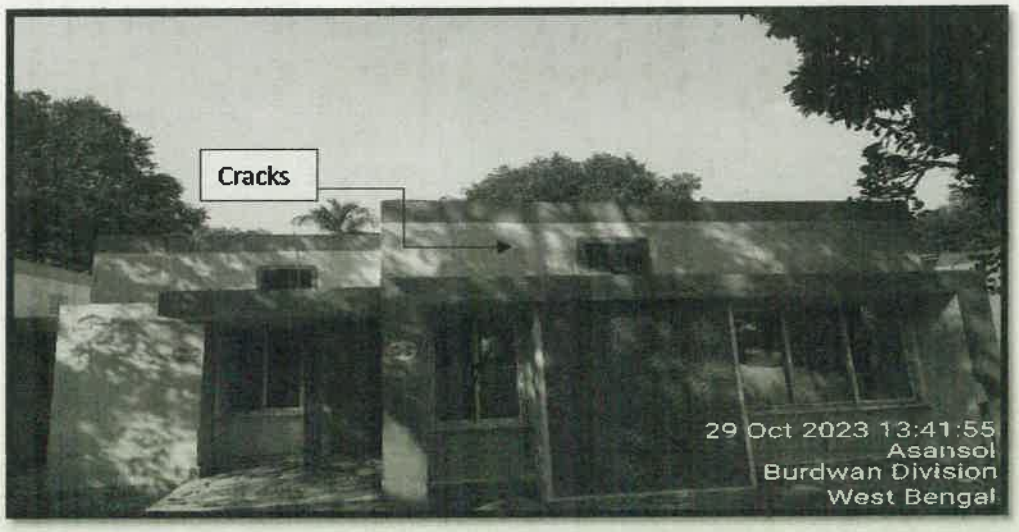
Corrosion and dampness in Ladies club building

Dampness and cracks in Community Hall building

Dampness and crack with cosmetic repair in D2 quarter







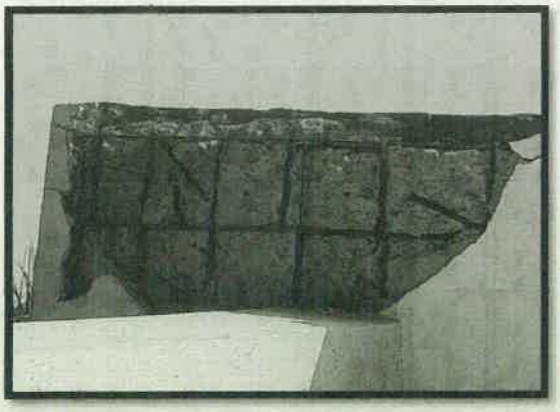
Cracks on interior and exterior walls of C quarter.

Cracks on back wall of B-quarter

Views of Quarter A-

Cracks on exterior wall of control room building

Crack line on the top of firefighting tank



11 KV ACB Building

Cracks in column of semiclosed store

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Ashok Raj Path, Patna-800005,Bihar

STRUCTURAL HEALTH ASSESSMENT REPORT OF RESIDENTIAL AND ADMINISTRATIVE BUILDINGS OF SUB- STATION AT MALDA

DEPARTMENT OF CIVIL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY PATNA
(An institution under Ministry of Education, Govt. of India)
Ashok Rajpath, Patna-800005, Bihar

Report on Structural health of residential and non-residential building at Malda Sub-Station

Malda SS has been commissioned in the year of 1986 and almost completed 37 years of service. Admin building, Control room, Transit camp and Township colony were constructed during that period. The area of the Sub-Station is around 36 Acres. The Sub-Station consists of Switchyard area and Township Colony. The various non-residential units present in the Sub-Station are Control room, Fire fighting room, DG Room, Overhead water tank, Administrative Office, Closed Buildings etc, Security post etc. The colony township consists of Quarters like A-type quarters (32), B-type quarters (28), C-type quarters (14), D-type quarters (02).

INFORMATION REGARDING BUILDINGS:

TYPOLOGY OF STRUCTURE: URM (Unreinforced Masonry)

Residential structures are two storey load bearing unreinforced masonry buildings with reinforced concrete slabs, chajja and porch.

USAGE OF BUILDING: RESIDENTIAL / Administrative

SEISMIC ZONE: Zone III

MULTI HAZARD AREA: Yes as per Vulnerability Atlas by BMTPC, New Delhi

DEPTH OF WATER TABLE: Generally available upto 3 to 4 m depth of ground surface.

AGE OF STRUCTURE: MORE THAN 30 YEARS. (As per information conveyed at site, it was constructed in year 1986).

DRAWINGS AND STRUCTURAL DOCUMENTS: Drawings and construction related documents were not available.

NUMBER OF STOREY: one/Two storey

BUILDING MATERIAL USED: Brick Masonry with RCC Slab. However in repair process, new material being used which were not bonded properly with existing material.

REPAIR, RENOVATION OR ANY OTHER MAINTENANCE DETAIL: As per detail available at site with some Letter of awards and maintenance register, the entire repair are cosmetic in nature which included painting, plastering, distempering, tile works, plumbing repair, electrical repair etc.

PLANNING FOR THE CONDITION ASSESSMENT:

Masonry structures are popular in residential, commercial, and industrial construction. The materials and technology used in masonry add to the strength, durability, energy efficiency, fire-resistance, sound-proofing, and thermal mass of a building. Despite these advantages, masonry damage can occur due to several reasons. Assessment strategy must find the causes of such damage and find appropriate solution. It has been planned that as the quarters are prototype, hence only randomly selected quarter of each type has been inspected extensively. The structures are constructed with similar building material. Similar design system and constructed at the same time, hence the results of the findings are valid for all the structures.

The visual assessment was based on measurements, hammering, visual observation of distress, exploratory observation by removing cover, photographic exploration, and interview of residents, Engineers and officials. The visual and documentation investigation has been carried during 29.10.2023 to 4.11.2023. The scope intended for assessing safety aspect related to the structure and person using it. Structural Health Assessment covered following:

Observe Deflection

Observe Moisture ingress

Observe Present Health Status

Observe Settlement

Observe Crack propagation

Durability Assessment

Structural Stability Assessment

Environment Impact Assessment

Structural Adequacy Assessment

Load carrying capacity Assessment

FINDINGS OF HEALTH ASSESSMENT:

CHAJJAS, PARAPETS: Diagonal cracks were distinctly visible which were continuously making ingress of water inside.

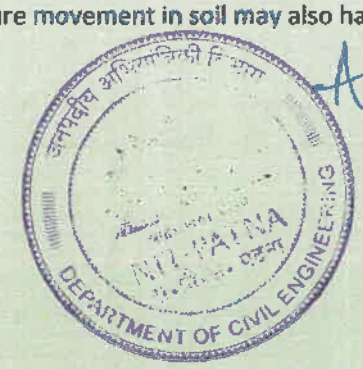
SLAB: The joints of wall to slab were with cracks at several places. Dampness, spalling of concrete, corrosion to reinforcement and peel offs are present. Minor cracks were seen in slabs. Heavily cracked slab wall junction has been observed. It clearly speaks of delamination. This makes slab vulnerable to shear action by lateral loads like earthquake and wind load. Heavily corroded steel bars were found when cover was removed. Spalling of concrete has been found. It has been reported to be occurring for years. Spalling of concrete is indication of third level of corrosion in reinforcement. It is to mention that corrosion is taken as cancer to reinforcement. Steel reinforcement was exposed by removing cover and was found to be highly corroded. More than 50% of cross section area of steel was found to be lost. Falling chunks of concrete is risk to lives of occupants.

LOAD BEARING WALLS: (vertical load carrying structural element)

Have been found cracked and delaminated for long time. Cosmetic repairs could not take care of the continual distress. The extent of cracks inside kept on increasing. Re-plastering may have covered cracks but the weakened walls went under progressive cracking and crack propagation went unhindered during last several years. Now, it has become very risky for structural stability. Extensive Cracks, Seepage of water and subsidence in wall were clearly visible. Cracks are through the wall thickness as evident from observing it from both sides of wall. As the structure is old hence its water absorbance is high. Bulging and unevenness have also been noticed at some places. Cracks due to inadequate bearing between slab wall junctions have been noticed. Provisions of seismic band and steel have been not followed.

OPENINGS: All the openings have been noticed with diagonal cracks. Openings are not reinforced as per IS 4326 provisions

FOUNDATION: Differential Settlement of Foundation has been noticed. Subsidence is obvious due to cracked floor and separation at wall floor junction. The pattern of crack is similar to subsidence crack; however, the crack will be widest at the base of the wall. The most common cause of ground heave is expansion of sub-soils. On older properties with shallow foundations the soil can expand and contract dependent upon the weather conditions. If the clay becomes waterlogged it can expand and push the foundations upwards causing the cracks. Cracks in walls under gravity load, subsidence of floor, separation at wall-floor junction are due to inadequate strength of foundation. Moisture movement in soil may also have affected soil bearing capacity



FLOORING: Cracked at places. Although floor was covered with tiles but still cracks were there on floor tiles. It may be due to heaving.

STAIRCASES: Cracks were noticed on staircases.

PLUMBING CONDITION: Seepages due to old pipelines which also has been changed before some time.(As per the residents).

ELECTRICAL CONNECTIONS: Seepages were noticed on wall with conduit of electricity.

Condition of wires, switchboards etc are under risk due to dampness and peel offs.

DETAILS OF MAINTENANCE:

Maintenance happened intermittently. The work such as repair with cement mortar, painting, distempering, floor changed with vitrified tile, plumbing repair, electrical repair.

Maintaining a building is not just the servicing of equipment, though this is a large part of it. It also includes monitoring its continual performance, fine-tuning (tweaking) and continuous improvement. A building needs to be thought of as a living organism. It changes over time, with the weather, use, as systems begin to age, as modifications are made. A pro-active maintenance regime right from the start using updated documentation is required for buildings. This means to adopt a planned or scheduled maintenance strategy, which is based on regular monitoring and repairing or replacing components when necessary.

MOISTURE PENETRATION

One of the biggest threats to a masonry structure is moisture. Masonry walls exposed to the elements can easily absorb water, and this compromises their structural integrity. Water leaking into a brick wall will deteriorate due to alternate wetting and drying, leading to delamination. Water penetration poses a danger not only to the masonry materials but the adjacent assemblage including wood, metal, doors, and windows. These have been noticed in the buildings.

CRACKING

Walls are affected by temperature and moisture change. Materials can suffer from initial shrinkage and/or subsequent expansion and contraction. This movement gives rise to the expansion cracks in masonry walls. Cracks are a common problem with masonry construction. They can occur when a building settles or because of moisture penetration. Poor preparation of mortar can also cause cracking in the joints. Natural disasters such as earthquakes and floods can also exert pressure on a masonry wall or foundation, leading to cracks. Cracks never got addressed in cosmetic maintenance. There has been thus progressive cracking in load bearing vertical structural members leading to appreciable degradation in load carrying capabilities of these important structural members in load transfer mechanism.

STAINING

Staining is a big problem for masonry walls. It poses a costly problem for property. Staining occurs when masonry materials or mortar come into contact with the deleterious elements. Water seepage and aging walls are the main causes of masonry staining. This has been observed in buildings.

BOND FAILURE

Bricks in masonry have to stay intact to guarantee the strength of a masonry structure. However, the loss of adhesion is a common problem in such construction. It leads to bulging or peeling, hollow patches, and raking of top layers. This has been noticed in buildings.

Roads and drainage system in campus were found to be in bad shape. Water logging creates problem to buildings and equipments. This causes moisture ingress to walls due to damaged damp proofing course. Roads are recommended to be laid keeping this aspect in consideration.

Control Room Building (CRB); Extensive seepage dampness was witnessed from the roof. Walls and roof are covered with false panels or ceiling and not exposed to visual inspection. But, seepage and lowered false ceiling were observed. Cracks in columns and walls were visible on external side of building. Since CRB is very old and entire control and Protection system, Substation auxiliaries are housed in that building only hence even minor issue will cause major damage to the safety and security of system which in turn may badly affect GRID security

Abandoned Quarters: C-05 & C-06
Unoccupied Quarters: D-2, C- 10 to C-14, B-1 to B-17, B19 to B-21, B24, B-25, B-27, A-13 to A-16, A-18 to A-20, A-22 to A-28, A-30 to A-32
Occupied Quarters: D-01, C-1 to C-4, C-7 to C-9, B-18, B-22, B-23, B-26, B-28, A1- to A-12, A-17, A-21, A-29

DISCUSSION AND CONCLUSION

The buildings are in Seismic Zone III and exposed to multi hazard situation as per Vulnerability Atlas. The structures are load bearing unreinforced masonry structures, and in present case without proper bands and steel, which is deficient in resisting anticipated design structural loads. Drawings and structural documents are not available. As per the information given at site, repair has been done in recent times to some buildings. The renovation work has not taken any strengthening measures and is of cosmetic nature. As the structure is old enough, hence moisture movement, popping and scaling again resurfaced.
As buildings are highly distressed, further adding more loads to structures due to retrofit actions is not advisable as the foundation already is showing settlements and the existing building material is having dull sound on hammering which indicates voids and degradation. Due to the stage of deficiency, distress, multi hazard exposure replacement should be preferred. Moreover, buildings have lived almost its useful life. The useful age of load bearing structures as per literature is 30 years. As the vertical load carrying structures are badly damaged and with visible cracks hence there is no need to carry any further tests on any wall and roof. From visual inspection it was very unambiguous that structure has lost its load carrying capacity appreciably. There is no benefit to carry these structures with repair or retrofitting.
Technically there is no point to keep the structures which are deficient in resisting earthquake that too in active seismic zone that is Zone III, retrofitting is not recommended as the existing structure has been found weak to carry additional load. Safety of residents must be first priority. Visual inspection has been found sufficient enough to reach to the conclusion that structure is heavily distressed, seismically deficient and hence not safe for people to live in. When it comes to safety, reliability factors like users' safety and structural safety prevail. As per the techno-economic feasibility, these existing buildings residential and administrative should be demolished and reconstruction with disaster resilient features as per NBC 2016 and relevant byelaws is suggested.

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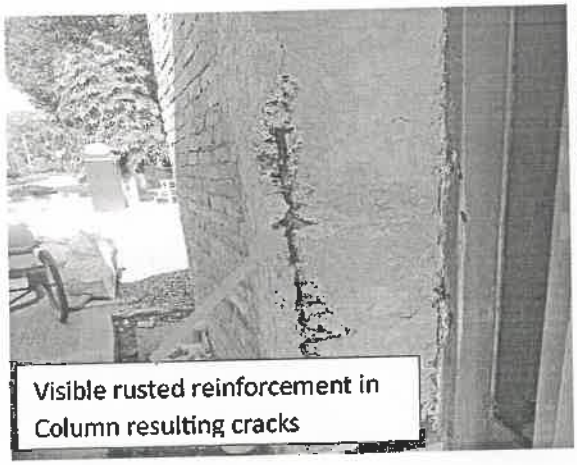
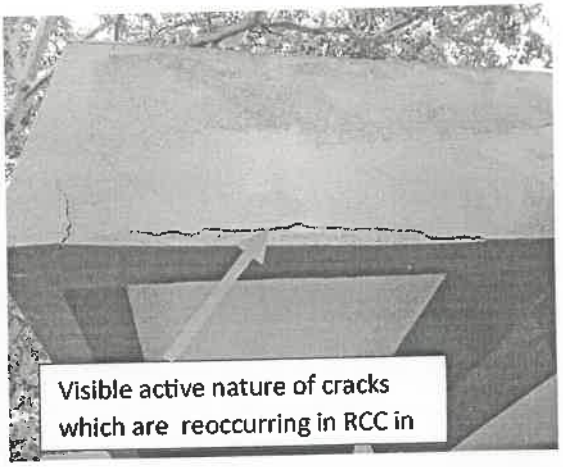
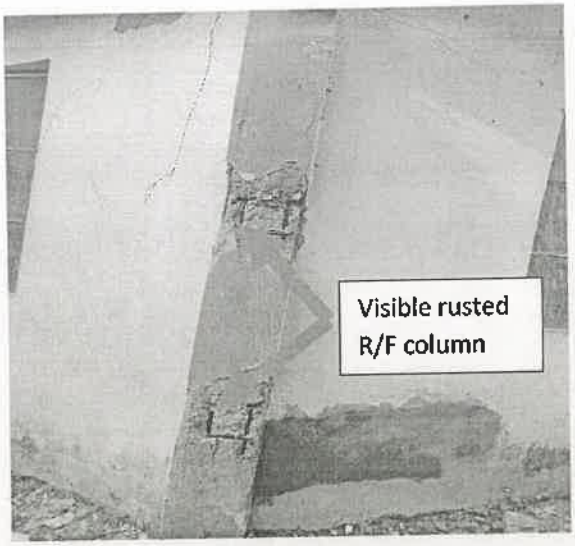
जनपदीय अभियांत्रिकी विभाग
Civil Engineering Department
राष्ट्रीय प्रौद्योगिकी संस्थान पटना-5
National Institute of Technology Patna-5

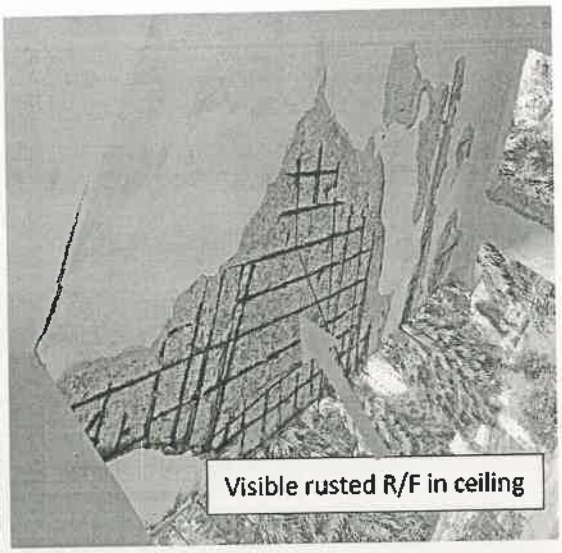
1) Transit Camp Building



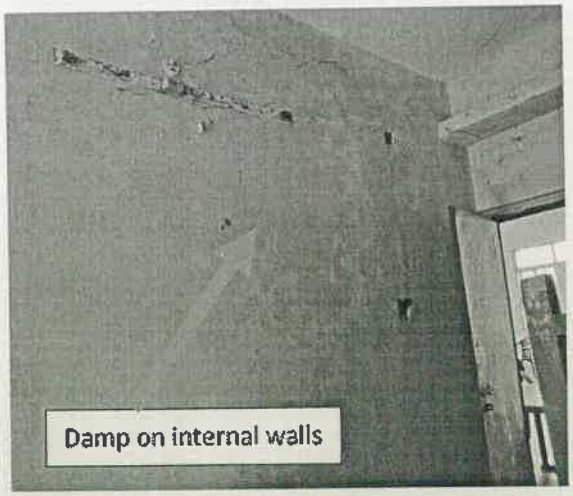


2) Ladies club



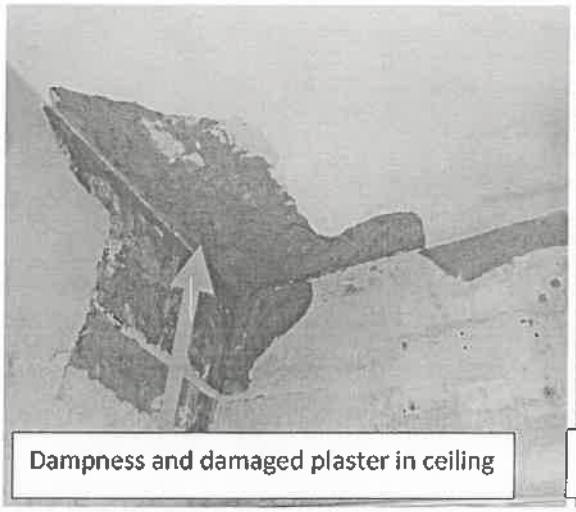


3) Community Hall/Recreation centre

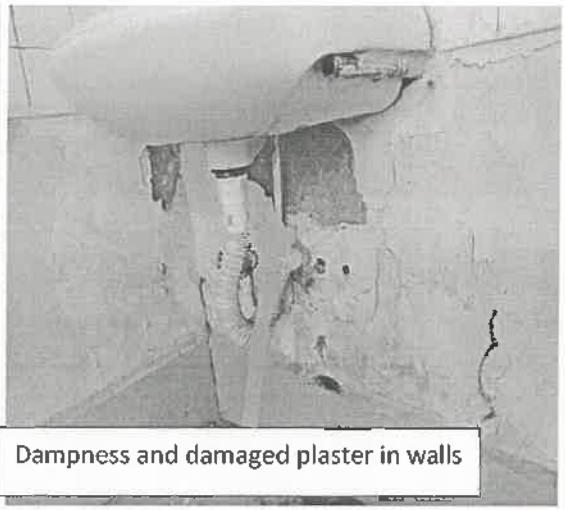


4) Residential quarters

4.1) D type Quarter (D-2)



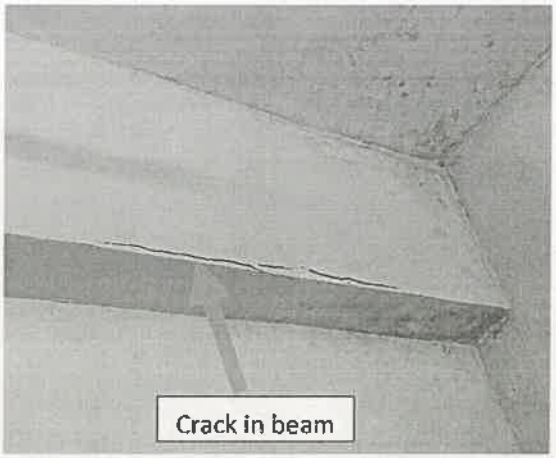
Dampness and damaged plaster in ceiling



Dampness and damaged plaster in walls

4.2) C type Quarter (Repaired)

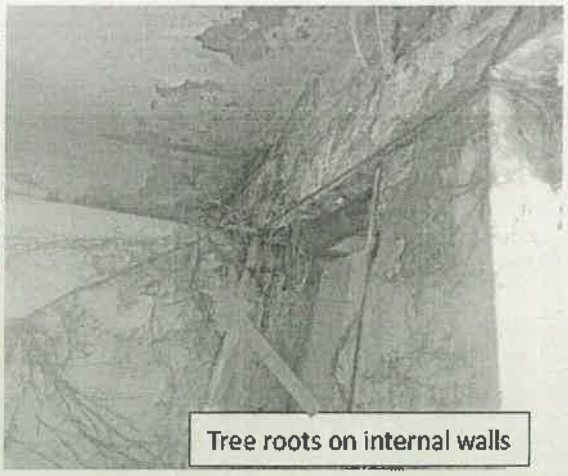
Dampness and damaged plaster



Crack in beam

4.3) C type Quarter

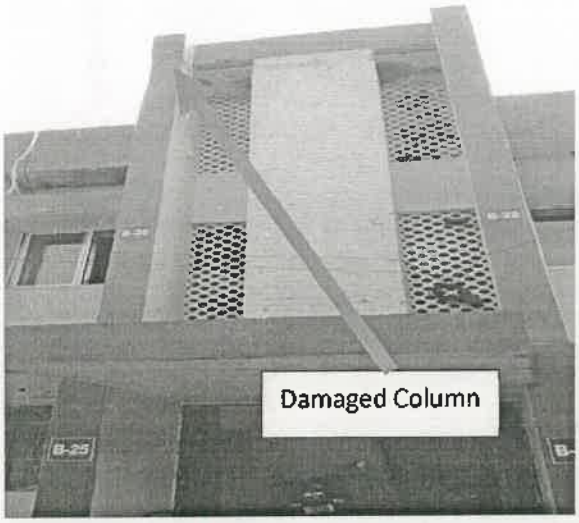
Damaged plaster

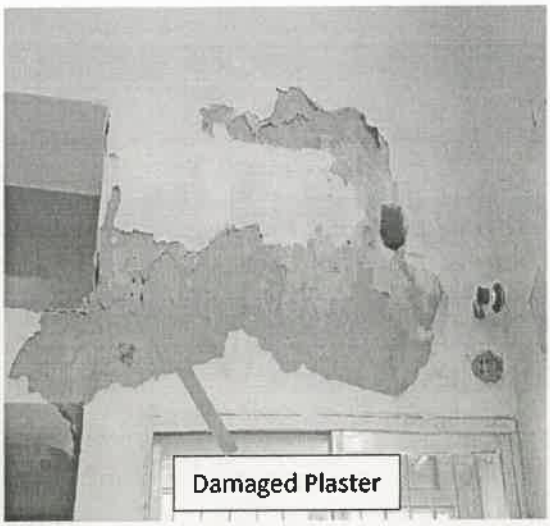


Tree roots on internal walls

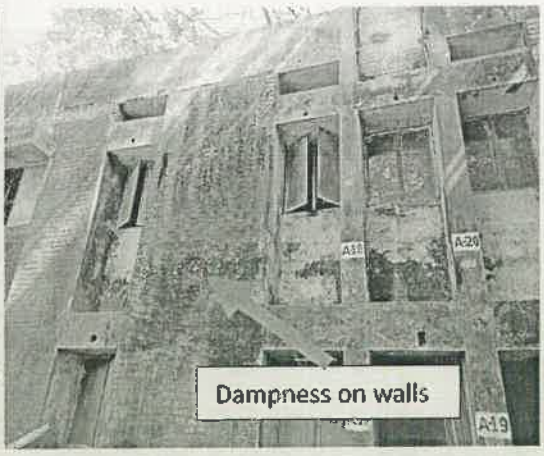
4.4) B Type quarter

4.5) B type Quarter (Repaired)

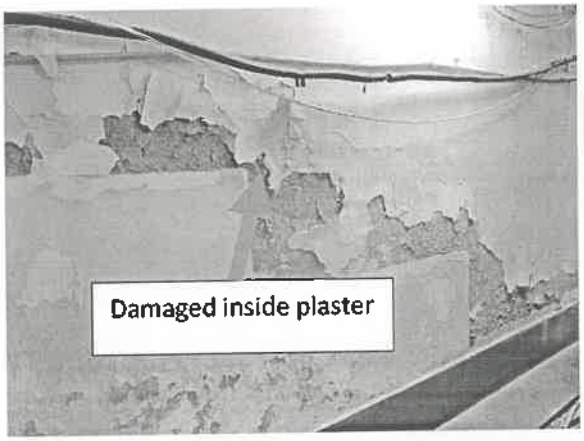


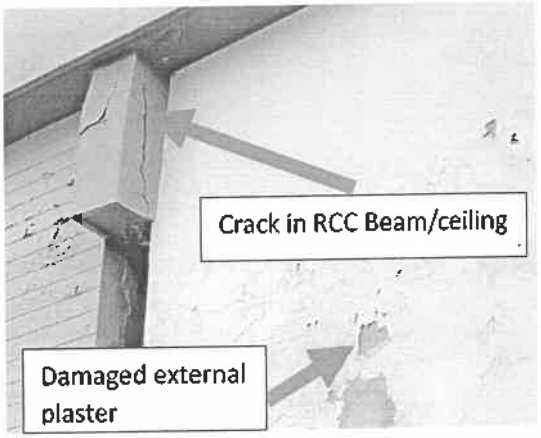


4.6) A type Quarter

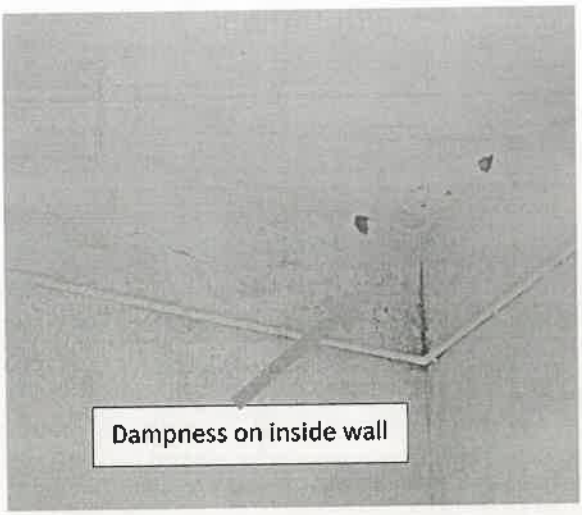


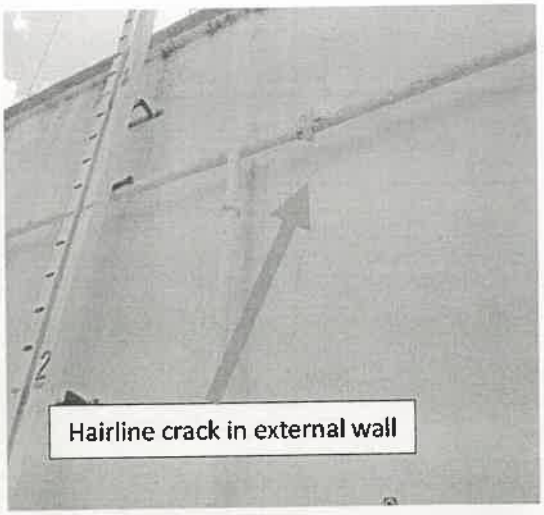
5) Control room Building



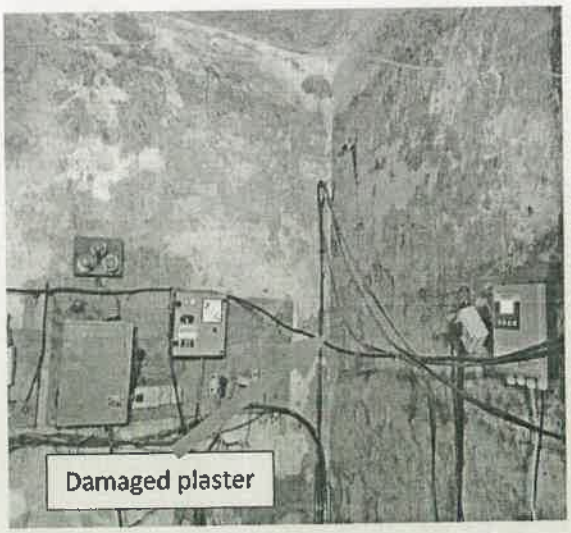


6) Fire Fighting Pump House (FFPH building)

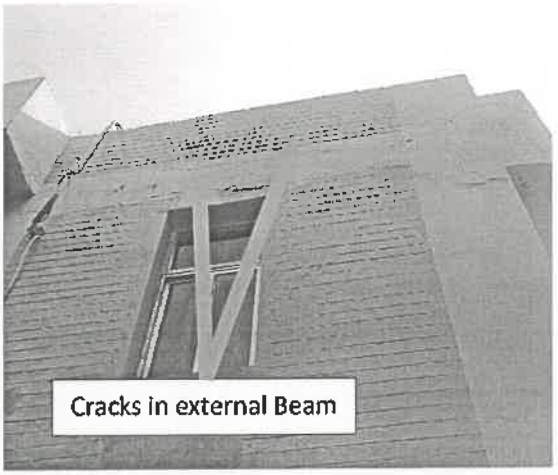




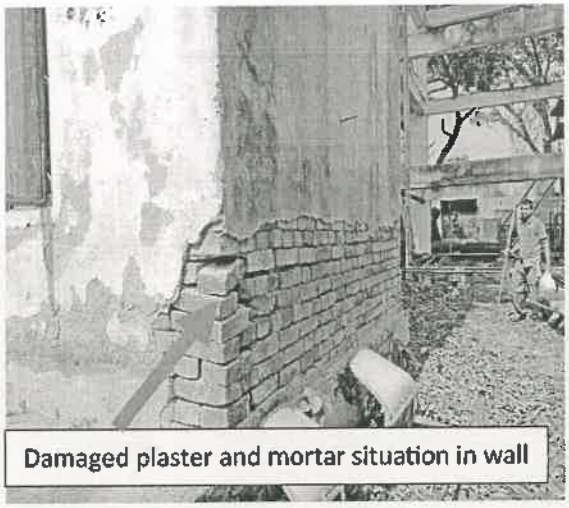
8) Pump House

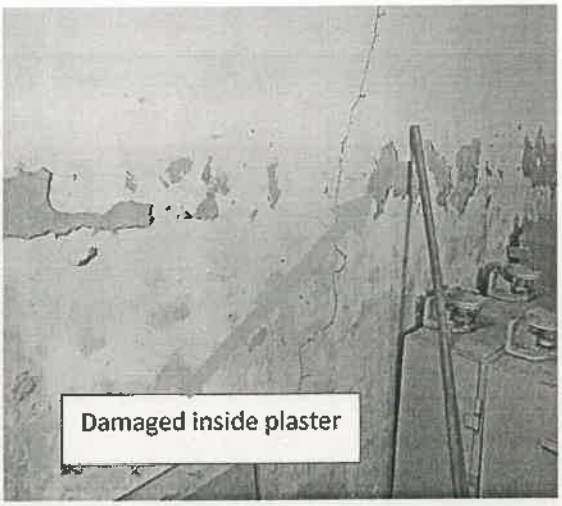


9) Administrative Building

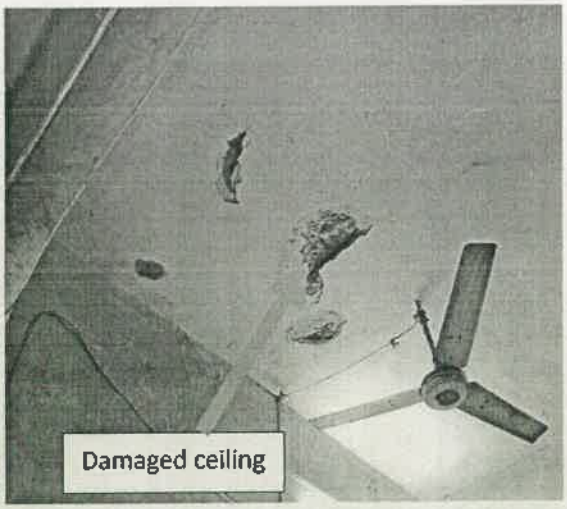


10) Closed Store





11) Security Hut



Annexure B.13.3

Sl. No	Region	Name of Sub-Station	Name of the Project	No. of units to be demolished	No. of units proposed for construction	Inductive Estimated Expenditure (Rs in Crore)	Remarks
1	**ER-II**	**Malda**	CTS	42	14	16.94	
2	**ER-II**	**Durgapur**	FSTPP	54	20	19.87	
3	**ER-II**	**Maithon**	KTPS	28	20	20.55	
	Total					57.36	

Annexure B.18

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ERPC Outage Planning Procedure

पूर्वी क्षेत्रीय विद्युत समिति
Eastern Regional Power Committee

September 2023

1.1 Background

Maintenance of grid elements shall be carried out by the respective users, transmission licensees, STUs and CTU in accordance with the provisions of the Central Electricity Authority (Grid Standards) Regulations, 2010.
As per clause No. 32(4) of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2023 under Operating Code, it has been envisaged "To facilitate coordinated planned outages of grid elements, a common outage planning procedure shall be formulated by each RPC in consultation with the NLDC, concerned RLDC and concerned users."
The timeline for Annual Outage Planning Process shall be as follows:

Activity	Agency	Cut-off date
Submission of proposed outage plan for the next financial year to ERPC with the earliest start date and latest finishing date	STUs, transmission licensees, generating stations and other entities directly connected to ISTS	31st October or as directed by CEA/MoP from time to time
Submission of LGBR of the control area to ERPC for both peak and off-peak scenarios	SLDC	31st October or as directed by CEA/MoP from time to time
Publishing draft LGBR and draft outage plan of regional grid for next financial year on the concerned ERPC's website for inviting suggestions, comments, objections of stakeholders.	ERPC	30th November or as directed by CEA/MoP from time to time
Publishing final LGBR and final outage plan of regional grid for next financial year on the concerned ERPC's website	ERPC	31st December or as directed by CEA/MoP from time to time

1.2 Introduction

- Outage planning shall be prepared for the grid elements in a coordinated and optimal manner keeping in view the system operating conditions and grid security. The coordinated generation and transmission outage plan for the national and regional grid shall take into consideration all the available generation resources, demand estimates, transmission constraints, and factor in water for irrigation requirements, if any. To optimize the transmission outages of the national and regional grids, to avoid grid operation getting adversely affected and to maintain system security standards, the outage plan shall also take into account the generation outage schedule and the transmission outage schedule.

- Annual outage plan of grid elements under regional control area and identified important grid elements identified under sub-clause (b) of clause (2) of Regulation 29 of IEGC regulations, shall be prepared in advance for the financial year by ERPC in consultation with the users, respective SLDCs, RLDCs and NLDC and reviewed before every quarter and every month.
- Annual outage plan shall be prepared in such a manner as to minimize the overall downtime, particularly where multiple entities are involved in the outage of any grid element(s).
- The outage plan of hydro generation plants, REGS and ESS and its associated evacuation network shall be prepared with a view to extracting maximum generation from these sources. Example: Outage of hydro generator may be planned during the lean water season. Likewise, outage of wind generator may be planned during lean wind season. Outage of solar generator, if required, may be planned during the rainy season.
- Protection relay related outages, auto–re-closure outages and SPS testing outages shall be planned on a monthly basis with the prior permission of ERPC, in consultation with ERLDC & NLDC as the case maybe.
- Outages in the transmission network could either be on account of planned maintenance activities or construction related activities or any emergency conditions arising in the field.
- As outage planning is an important part of operational planning, multi-layered checks would help in ensuring reliability of the power system. These checks need to be at the following levels:
    - Due diligence between the agencies involved in the transmission asset maintenance through bilateral discussion.
    - Operation Coordination Sub-Committee of ERPC (Outage Coordination Group).
    - Off-line simulations and planning at SLDC, ERLDC/NLDC level, as the case maybe.
    - Real time check at SLDC, ERLDC/NLDC level, as the case maybe.
- Maintenance of grid elements shall be carried out by the respective users in accordance with the provisions of the CEA Grid Standards. Outage of any element which is causing or likely to cause danger to the grid or sub- optimal operation of the grid shall be monitored by ERLDC. ERLDC shall report such outages (emergency/forced/beyond planned) to ERPC and ERPC shall issue suitable instructions to restore such elements in a specified time period.

1.3 Objective

- To finalise the following Outage Plan on Annual basis:
    - Outage planning of Generating units of ER
    - Outage planning of Transmission line and Elements
- The procedure aims to streamline the process of outage coordination between SLDCs, Grid-India (ERDLC/NLDC), ERPC and Transmission Licensees and Generators.

1.4 Scope

- The procedure is applicable to ERLDC, NLDC, SLDCs STUs, Generating utilities, Transmission licensees. It would be applicable once the Annual outage plan is finalized by 31st December of each year for the next financial year by ERPC.

Activity (as per IEGC)	Sub-Activity (as per this procedure)	Utility	Cut-off Date
	Submission of: -		

Submission of proposed outage plan for the next financial year to RPC with the earliest start date and latest finishing date	(i)Month-wise peak/off-peak demand (MW) – restricted/unrestricted (ii)Month-wise energy requirement (in MU) – restricted/unrestricted (iii) node wise demand in MW (peak/off-peak) for all ISTS drawl points for each month of the year. (iv)Month-wise and source-wise power purchase and sale plan (both MU and MW)	STUs/SLDCs	15th September
	Submission of: (i)Annual Maintenance Program for each of the generating units(thermal, hydro and RES) (ii)Generating stations under R&M/long outage indicating date of outage and reasons of outage and expected date of return(thermal and hydro both) (iii)Unit-wise and station wise monthly energy generation (in MU) proposed from existing units/units to be commissioned in the next financial year alongwith its allocation. (iv) Generation(peak/off-peak) in MW ex-bus for each station (v)Partial and forced outage figures (in %) of generating units and auxiliary power consumption for the last 3 years.	State GENCOs/ CSGS/IPP/CPP	15th September
	Submission of Planned Unit Shutdown/AMP of each of the generating units(thermal/hydro/solar)	State GENCOs/ CSGS/IPP/CPP	15th September

	Submission of: (i)monthly and annual planned outage of transmission system (ii) Timeline and system parameters of new transmission elements to be commissioned in the next financial year.	All ISTS licensees	15th September
	Preparation of base case	ERLDC/ERPC	20th September
	All India System Study Report from CEA	CEA	30th September
	Publish of Detailed Annual System Study Report	ERPC	30th September
	Submission of comments on Annual System Study Report	STUs/SLDCs/ State GENCOs/ CSGS/IPP/CPP/all ISTS licensees	15th October
Submission of LGBR of the control area to RPC for peak and off-peak scenarios	Submission of LGBR of the control area to RPC for peak and off-peak scenarios	SLDCs	31st October
Publishing draft LGBR and draft outage plan of regional grid for next financial year on the concerned RPCs website for inviting suggestions, comments,	Preparation of draft LGBR based on Annual System Study Report and respective states' LGBR	ERPC	15th November
	Publish draft LGBR and draft outage plan of regional grid for next financial year	ERPC	30th November

objections of stakeholders.			
Publishing final LGBR and final outage plan of regional grid for next financial year on the concerned RPC's website	Submission of public comments on draft LGBR and draft outage plan of regional grid for the next financial year	Public	15th December
	Publishing of final LGBR and final outage plan of regional grid for next financial year	ERPC	31st December

In continuation to above, the monthly shutdowns of Generating Units to be discussed and approved in OCC meeting of ERPC. The procedure and timeline for studies/re-conciliation with LGBR to facilitate the same is as follows: -

Activity	Utility	Cut-off date*
Submission of monthly planned outage of generators/transmission system elements	ISGS/all ISTS licensees	05th of M-1
Updation of annual base case with monthly scenarios.	ERLDC	05th of M-1
Preparation of System Study with planned outage details and updated base case and submission to respective RPC.	ERLDC	07th of M-1
Publish of System Study with report on Deviations from LGBR resulting in system constraints.	ERPC	09th of M-1
Submission of revised monthly outage plan	ISGS/all ISTS licensees	10th of M-1
Approval of next month outage	ERPC	By 15th of M-1

*M – month of shutdown

1.5 Applicability

- The procedure is applicable to important grid elements published by ERLDC/NLDC in consultation with ERPC, users, SLDCs.
- To be applicable to other grid elements like bus, bays and other elements as mandated in CEA Regulations.
- The Important Grid elements would include the following:
  - All Inter Regional Transmission Lines
  - All Trans-national Transmission Lines
  - All HVDC Transmission Lines and HVDC elements including Poles & Back-to-back Blocks
  - All 400 kV and above AC Transmission Lines
  - All 220 kV AC Transmission lines belonging to ISTS Licensees and ISGS and all transmission lines emanating from ISGS and ISTS substations irrespective of voltage level.
  - All 400 kV and above Inter-connecting transformers (ICTs), Bus Reactors, Filter Banks, Bus Series Reactor and FACTS Devices connected at 400 kV and above voltage level along with all bays associated with these elements.
  - All natural ISTS lines.
  - 220 kV and above Transmission elements feeding loads of a strategic/sensitive nature.
  - All generating units which are regional entities.

1.6 Procedure for planning outage of generating units

1.6.1 Annual Outage Plan:

- Generating stations of the Eastern Region would submit proposed outage plan for the next financial year to ERPC Secretariat latest by 31st of October or as directed by CEA/MoP from time to time in the prescribed format.
- The data shall include the dates, nature of maintenance work planned whether mandatory or otherwise, duration of outage and related information.
- Draft outage plan of generating units for next financial year would be published on the ERPC's website for inviting suggestions, comments, and objections of stakeholders by 30th November or as directed by CEA/MoP from time to time.
- Final outage plan of generating units for next financial year on the ERPC's website by 31st December or as directed by MoP/CEA from time to time.
- All generating stations shall follow the annual outage plan. If any deviation is required, the same may be allowed with the prior permission of ERPC in consultation with beneficiaries & ERLDC.

1.6.2 Monthly Outage Plan:

- The annual outage plan shall be reviewed in monthly Meetings of Operation Coordination Sub-Committee of ERPC on a monthly and quarterly basis in coordination with all the parties concerned, and adjustments or additions of new outages shall be made wherever necessary.
- Outage planning should be done in a judicious way to make available maximum no. of running units during high demand season of the ER Grid and specific state high demand period.

1.7 Procedure for Planning Outage of Transmission lines and Grid Elements

1.7.1 Annual Outage Plan:

- STUs, transmission licensees and other entities directly connected to ISTS of the Eastern Region would submit proposed outage plan for the next financial year to ERPC Secretariat by 31st of October in the prescribed format.
- The data shall include the dates, nature of maintenance work planned whether mandatory or otherwise, duration of outage and related information.
- Draft outage plan of transmission lines and equipment for next financial year would be published on the ERPC's website for inviting suggestions, comments, and objections of stakeholders by 30th November.
- Final outage plan of transmission lines and equipment for next financial year on the ERPC's website by 31st December.
- The above annual outage plan shall be reviewed by ERPC Secretariat on quarterly and monthly basis in coordination with all parties concerned, and adjustments made wherever found to be necessary. All deviations from outage plan shall be uploaded on ERPC website.

1.7.2 Monthly Outage Plan/ Procedure for Discussing Outages in OCC Meeting:

- For the purpose of Load Generation Balance (LGB)/ Outage planning process, OCC (Operation Coordination Sub Committee) of ERPC shall, in general, be the forum for reviewing and deciding the outage planning.
- Any deviation in annual outage plan may be reviewed based on merit/urgency by OCC of ERPC.

- **Indenting Agency:** The agency which gives the requisition for outage of any power system element shall be called Indenting Agency. Any of the following may request for outage of any power system elements:

    - Transmission Licensees / State Transmission Utilities
    - Generating Companies
    - RLDC/NLDC for defence mechanism testing / Blackstart mock drills

- Indenting Agency shall submit the proposed shutdown for the next calendar month latest by 5th day (Inter- Regional Element Outage List affecting the transfer capability of any inter regional) & 5th day (Intra-Regional Element Outage List) of the current month to ERPC Secretariat/NLDC/NPC Secretariat as per Format (included in Annexure 1). In the said proposal apart from the main power system element(s) to be taken out of service and its purpose, the agency should also mention the duration of non-availability of each sub-station equipment such as bus section, CB, isolator or any other switchgear as well as non-availability of any protection feature or PLCC, in as much detail as possible.
- ERPC Secretariat shall compile all the received proposals and circulate to SLDCs/ERLDC by ~~8th~~ 7th day of every month for feedback, if any.
- ERLDC shall study the impact of these outages and furnish to ERPC Secretariat.
- OCC Meeting/System Study subcommittee of ERPC shall study the impact of these outages and based on its recommendations, ERPC shall discuss proposed outages in the OCC meeting (preferably between 10- 15th of every month) and prepare a list of transmission outages with the precautions to be taken.
- Any transmission element approved outages in OCC may be allowed to re-schedule within the same month.

- All the entities need to attend OCC (Outage Co-ordination Meeting) for the concerned element outage as per the requisition list. In case of absence of any entity in OCC, it will be treated as deemed consented.

- While submitting monthly outage plan for outage OCC meeting of ERPC, it was decided that shutdowns which have been approved by ERPC/ERLDC in consecutive three outage OCC meetings but have not been availed by utilities would not be included for future OCC requisition list. This step aims to remove shutdown requests that have not been utilized in the past, streamlining the planning process and improving resource allocation. At present the number of shutdown requisition is limited to 1.25 times of the maximum shutdown availed in a month during the last financial year. So, by adopting these methods, the planning process can be better aligned with realistic shutdown requirements and thus this approach will ensure optimal utilization of resources and reduce the burden of unnecessary studies. (**Methodology approved in the Outage OCC Forum, Refer MOM of 204th OCC**).
- In case of shutdown of inter-regional lines and intra-regional lines affecting the transfer capability or reliability of any inter regional corridor, the Indenting agency shall submit the shutdown proposal in both the concerned RPCs/NLDC/NPC by 5th day of month. To facilitate this, broad list of such lines is provided in list of important grid elements whose criteria is defined in Annexure1 which will be reviewed and updated by NLDC from time to time. The indenting agency may do an internal screening of its outage plan centrally to avoid multiple outages in the same corridor simultaneously. Bilateral discussion between the agencies involved may also be done to minimize outage duration before submitting the outage plan to RPCs.
- While approving the shutdowns it shall be ensured that multiple outages in the same corridor are not be approved simultaneously. It also needs to be ensured that all other concerned entities also complete their maintenance works requiring the same shutdown during the same period so that multiple shutdowns of any particular element for maintenance work by multiple agencies are avoided. Multiple outages of transmission element for the same work during the year may also be avoided.
- Indenting agency should put all the effort to the possible extent in order to combine the line maintenance with non-switchable line reactor maintenance. Indenting agency should put all the effort to the possible extent in order to combine the maintenance of bay elements along with line to minimized outage period.
- It also be noted that, while applying for outages, indenting agency needs to ensure the healthiness of DIA to which the transmission element is connected. i.e., in case of One and half CB scheme, other side DIA and for DMT scheme healthiness of TBC needs to be intimated.
- While applying outage of a bus coupler, an intending agency needs to put up the requisition at the time of bus outage of that particular AIS substation. Bus-coupler shutdown of AIS substations should be clubbed with program of Bus shutdown to minimize the outage duration of transmission element.
- While applying outage of a 765kV line reactor, an intending agency needs to put up the requisition at the time of outage of that particular feeder to the extent possible.
- If owner of transmission lines is different from bay owner, then both asset owner shall try to coordinate within themselves to avail the outage in combined manner to minimize outage period to the extent possible.
- Reason of availing any outage and time duration of outages should be reasonable. Indenting agency needs to submit any findings/observations, site photographs, substation diagrams and confirmation of suitable weather condition to carry out the work well before availing the shutdown on case-to-case basis depending upon the nature of the outage.

- ERPC shall publish the approved list of transmission elements outage plan after the outage meeting. Any shutdown proposal which requires approval of two RPCs shall be considered approved only if it is approved in both the RPCs.
- ERLDC may defer or conduct studies again before giving clearance of any planned outage in case of any of the following:
  - Major grid disturbances (Total black out in Region)
  - System isolation / separation
  - Black out in a control area
  - Any other event in the system that may have an adverse impact on the system security by the proposed outage with proper justification.

1.8 Procedure for Availing the Outage

- At present, following outage categories are being followed:

  - **Planned Outage Category:** *Planned outages are being discussed in respective Operation Coordination Committee (OCC) meeting of ERPC on monthly basis and availed based on the actual grid conditions.*
  - **Post OCC Category:** *Under exceptional cases such as construction activities or urgent nature of works, outage shall be proposed by indenting agency to ERPC.*
  - **Emergency Category:** *For attending emergency nature of works, asset owner shall send the proposal mentioning the nature of emergency directly to ERLDC control room and shutdown may be facilitated based on the actual grid condition in co-ordination with NLDC, SLDC.*

1.8.1 Procedure for applying shutdowns under OCC approved category:

- **Request for outages which are approved by OCC** must be sent by the owner of the transmission asset **at least 3 days in advance to ERLDC by 12:00 hours**, together with the details.
- If ERLDC requires any further information regarding the applied shutdown, the same should be provided by 15:00hrs of D-3 day by indenting agency to ERLDC.
- In case the outage of inter-regional links, trans-national or any 765 kV links or any links outage which need ATC revision, ERLDC shall forward the request for shutdown along with their consent and observation as per Format V to NLDC/other concerned RLDCs with clear observations regarding possible constraints /contingency plan and consent including study results by 10:00 hours of D-2 day.
- For all testing or operation related to automatic voltage regulators (AVRs), Power System Stabilizers (PSSs), Power Plant Controllers (PPC), RGMO, etc. indenting agency would send request to ERLDC through Web portal / through mail **at least 3 days in advance to ERLDC by 12:00 hours**.
- In case the owner is not availing the OCC approved outage, the same shall be intimated to the ERLDC at least 3 days in advance with a copy to MS/ERPC for approval from ERPC side. After due communication from ERPC, ERLDC will process accordingly.
- If consent/concurrence of other SLDC/~~NLDC/~~Agency is required for a particular shutdown then the said shutdown will also be forwarded to SLDC & agency by ~~16:00 hours of D-3~~ D-2 day.

- ~~NLDC/~~SLDC/Agency shall submit their consent/ approval/ concurrence/ comment with recommendations & study results to ERLDC/NLDC by 16:00 hrs. of D-2 day. If no consent/approval/concurrence/comment is received by this time, the request of shutdown shall be deemed ~~cancelled~~ approved.
- ERLDC will issue approvals for shutdowns by 12:00 hrs of D-1 day & same shall be intimated to all concerned on the same day. A list of all the outages approved for the day 'D' shall be forwarded to NLDC for all India compilation by ERLDC.

1.8.2 Procedure for proposing shutdowns under Post OCC category:

Under exceptional cases such as construction activities or urgent nature of works, outage shall be proposed by indenting agency to ERPC on D-5 basis. Indenting agency shall propose the outage to concerned RPCs in case of inter-regional (IR)/intra-regional transmission elements affecting IR TTC/ATC on **D-5 basis**. RPCs would also consult respective SLDCs/RLDC/NLDC, as the case may be, before approval on D-4. Only after approval from respective RPCs, shutdown will be considered by RLDC/NLDC. Outage facilitation priority may be given to OCC approved outages.

- The agencies involved shall ensure availing of outages as per the approved schedule time.
- A list of all the outages approved for the next day shall be forwarded to NLDC for all India compilation.
- On the day of outage, the outage availing agency shall seek the code for availing outage from ERLDC/NLDC (wherever applicable). The agencies involved shall endeavor to avail the outage within 15 minutes of availing the code but not later than 60 minutes. In case, due to any contingency, the outage could not be availed within 60 minutes, a fresh code needs to be obtained by all concerned agencies stating the reason there of. Record of scheduled and actual time of outage and restoration shall be maintained at ERLDC/NLDC.
- As any deviation in the outage from the schedule can affect other planned outages as well as affect reliability and electricity markets, indenting agency must strictly adhere to the shutdown timings.
- ERLDC if required shall conduct further system studies based on the system condition and approve the shutdown at least two days in advance.
- Planned Outages which are approved in OCC meeting shall only be considered for approval on D-3 basis and priority shall be given to OCC approved outages in case of shutdowns applied on the same corridor.
- Planned Shutdown procedure with timeline is given below:

Sl No	Activity	Day & Time
1	Request of shutdown from Indenting agency to ERLDC.	10:00 hrs of D-4 to 10:00 hrs of D-3
2	Forwarding request of shutdown requiring NLDC approval from ERLDC to other concerned RLDCs and NLDC (along with the recommendations and study result)	10:00 hrs/D-3 to 10:00hrs/D-2
3	Comments of other RLDCs or NLDC	18:00hrs/D-2
4	Approval or Rejection of Request	12:00hrs/D-1

- ***D = The date for which Shutdown is applied**

- Flow chart of the process is given in Annexure-2. The flowchart includes emergency shutdown procedure.

1.8.3 Procedure for proposing shutdowns under Emergency category:

- All outages which are not approved in the OCC meeting / Post OCC category, however having impact on human and equipment safety shall be considered under Emergency Outage category.
- All emergency outages are to be applied in Real Time with supportive documents including –
  -
  - The reason due to which emergency situation has arisen.
  - Proof (photographic, docs, display etc.) with an appropriate time stamp that substantiates/validates the reason cited as an emergency.
  - Details of work to be done to rectify the emergency issue.
  - Information of when last time maintenance activity of the element under purview was taken under maintenance activity. (if, readily available with indenting agency).
- Emergency outages shall be allowed subject to system conditions and its severity. In this case, if required, planned outage may be deferred, if possible.
- Emergency outages shall be allowed immediately or within the short possible time, based on the severity of the emergency and system condition on instance-to-instance basis.

- While issuing clearance of the shutdown ERLDC shall clearly mention the following (**vide format at Annexure 3**):
  - Date and Serial Number
  - Name of the element /elements which shall remain under outage.
  - Name of the agency /agencies availing the outage.
  - Date and duration of the outage
  - Nature of the outage
  - Reason for availing the shutdown
  - Specific network /system conditions to be maintained including impact of the outage
  - Sequence of switching instruction if any.

1.8.4 Consenting and approving agencies for various types of outages:

S No	Type of Outage	Consenting Load Despatch Centre	Approving Load Despatch Centre
1	765 kV or above Lines	Concerned RLDCs	NLDC
2	Inter-Regional Lines	Concerned RLDCs	NLDC
3	HVDCs	Concerned RLDCs	NLDC
4	International Interconnections	Concerned RLDCs	NLDC
5	Intra-Regional Lines affecting transfer capability of any inter regional corridor	Concerned RLDCs	NLDC
6	Intra-Regional Lines which does not affect transfer capability of any inter regional corridor and included in the list of	SLDCs	RLDCs

	important elements of RLDCs (excluding lines covered under S No.1,3,4 and 5)		
7	All other lines (excluding S No. 1,2,3,4,5,6)	SLDCs	SLDC
8	Lines having impact on major generating station(having major shareholders in other regions) and chicken neck area	NLDC	RLDCs

- Where approving authority is SLDC then SLDC shall study the impact of proposed outages on the system and approve the outage latest by 12:00 Hrs of D-1 day. A copy of the approval / refusal list shall also be sent to RLDC through E-mail.

- In case, any approved outage is not availed/ not allowed in real time for a valid reason like bad weather, transmission constraint etc. In such a scenario, indenting agency may have option to reschedule the same within calendar month.

1.9 Restoration of Outages

- All effort shall be made by the Indenting agency to normalise the shut down within approved time period so that the transmission element is normalised within the approved time period.
- On completion of the outage work, the outage availing agency shall seek the code for normalisation of elements from ERLDC.
- While returning the shutdown of any transmission element, availing agency will intimate ERLDC regarding healthiness of the element to be charged with its all-associated bays. In case of outage any associated bays of the element, same shall be intimated to ERLDC.
- While applying outage of a transmission element where two end point of that element Is connected with two generating stations, ERLDC will coordinate with the concerned utilities to charge the line as per the procedure approved in ERPC Forum (**150th OCC, Refer Section 6.12**).

- The agencies involved shall endeavour to normalise the outage within 15 minutes of availing the code but not later than 60 minutes. In case, due to any contingency, the normalisation could not be done within 60 minutes, a fresh code needs to be obtained by all concerned agencies stating the reason thereof.
- In case of extension of a shutdown, the Indenting agency would furnish the reasons of extension, and expected normalisation time to ERLDC/SLDC at least two and half hours before the scheduled normalisation time to take care of any change in schedule.
- In case shutdown is extended beyond scheduled period by more than one day, then utility should approach for ERPC consent/approval with proper reason and justification of delay to SLDC/ERLDC/NLDC as the case may be with a copy to ERPC. SLDC/ERLDC/NLDC would take appropriate decision considering the grid situation.
- Under such circumstances SLDCs/ ERLDC/NLDC shall review the impact of such delay on the shutdown already approved transmission system and would reserve the right to review for according/cancellation of the shutdown.
- In case of repeated delay in normalisation of outages by any agency, the same shall be reported by SLDCs/ERLDC/NLDC to ERPC.

ANNEXURE 1: CRITERIA FOR IMPORTANT GRID ELEMENTS OF EASTERN REGION

Important Grid Elements of Eastern regional Grid has been issued in compliance with IEGC 29.2 (b).

1. The criterion that has been adopted for including a transmission line in this list is as follows:
   a) All HVDC Transmission elements including Poles & Back-to-back Blocks.
   b) All Transmission Lines, Bays, Buses, Bus Reactors, Line Reactors, Transformers, TCSC, FSC, Filter Banks and STATCOM connected at 400 kV and above voltage level.
   c) All Transmission Lines, Bays, Buses, Bus Reactors, Line Reactors, Transformers, TCSC, FSC, Filter Banks and STATCOM owned by ISTS Licensees, Central Sector Generating Stations, ISGS and Generating Stations whose dispatch schedules are being done by ERLDC
   d) All Transmission Lines, Bays, Buses, Bus Reactors, Line Reactors and Transformers connected to ISTS Licensees, Central Sector Generating Stations, ISGS and Generating Stations whose dispatch schedules are being done by ERLDC
   e) All Transmission Lines, Bays, Buses, Bus Reactors, Line Reactors and Transformers at 400 kV and above voltage level in state control areas (SLDC jurisdiction).
   f) All Transmission elements from the territory of one State control area to other state control areas.
   g) All Transmission elements affecting system security or forming part of Islanding Scheme.
   h) 220 kV Transmission elements feeding loads of a strategic/sensitive nature
   i) All cross-border AC and DC transmission elements

2. The transmission lines in the above context means a grid element from bus-bar to bus bar and includes all equipment such as associated circuit breakers, Line reactors , isolators, CVT's , CT's, LAs etc.

3. The criteria that have been adopted for including a generating unit is as follows:
   a) All Regional entities
   b) All thermal units of 200 MW and above
   c) All Hydro units of 25 MW and above

4. **Format – IA: PROPOSAL OF TRANSMISSION ELEMENT OUTAGES OF XXXXXXXX PROPOSED IN OCC MEETING OF ERPC FOR MONTH OF XXXXXX AND SEEKING RPC APPROVAL**

PROPOSAL OF TRANSMISSION ELEMENT OUTAGES OF XXXXXXXX PROPOSED IN OCC MEETING OF ERPC FOR MONTH OF XXXXXX AND SEEKING RPC APPROVAL

SL.NO.	NAME OF THE ELEMENTS	FROM		TO		REMARKS (DDB/OCB)			Remarks
		DATE	TIME	DATE	TIME		S/D TO BE AVAILED BY	REASON OF OUTAGE	

Format – IB: PROPOSAL OF TRANSMISSION ELEMENT OUTAGES OF XXXXXXXX PROPOSED IN OCC MEETING FOR MONTH OF XXXXXX

Sr. No.	Name of Requesting Agency	Element Name	Element Type	Daily/ Continuous	Reason	Requested From Date	Requested From Time	Requested To Date	Requested To Time	Requester Remarks	No. of Days	Consent	Remarks

In view of the network security ERLDC will also consider the following criteria for important grid element, inline with the IEGC and CEA grid standards operation liaison

1. Switching operation for all 400 kV and above elements and tie lines can be performed only after obtaining operating code from ERLDC.

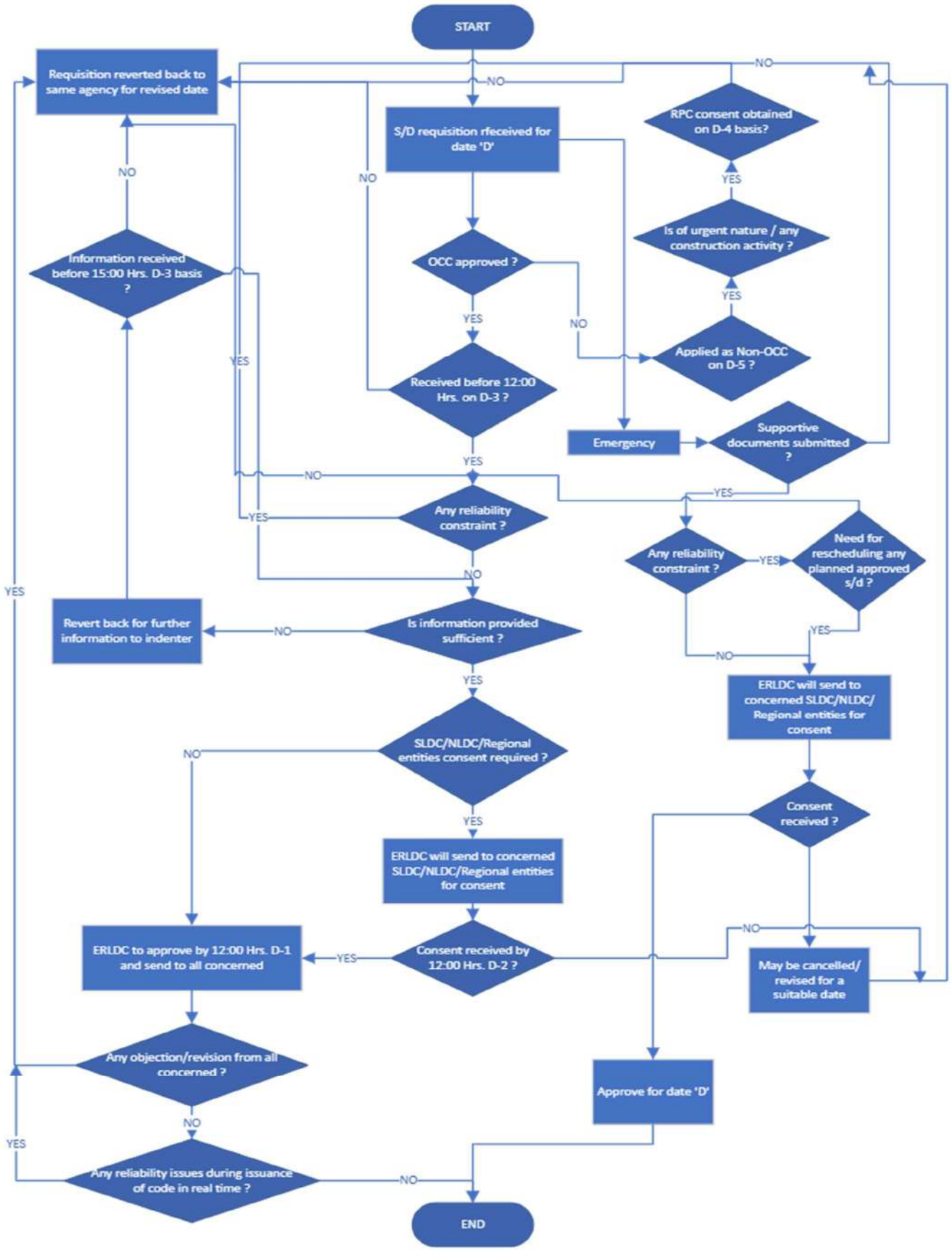
2. Before performing any operation (including switching in and switching out) by any of the USER, which would have an impact on the security and reliability of the regional grid, the same shall be intimated to ERLDC by the USER along with the likely time and status of normalization. SLDC should intimate such operation by any of their state control areas entities to ERLDC.

3. In respect of two main and transfer bus switching scheme at 400 kV substations, ERLDC shall be informed whenever the 400 kV transfer breakers at any substation is utilized for switching any line/ICT.

4. In respect of 765/400kV substation/Power station switchyard having breaker and a half switching scheme, outage within the substation (say main or tie circuit breaker) not affecting power flow on any line/ICT can be availed by the constituents only after obtaining code from ERLDC. However, while availing such shutdowns or carrying out switching operations it must be ensured by the substation that at least two Dias are complete even after such outage from the viewpoint of network reliability. Any outage not fulfilling the above condition needs the approval of ERLDC.

5. Transmission elements/bays/buses commissioned after finalization of this documents and falls under above criteria will be under purview of important regional grid elements

ANNEXURE 2: SHUTDOWN PROCEDURE, TIMELINE AND FLOWCHART



ANNEXURE 3: FORMAT FOR MESSAGE TO BE ISSUED BY ERLDC FOR PLANNED OUTAGE CLEARANCE

पावर िस टम ऑपरेशन िनगम िलिमटेड पूव े ीय भार ेषण क कोलकाता- 700033

संदेश सं"या: ERLDC/ddmmyy/Rev-

Date :

ेषक : पारी भारी बंधक , पूव े ीय भार ेषण क , कोलकात

SUB: SHUTDOWN CLEARANCE

The following shutdown may be availed

	Element Name	Requesting Agency	Consenting Agency	Nature	Type	From		To	
						Date	Time	Date	Time
1									
	Reason								
	Condition								
2									
	Reason								
	Condition								
3									
	Reason								
	Condition								

Notes : 1)
2)
3)
4)

पारी भारी बंधक

Format V: Monthly Shutdown Report for Transmission Elements by RLDCs

Sl. No.	Name of Constituent	No. of outages planned in OCC	No. of planned outages in Post OCC	Total planned outages	Number of final outages approved	Number of actual outages availed	Availed vs Planned (%)	Availed V sApproved (%)
		(a)	(b)	(c) = (a+b)	(d)	(e)	(f) = (e/c)	(g) = (e/d)
1	Constituent-1							
2	Constituent-2							
3								
4								
. . .								
	XXX Region							

Annexure D.1

Anticipated Peak Demand (in MW) of ER & its constituents for December 2023

1	**BIHAR**	**Demand (MW)**	**Energy Requirement (MU)**
	NET MAX DEMAND	5864	3175
	NET POWER AVAILABILITY- Own Sources	613	372
	Central Sector+Bi-Lateral	6095	3738
	SURPLUS(+)/DEFICIT(-)	845	935
2	**JHARKHAND**		
	NET MAXIMUM DEMAND	1960	1129
	NET POWER AVAILABILITY- Own Source	430	189
	Central Sector+Bi-Lateral+IPP	772	540
	SURPLUS(+)/DEFICIT(-)	-948	-400
3	**DVC**		
	NET MAXIMUM DEMAND	3260	2156
	NET POWER AVAILABILITY- Own Source	5627	3308
	Central Sector+MPL	283	151
	Bi- lateral export by DVC	1874	1221
	SURPLUS(+)/DEFICIT(-) AFTER EXPORT	775	81
4	**ODISHA**		
	NET MAXIMUM DEMAND (OWN)	5200	3001
	NET MAXIMUM DEMAND (In Case of CPP Drawal)	5200	2897
	NET POWER AVAILABILITY- Own Source	3158	2086
	Central Sector	1484	935
	SURPLUS(+)/DEFICIT(-) (OWN)	-557	20
	SURPLUS(+)/DEFICIT(-) (In Case, 600 MW CPP Drawal)	-557	124
5	**WEST BENGAL**		
	WBSEDCL		
5.1	NET MAXIMUM DEMAND	5810	3260
	NET MAXIMUM DEMAND (Incl. Sikkim)	5815	3264
	NET POWER AVAILABILITY- Own Source (Incl. DPL)	5302	2686
	Central Sector+Bi-lateral+IPP&CPP+TLDP	2248	1155
	EXPORT (To SIKKIM)	5	4
	SURPLUS(+)/DEFICIT(-) AFTER EXPORT	1735	577
5.2	**CESC**		
	NET MAXIMUM DEMAND	1450	695
	NET POWER AVAILABILITY- Own Source	460	312
	IMPORT FROM HEL	540	313
	TOTAL AVAILABILITY OF CESC	1000	625
	DEFICIT(-) for Import	450	-70
			-70
	WEST BENGAL (WBSEDCL+CESC+IPCL)		
	(excluding DVC's supply to WBSEDCL's command area)		
	NET MAXIMUM DEMAND	7260	3955
	NET POWER AVAILABILITY- Own Source	5762	2998
	CS SHARE+BILATERAL+IPP/CPP+TLDP+HEL	2788	1468
	SURPLUS(+)/DEFICIT(-) BEFORE WBSEDCL'S EXPORT	1290	511
	SURPLUS(+)/DEFICIT(-) AFTER WBSEDCL'S EXPORT	1285	507
6	**SIKKIM**		
	NET MAXIMUM DEMAND	127	64
	NET POWER AVAILABILITY- Own Source	2	1
	Central Sector	77	19
	SURPLUS(+)/DEFICIT(-)	-48	-44
	EASTERN REGION		
	NET MAXIMUM DEMAND	23207	13480
	NET MAXIMUM DEMAND (In Case of CPP Drawal of Odisha)	23207	13376
	BILATERAL EXPORT BY DVC (Incl. Bangladesh)	1874	1221
	EXPORT BY WBSEDCL TO SIKKIM	5	4
	EXPORT TO B'DESH & NEPAL OTHER THAN DVC	642	478
	NET TOTAL POWER AVAILABILITY OF ER	25218	14583
	(INCLUDING CS ALLOCATION +BILATERAL+IPP/CPP+HEL)		
	SURPLUS(+)/DEFICIT(-)	2006	1099
	SURPLUS(+)/DEFICIT(-) (In Case, 600 MW CPP Drawal of Odisha)	2006	1203