सत्यमेव जयते

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
उत्तर क्षेत्रीय विद्युत समिति
Northern Regional Power Committee

दिनांक: 15.07.2025

सेवा में/ To,

संलग्न सूची के अनुसार/As per list attached

विषय: दूरसंचार, स्काडा और टेलीमेटरी उपसमिति की 28 वीं बैठक।
Subject: 28th meeting of Telecommunication, SCADA & Telemetry Sub Committee.

इस कार्यालय के पत्र दिनांक **20.03.2025** के क्रम करते हुए यह सूचित किया जाता है कि उत्तर क्षेत्रीय विद्युत समिति की दूरसंचार, स्काडा और टेलीमेटरी (टेस्ट) उप-समिति की **28 वीं बैठक दिनांक 23.07.2025 को 11:00 बजे सम्मेलन कक्ष, एन.आर.पी.सी, नई दिल्ली** में आयोजित की जाएगी। बैठक की कार्यसूची आपकी सूचना एवं आवश्यक कार्यवाही हेतु संलग्न है।

In continuation to NRPC letter dated 20.03.2025, it is to be intimated that the 28th meeting of Telecommunication, SCADA & Telemetry (TeST) Sub-committee of NRPC will be **held at Conference Room in NRPC, New Delhi on 23.07.2025 at 11:00 AM**. The agenda for the meeting is enclosed herewith for your information and necessary action.

अनुलग्नक– यथोपरि।

भवदीय,

Signed by Anzum Parwej
Date: 15-07-2025 11:03:30

(अंजुम परवेज)
अधीक्षण अभियंता

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28th Telecommunication, SCADA & Telemetry (TeST) Sub-Committee Meeting of NRPC
Agenda

1. Confirmation of Minutes

The minutes of 27th meeting of TeST sub-committee held on 21st April, 2025 were issued on 22.05.2025. Minutes are available at NRPC website (http://164.100.60.165).

No comments have been received till date.

Members may kindly confirm the minutes.

2. J&K Telemetry Issues (Agenda by NRLDC)

2.1. Reliability and accuracy of SCADA data and its associated communication system is essential for monitoring and coordinating operations of a large electricity grid. It helps in visualization and management of the critical grid element failure/grid incident in real time and minimizes the possibility of any untoward incidences/disturbances.

2.2. Real-Time data availability from Jammu and Kashmir is very poor. There is zero visibility of data in J&K stations at J&K and NRLDC. With poor monitoring of data, it is very difficult to monitor grid in efficient manner.

2.3. The matter has been discussed in various TCC and TeST Meetings but there is no improvement of the same.

2.4. Brief details are as follows:

i. Under SCADA upgrade project M/s Siemens at all 400KV / 220 KV and 132 KV sub-stations/generating Stations of J&K PDD installed 66 RTUs.

ii. RTUs were not integrated with Control centre due to non-availability of communication network.

iii. RTUs were tested locally and commissioned without data availability at Control Centre.

iv. **Due to non-availability of data, JK PDD is not able to monitor its drawal from grid and its generation.** It is dependent of Central sector data for monitoring of drawal.

2.5. Matter was also discussed in Special Meeting with J&K on 28.07.2020 where in Representative of J&K informed that they have given consultancy work to POWERGRID for installation of OPGW in J&K. However, due to funding issue OPGW work has been stalled by POWERGRID. According to J&K almost 95% of the work is complete and once funding issue is resolved non-availability of telemetry issue will be resolved.

2.6. Further, it was informed that payment issues were resolved and many communication links were commissioned and pending link would be commissioned by December 2022.

2.7. Matter was also discussed in 47th TCC-49th NRPC Meeting, J&K confirmed that they will resolve the issues mutually with POWERGRID so that data starts reporting to SLDC/ NRLDC.

2.8. During 19th TeST Meeting dated 07.03.2022, J & K representative informed that by 31st December 2022 all 70 RTUs will be integrated with SLDC.

2.9. During 20th TeST Meeting held on 09.09.2022 it was discussed that J&K informed that although some of the links have been commissioned but data reporting is yet to start due to disconnection of CT/PT cables at site / other integration issues of the RTU. Further it was informed that they are in process of rectification of RTU issues and joint visit is planned with M/s Siemens.

2.10. During 64th NRPC Meeting held on 24th March 2023 it was informed that joint visit could not be conducted and after discussions it was decided that a joint meeting shall be conducted comprising members from Siemens, POWERGRID, J&K and NRLDC to resolve the RTU integration issues.

2.11. During 68th NRPC Meeting held on 18th Aug 2023 Representative from J&K informed that there is no improvement in regard to telemetry and they are taking up with POWERGRID and Siemens.

2.12. Issue was also discussed in 23rd TeST Meeting on 21st Sep 2023 and Special Meeting with J&K on 12th Oct 2023 where in J&K confirmed they will start the process of RTU integration with the support of Vendor. However, till date there is no improvement in data reporting from J&K Sub-stations.

2.13. Issue was also discussed in 24th TeST Meeting on 09th Feb 2024.

2.14. Further Issues was discussed in 50th TCC- 74th NRPC held on 28th/29th June 2024 where J&K representative informed that they are in discussion with OEM i.e. M/s Siemens for integration of RTUs. Further, they are arranging fund of approx. 34crore, so that communication links can be commissioned.

2.15. Issue was also discussed in 26th TeST Meeting on 19th Nov 2024.

2.16. During 77th TCC meeting held on 27.12.2024, POWERGRID representative informed the forum that under the PMRP-2004 scheme for the PDD, J&K, the plan included commissioning 76 RTUs and laying 1,781 km of OPGW. As of 2024, 1,280 km of OPGW has been laid, and 41 RTUs have been commissioned. However, no funds have been disbursed by J&K since September 2022, despite multiple meetings, including the most recent one on 31.05.2024 with the Secretary of Power, J&K Government. Consequently, the work has stalled due to the non-payment of funds. POWERGRID's last demand for ₹34 crores, raised in September 2022, remains unpaid. The representative further stated that under the ULDC Phase-3 scheme, 76 RTUs in J&K are to be replaced, which will address both the commissioned and uncommissioned RTUs from the earlier scheme. However, an additional 501 km of OPGW still needs to be laid, for which funds from J&K are essential.

2.17. During J&K Special meeting held on 06.02.2025, representative from JKPTCL informed the Ministry of Power (MoP) sanctioned funds for J&K on January 9, 2025. The POWERGRID representative stated that 501 km of pending OPGW work would commence upon receipt of payment from J&K. Additionally, 76 RTUs (commissioned and un-commissioned) are to be replaced. POWERGRID formally communicated this

to J&K through a letter dated January 15, 2025, urging immediate payment to start the work. It was emphasized that RTU commissioning and OPGW laying must be synchronized to meet ULDC Phase-3 timelines. Concern was also raised over TOC approvals, as seven TOCs from Jammu have been pending since June 2024, while Kashmir's TOCs have been received.

2.18. In 27th TeST meeting, NRLDC representative pointed out the ongoing issue of telemetry data not being available from J&K stations and requested the concerned authorities to kindly expedite the integration of RTUs at SLDCs. It was also noted that representatives from J&K were not present during the meeting. The Member Secretary, NRPC, expressed concern regarding the continued unavailability of the data and emphasized the importance of resolving the issue at the earliest.

J&K/POWERGRID to update the status.

3. Redundant RTU Communication for Main / Backup RLDC (Agenda by NRLDC)

3.1. Presently SCADA data channels are reporting in main and backup mode (1+1) with 1 main channel to RLDC and 1 backup channel to Backup RLDC. As deliberated in the meetings held among POWERGRID, Grid-India, CTU and CEA dated 09.05.2023 and 27.06.2023, it has been finalized that to increase the redundancy in the system, 2 main and 2 backup channels should report to RLDCs as well as back up RLDCs considering the criticality of real time grid operations by the RLDCs.

3.2. It may also be mentioned that CERC has issued Guidelines on "Interface Requirements" under the CERC (Communication System for inter-State transmission of Electricity) Regulations, 2017: "The interfaces shall be designed to operate under single contingency failure condition. Equipment should support interfaces with multiple ports, cards, gateways etc. and configured in redundant mode so that failure of single hardware element, i.e. communication port, card, gateway etc. of the users shall not lead to failure of data communication."

3.3. For new ISTS stations, CTU is already including this requirement in the RfP inputs for TBCB projects. For existing ISTS sub stations, requirement for additional ethernet ports in RTU/SAS and FOTE were deliberated in various meetings. POWERGRID has provided the region wise data of additional requirement for equipment/port etc in respective SAS Gateway/RTU along with cost estimate for the implementation of dual redundancy to RLDCs & Backup RLDCs. Scheme for requirement of additional FOTE/ cards for dual redundancy in the existing POWERGRID stations has already been reviewed in 69th, 70th, 71st NRPC meetings and approved in 19th NCT meeting.

3.4. This scheme was also deliberated in the 72nd NRPC for northern region, where forum has the view that a comprehensive scheme shall be prepared considering the Private TSPs also.

3.5. Issue was also discussed in 25th TeST Meeting held on 25.06.2024, during discussion it was finalised that CTUIL shall internally finalize the draft scheme and take up in the next TeST meeting for deliberations.

3.6. Issue was also discussed in 26th TeST Meeting held on 19th Nov 2024, where it was decided that matter would be discussed with CEA as similar proposal for funding of firewall installation at Sub-station is in progress. CTU also clarified that, as CTU typically does not form element level schemes, SAS upgrades for RTM sub-stations could be carried out under Add Cap, while upgrades for TBCB sub-stations may fall under the Change in Law provision

3.7. Matter was also discussed during the 27th TeST Meeting wherein, it was decided that sub-committee will decide on the matter considering decision taken by NPC in 16th NPC meeting on cost-recovery mechanism of new Firewall (NGFW) at existing 273 nos. substations.

Members may please review and provide their observations on the agenda.

4. Display of DC/Schedule of Generating Stations in SCADA Display (Agenda by NRLDC)

4.1. In high-demand period there is requirement of monitoring Declared Capacity & Schedule of all Generating Stations so that reserves can be monitored for real-time grid operation. Schedule & DC of Central sector is being integrated with NRLDC SCADA system and same is being monitored by Control Room.

4.2. However, DC & Schedule of Punjab, Haryana Uttarakhand and J&K State generator is not integrated with their SCADA system. It was requested that all states take up for integration of state generator in their SCADA system for further integration with NRLDC.

4.3. Issue was discussed in 23rd TeST Meeting held on 21.09.2023 & 24th Test Meeting held on 09.02.2024. Present Integration from J&K, Uttarakhand and Rajasthan is still pending. Considering high-demand crunch period, it is very critical to monitor all the generators and corresponding reserves. In this regard, it is requested to please take for integration of Schedule / DC of generators in SCADA.

4.4. Issue was also discussed in 73rd NRPC Meeting held on 21.05.2024 where Rajasthan SLDC representative stated that the work is being carried out in association with L&T and would be completed within next one-two week. Uttarakhand SLDC representative stated that DC declaration portal is under M/S Secure and SCADA system under M/S GE compatibility issues are being noticed. The work would possibly be completed after SCADA upgradation system. NRLDC requested Uttarakhand SLDC to take up the matter with Secure and GE and resolve the issue.

4.5. Issue was also discussed in 25th TeST Meeting and 50th TCC- 74th NRPC Meetings. After discussion timelines shared by states.

4.6. Issue was also discussed in 26th TeST Meeting held on 19th Nov 2024 and after discussion timelines shared by states is as below:

Sl. No.	State	Status	Timelines
1	Punjab	NHPC	Script Automation shall be done in months' time
2	Haryana	NHPC	They will integrate schedule through SAMAST within 2 months.

3	Uttarakhand	NHPC	Integration work is in process, considering Cyber security requirement procurement of firewall is in process will be done in 3 months' time
4	Jammu & Kashmir	NHPC	J &K will discuss and revert

4.7. Matter was discussed during the 27th TeST Meeting held, the representative from Punjab informed that the automation will be carried out shortly. Representatives from Haryana and J&K were not present in the meeting. The representative from Uttarakhand mentioned that the integration is expected to be completed within the next two months.

All concerned are requested to update the status please.

5. Non-availability of Real-Time data from PTCUL (Agenda by NRLDC)

5.1. As per details submitted by PTCUL out of 58 Sub-Station/Generating Stations data from only 26 Sub-stations are integrated at SLDC.

5.2. The same issue was also informed to PTCUL vide letter (Ref: - NRLDC/SLII/2019-20) dated: - 05.03.2020 38.3. Issue was discussed in Special Meeting with PTCUL held in July 2020 and December 2020. Subsequently issue was also discussed in 17th, 18th & 19th Test Meeting and 45th TCC-48th NRPC and 47th TCC-49th NRPC, 64th NRPC.

5.3. During 47th TCC -49th NRPC dated 27.12.2021, representative from PTCUL informed that they are in the process of tendering of RTU and OPGW Installation work and informed that they would expedite the installation works and is expected to be completed in 6 months.

5.4. During 52nd NRPC Meeting dated 31.12.2022 NRPC Meeting PTCUL informed that PTCUL representative informed that they are on the verge of finalizing the OPGW project and order will be placed in one-month duration. Tender has been floated for RTU.

5.5. During 22nd TeST Meeting representative from PTCUL informed that last tender was cancelled due to higher rates then estimate; there was approximate 39% more than estimate. Further, it was informed that they have prepared fresh DPR for RTU & OPGW installation and they would submit the proposal within next 7-10 days. After approval, PTCUL will initiate tendering process and try to expedite the work.

5.6. It may be noted that SCADA upgradation project is also in progress, PTCUL is requested to please match the timelines with SCADA project, so that RTU can be integrated along with new SCADA commissioned.

5.7. During 25th TeST Meeting, representative from PTCUL informed that the project is stuck due to non-availability of funding from PSDF. After detailed discussion forum suggested PTCUL to explore alternate arrangements for project funding such as its own funds or state PSDF and complete RTU /OPGW procurement.

5.8. Matter was discussed in 26th TeST Meeting & After detailed discussion forum suggested PTCUL to explore alternative funding mechanisms, including utilizing State

PSDF or their own funds, to ensure the timely execution of the project. PTCUL agreed to the suggestion and confirmed that they would resubmit the proposal for approval by their management.

5.9. During 27th TeST Meeting, the representative from PTCUL informed that, in addition to seeking PSDF funding, they will also explore alternative funding options. They further mentioned that a proposal will be submitted for approval by their management to ensure timely execution of the project.

PTCUL to please update the status.

6. Non-Reliable Telemetry from RRVPN Sub-stations (Agenda by NRLDC)

6.1. Telemetry is not available from many RRVPNL substations, RRVPNL/NRLDC control room engineers take the decisions based on real-time SCADA data available to Control room. Hence, good quality SCADA input data of all the grid substations/generators is prerequisite for all time monitoring & Control of integrated grid. Unavailability of data may have far-reaching implications for decision-making processes during real time grid operation

6.2. Further, it has impact on successful running of state estimator. Correct telemetry is essential for running State Estimator/ Contingency Analysis in EMS, Better SE output will aid in situational awareness of the system operators of NRLDC.

6.3. RRVPNL/Rajasthan SLDC is requested to please take up for resolution of the issue at the earliest.

6.4. Matter was also discussed in 24th TeST Meeting held on 09th Feb 2024, where representative from Rajasthan SLDC informed that they have already taken up with matter with STU. However, resolution is still pending from STU.

6.5. Further issue was discussed in 50th TCC /74th NRPC held in Raipur on 29th-30th June 2024. During the meeting RRVPNL informed the following:

i. Estimate of upgradation 22 SAS stations (2 no.- 765kV, 8 no.- 400kV, 5 no- 220 kV, 7 no. 132kV) is finalised and it is expected that NIT shall be floated by August 2024.

ii. Further, they are in the process of replacement of 132 number of obsolete RTUs and estimate has been finalized, and its NIT is also likely to floated by August 2024.

6.6. Matter was also discussed in 26th TeST Meeting held on 19th Nov 2024, where Representative from RRVPNL informed that there was delay in tendering due to some approval. However, they confirmed that tendering for RTU/SAS upgradation would be carried out by December 2024.

6.7. During 27th TeST Meeting, the representative from RRVPN informed that the approval for 22 SAS has been obtained, and the tender document for the replacement of 132 obsolete RTUs is currently under the approval process.

RRVPNL may update the status.

7. Non-availability of Telemetry from HVPNL Sub-stations (Agenda by NRLDC)

7.1. Telemetry is not available from many HVPNL substations (including 400kV also), HVPNL/NRLDC control room engineers take the decisions based on real-time SCADA data available to Control room. Therefore, for continuous monitoring and control of the integrated grid, good-quality SCADA input data from all grid substations and generators is required. Unavailability of data may have far-reaching implications for decision-making processes during real time grid operation

7.2. Further, it has impact on successful running of state estimator. Correct telemetry is essential for running State Estimator/ Contingency Analysis in EMS, Better SE output will aid in situational awareness of the system operators of NRLDC.

7.3. Most importantly, telemetry of many substations isn't available, **which serves as Drawl point for other end Drawl calculations.**

7.4. Matter was discussed during the 27th TeST Meeting, where Representative from NRLDC informed about non-availability of telemetry data from HVPNL stations and requested concerned to expedite the process for integration of RTUs at SLDCs. Representatives from HVPNL were not available in the meeting. Member Secretary NRPC expressed serious concern regarding non-availability of data.

HVPNL may update the status.

8. Communication channel redundancy/ Telemetry Issues to NRLDC (Agenda by NRLDC)

8.1. The provision of redundant & reliable communication was discussed in various TeST Meetings. Redundant communication is to ensure that at least two ports at RTU end are configured for RLDC. Also, data is configured with two different communication channels for bringing redundancy into the system and increase reliability of data to NRLDC/RLDC.

8.2. The reliability of communication channel to NRLDC was discussed in various TeST Meeting since November 2016 (8th TeST Meeting).

8.3. It is to inform that many RTUs are still reporting to NRLDC on single channel. It is to note that stations where second is down since long is considered as single channel only. Thus, it is requested that reliability of redundant channel may also be ensured.

8.4. List of RTUs with single channel is given below:

Sl. No.	Name of RTU	Owner	Remarks
1	DHAULIGANGA	NHPC	
2	KISHANGANGA	NHPC	
3	PARBATI-2	NHPC	
4	PARBATI-3	NHPC	
5	SEWA-2	NHPC	
6	SALAL	NHPC	Create loop in communication system
7	URI-2	NHPC	
8	BUDHIL	IPP	
9	KARCHAM WANGTOO	IPP	
10	AD Hydro	AD Hydro	
11	Bhiwadi HVDC	POWERGRID	Second gateway Faulty
12	KalaAmb	POWERGRID	
13	CHAMBA	POWERGRID	
14	Lucknow 400	POWERGRID	Wrong analog data
15	KOTPUTLI	POWERGRID	
16	SOHAWAL	POWERGRID	
17	SAHAJAHANPUR	POWERGRID	
18	PATIALA	POWERGRID	Second gateway Faulty
19	Raibareilly	POWERGRID	
20	Fatehabad	POWERGRID	
21	Jhajjar	IPP	Communication link issue (Jhajjar to Hisar)
22	Prithla	Indigrid	Second gateway Faulty
23	SINGRAULI	NTPC	Main Gateway issue

8.5. It is requested to please take up for rectification of data on priority basis and confirm the dates of resolution of the points.

8.6. During the 27th TeST Meeting, Representatives from various entities provided updates on the status of the RTUs and following are still pending.

Sl. No.	Name of RTU	Owner	Remarks/Updates
1	KISHANGANGA	NHPC	NHPC will check
2	PARBATI-2	NHPC	OPGW cable to be layed by INDIGRID by Aug'25.
3	PARBATI-3	NHPC	OPGW cable to be layed by INDIGRID by Aug'25.
4	SALAL	NHPC	Create loop in communication system
5	URI-2	NHPC	Needed to be Address
6	BUDHIL	IPP	Informed to GreenCO
7	AD Hydro	AD Hydro	Informed to AD hydro
8	Bhiwadi HVDC	POWERGRID	Second gateway Faulty-Upgradation Required
9	CHAMBA	POWERGRID	Communication Equipment issue
10	Lucknow 400	POWERGRID	Wrong analog data
11	Raibareilly	POWERGRID	Converter issue at site end

12	Fatehabad	POWERGRID	Rectified
13	Jhajjar	IPP	Communication link issue (Jhajjar to Hisar)
14	Kankroli	POWERGRID	Main gateway Faulty
15	Shree Cement	Shree Cement	Standby link/Gateway Faulty
16	Chamera 3	NHPC	Available through main only

Concerned Utilities may update the status.

9. Requirement for Additional VOIP SIP Numbers (Agenda by NRLDC)

9.1. The existing SIP numbers at NRLDC have been fully utilized, making it impossible to configure any new substations or plants.

9.2. We request POWERGRID to coordinate with M/s Orange for the allocation of additional SIP extension numbers to ensure seamless VOIP communication.

9.3. During 27th TeST meeting, the representative from POWERGRID informed that the RRVPN Orange Exchange will be utilized, which was also confirmed by the RRVPN representative.

9.4. A configuration issue persists in integrating the SIP number via the SLDC Rajasthan Orange server. It is requested to escalate the matter to M/s Orange for necessary rectification

POWERGRID to please update the status.

10. Use of trusted products from trusted sources for procurement of IT equipment and services in power sector (Agenda by NRLDC)

10.1. An office memorandum with ref. F. No. 1/45/2021/IT&CS (P-258739) dated 05-Jun-2025 has been issued by Ministry of Power for usage of Trusted Products from Trusted Sources for procurement of IT equipment and services in power sector.

10.2. National Security Council Secretariat (NSCS) of the Government of India has set up a Trusted Telecom Portal for ensuring only trusted telecom equipment are being used by the Telecom/Internet Service Providers in India from trusted sources. NSCS has allowed access of Trusted Telecom Portal by Ministry of Power and the power sector entities.

10.3. Accordingly, all IT equipment and services utilized in the power sector should be cleared through the Trusted Telecom Portal before the supply of equipment starting 01-Jan-2025. The list of IT equipment and services mandated to be cleared through the portal shall be notified in due course. It has not been mandated to replace any existing ICT equipment. Furthermore, it will not impact ongoing Annual Maintenance Contracts (AMCs) or updates pertaining to equipment already in service.

10.4. MoP will establish a Coordination Cell, which will liaise with the designated nodal officers, duly authorized by the heads of the power sector entities, to ensure the effective and seamless implementation of the process.

10.5. In 5th GO-NR-CSCF meeting held on 20-Jun-2025, the matter was discussed and deliberated. Forum requested CERT-GO secretariat and NRLDC to inform the developments in formation of coordination cell, designating nodal officers, etc. with the SLDCs.

For information of forum.

11. Compliance of Workforce Adequacy Guidelines by States/UTs (Agenda by NRLDC)

11.1. The "Workforce Adequacy Guidelines for Load Despatch Centres" was circulated by Ministry of Power, GoI on 30-Oct-2024 for compliance by States/UTs.

11.2. Further for enabling effective implementation of these guidelines, the Monitoring Committee of PSDF, in its 24th meeting held on 18-Feb-2025 has resolved to link the sanction of new proposal from SLDCs/STUs under PSDF with the implementation of these guidelines w.e.f. 01-Apr-2025. The same had been conveyed by Secretary-Power vide letter ref. 22-1306/4/2022-OM dated 13-Mar-2025. The following major points have been decided by Monitoring Committee of PSDF –

i. All SLDCs shall be required to submit details of nod. Of sanctioned posts and current manpower deployed at their respective centres to NLDC. This will provide a baseline understanding of the existing workforce at SLDCs.

ii. SLDCs shall be asked to submit a plan outlining the steps to address gaps between the existing workforce and the staffing levels recommended in the "Workforce Adequacy Guidelines". This plan should include a timeline of 2 to 3 years, with clearly defined milestones every 6 months to track the progress. This structured approach will ensure that SLDCs can gradually build up the required workforce to meet the guidelines.

iii. The new projects received which are falling under the categories of 5.1 (b), (c), (e) and (f) of the "Guidelines/Procedure for disbursement of funds from Power System Development Fund (PSDF)" shall be linked to the deployment of the manpower in SLDCs. These measures will be applicable from 01-Apr-2025 onwards.

11.3. The categories under the PSDF guidelines/procedure referred above are as follows –

i. Installation of reactive energy generators for improvement of the voltage profile in the grid.

ii. Installation of standard and special protection schemes, pilot and demonstrative projects, any communication/ measurement/ monitoring scheme including installation of Phasor Measurement Units (PMUs), etc.

iii. Creating necessary support for integration of Renewable Energy (RE) like solar, wind, hybrid system and creation of adequate energy storage capacity.

iv. Any other scheme/ project in furtherance of the above objectives, such as, conducting technical studies and capacity building, etc.

For information of forum.

12. Network Operation Centre (NOC) at SLDCs (Agenda by NRLDC)

12.1. A meeting was held on 01st May 2025 at CSIRT-Power office to review the model BoQ for Indigenous Security Operations Centre (SOC) to be implemented under PSDF scheme along with inclusion of Network Operation Centre (NOC).

12.2. In the associated minutes of meeting released by CSIRT-Power vide letter dated 08-May-2025, it has been recorded that –

i. Information Technology (Information Security Practices and Procedures for Protected System) Rules, 2018 mandate setting up NOC and SOC for organizations having protected systems. The POWERGRID representative clarified that UNMS provides visibility only at the WAN level, whereas NOC provides deeper visibility till LAN. Therefore, deployment of NOC is necessary for comprehensive monitoring of the network. Representatives from NHPC, SECI, Distribution CERT, CERT-IN, NCIIPC, NTPC, POWERGRID and Grid-India endorsed the deployment of separate indigenous NOC.

ii. Updated BoQ of Indigenous SOC (incl. Indigenous NOC) projects at SLDCs was finalized.

12.3. In 5th GO-NR-CSCF meeting held on 20-Jun-2025, the matter was deliberated and SLDCs requested CERT-GO secretariat to prepare a draft template document of technical specifications for an indigenous solution and circulate among SLDCs/RLDCs as a reference.

12.4. Accordingly, the initial version of model template DPR of SOC/NOC project had been shared by CERT-GO secretariat with all SLDCs vide e-mail dated 30-Jun-2025; the same will be further modified and revised version will be shared tentatively within Jul'25.

For information of forum.

13. Replacement of obsolete communication equipments installed in various Substations of Northern Region to rectify and make operational the SPS-NR Scheme for Mundra-Mahendragarh Transmission System (Agenda by ATIL)

13.1. In the 226th OCC meeting (agenda no B.12), it was decided to check the healthiness of SPS of ±500 kV HVDC Mundra Mahendragarh Transmission system and ATIL was asked to coordinate with odal officers of various Substations to resolve the issues regarding the healthiness of SPS System. Accordingly, ATIL had placed order to M/S Comtel Networks Private Limited for a detailed survey of the communication system at various locations and identify the issues.

13.2. Engineers from M/S Comtel along with ATIL team had visited the respective Substations and had identified that most of the communication equipments have reached their End of life and are not revivable due to obsolescence (The same had been communicated by ATIL vide email dated 25.03.2025 as well as the status was apprised in the 59th and 60th PSC meeting. Basis the survey report, ATIL is asked the

commercial offer for the replacement of obsolete equipments, and M/S Comtel has submitted an estimate of Rs 2.0 crore.

13.3. Since the useful life of the communication system is already over and the system is now obsolete, it is requested to approve the above replacement of communication on Additional Capitalization basis.

13.4. The matter was discussed in the 232nd OCC of NRPC wherein it was asked to submit the agenda in the TeST meeting for approval. Accordingly, we request for approval of the replacement of communication equipments for the revival of SPS of ±500 kV HVDC Mundra Mahendragarh Transmission system on Additional Capitalization basis. Extracts of the minutes of 226th OCC meeting of NRPC, extracts of the minutes of 59th PSC meeting of NRPC, Email from ATIL regarding replacement of Communication equipments, Observation report of M/S Comtel are attached as **Annexure-I** respectively.

Members may deliberate

14. Non- Installation of OPGW on LILO Portion of 400kV Koldam-Ludhiana Line at Ropar by M/S Indigrid (agenda by PSTCL)

14.1. As per the decision in 57th NRPC Meeting Agenda A.4(**Annexure-II)**, it was decided to install OPGW cable on existing ISTS lines including the 400kV Koldam—Ludhiana (150 km) line which was to be LILOed at Ropar substation. The forum approved the CTU's proposal for providing fibre connectivity to PSTCL substations including Ropar and it was agreed that Punjab (PSTCL) would bear the cost of OPGW installation to the concerned parties i.e., POWERGRID/ INDIGRID as applicable.

14.2. This work is essential to provide fibre communication connectivity for the PSTCL 400 kV substation at Ropar to interface with the ISTS/STU network.

14.3. While the mainline work of 150 km on the 400 kV Koldam—Ludhiana line has been completed by Indigrid, the critical LILO portion measuring approximately 6.8 km at Ropar remains unattended.

14.4. This matter was discussed in 54th TCC and 79th NRPC meeting wherein it was decided that issue may firstly be deliberated in TeST sub-committee meeting.

Members may deliberate

15. Regarding MoU for ULDC Phase-III scheme (Agenda by BBMB)

15.1. The observations/comments on draft MoU shared by PGCIL were sent by BBMB on dated 25.11.2024. Further, draft MoU was again shared by PGCIL without incorporating the observations of BBMB to which request letter was again sent to PGCIL on 19.06.2025. PGCIL is again requested to incorporate the observations/comments of BBMB in draft MoU so that the same can be finalized for all states.

Members may deliberate

16. Regarding information in respect of ULDC Phase-III scheme (Agenda by BBMB)

16.1. Various letters have been sent to PGCIL and M/s GE T&D Pvt Ltd. (Vendor for implementing ULDC Phase-III scheme) such as testing schedule of FAT vide letter dated 06.06.2025, Bill of Material for BBMB Portion, Make and Model of equipments

being procured from M/s GE T&D Pvt Ltd. vide email dated 03.06.2025. Make, Model, Technical Specifications of Equipments/ Softwares and Percentage of Make In India (MII) content in Equipments/ Softwares vide letter dated 15.05.2025.

16.2. As directions of Ministry have been received for implementation of Security Operations Centre (SOC) for Protected Systems of SLDCs, the above information is also mandatory for successful installation/integration of SOC.

Members may deliberate

17. Regarding storage of Logs of URTDSM System (Agenda by BBMB)

17.1. As per directions of CERT-In, it is mandatory to maintain logs of 180 days for all IT/OT systems. The same is not being presently complied in URTDSM Systems installed in SLDCs of Northern Region. Although, the approval regarding increasing the storage has already been obtained by PGCIL in 54th TCC/ 79th NRPC meeting held on 30.05.2025. It is requested that compliance of the same maybe ensured at the earliest.

Members may deliberate

18. Replacement of S-900 RTU's of ULDC-Phase-I Scheme and Integration of 61850 compliant Numerical Relays with HMI Servers for providing functionality of Event Logger (Agenda by BBMB)

18.1. Contract Agreement No. N1/C&M/18-19/ULDC/CA-II/162-Service Portion dated 01.04.2019 for Replacement of S-900 RTU's of ULDC-Phase-1 was signed between M/s Synergy Systems and Solutions and Powergrid for NR constituents having additional work of integration of 61850 compliant Numerical Relays with HMI Servers to extract dedicated GPS time stamped station events to analyze multiple element tripping. This additional work requires to be completed by the firm as reconciliation of advance payment to Powergrid paid by BBMB could be finalized only after completion of this work by the firm.

18.2. In this regard, it is submitted that BBMB officers/officials along with M/s Synergy authorized representative carried out a site visit to Dhulkot substation on 28.01.2025. During the visit, it was found out that the various details of Node addresses and CID files were required to be submitted to the firm by BBMB. The same were submitted to the quarter concerned and intimated to PGCIL vide this office email dated 04.03.2025 and requested to expedite the work of integration at BBMB Dhulkote substation.

18.3. Some observations were raised by M/s Synergy vide email dated 19.05.2025 to which Deputy Director/P&T Cell, BBMB, Chandigarh clarified vide email dated 22.05.2025. It was again requested vide email dated 23.05.2025 to PGCIL but no input has been received yet.

18.4. Keeping in view the above, it is requested to get the long pending work of integration of 61850 compliant Numerical Relays with HMI Servers at all the stations of BBMB completed from M/s Synergy at the earliest please.

Members may deliberate

19. Poor telemetry data availability of interstate PowerGrid/NTPC Substations (Agenda by UPSLDC)

19.1. It has been observed that several interstate substations under Power Grid Corporation of India Ltd. (PGCIL) and NTPC are reporting suboptimal SCADA data availability for the month of June 2025. A list of such substations is as below:

S.NO.	SUB-STATION	% Availability Jun-25
1	FATEHPUR-PG	91.75
2	MEERUT-PG	91.64
3	LUCKNOW-PG	84.51
4	BAGHPAT-PG	91.50
5	AGRA-PG	91.26
6	TANDA-NTPC	54.43

19.2. It is also to mention that

i. Real-time data from Tanda NTPC station is not being updated consistently and data updation frequency varies from minutes to hours (graph attached).

ii. Intermittency in real time telemetry data of ICTs of Meerut (PG) substation has been observed for a long duration.

19.3. The above substations are Cal check substations and poor telemetry data availability from these Cal check substations adversely impacts the accuracy of drawal computation for Uttar Pradesh and may also affect DSM of UP state.

19.4. It is requested for rectification of the issues and ensure accurate and reliable telemetry data availability from these substations.

Members may deliberate

20. SCADA/EMS Upgradation ULDC Phase-III Project (Agenda by UPSLDC)

20.1. Under ULDC Phase-III project, a change in the planned training venue was proposed. Initially training is scheduled to be conducted in Noida, it is now requested to shift the training to **NRLDC, New Delhi or Power Grid Training Institute, Manesar**, considering logistics and TA rules of UP.

20.2. The execution of the ULDC Phase-III project is currently underway, and materials are being received at the UPSLDC site. In this context, deputation of a site engineer from GE at Lucknow and Modipuram is essential to facilitate proper coordination and supervision during the material receiving process. GE is requested to depute a qualified site engineer at the earliest to assist with on-site coordination and technical support.

Members may deliberate

21. Pending AMC Extension from Siemens – SCADA Phase-II (Agenda by UPSLDC)

21.1. The Annual Maintenance Contract (AMC) for SCADA/EMS ULDC Phase-II has expired on 31.03.2025 and extension of project AMC is still pending. It is requested to kindly expedite the AMC contract extension process.

21.2. Deployment of GE site Engineer at SLDC for SCADA Phase-III.

Members may deliberate

22. Submission of report for Communication Audit of Substations (Agenda by NRPC)

22.1. NRPC Secretariat, vide Letter No. CEA-GO-17-14(16)/1/2024-NRPC dated 02.06.2025, had requested all Transmission Service Providers (TSPs) and Generation Companies (GENCOs) to submit the healthiness report of their respective communication infrastructure **(Annexure III)**. However, reports have not been received from most of the entities. It is reiterated that submission of the healthiness report is required as per the approved Standard Operating Procedure (SOP) for communication audit **(Annexure IV)**. As per the SOP, physical audit of the communication infrastructure shall be conducted in the next phase, based on the reports submitted.

22.2. This is in line with the compliance requirements of the Central Electricity Regulatory Commission (Communication System for Inter-State Transmission of Electricity) Regulations, 2017.

All GENCOs/TSPs to submit the audit report

23. Conducting of physical audit of substations (Agenda by NRPC)

23.1. As per the SOP of Communication Audit of substation, audit shall be conducted in two phases:
Phase I – Scrutiny of reports, documents, and other relevant information.
Phase II – Physical verification of selected nodes

23.2. Accordingly, NRPC Secretariat, vide Letter No. CEA-GO-17-14(16)/1/2024-NRPC dated 02.06.2025, requested all Transmission Service Providers (TSPs) and Generation Companies (GENCOs) to submit the healthiness report of their communication infrastructure **(Annexure III)**. However, it has been observed that most entities have not submitted the required reports.

23.3. In view of the above, it is proposed that NRLDC may identify and propose substations for Phase II physical audit, based on the past year's performance of the communication system and other relevant operational parameters.

Members may deliberate and agree on the proposed approach.

24. Communication Outage Planning (Agenda by NRPC)

24.1. NRPC Secretariat is planning to commence monthly communication outage planning from the month of September 2025, in accordance with the approved Standard Operating Procedure (SOP) for communication outage planning **(Annexure V)**.

24.2. All utilities are requested to provide details of the following communication links/equipment available at their respective substations:

1. Tele-Protection
2. AMR
3. PMU
4. SDH & PDH
5. DCPC
6. RTU & its CMU cards
7. DTPCs
8. Battery Banks and Charging Equipment
9. EPAB

Following details are requested from NLDC/NRLDC:

1. ICCP links between Main & Backup RLDCs, Main & Backup SLDCs & Main &Backup NLDC
2. VC links between LDCs
3. Inter-regional AGC links

It is mentioned that CTU has already provided OPGW Links for ISTS in northern region.

24.3. The monthly outage planning shall be carried out as per the following schedule:

1. 1st working day of every month – NRPC Secretariat shall circulate an email requesting all entities to submit their communication system outage proposals.
2. By 8th of every month – Entities to submit their outage requests in the prescribed format.
3. NRPC Secretariat shall compile all received outage requests and forward them to NRLDC for their observations/input.
4. Outage Planning Meeting for the communication system shall be conducted in the third week of every month to finalize the proposed outages.
5. The proposed monthly outage plan shall be published on the NRPC website.
6. Entities shall avail the approved outages in coordination with NRLDC.
7. Deviation reports (if any) are to be submitted by 10th of the following month in the prescribed format.

Members may deliberate

Annexure-I

B.12 Corrective action for healthiness of 500kV Mundra-Mahindergarh SPS

On 17th May 2024 on outage of both pole (carrying total ~1500MW), SPS of 500kV HVDC Mundra-Mahindergarh inter regional link didn't operate. This issue was discussed during 51st PSC meeting and ADANI was requested to share the details w.r.t. SPS operation during the meeting.
Further, NRLDC in coordination with NLDC conducted an online discussion meeting with concerned stakeholders (SLDCs, ADANI, POWERGRID) on 12th August 2024, for further remedial actions required to make this SPS healthy.

Following actions were decided during the meeting:

i. POWERGRID, ADANI and concerned states were requested to identify the issue in communication links and take expeditious actions to make the all the communication link healthy. POWERGRID & ADANI shall review the healthiness of SPS system at different load centres and communication path between them in coordination with the SLDCs.
ii. States were requested to go through the details of load feeders mentioned in SPS document and share the changes / modifications as per present scenario and share the inputs w.r.t. unavailability in identified load feeders and load shedding. SLDCs shall share the revised updated feeder details (radial) along with expected average/peak load relief through respective feeders.
iii. SLDCs in coordination with their transmission and protection team shall share the status and healthiness of existing SPS system along with details of availability of communication path for incorporation of proposed revised/additional feeders.

Load end details have been received from UP, Haryana, Punjab Rajasthan & Delhi. Details are attached as Annexure-B.IV of agenda.

ADANI has submitted the status of healthiness of communication network and hardware system at different locations on the basis of preliminary inspection. As per details submitted, counter status was found OFF at Alwar, Ratangarh, Gobindgarh, Malerkotla, Bamnauli, Shamli and Dhanonda.

Details of nodal officer of different substation involved in SPS scheme has already been shared with ADANI team for coordination and further remedial actions.

During 53rd PSC meeting, ADANI was requested to coordinate with the respective states to rectify the issues in the SPS system and share the status of remedial action taken / planned to be taken. Desired remedial actions need to be expedited.
ADANI agreed for the same and stated that update would be given within 01 week. However, no detail received yet from ADANI.

During discussion in 54th PSC meeting also there was no further update received from ADANI team.

During 226th OCC meeting, NRLDC representative requested OCC forum to discuss the issue and propose action plan for necessary remedial action plans needed for making SPS scheme of HVDC Mundra-Mahindergarh healthy & operational.

ADANI was requested to apprise the forum about the present status of remedial actions.

ADANI representative stated that there are basically communication related issues at various location involved in this scheme. OEM / vendor has been assigned and instructed to inspect all the stations and list out the different issues. After compilation of all the issues comprehensive action plan would be shared. Further, issue related to coordination & communication with the state nodal officers was highlighted by ADANI representative. Support from states would be required for expeditious corrective actions.

NRLDC representative emphasized the importance of this SPS link and requested ADANI to take lead for corrective actions as this SPS scheme was commissioned by ADANI. Details of nodal officers will be provided however necessary coordination with state counterpart need to be done for identification and rectification of issues. States were also requested to ensure proper coordination from their end. Further, states were also requested to ensure incorporation of revised decided feeders during work at their stations.

States representative assured to provide all necessary coordination from their end.

OCC forum emphasized the importance of 500kV Mundra-Mahindergarh SPS and its healthiness is important to ensure secure & reliable operation of grid. ADANI was requested to coordinate with the respective states to rectify the issues in the SPS system and share action plan along with the status of remedial action taken / planned to be taken. Desired remedial actions need to be expedited.

B.13 Frequent elements tripping during November 2024:

OCC forum was of view that cited agenda to be deliberated in detail in the upcoming 55nd PSC meeting of NRPC.

B.14 Multiple element tripping events in Northern region in the month of November ’24:

lines and may lead into cascade tripping in the complex. Therefore, frequent tripping of lines in RE complex during solar hours affects the security and reliability of the complex. It is also suspected that phase overcurrent protection has been kept enabled in 400kV transmission lines in Rajasthan control area which is not desired and non-compliance of NRPC protection philosophy. It may also lead to unwanted tripping of transmission lines.

Decision of the Forum

Forum requested SLDC-RS / RVPNL to share the reason and analysis of tripping incidents and share the details of remedial action taken to avoid such tripping incidents specifically in RE complex. Further, it was also requested to disable the phase overcurrent protection in transmission lines if it is kept enabled.

B.9 Corrective action for healthiness of 500kV Mundra-Mahindergarh SPS (agenda by NRLDC)

B.9.1 On 17th May 2024 on outage of both pole (carrying total ~1500MW), SPS of 500kV HVDC Mundra-Mahindergarh inter regional link didn't operate. This issue was discussed during 51st PSC meeting and ADANI was requested to share the details w.r.t. SPS operation during the meeting.

B.9.2 Further, NRLDC in coordination with NLDC conducted an online discussion meeting with concerned stakeholders (SLDCs, ADANI, POWERGRID) on 12th August 2024, for further remedial actions required to make this SPS healthy.

B.9.3 Following actions were decided during the meeting:

i. POWERGRID, ADANI and concerned states were requested to identify the issue in communication links and take expeditious actions to make the all the communication link healthy. POWERGRID & ADANI shall review the healthiness of SPS system at different load centres and communication path between them in coordination with the SLDCs.

ii. States were requested to go through the details of load feeders mentioned in SPS document and share the changes / modifications as per present scenario and share the inputs w.r.t. unavailability in identified load feeders and load shedding. SLDCs shall share the revised updated feeder details (radial) along with expected average/peak load relief through respective feeders.

iii. SLDCs in coordination with their transmission and protection team shall share the status and healthiness of existing SPS system along with details of availability of communication path for incorporation of proposed revised/additional feeders.

B.9.4 Load end details have been received from UP, Haryana, Punjab Rajasthan & Delhi. Details and communications are attached as **Annexure-B.IX**.

B.9.5 ADANI has submitted the status of healthiness of communication network and hardware system at different locations on the basis of preliminary inspection. As per details submitted, counter status was found OFF at Alwar, Ratangarh, Gobindgarh, Malerkotla, Bamnauli, Shamli and Dhanonda.

B.9.6 Details of nodal officer of different substation involved in SPS scheme has already been shared with ADANI team for coordination and further remedial actions.

B.9.7 During 53rd PSC meeting, ADANI was requested to coordinate with the respective states to rectify the issues in the SPS system and share the status of remedial action taken / planned to be taken. Desired remedial actions need to be expedited.

B.9.8 ADANI agreed for the same and stated that update would be given within 01 week. However, no detail received yet from ADANI.

B.9.9 During discussion in 54th PSC meeting also there was no further update received from ADANI team.

B.9.10 During 55th PSC meeting, ADANI representative stated that there are basically communication related issues at various location involved in this scheme. OEM / vendor has been assigned and instructed to inspect all the stations and list out the different issues. After compilation of all the issues comprehensive action plan would be

shared. Further, issue related to coordination & communication with the state nodal officers was highlighted by ADANI representative.

B.9.11 NRLDC representative emphasized that ADANI shall take lead as this SPS scheme was commissioned by them and further stated that details of nodal officers will be provided. States were also requested to ensure proper coordination from their end. Further, states were also requested to ensure incorporation of revised decided feeders during work at their stations.

B.9.12 States representative assured to provide all necessary coordination from their end.

B.9.13 During 56th PSC meeting, ADANI was requested to apprise the forum about the present status of remedial actions.

B.9.14 ADANI representative stated that they have raised service order to COMTEL (OEM) for approval. After approval of this service order, COMTEL engineers will visit all the sites in coordination with nodal officers from respective stations. It is expected that identification of issues and estimate hardware requirement will be completed by the end February 2025. Thereafter, after financial approval, rectification of issues will be done.

B.9.15 NRLDC representative requested ADANI to ensure completion of whole work before summer 2025. State representatives were also requested to coordinate with the ADANI team and also ensure incorporation of identified revised feeders for load relief in SPS.

B.9.16 During 57th PSC meeting, ADANI representative informed that visit by COMTEL engineers at all the sites is completed and COMTEL will submit the report within 10 days.

B.9.17 NRLDC representative requested ADANI to share the report at the earliest and make Action Plan accordingly to ensure completion of whole work before summer 2025.

B.9.18 During 58th PSC meeting, ADANI representative shared the observations made by COMTEL engineers and informed that it would at least require 6 months to complete the work.

B.9.19 NRLDC CGM (SO) highlighted that in view of envisaged growth in demand in next summer season, it is important to ensure rectification of issues and healthiness of SPS.

B.9.20 ADANI representative further informed that cost implication in this case is estimated as approx. Rs. 1.5 Cr. Till now they conducted technical assessment and made cost estimation. He submitted to allow the cost recovery of this under ADDCAP. MS, NRPC conveyed that Adani may bring the separate agenda for approval of cost recovery mode with proper justification. Adani representative mentioned that he will look into the regulatory aspect and will present accordingly.

B.9.21 During 59th PSC meeting, ADANI representative informed that they are doing discussions with ULDC for allocation of necessary links between locations. They have also initiated internal approval for placing necessary orders to the partner for execution of upgradation activity. They are expecting to complete the execution within 4-5 months in collaboration with all the stakeholders from respective utilities and ULDC team. Communication from ATIL in this regard is also sent to NRLDC through letter dated 10th April 2025.

Decision of the Forum

Forum emphasized the importance of 500kV Mundra-Mahindergarh SPS and its healthiness is important to ensure rectification of issues in SPS system before summer 2025. State representatives were also requested to coordinate with the ADANI team and also ensure incorporation of identified revised feeders for load relief in SPS. Desired remedial actions need to be expedited.

Part-C: Agenda for final approval of protection settings by PSC Forum for FTCs which have been provisionally allowed by NRLDC/SLDCs

C.1. First Time Charging of transmission lines/Bays/Transformer/Reactor etc. by NRLDC

C.1.1 AEE (P), NRPC mentioned that NRLDC has submitted the list of FTCs allowed in month of March-2025. The same may be found on NRPC website: http://164.100.60.165/meetings/prsub.html

C.1.2 As per approved procedure of NRPC, utilities have to put up agenda in PSC forum for

Abhishek Kukreja

From: Sumeet Sharma
Sent: Tuesday, March 25, 2025 6:14 PM
To: nrldcso2; somara.lakra; mahavir@grid-india.in
Cc: deepak.kr; seo-nrpc@nic.in; Nihar Raj; Milan Popat; Abhishek Kukreja; Abhishek Kumar Singh; Sunil Kumar Raval; Naman Vyas; Namandeep Matta; Nikhil Singh; Narendra Kumar Ojha; Afak Pothiawala
Subject: FW: Mundra-Mohindergarh HVDC , SPS-NR defect resolutions
Attachments: 20250325 Observation and Solutions.xlsx

Dear Sir,

With reference to the subject and the trailing email, We express our sincere Thanks for your patience and understanding towards our dependance on the partner for this specific scheme.

The site survey of SPS-NR installations was completed by M/s Commtel at all locations in time, However the compilation of issues observed and respective solutions have been received very recently from M/s Commtel. (refer attachment)

The systems have either achieved End-of-life or are not revivable now due to end-of-support. **In order to run this scheme to full operation, the systems have to be upgraded** to the latest which can then be supported further. The entire upgrade will call for new engineering, procurement, installation and commissioning which is expected to take at-least 6-7 months for completion.

Regards,

Sumeet Sharma
Head- Automation, Communications & OT-Cyber Technology
Adani Energy Solutions Limited.(Grid Division)
Mob +91 90990 05648 | sumeet.sharma@adani.com | www.adani.com
KP Epitome|10th Floor South Wing | SG Highway |Ahmedabad-382421| Gujarat

From: Sumeet Sharma
Sent: Monday, February 3, 2025 6:59 PM
To: aen.com <xen.prot.alwar@rvpn.co.in>; m.alwar@rvpn.co.in; aen.mpt&s.rtg@rvpn.co.in; aen.comm.ratangarh@rvpn.co.in; aen.subsldc.bhl@rvpn.co.in; xen.mpts.bhl@rvpn.co.in; aen.prot.mertacity@RVPN.CO.IN; aen.comm.merta@RVPN.CO.IN; nainwal@powergrid.in; vinaykumargupta@powergrid.in; ravindra_kumar@powergrid.in; smahajan1999@powergrid.in; rkagrawal83@powergrid.in; dharmendrameena@powergrid.in; vineet@powergrid.in; bhakalramjash@powergrid.in; dhanonda400kv@gmail.com; sse220kvlulaahir@hvpn.org.in; sse220kvrwr@hvpn.org.in; sse132kvdadri@hvpn.org.in; ae-220kvg1-mgg@pstcl.org; sse-pm-lalton@pstcl.org; sse-pm-mlrk@pstcl.org; eeetdshamli@upptcl.org; ee400mrd2@upptcl.org; aeprotection@upsldc.org; ase-sldcop@pstcl.org; bl.gujar@dtl.gov.in; ce.ld@rvpn.co.in; ce-sldc@pstcl.org; dtldata@yahoo.co.in; dtlscheduling@gmail.com; eesldccontrol@upsldc.org; ldrvpnl@rvpn.co.in; ldshutdown@gmail.com; ldshutdown@rvpn.co.in; paritosh.joshi@dtl.gov.in; pccont@bbmb.nic.in; pc-sldcop@pstcl.org; rajbir-walia79@yahoo.com;

rtamc.nr1@powergrid.in; pankaj.jha@powergrid.in; neerajk@powergrid.in; se.mpts.udr@rvpn.co.in; se.prot.engg@rvpn.co.in; se.sold@rvpn.co.in; sera@upsldc.org; sesc@upsldc.org; sesldcop@hvpn.org; se-sldcop@pstcl.org; setncmrt@upptcl.org; sldcdata@gmail.com; sldcharyanacr@gmail.com; sldcmintoroad@gmail.com; system.uppcl@gmail.com; xenemtcbhpp2@bbmb.nic.in; xenmpccggn@hvpn.org; xenplgss@hvpn.org
Cc: nrldcso2@grid-india.in; somara.lakra@grid-india.in; mahavir@grid-india.in; deepak.kr@grid-india.in; Sunil Kumar Raval <Sunil.Raval@adani.com>; Namandeep Matta <Namandeep.Matta@adani.com>; Kali Charan Sahu <Kalicharan.Sahu@adani.com>; RAVINDRA ATALE <Ravindra.Atale@adani.com>; Nihar Raj <nihar.raj@adani.com>; Milan Popat <Milan.Popat@adani.com>; Abhishek Kukreja <Abhishek.Kukreja@adani.com>; Naman Vyas <Namany.Vyas@adani.com>; Abhishek Kumar Singh <Abhishekk.Singh@adani.com>
Subject: Mundra-Mohindergarh HVDC , SPS-NR defect resolutions

Dear Sirs,

This refers to the matter discussed during recent Protection subcommittee (PSC) meetings with regards to the requirement of rectifications of SPS-NR implemented for Mundra-Mohindergarh HVDC transmission. We have awarded the service to M/s commtel for survey and restoration of possible elements installed at the locations.

Please note that Engineers from M/s Commtel shall be visiting your stations as per the attached schedule and necessary coordination shall be done by Mr. Abhishek Singh (Station -in charge) of Mohindergarh HVDC station (AESL-GD). He can be contacted at Mobile: 9671306831.

We request your kind permission and necessary support in carrying out the observations/possible restorations of the installations at your respective stations.

Thank you.

Regards,

Sumeet Sharma
Head- Automation, Communications , OT-Cyber & Technology
Adani Energy Solutions Limited.(Grid Division)
Mob +91 90990 05648 | sumeet.sharma@adani.com | www.adani.com
KP Epitome|10th Floor South Wing | SG Highway |Ahmedabad-382421| Gujarat

Clinet: M/s Adani
Contractor : M/s Commtel
Project : To check Sytem healthiness anc configuration of system installed Under M/s Adani

S. No	Site name	Region	Status	Observations	Remarks	Equipment Required
1	PG Bhiwani	Haryana	Site visit done	1. There is no optical connectivity between Bhiwani PG and Bhiwani BBMB.	Firstly, connectivity has to be done between bhiwani PG to BBMB as it was done in 2014 or alternative way has to be provided .	1. New E-1 has to be configured from Bhiwani PG (Existing or New installed System) to laltokalan (Exisitng System) 2. Optial STM 16 Port to be provided in Exisiting System.
2	laltokalan	Punjab	Site visit done	**1**. G.703 card not avalible at site , Trib counter set found faulty. **2**. E1 Connetivty found break from laltokaln to other sites. New E-1 has to be configured from laltokalan to other End . **3**. Cable from Field to TB is not connected properly as many cable found loose at TB also other cable end to be checked.	As G.703 card is Not available at site ,G.703 card is End of life.	1. Two No DTPC are required (One at Laltokalan and Other at Mahendragarh). 2. New E-1 has to be configured from Bhiwani PG (Existing or New installed System) to laltokalan (Exisitng System) 3. One cabinet to be installed at mahendragarh and DTPC will be installed in existing cabinet at Laltokalan
3	Gobidngarh		Site visit done	**1**. Nokia Mux card and G.703 card found faulty at site . **2**. E1 connected found break as we are getting alarm on the SDH.	As G.703 card is faulty, G.703 card is End of life.	1. Two No DTPC are required (One at Gobindgarh and Other at Mahendragarh). 2. New E-1 has to be configured from Bhiwani PG (Existing or New installed System) to Gobidgarh (Exisitng System) 3. DTPC to be installed in exisiting cabinetat Gobindgarh .
4	Malerkotla		Site visit done	**1**. Nokia Mux card is fauty as we are not able to login into the system. **2**. There is no E1 Connectivity as we are getting Alarm on SDH. **3**. Mux has been shifted to other room , cable coming from field to the Terminal Block is also not connected and cable also not avalible in Mux room .	As Nokia Mux is faulty. Subrack is End of Life.	1. Two No DTPC are required (One at malerkotla and Other at Mahendragarh). 2. New E-1 has to be configured from Bhiwani PG (Existing or New installed System) to lmalerkotla (Exisitng System) 3. DTPC to be installed in exisiting cabinetat Malerkotla.
5	Alwar	Rajasthan	Site visit done	**1**. fujistu SDH system has been dismetal , found no Connectivity with the E1, we have configure new E1 from other SDH end to end .	End to End New E-1 has to be configured on new SDH or alreanate way has to be provided as Exisiting Muxat heera pura and panipat are end of life	1. Two No DTPC are required (One at Alwar and Other at Mahendragarh). 2. New E-1 has to be configured from Bhiwani PG (Existing or New installed System) to Alwar (Exisitng System) 3. One cabinet to be installed at Mahendragarh. 4. DTPC to be installed in exisiting cabinetat Alwar.
6	Ratangarh		Site visit done	**1**. Connectivity from Ratangarh Site to other site found break as many sites has been removed in between and new E1 has to be configured from Ratangarh to other Sites .	End to End New E-1 has to be configured on new SDH or alreanate way has to be provided as Exisiting Mux at heera pura are end of lyf .	New E-1 has to be configured from Bhiwani PG to haarapura patching from Heerapura to Ratangarh
7	Bhilwara		Site Visit done	**1**. Mux Suback along with DM2 card Faulty at site .	As Nokia Mux is faulty. Subrack is End of Life.	1. Two No DTPC are required (One at Bhiwara and Other at Mahendragarh). 2. New E-1 has to be configured from Bhiwani PG (Existing or New installed System) to bhilwara (Exisitng System) . 3. DTPC to be installed in exisiting cabinetat bhilwara.
8	Merta		Site Visit done	**1.** E1 connectivity found break from Metra to other Sites **.**	End to End New E-1 has to be configured on new SDH or alreanate way has to be provided as Exisiting Mux at heerapura are end of Life	New E-1 has to be configured from Bhiwani PG to merta System
9	Bamnauli	DTL	Site visit done	**1**. DM2 card, G703 and Power card found faulty. **2**. fujistu SDH system has been dismetal , found no Connectivity with the E1, we have configure new E1 from other SDH end to end . **3.** Trib counter set found faulty.	Dm2 card is faulty , and card is End of Life .	1. Two No DTPC are required (One at bamnauli and Other at Mahendragarh). 2. New E-1 has to be configured from Bhiwani PG (Existing or New installed System) to Alwar (Exisitng System) 3. DTPC to be installed in exisiting cabinetat Bamnuali .
10	BBMB bhiwani		Site visit done	**1**. fujistu SDH system has been dismetal , **2**.Found no Connectivity with the E1, we have configure new E1 from other SDH end to end .	B2 and X2 cards are faulty , and cards are end of Life	1. Two No DTPC are required (One at bamnauli and Other at Mahendragarh). 2. New E-1 has to be configured from Bhiwani PG (Existing or New installed System) to Bhiwai BBMB (Exisitng System) 3. DTPC to be installed in exisiting cabinetat bhiwani BBMB.

11	Hissar		Site visit done	**1.** fujistu SDH system has been dismetal , **2.**Found no Connectivity with the E1, we have configure new E1 from other SDH end to end .	End to End New E-1 has to be configured on new SDH or alreanate way ha to be provided as Exisiting Mux are end of life	N/a
12	Dadri		Site Visit Done	**1.** Mux subrack along with DM2 , Power card and G.703 card not present st site. **2.** Display counter faulty.	As Nokia Mux is faulty, Subrack is End of Life.	1. Two No DTPC are required (One at Dadri and Other at Mahendragarh). 2. New E-1 has to be configured from Bhiwani PG (Existing or New installed System) to Dadri (Exisitng System) 3. One cabinet to be installed at Mahendragarh. 4. DTPC to be installed in exisiting cabinetat Dadri .
13	Bahadurgah		Site Visit Done	**1.** Fiberhome SDH is not in use , No connectivity with the Exiting System . **2.** End to end connecivity found break	End to End New E-1 has to be done and configuration has to be done. No supervision of PDH and SDH	1. Two No DTPC are required (One at Bahadurgah and Other at Mahendragarh). 2. New E-1 has to be configured from Bhiwani PG (Existing or New installed System) to Bahadurgah (Exisitng System) 3. DTPC to be installed in exisiting cabinetat Bahadurgah .
14	Shamli	UP	Site Visit Done	1. End to end Connectivity found break. **2.** Display unit found faulty.	End to End New E-1 has to be configured on new SDH or alternate way has to be provided as Exisiting PDH Mux are End of Life	1. Two No DTPC are required (One at Shamli and Other at Mahendragarh). 2. New E-1 has to be configured from Bhiwani PG (Existing or New installed System) to Shamli (Exisitng System) 3. DTPC to be installed in exisiting cabinetat Shamli .
15	Mandula	UP	Site Visit Done	**1.** fujistu SDH system has been dismetal , **2.** End to End connectivity found break .	End to End New E-1 has to be configured on new SDH or alternate way has to be provided as Exisiting Mux (SDH and PDH) are End oF life	New E1 has to be configured from Bhiwani PG to Mandula

Annexure-II

A.4 OPGW installation on existing 400kV Jallandhar (PG) – Kurukshetra (PG) line & 400kV Koldam (Indigrid) – Ludhiana (PG) line which are to be LILOed at Dhanansu & Ropar substations of PSTCL respectively (Agenda by CTU)

A.4.1 PSTCL has given their agenda to CTU in ISTS communication planning meeting of Northern Region to provide fibre connectivity of their two nos. of substations viz. Dhanansu & Ropar which are to be LILOed at following existing lines respectively:

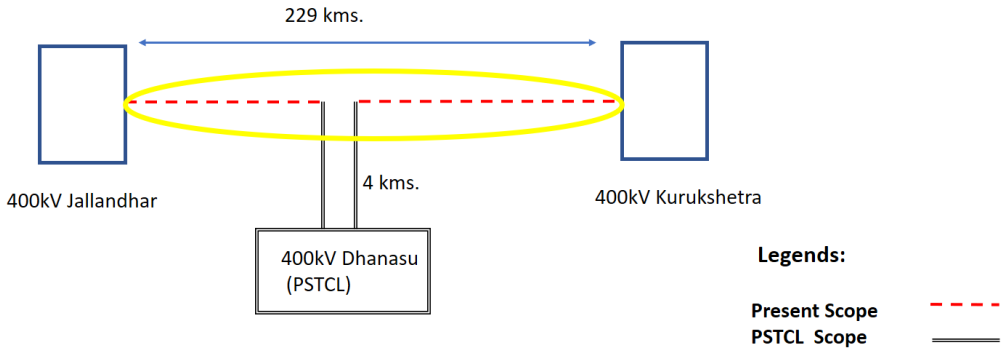
A. 400kV Jallandhar (PG) – Kurukshetra (PG) – 229 kms.
B. 400kV Koldam (Indigrid) – Ludhiana (PG) – 150 kms.

A.4.2 As these stations have no other connectivity to the ISTS/STU communication network. Therefore, it is proposed to install OPGW cable on above two ISTS lines.

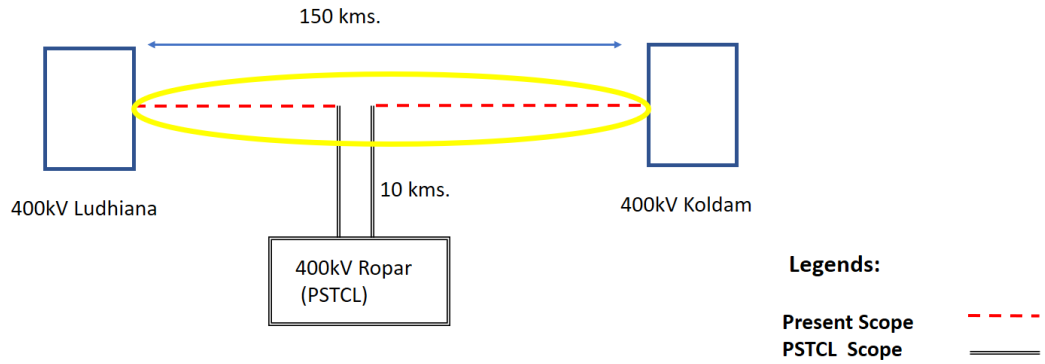
A.4.3 Total OPGW length is 379 kms. with cost estimate Rs. 17.0 Crore (approx.).

A.4.4 It may be mentioned that line mentioned at A above belongs to POWERGRID and B above belongs to Indigrid.

Connectivity diagram for providing communication to Dhanansu (PSTCL)



Connectivity diagram for providing communication to Ropar (PSTCL)



A.4.5 Regarding 400kV Koldam (Indigrid) – Ludhiana (PG), INDIGRID representative stated that a petition is pending in Hon'ble CERC regarding decision of ownership of assets by two different licensees. He requested that they are agreed to CTU proposal if Indigrid shall be given work for OPGW on LILO portion.

A.4.6 Punjab agreed to pay cost of OPGW installation to concerned parties i.e. POWERGRID/INDIGRID, as the case may be.

A.4.7 MS, NRPC stated that as there may be delay in decision of Hon'ble CERC, INDIGRID and Punjab may decide mutually regarding OPGW work on LILO portion of 400kV Koldam (Indigrid) – Ludhiana (PG) and NRPC forum may be apprised accordingly.

A.4.8 Forum approved the proposal of CTU to provide fibre connectivity at two nos. of substations viz. Dhanansu & Ropar which are to be LILOed at following existing lines respectively:

A. 400kV Jallandhar (PG) – Kurukshetra (PG) – 229 kms.
B. 400kV Koldam (Indigrid) – Ludhiana (PG) – 150 kms

A.5 Modalities for installation services for Special Energy Meters/Interface Energy Meters (IEMs) as per agreement between POWERGRID & CTUIL regarding Consultancy services to CTUIL (Agenda by CTU)

A.5.1 CTU apprised that as per Electricity Grid Code (IEGC) 2010 & Amendments {Clause no. 6.4 (21)}:

- ***The CTU shall install*** *Special energy meters on all inter connections between the regional entities and other identified points for recording of actual net MWh interchanges and MVArh drawls. The installation, operation and maintenance of special energy meters shall be in accordance with Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006. All concerned entities (in whose premises the special energy meters are installed) shall take weekly meter readings and transmit them to the RLDC by Tuesday noon The SLDC must ensure that the meter data from all installations within their control area are transmitted to the RLDC within the above schedule.*

A.5.2 Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006 and its amendment thereof

- **Ownership of meters {clause no 6.0 (1a)}**

  All interface meters installed at the points of interconnection with Inter-State Transmission System (ISTS) for the purpose of electricity accounting and billing shall be owned by CTU.

- **Operation, Testing and Maintenance of meters {clause no 10} –**

  The operation, testing and maintenance of all types of meters shall be carried out ***by the generating company or the licensee****, as the case may be.*

A.5.3 Accordingly, the procurement and installation of SEMs & DCD was being rendered by POWERGRID as CTU till 1st April 2021. Pursuant to Gazette Notification No.

Annexure - III

सत्यमेव जयते

भारतसरकार
Government of India
विद्युतमंत्रालय
Ministry of Power
उत्तरक्षेत्रीयविद्युतसमिति
Northern Regional Power Committee

Date: 02.06.2025

To,

(As per distribution list)

Subject: Submission of report for Communication Audit of Substations for FY 2024-25 –reg.

Sir/Madam,

It is to apprise that Standard Operating Procedure (SOP) for Communication Audit of Substations was finalized by NPC in accordance with the *Central Electricity Regulatory Commission (Communication System for Inter-State Transmission of Electricity) Regulations, 2017*. (copy enclosed)

As per regulations 10 of Communication regulations, RPC shall the conduct communication system audit. As per SOP, audit shall be conducted in two phases:

1. **Phase I** – Scrutiny of reports, documents, and other relevant information.
2. **Phase II** – Physical verification of selected nodes

In this regard, it is requested to kindly submit the report on communication system healthiness **for the financial year 2024-25** duly filled in the prescribed format **(Annexure-I)** in accordance with table provided below. The report should be submitted to the **NRPC Secretariat** and **NRLDC on or before June 15, 2025**.

S. No.	**Scenario**	**Entities Responsible**
1	Equipments installed Under ULDC Scheme on generating station, and transmission substation.	Details to be provided by POWERGRID
2	Equipments installed by TSPs/ GENCOs on generating station, and transmission substation pertaining to Inter-State Transmission System (ISTS).	Details to be provided by respective TSP/GENCO

The report shall serve as a **self-certification** of your communication infrastructure's **performance and regulatory compliance**, and will facilitate **Phase I of the audit** (scrutiny of submitted documents). Based on this scrutiny, **Phase II** involving physical verification will be carried out. Kindly ensure that the report includes:

- Details of communication links and terminal equipment
- Outage data and root cause analysis
- Cybersecurity audit report (as per CEA Guidelines, 2021)
- Status of compliance to CERC/CEA regulations
- Any other information as required in the SOP

It is mentioned that timely submission is required for consolidating the regional audit findings and forward the Annual Communication Audit Report to the Commission within the stipulated timeline.

भवदीय

Signed by Anzum Parwej
Date: 02-06-2025 17:18:32

(अंजुम परवेज)
अधीक्षण अभियंता (संचार)

Final Standard Operating Procedure (SOP) for Communication audit of Substations

1. This procedure has been prepared in compliance to Central Electricity Regulatory Commission (Communication System for inter-State transmission of electricity) Regulations, 2017. As per clause 10 of the Regulation, RPC shall conduct annual audit of the communication system annually as per the procedure finalized in the forum of the concerned RPC. However, this SOP for communication audit of substations is finalized to maintain uniformity at the national level. It also mandates that RPC Secretariat shall issue necessary instructions to all stakeholders to comply with the audit requirements within the time stipulated by the RPC Secretariat based on the audit report. An Annual Report on the audit carried out by respective RPC is to be submitted to the Commission within one month of closing of the financial year.
2. The Audit would be conducted in two phases. In first phase scrutiny of the reports, documents etc. In the second phase physical verification shall be carried out.
3. Each User/entity, using inter-state transmission or the intra-state transmission incidental to inter-state, shall submit the detailed report to RPC Secretariat and RLDC, as per prescribed format on yearly basis. The detailed report shall be submitted by the April end of the respective year. This report shall be considered as self-certificate regarding availability and healthiness of the Communication system of respective user/entity.
4. In respect of intra-state users/entities, SLDC shall submit detailed reports yearly by the April end of the respective year, to RPC Secretariat and RLDC.
5. Outage report of all the channels (including Network Management System, PLCC etc) report for a month shall be submitted by the Users/entities to RLDC and respective SLDCs, on monthly basis, by 7th day of the next month. RLDC and SLDCs after verifying the NMS data shall submit report to RPC Secretariat by 15th day.
6. All users/entities and Control Centers shall get the third-party cyber security audits done from a Cert-in certified vendor in compliance of CEA (Cyber Security in Power Sector) Guidelines,2021. The detailed report of the Cyber Security Audit shall be submitted by 15th April for the previous financial Year.
7. RPC Secretariat may ask any other information required for Audit of the communication system in addition to these periodic reports.

Phase-I Audit: Scrutiny of the Information

8. A Communication System Audit Sub-Group comprising one member each from RPC, RLDC, PowerGrid and One of the respective Region SLDCs shall be constituted by RPC Secretariat with the approval of Member Secretary, RPC. The sub-group may co-opt any other member from any organization for facilitating the activities of the sub-group. Further, consultation from CEA may be taken, if required. The Audit team shall be formed excluding the member forthe Organization/Utility whose system is to be audited.
9. The Communication System Audit Sub-group shall scrutinize the information received in RPC Secretariat. The Sub-group may also ask any additional information necessary for its activities. All the users/entities, RLDC, SLDCs shall provide the information to the sub-group on priority within the stipulated time period.
10. The sub-group shall also identify the nodes for physical inspection based on the criticality of the node in view of performance of the communication network or based on the deficiencies observed in the communication system.
11. The Audit would include but not limited to following aspects:
    a. Availability of communication channels. The outage reason needs to be clearly specified whether it is on account of the concerned entity or on account of any other entity, force majeure etc. The list of communication channels would be finalized by Communication System Sub Group in consultation with other stakeholders.
    b. Availability of terminal equipment. The outage reason needs to be clearlyspecified whether it is on account of the concerned entity or on account of any other entity, force majeure etc. The list of terminal equipment would be finalized by Communication System Sub Group. Part outage like failure of specific cards etc. would also be furnished along-with reasons.
    c. Availability of Auxiliary System e.g. Battery Charger, Battery bank, sufficient cooling equipment etc.
    d. Compliance of CERC and CEA Regulations and the procedures under these Regulations.
    e. Completion of periodic testing of the communication system in accordance with procedure for maintenance and testing prepared by CTU.
    f. Audit of all newly commissioned communication equipment within six months of its commissioning.
    g. Completion of 3rd party Cyber Security Audits.
    h. Network traffic w.r.t capacity.
    i. Spare availability, replenishment etc.
    j. Any other parameters as agreed by the Communication Sub Group.

Phase-II Audit: Physical Verification

12. Based on the Recommendations of the Communication System Audit Sub-group, Audit team shall be constituted and the physical inspection Audit plan shall be prepared by RPC Secretariat.
13. Audit team shall be formed on regional basis.
14. Audit shall be carried out in a planned manner as included in this document by a team of three members. The audit team shall comprise of one representative from the RPC Secretariat, one representative from RLDC and one representative from any of the Utilities or SLDCs of respective Region. The Audit team shall be formed excluding the member for the Organization/Utility whose system is to be Audited. The Audit team may co-opt any other member from any organization for facilitating the activities of the committee.
15. Once the plan is finalized, minimum 3 days advance notice shall be served to the concerned Auditee entity intimating the detailed plan so that availability of required testing equipment and the required documents is ensured by Auditee entity and is made available to the Audit team during the site visit.
16. Member Secretary, RPC in consultation with the Communication System Audit Sub-Group may decide on any additional nodes/locations for physical inspection if a location is very critical in view of performance of the communication network at any time of the year.
17. The Scope of the physical verification shall include but not limited to thefollowing:
    a. Available communication Network for its redundancy
    b. Availability of channel redundancy for all the functions for which it is configured.
    c. Communication equipment (hardware and software configuration) of all thenodes including repeater stations for its recommended performance.
    d. Documentation of the configuration of the respective site and its updation.
    e. Fibre layout / usage of fibre / Availability of dark fibre and its healthiness.
    f. Cable Schedule and identification / tagging.
    g. Healthiness of Auxiliary supply including the healthiness of Battery backup.
    h. Healthiness of Earthing / Earth protection for communication system.
    i. Availability of sufficient cooling equipment at the User's premises to maintain the stipulated temperature for the communication equipment.
    j. Optical power level
    k. Alternate modes of communication for speech

18. The format for collecting the details of Communication channels/links and Equipment is at **Annexure-I** and the same shall be furnished by the Auditee entity.

19. Communication Audit Checklist points are given in **Annexure-II** and the same are to be thoroughly verified by the Audit team.
20. Expenses towards Lodging, Boarding & Transportation (Excluding Air/Train Fair) between various places within the jurisdiction of Auditee entity shall be borne by respective Auditee entity. The Coordinating Officer(s) from the Auditee Utilities identified for each Team is (are) responsible for facilitating them to all the Members of respective Team.
21. Audit team shall submit report including recommendations for action on deficiencies, if any, found during the inspection, within 15 days from the date of inspection to Member Secretary, RPC. After approval of MS, RPC, the report would be communicated to the Auditee entity for compliance.

Audit Compliance Monitoring

22. Communication System Audit Sub-group would monitor the compliance of audit observations as applicable. Non-compliance of Audit Recommendations, if any, shall be put up to TCC and RPC.
23. The Annual Audit Report would be reviewed by a Communication System Sub Group at RPCs level. After considering the observations of Sub Group, RPC Secretariat shall issue necessary instructions to all stakeholders to comply with the audit requirements within the time stipulated by the RPC Secretariat based on the audit report. An Annual Report on the audit carried out by RPC would be submitted to the Commission within one month of closing of the financial year.

***

REGIONAL COMMUNICATION AUDIT REPORT			
General Information:			
1	**Substation Name**		
2	**SS Voltage level**		
3	**Date of commissioning of the substation**	**XX.XX.XXXX**	
4	**Region & State / Auditee**	**/**	
5	**Audit Date**		
6	**Name of the Utility which owns the SS**		
Details of Audit Team Members :			
SL	**Name**	**Designation**	**Organization**
1			
2			
3			
4			
Attached Documents, if any			
SL	**Name of the document**		**Original / Signed / Copy**
1			
2			
3			
4			
5			
6			
7			

8		
9		
10		
11		
12		
13		
14		
15		
16		
17		

Communication Channels and Equipments Audit Format

(A) List of channels in usage for data (64 kbps, 104, PMU, VC, 101) / Voice / Protection circuits / others:

Sl	Description (64 kbps, 104, PMU, VC, 101) / Voice / Protection circuits / Others)	Source	Destination	Channel Routing	Ownership details of terminal equipment / Links
1					
2					
3					
4					
5					
6					
7					
8					

(B) List of terminal communication equipments:

Sl	Name of Station	Equipment Type (SDH / PDH / Radio / VSAT / EPABX)	Make / Model	Ownership
1				
2				
3				
4				
5				
6				
7				
8				

(C) Communication System Details:

I. SDH Equipment

(1) Card Details:

Slot No	IP Address & Path / Direction Name	Card Details	Place a ✓mark if on usage, else Write as "Spare"	Whether Card is healthy / Faulty ? (H / F)	Cards Redundancy available (Yes / No)	Power Supply Card / Optical Card (Yes / No)	MSP configured? (Yes / No)	Action Plan for faulty cards	Other Information, if any
1									
2									
3									
And so on									

(2) Whether equipment is time synchronized : Yes / No

If Yes, how is it being done?

(3) Failures during last Fin. year / since last Audit :

Particulars	Number of failures of Card / Power Supply	Reason for failures	Measures taken for rectification
Card		**(i)** **(ii)** **(iii)**	**(i)** **(ii)** **(iii)**
Power Supply		**(i)** **(ii)** **(iii)**	**(i)** **(ii)** **(iii)**

(4) Configuration of the Node:

Name of Equipment	Number of Nodes	Number of directions	Name of Directions	Number of links down, with details	Details of corrective action, if any, taken

(5) Preventive maintenance schedule and its compliance:

Date of Last Preventive maintenance	Maintenance carried out as per schedule? (Yes / No)	Whether all the defects have been attended? (Yes / No) Give details

II. PDH Equipment

(1) Card Details :

Slot No	IP Address	Card Details	Place a ✓mark if on usage, else Write as "Spare"	Whether Card is healthy / Faulty ? (H / F)	Cards Redundancy available (Yes / No)	Power Supply Card / Optical Card (Yes / No)	MSP configured? (Yes / No)	Action Plan for faulty cards	Other Information, if any
1									
2									
3									
And so on									

(2) Whether equipment is time synchronized : Yes / No

If Yes, how is it being done?

(3) Failures during last Fin. year / since last Audit :

Particulars	Number of failures of Card / Power Supply	Reason for failures	Measures taken for rectification
Card		**(i)** **(ii)**	**(i)** **(ii)**

		(iii)	**(iii)**
Power Supply		**(i)** **(ii)** **(iii)**	**(i)** **(ii)** **(iii)**

(4) Configuration of the Node:

Name of Equipment	Number of Nodes	Number of directions	Name of Directions	Number of links down, with details	Details of corrective action, if any, taken

(5) Preventive maintenance schedule and its compliance:

Date of Last Preventive maintenance	Maintenance carried out as per schedule? (Yes / No)	Whether all the defects have been attended? (Yes / No) Give details

III. OPGW / Optical Fibre Details

Number of Directions	**Name of Direction**	**No. of Pairs**	**No. of Fibers used**	**No. of spare & healthy Fibers**	**Unarmoured cable laid within PVC/Hume duct pipe?**	**Fibre Count in OPGW? Whether matching with Approach cable to FODP?**	**Overall Optical Fibre Path Attenuation (dB/km)**	**Power Received**	**Conformation to Compliance of CEA Standards**

IV. Healthiness of Auxiliary System:

(1) Details of 2 independent Power Sources :

Source	Commissioning Date	Battery Back up (Hour)	Battery capacity (AH)	Supply Voltage (V)	Healthiness of Battery (Yes / No)	Make of Charger	Charger Capacity (A)	Periodicity of Maintenance Schedule	Date of Last 2 Actual Maintenance carried out	Remarks
1										
2										

(2) Conformation to Compliance of CEA Standards :

V. Healthiness of Earthing of each equipment:

Sl	Equipment	Status on Healthiness of Earthing

VI. Details of Voice communication available between Sub-station and Control Centre:

Sl	Voice communication (Sub-station - Control Centre)	Status on Healthiness of Voice communication	Healthiness of air-conditioning of communication room as per OEM recommendation

VII. PLCC Details:

Number of Panels	Make and Model	Direction	Frequency (Tx & Rx) KHz	Status on Healthiness	Last preventive maintenance		Details of defects, if any, attended	Status of Availability of Spares	Conformation to Compliance of CEA Standards
					Schedule	Actual			

VIII. Radio Communication Details:

Number of Equipments	Make and Model	Status on Healthiness	Last preventive maintenance		Details of defects, if any, attended	Status of Availability of Spares	Conformation to Compliance of CEA Standards
			Schedule	Actual			

IX. Data Retention :

(i) Earliest Date of availability of data: _____

(ii) Historical data availability : ____ days.

X. Control Command Delay :

(i) Time delay in seconds from Control Centre for SCADA : ____ Seconds

(ii) Time delay in seconds from Control Centre for WAMS : ____ Seconds

XI. Wide Band Network :

(i) Absolute channel delay in protection applications : _____ ms

(ii) Channel delay asymmetry in protection applications : _____ ms

(iii) Switching Time delay to alternate path/route during failure of one path : _____ ms

XII. Any other information :

Audit Team Member	Audit Team Member	Audit Team Member	Audit Team Member
SRPC	Co-Ordinator	PGCIL (Internal / External)	State (Internal / External)

Communication Audit Checklist (Annexure-II)

S.No	Check list points	Expected	Actual	Reference
1	Whether OPGW is terminated properly. Down lead shall be fixed property in sufficient locations. Metallic part shall be connected to earth mat riser.	Yes		
2	Distinct approach cable shall be laid 1 Protection & Communication 2 Fibers for commercial applications Item no 1 cable shall be terminated in communication room FODP One number FODP panel shall be available in communication room			
3	Fiber Identification shall be done in FODP properly			
4	Whether End to end tests were carried out during installation and records are available (both Optical Power Source/receiver testand OTDR Test results			
5	Whether patch chords 1 Cross labelled (source/ receive) 2 Tx – Rx Marking 3 Mechanical protection is provided for pach chords laid between panels			
6	Whether separate room for communication is available with following:- 1 Air conditioning with standby A/C Unit 2 AC Distribution board with ELCB 3 Single point earthing bar which shall be connected to substation Earth mat			
7	Two sets of 48 V (Positive Earthed) DC Systemshall be available with 1 Common DC Distribution board/ Panels with incoming MCB, coupler MCB , out doing MCBsetc 2. Minimum 200 Ah (2 sets of battery) VRLA batteries are preferred to keep chargers and battery in communication room. 3. Battery Charger shall be Thryristorised/SMPS			
8	Battery Charger alarms /measurements shallbe made available to SAS (if available) It can be achieved through MOD bus or connecting analogue/ digital signals to Common BCU of SAS. If such system is not available major			

	alarms shall b alarmed in common substation annunciator			
9	2 nos of substation Data (From RTU or SAS Gateway)shall route in different roots to Main and Standby Load Dispatch centres			
10	Kindly assure proper protection is available for AC Distribution (ELCB, MCB, Backup fuse),			
11	Aux Transformer neutral Earthing shall be connected to Stations earth mat (Aux Transformers shall be installed in yard earth mat area only)			
12	Whether DG sets with AMF panels are provided for Aux AC Supply			
13	Whether 2 nos 11 kV (or 33kV) supplies are available for Each station aux Transformer			

Annexure-IV

Final Standard Operating Procedure (SOP) for Communication audit of Substations

1. This procedure has been prepared in compliance to Central Electricity Regulatory Commission (Communication System for inter-State transmission of electricity) Regulations, 2017. As per clause 10 of the Regulation, RPC shall conduct annual audit of the communication system annually as per the procedure finalized in the forum of the concerned RPC. However, this SOP for communication audit of substations is finalized to maintain uniformity at the national level. It also mandates that RPC Secretariat shall issue necessary instructions to all stakeholders to comply with the audit requirements within the time stipulated by the RPC Secretariat based on the audit report. An Annual Report on the audit carried out by respective RPC is to be submitted to the Commission within one month of closing of the financial year.
2. The Audit would be conducted in two phases. In first phase scrutiny of the reports, documents etc. In the second phase physical verification shall be carried out.
3. Each User/entity, using inter-state transmission or the intra-state transmission incidental to inter-state, shall submit the detailed report to RPC Secretariat and RLDC, as per prescribed format on yearly basis. The detailed report shall be submitted by the April end of the respective year. This report shall be considered as self-certificate regarding availability and healthiness of the Communication system of respective user/entity.
4. In respect of intra-state users/entities, SLDC shall submit detailed reports yearly by the April end of the respective year, to RPC Secretariat and RLDC.
5. Outage report of all the channels (including Network Management System, PLCC etc) report for a month shall be submitted by the Users/entities to RLDC and respective SLDCs, on monthly basis, by 7th day of the next month. RLDC and SLDCs after verifying the NMS data shall submit report to RPC Secretariat by 15th day.
6. All users/entities and Control Centers shall get the third-party cyber security audits done from a Cert-in certified vendor in compliance of CEA (Cyber Security in Power Sector) Guidelines,2021. The detailed report of the Cyber Security Audit shall be submitted by 15th April for the previous financial Year.
7. RPC Secretariat may ask any other information required for Audit of the communication system in addition to these periodic reports.

Phase-I Audit: Scrutiny of the Information

8. A Communication System Audit Sub-Group comprising one member each from RPC, RLDC, PowerGrid and One of the respective Region SLDCs shall be constituted by RPC Secretariat with the approval of Member Secretary, RPC. The sub-group may co-opt any other member from any organization for facilitating the activities of the sub-group. Further, consultation from CEA may be taken, if required. The Audit team shall be formed excluding the member forthe Organization/Utility whose system is to be audited.
9. The Communication System Audit Sub-group shall scrutinize the information received in RPC Secretariat. The Sub-group may also ask any additional information necessary for its activities. All the users/entities, RLDC, SLDCs shall provide the information to the sub-group on priority within the stipulated time period.
10. The sub-group shall also identify the nodes for physical inspection based on the criticality of the node in view of performance of the communication network or based on the deficiencies observed in the communication system.
11. The Audit would include but not limited to following aspects:
    a. Availability of communication channels. The outage reason needs to be clearly specified whether it is on account of the concerned entity or on account of any other entity, force majeure etc. The list of communication channels would be finalized by Communication System Sub Group in consultation with other stakeholders.
    b. Availability of terminal equipment. The outage reason needs to be clearlyspecified whether it is on account of the concerned entity or on account of any other entity, force majeure etc. The list of terminal equipment would be finalized by Communication System Sub Group. Part outage like failure of specific cards etc. would also be furnished along-with reasons.
    c. Availability of Auxiliary System e.g. Battery Charger, Battery bank, sufficient cooling equipment etc.
    d. Compliance of CERC and CEA Regulations and the procedures under these Regulations.
    e. Completion of periodic testing of the communication system in accordance with procedure for maintenance and testing prepared by CTU.
    f. Audit of all newly commissioned communication equipment within six months of its commissioning.
    g. Completion of 3rd party Cyber Security Audits.
    h. Network traffic w.r.t capacity.
    i. Spare availability, replenishment etc.
    j. Any other parameters as agreed by the Communication Sub Group.

Phase-II Audit: Physical Verification

12. Based on the Recommendations of the Communication System Audit Sub-group, Audit team shall be constituted and the physical inspection Audit plan shall be prepared by RPC Secretariat.
13. Audit team shall be formed on regional basis.
14. Audit shall be carried out in a planned manner as included in this document by a team of three members. The audit team shall comprise of one representative from the RPC Secretariat, one representative from RLDC and one representative from any of the Utilities or SLDCs of respective Region. The Audit team shall be formed excluding the member for the Organization/Utility whose system is to be Audited. The Audit team may co-opt any other member from any organization for facilitating the activities of the committee.
15. Once the plan is finalized, minimum 3 days advance notice shall be served to the concerned Auditee entity intimating the detailed plan so that availability of required testing equipment and the required documents is ensured by Auditee entity and is made available to the Audit team during the site visit.
16. Member Secretary, RPC in consultation with the Communication System Audit Sub-Group may decide on any additional nodes/locations for physical inspection if a location is very critical in view of performance of the communication network at any time of the year.
17. The Scope of the physical verification shall include but not limited to thefollowing:
    a. Available communication Network for its redundancy
    b. Availability of channel redundancy for all the functions for which it is configured.
    c. Communication equipment (hardware and software configuration) of all thenodes including repeater stations for its recommended performance.
    d. Documentation of the configuration of the respective site and its updation.
    e. Fibre layout / usage of fibre / Availability of dark fibre and its healthiness.
    f. Cable Schedule and identification / tagging.
    g. Healthiness of Auxiliary supply including the healthiness of Battery backup.
    h. Healthiness of Earthing / Earth protection for communication system.
    i. Availability of sufficient cooling equipment at the User's premises to maintain the stipulated temperature for the communication equipment.
    j. Optical power level
    k. Alternate modes of communication for speech

18. The format for collecting the details of Communication channels/links and Equipment is at **Annexure-I** and the same shall be furnished by the Auditee entity.

19. Communication Audit Checklist points are given in **Annexure-II** and the same are to be thoroughly verified by the Audit team.
20. Expenses towards Lodging, Boarding & Transportation (Excluding Air/Train Fair) between various places within the jurisdiction of Auditee entity shall be borne by respective Auditee entity. The Coordinating Officer(s) from the Auditee Utilities identified for each Team is (are) responsible for facilitating them to all the Members of respective Team.
21. Audit team shall submit report including recommendations for action on deficiencies, if any, found during the inspection, within 15 days from the date of inspection to Member Secretary, RPC. After approval of MS, RPC, the report would be communicated to the Auditee entity for compliance.

Audit Compliance Monitoring

22. Communication System Audit Sub-group would monitor the compliance of audit observations as applicable. Non-compliance of Audit Recommendations, if any, shall be put up to TCC and RPC.
23. The Annual Audit Report would be reviewed by a Communication System Sub Group at RPCs level. After considering the observations of Sub Group, RPC Secretariat shall issue necessary instructions to all stakeholders to comply with the audit requirements within the time stipulated by the RPC Secretariat based on the audit report. An Annual Report on the audit carried out by RPC would be submitted to the Commission within one month of closing of the financial year.

***

REGIONAL COMMUNICATION AUDIT REPORT			
General Information:			
1	**Substation Name**		
2	**SS Voltage level**		
3	**Date of commissioning of the substation**	**XX.XX.XXXX**	
4	**Region & State / Auditee**	**/**	
5	**Audit Date**		
6	**Name of the Utility which owns the SS**		
Details of Audit Team Members :			
SL	**Name**	**Designation**	**Organization**
1			
2			
3			
4			
Attached Documents, if any			
SL	**Name of the document**		**Original / Signed / Copy**
1			
2			
3			
4			
5			
6			
7			

8		
9		
10		
11		
12		
13		
14		
15		
16		
17		

Communication Channels and Equipments Audit Format

(A) List of channels in usage for data (64 kbps, 104, PMU, VC, 101) / Voice / Protection circuits / others:

Sl	Description (64 kbps, 104, PMU, VC, 101) / Voice / Protection circuits / Others)	Source	Destination	Channel Routing	Ownership details of terminal equipment / Links
1					
2					
3					
4					
5					
6					
7					
8					

(B) List of terminal communication equipments:

Sl	Name of Station	Equipment Type (SDH / PDH / Radio / VSAT / EPABX)	Make / Model	Ownership
1				
2				
3				
4				
5				
6				
7				
8				

(C) Communication System Details:

I. SDH Equipment

(1) Card Details:

Slot No	IP Address & Path / Direction Name	Card Details	Place a ✓mark if on usage, else Write as "Spare"	Whether Card is healthy / Faulty ? (H / F)	Cards Redundancy available (Yes / No)	Power Supply Card / Optical Card (Yes / No)	MSP configured? (Yes / No)	Action Plan for faulty cards	Other Information, if any
1									
2									
3									
And so on									

(2) Whether equipment is time synchronized : Yes / No

If Yes, how is it being done?

(3) Failures during last Fin. year / since last Audit :

Particulars	Number of failures of Card / Power Supply	Reason for failures	Measures taken for rectification
Card		**(i)** **(ii)** **(iii)**	**(i)** **(ii)** **(iii)**
Power Supply		**(i)** **(ii)** **(iii)**	**(i)** **(ii)** **(iii)**

(4) Configuration of the Node:

Name of Equipment	Number of Nodes	Number of directions	Name of Directions	Number of links down, with details	Details of corrective action, if any, taken

(5) Preventive maintenance schedule and its compliance:

Date of Last Preventive maintenance	Maintenance carried out as per schedule? (Yes / No)	Whether all the defects have been attended? (Yes / No) Give details

II. PDH Equipment

(1) Card Details :

Slot No	IP Address	Card Details	Place a ✓mark if on usage, else Write as "Spare"	Whether Card is healthy / Faulty ? (H / F)	Cards Redundancy available (Yes / No)	Power Supply Card / Optical Card (Yes / No)	MSP configured? (Yes / No)	Action Plan for faulty cards	Other Information, if any
1									
2									
3									
And so on									

(2) Whether equipment is time synchronized : Yes / No

If Yes, how is it being done?

(3) Failures during last Fin. year / since last Audit :

Particulars	Number of failures of Card / Power Supply	Reason for failures	Measures taken for rectification
Card		**(i)** **(ii)**	**(i)** **(ii)**

		(iii)	**(iii)**
Power Supply		**(i)** **(ii)** **(iii)**	**(i)** **(ii)** **(iii)**

(4) Configuration of the Node:

Name of Equipment	Number of Nodes	Number of directions	Name of Directions	Number of links down, with details	Details of corrective action, if any, taken

(5) Preventive maintenance schedule and its compliance:

Date of Last Preventive maintenance	Maintenance carried out as per schedule? (Yes / No)	Whether all the defects have been attended? (Yes / No) Give details

III. OPGW / Optical Fibre Details

Number of Directions	**Name of Direction**	**No. of Pairs**	**No. of Fibers used**	**No. of spare & healthy Fibers**	**Unarmoured cable laid within PVC/Hume duct pipe?**	**Fibre Count in OPGW? Whether matching with Approach cable to FODP?**	**Overall Optical Fibre Path Attenuation (dB/km)**	**Power Received**	**Conformation to Compliance of CEA Standards**

IV. Healthiness of Auxiliary System:

(1) Details of 2 independent Power Sources :

Source	Commissioning Date	Battery Back up (Hour)	Battery capacity (AH)	Supply Voltage (V)	Healthiness of Battery (Yes / No)	Make of Charger	Charger Capacity (A)	Periodicity of Maintenance Schedule	Date of Last 2 Actual Maintenance carried out	Remarks
1										
2										

(2) Conformation to Compliance of CEA Standards :

V. Healthiness of Earthing of each equipment:

Sl	Equipment	Status on Healthiness of Earthing

VI. Details of Voice communication available between Sub-station and Control Centre:

Sl	Voice communication (Sub-station - Control Centre)	Status on Healthiness of Voice communication	Healthiness of air-conditioning of communication room as per OEM recommendation

VII. PLCC Details:

Number of Panels	Make and Model	Direction	Frequency (Tx & Rx) KHz	Status on Healthiness	Last preventive maintenance		Details of defects, if any, attended	Status of Availability of Spares	Conformation to Compliance of CEA Standards
					Schedule	Actual			

VIII. Radio Communication Details:

Number of Equipments	Make and Model	Status on Healthiness	Last preventive maintenance		Details of defects, if any, attended	Status of Availability of Spares	Conformation to Compliance of CEA Standards
			Schedule	Actual			

IX. Data Retention :

(i) Earliest Date of availability of data: _____

(ii) Historical data availability : ____ days.

X. Control Command Delay :

(i) Time delay in seconds from Control Centre for SCADA : ____ Seconds

(ii) Time delay in seconds from Control Centre for WAMS : ____ Seconds

XI. Wide Band Network :

(i) Absolute channel delay in protection applications : _____ ms

(ii) Channel delay asymmetry in protection applications : _____ ms

(iii) Switching Time delay to alternate path/route during failure of one path : _____ ms

XII. Any other information :

Audit Team Member	Audit Team Member	Audit Team Member	Audit Team Member
SRPC	Co-Ordinator	PGCIL (Internal / External)	State (Internal / External)

Communication Audit Checklist (Annexure-II)

S.No	Check list points	Expected	Actual	Reference
1	Whether OPGW is terminated properly. Down lead shall be fixed property in sufficient locations. Metallic part shall be connected to earth mat riser.	Yes		
2	Distinct approach cable shall be laid 1 Protection & Communication 2 Fibers for commercial applications Item no 1 cable shall be terminated in communication room FODP One number FODP panel shall be available in communication room			
3	Fiber Identification shall be done in FODP properly			
4	Whether End to end tests were carried out during installation and records are available (both Optical Power Source/receiver testand OTDR Test results			
5	Whether patch chords 1 Cross labelled (source/ receive) 2 Tx – Rx Marking 3 Mechanical protection is provided for pach chords laid between panels			
6	Whether separate room for communication is available with following:- 1 Air conditioning with standby A/C Unit 2 AC Distribution board with ELCB 3 Single point earthing bar which shall be connected to substation Earth mat			
7	Two sets of 48 V (Positive Earthed) DC Systemshall be available with 1 Common DC Distribution board/ Panels with incoming MCB, coupler MCB , out doing MCBsetc 2. Minimum 200 Ah (2 sets of battery) VRLA batteries are preferred to keep chargers and battery in communication room. 3. Battery Charger shall be Thryristorised/SMPS			
8	Battery Charger alarms /measurements shallbe made available to SAS (if available) It can be achieved through MOD bus or connecting analogue/ digital signals to Common BCU of SAS. If such system is not available major			

	alarms shall b alarmed in common substation annunciator			
9	2 nos of substation Data (From RTU or SAS Gateway)shall route in different roots to Main and Standby Load Dispatch centres			
10	Kindly assure proper protection is available for AC Distribution (ELCB, MCB, Backup fuse),			
11	Aux Transformer neutral Earthing shall be connected to Stations earth mat (Aux Transformers shall be installed in yard earth mat area only)			
12	Whether DG sets with AMF panels are provided for Aux AC Supply			
13	Whether 2 nos 11 kV (or 33kV) supplies are available for Each station aux Transformer			

Final Standard Operating Procedure (SoP) for Communication System Outage Planning

1. As per the following CEA and CERC Regulations, the Communication Outage for the Region shall be carried out by RPC Secretariat:
   a) Regulation 7.3 of Central Electricity Regulatory Commission (Communication System for inter-State transmission of electricity) Regulations, 2017 stipulates as below:

   Quote:

   7.3 Role of National Power Committee (NPC) and Regional Power Committee (RPC):

   ……

   (iv) The RPC Secretariat shall be responsible for outage planning for communication system in its region. RPC Secretariat shall process outage planning such that uninterrupted communication system is ensured.

   ……

   Unquote

   b) Regulation 10 Central Electricity Authority (Technical Standards for Communication System in Power System Operations) Regulations, 2020 notified on 27.02.2020 envisages as below:

   Quote:

   10. Outage Planning: Monthly outage shall be planned and got approved by the owner of communication equipment in the concerned regional power committee, as per detailed procedure finalized by the respective regional power committee.

   Unquote

2. A Communication System Outage Planning Sub-Group/ TeST Sub Committee shall be formed in each region constituting the members from all the entities connected to ISTS including all CGS, ISGS, REGs/SPPDs/SPDs, STUs, SLDCs etc., of the respective Region, RLDC/Grid-India, PGCIL, CTUIL, Private Transmission licensees in respective region & RPC secretariat. The sub-group/ Sub Committee may co-opt any other member from any organization for facilitating the activities of the sub-group/ Sub Committee.

3. Communication System Outage Planning will be limited to the following systems:
   (i) ISTS Communication System including ISGS
   (ii) Intra-state Communication System being utilized for ISTS Communication
   (iii) ICCP links between Main & Backup RLDCs, Main & Backup SLDCs & Main & Backup NLDCs.
   (iv) Inter-regional AGC links.

(v) Any other system agreed by the sub-group.

4. Communication Equipment/link within the scope of the Procedure would include :

   (i) Optic Fibre links
   (ii) Any other link being used for ISTS communication
   (iii) ICCP links between Main & Backup RLDCs, Main & Backup SLDCs & Main & Backup NLDC
   (iv) VC links between LDCs
   (v) Inter-regional AGC links
   (vi) SPS Links
   (vii) Tele-Protection
   (viii) AMR
   (ix) PMU
   (x) SDH & PDH
   (xi) DCPC
   (xii) RTU & its CMU cards
   (xiii) DTPCs
   (xiv) Battery Banks and Charging Equipment
   (xv) EPABX
   (xvi) Any other equipment/link agreed by the sub-group

5. A Web Portal named as "Communication System Outage Planning Portal" shall be developed by respective RLDCs. Log-in credentials shall be provided to all the ISTS connected entities/concerned entities.

6. Entities/Users/Owners shall add their communication links and the equipment to the Web Portal as soon as they are commissioned. The same has to be furnished to RPC Secretariat /RLDCs.

7. Entities/Users/Owners of the communication equipment shall upload the outage proposals of communication links and the equipment (in the prescribed format only) to be availed during subsequent month by 7th/8th of every month in the Web Portal.

8. RPC Secretariat consolidates the list of outage proposals received from various Entities/Users/Owners of the communication links and equipment by downloading from the Web portal and circulate the same among all the respective region entities by 15th of every month. Communication outages affecting other regions would be coordinated by respective RLDC through NLDC.

9. Communication System Outage Planning (CSOP) meeting shall be conducted during the third week of every month normally (preferably through VC) to discuss and approve the proposed outages of communication links and equipment.

10. The approved outages of Communication links and equipment in the CSOP meeting shall be published in the RPC website and respective RPCs Communication Outage Portal within 3 days from the date of CSOP meeting.

11. Outage of the approved communication links and equipment shall be availed by the respective owner /entities after confirming the same with RLDC on D-3 basis.
12. In case of any emergency outage requirement of communication links and equipment, Entities/Users/Owners may directly apply to respective RLDC with intimation to respective RPCs on D-2 basis. Confirmation of approval/rejection will be provided on D-1 basis by RLDCs in consultation with respective RPCs considering 24hrs processing window.
13. Entities/Users/Owners shall take the code from the respective RLDC before availing the planned outage of the communication links & equipment and before restoration of the same.
14. Entities/Users/Owners of the communication links and equipment shall submit the deviation report for the approved outages (approved dates & approved period) availed during the previous month and the report on planned / forced / other outage of communication links / equipment by 10th of the month to RPC Secretariat as per the format at **Annexure-I** .
15. In the monthly CSOP meetings, communication links and equipment whose outage duration (Planned / Forced / Others) more than 48 hours for the last 12 months of rolling period shall be deliberated for the measures to be taken in future for the better outage management. The date deviations and non-availing the outages that were approved in the previous CSOP meetings shall also be deliberated in the CSOP meetings.

Note: The manual for implementation of Communication System Outage Planning through web portal received from SRPC is attached at **Annexure-II** for ready reference.

***

Annexure: DCOA-I

Outage Deviation Report : List of outages of Communication Links, availed / deviated during the month of June, 2021

Dated :

A Details of Communication Links (Point to Point) availed :

SL	Name of Requesting Agency	Description of Link	Source	Destination	Channel Routing	Ownership	Reason for availing outage with the details of equipment attended	Approved Start Date : Time [dd-mm-yy<>hh:mm]	Approved End Date : Time [dd-mm-yy<>hh:mm]	Approved Outage Hours	Outage availed Start Date : Time [dd-mm-yy<>hh:mm]	Outage availed End Date : Time [dd-mm-yy<>hh:mm]	Total hours of outage availed now	Deviation ? (Y/N)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	**Example**	Back up Control Center (BCC) : Data	KAYATHAR 230 kV SS	MADURAI LDC	Data will be availble throu	TANTRANSCO	Shifting of FODB panel at Kayathar 230 KV SS	10-Mar-2021 09:00	10-Mar-2021 18:00	**09:00**	10-Mar-2021 14:07	10-Mar-2021 17:30	**03:23**	**N**

Annexure: DCOA-II

Outage Deviation Report : List of outages of Communication Equipment availed / deviated during the month of June, 2021

Dated : **00:00**

B Details of Communication Equipment availed :

SL	Name of Requesting Agency	Name of the communication equipment	Location of the Equipment / Name of Station	Name of the Link/Channel/Path / directions affected	Alternate Channel/Path available ? (Furnish details)	Ownership	Reason for availing outage with the details of faults	Approved Start Date : Time [dd-mm-yy<>hh:mm]	Approved End Date : Time [dd-mm-yy<>hh:mm]	Approved Outage Hours	Outage availed Start Date : Time [dd-mm-yy<>hh:mm]	Outage availed End Date : Time[dd-mm-yy<>hh:mm]	Total hours of outage availed now	Deviation ? (Y/N)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	**Example**	DC Charger -2, Amararaja, 48v	Edamon	Nil	Nil	KSEBL	Monthly maintenance. No interruption as alternate chargers available	16-Mar-21, 11:00	16-Mar-21, 16:00	**05:00**	16-Mar-21, 10:30	16-Mar-21, 16:00	**05:30**	**Y**

COMSR

MANUAL-2023

ग्रिड-इंडिया
GRID-INDIA

PREPARED BY

SRLDC, GRID-INDIA

Table of Contents

1. Need for Communication Outage Portal?

In line with the requirements for outage planning of communication equipment as per CERC Communication System for Inter State Transmission of Electricity Regulations 2017, SRPC has devised a procedure for Outage planning for Communication system in Southern Region available at the website of Southern Regional Power Committee (SRPC) (https://www.srpc.kar.nic.in/website/2020/communication/com_outg_proc.pdf) and attached as **Annex-I**. As per the "Procedure on Outage Planning for Communication System -SR", monthly meetings are being conducted with participation of Nodal Officers from users, SLDCs, SRLDC, SRPC & CTU. These meetings are conducted to discuss and approve/reschedule / dispose of the proposed list of outages pertaining to communication links / equipment scheduled for the next month. In order to provide a seamless experience for applying and availing communication outages and monitoring availed outage timelines, SRLDC has developed a web portal which is used to register communication equipment/links, configure outage proposals for already registered equipment/links, view deviations between approved outage timelines and actual outage timelines .The web portal facilitates entering observations/remarks by RLDC/RPC on any outage proposal with the facility to concur/deny the proposal by SRPC.

2. COMSR (Communication Equipment Outage Coordination Meeting - SR) Outage Portal:

The web portal is accessible through the following URL: https://srcom.srldc.in/login

2.1. Login Page:

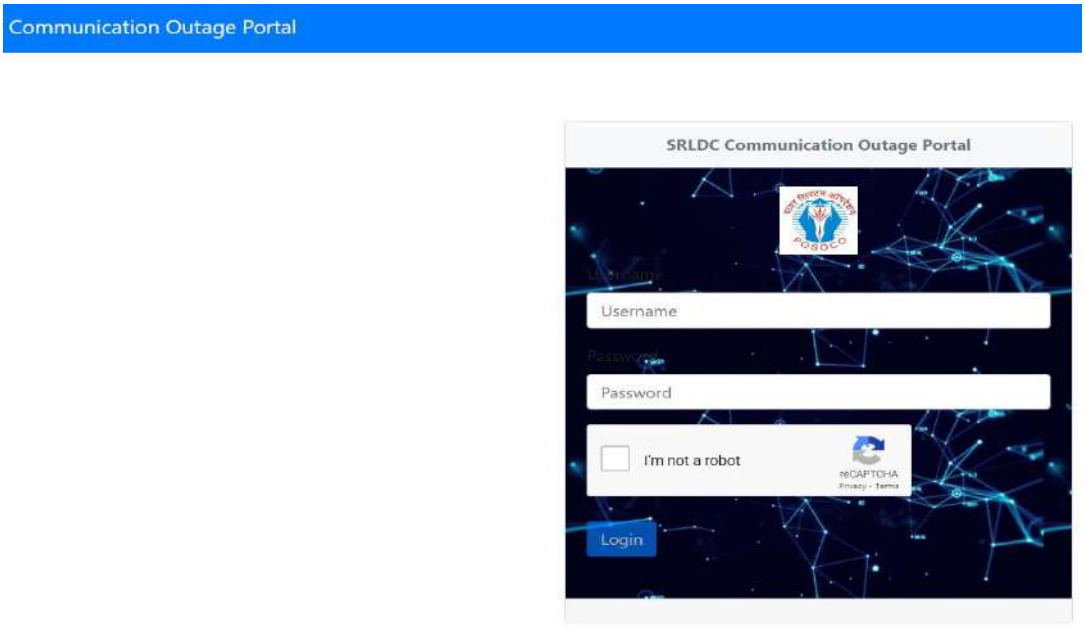


Figure 1 COMSR Portal Login Page

- User name & initial password are created and shared by web admin (SRLDC).
- Note: Password Change can be enforced after first time login.

2.2. Roles defined in the Communication outage portal

1. **Administrator (RPC)**
2. **Supervisor (RLDC)**
3. **User**
4. **Operator**

The administrator role is assigned to the respective RPC. Supervisor Role is assigned to the respective RLDC. User Role is assigned to each entity/utility, who can apply for outages. Operator Role is assigned to real time shift operators at RLDC.

- Only Administrator can approve/deny the proposed outages. Supervisor can provide remarks against each proposed outage and do necessary configuration and maintenance of web-portal front end and Db for smooth functioning of the entire process.
- Operator can view the portal for list of approved outages and issue codes for availing outages
- User can apply for the outages proposed for the next month and once the outage is approved, the respective user can view the approval details under their account login . User can also apply for emergency outages. User can also update the actual time duration (Start time, End time) of each outage availed.

2.3. Main Tabs in COMSR Portal:

- **Meetings**
- **Links**
- **Equipment**
- **COA1(Link) -** Communication Outage Approval for Communication Links
- **COD1(Link) -** Communication Outage Deviation for Communication Links
- **COA2(Equipment)-** Communication Outage Approval for Communication Equipment
- **COD2(Equipment) -** Communication Outage Deviation for Communication Equipment
- **Rolling Report- 12 Months Outage Time > 48hours**
    - **COD3- Communication Outage Rolling 12 Months Deviation – Links**
    - **COD4-Communication Outage Rolling 12 Months Deviation - Equipment**

Note:
1. Formats for COA1, COA2, COD1, COD2, COD3 & COD4 have been finalized by SRPC.
2. All Reports can be downloaded from the web portal in Excel Format

2.4. Meetings Tab

Figure 2 below shows the Meeting summary Page, where details for upcoming monthly meeting can be configured with a unique meeting number for each meeting. The details configured include opening and closing dates for receipt of applications for

communication links/equipment outages proposed for next month (M+1month outages proposed in timelines defined in Mth month).

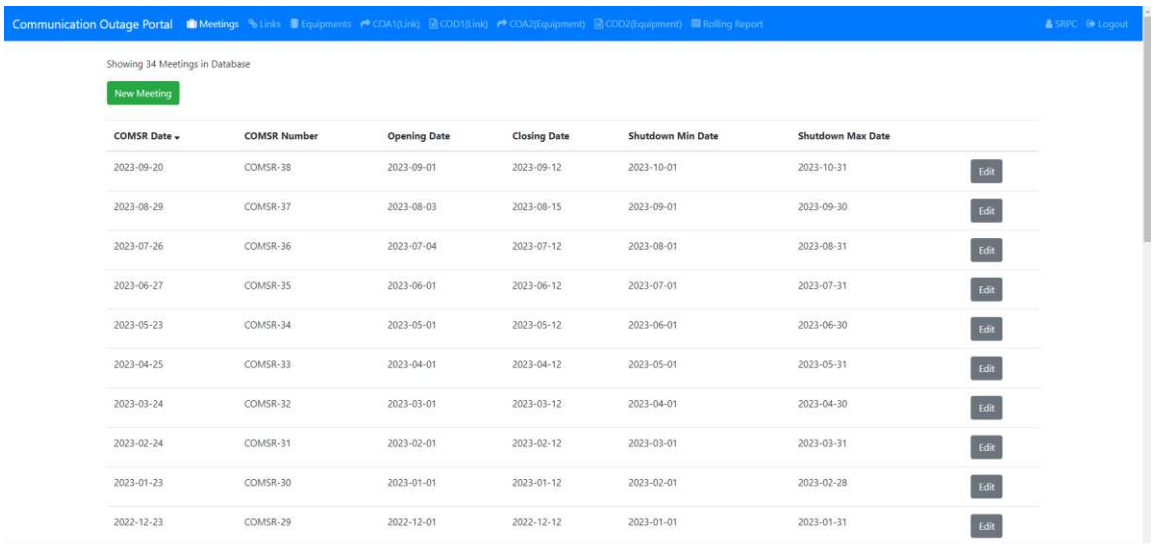


Figure 2 Meeting summary Page

A sample meeting creation page screen in shown in Figure 3 below:

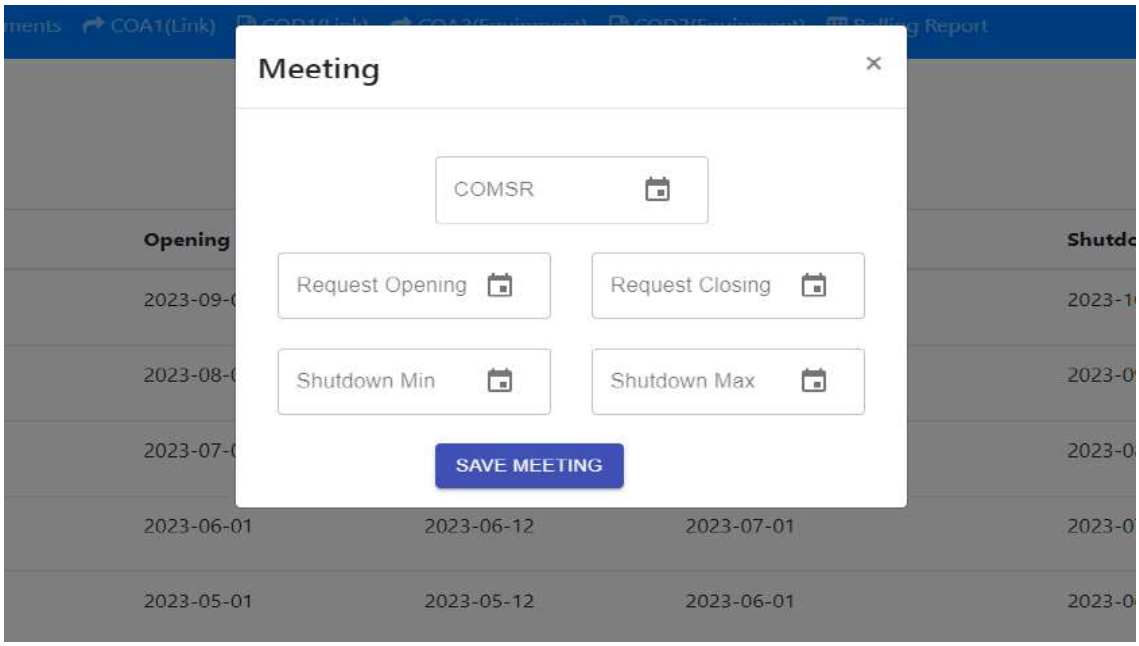


Figure 3 New Meeting Creation Page

All options available on this webpage are customisable and presently the meeting creation option is automated with default Opening and Closing dates for proposed outages as 1st and 12th of the current month.

2.5. Work Flow for availing communication outages:

RPC (Administrator Login) configures the upcoming COMSR Meeting details in the web portal through manual/automated mode and intimation for the next meeting is sent to all stakeholders through e-mail.

2.5.1. Planned Outages:

- User can apply planned outages for the M+1 month by furnishing various details during current month (M) window (planned outages to be submitted between defined timelines---*opening and closing date* as shown in Figure 3 above) and the applied outage details intimation are sent automatically through mail to RLDC and RPC by the portal itself.
- User can edit their applied outages till end of c*losing date* of requests for M+1 Month.
- RLDC can provide observations for the proposed outages.
- RPC consolidates the list of outage proposals received from various Users/Owners and releases the list around mid of the M^{th} month for outages proposed for M +1 month.
- On the meeting date, the proposed outages are deliberated, and RPC approves, revises or rejects the applied outages as per the outcome of discussions.
- Facility has been provided in the portal for RPC to change/defer (approval/rejection) of approved requests till D-1 day (D being the day of availing outage).
- User need to intimate RLDC about availing approved outages(confirmation) before D-3 through email (D being the date of availing outage).
- A consolidated view of day-wise approved outages is available under Operator Login. The facility has been made available to enable Grid Operators to issue unique codes to the concerned user seeking equipment/link outage on the day of outage.

Detailed flowcharts covering activities involved in creating a meeting instance on web portal, entering of planned outages by Users, provision for entering review/observations by RLDC/RPCs, discussions on proposed outages in monthly meeting, approval/denial of proposed outages, availing of outages on the proposed dates, computing deviations between actual outage timeline with proposed timeline and preparation of Rolling Window for outages for last 12 months are depicted in figures 4 and 5 below.

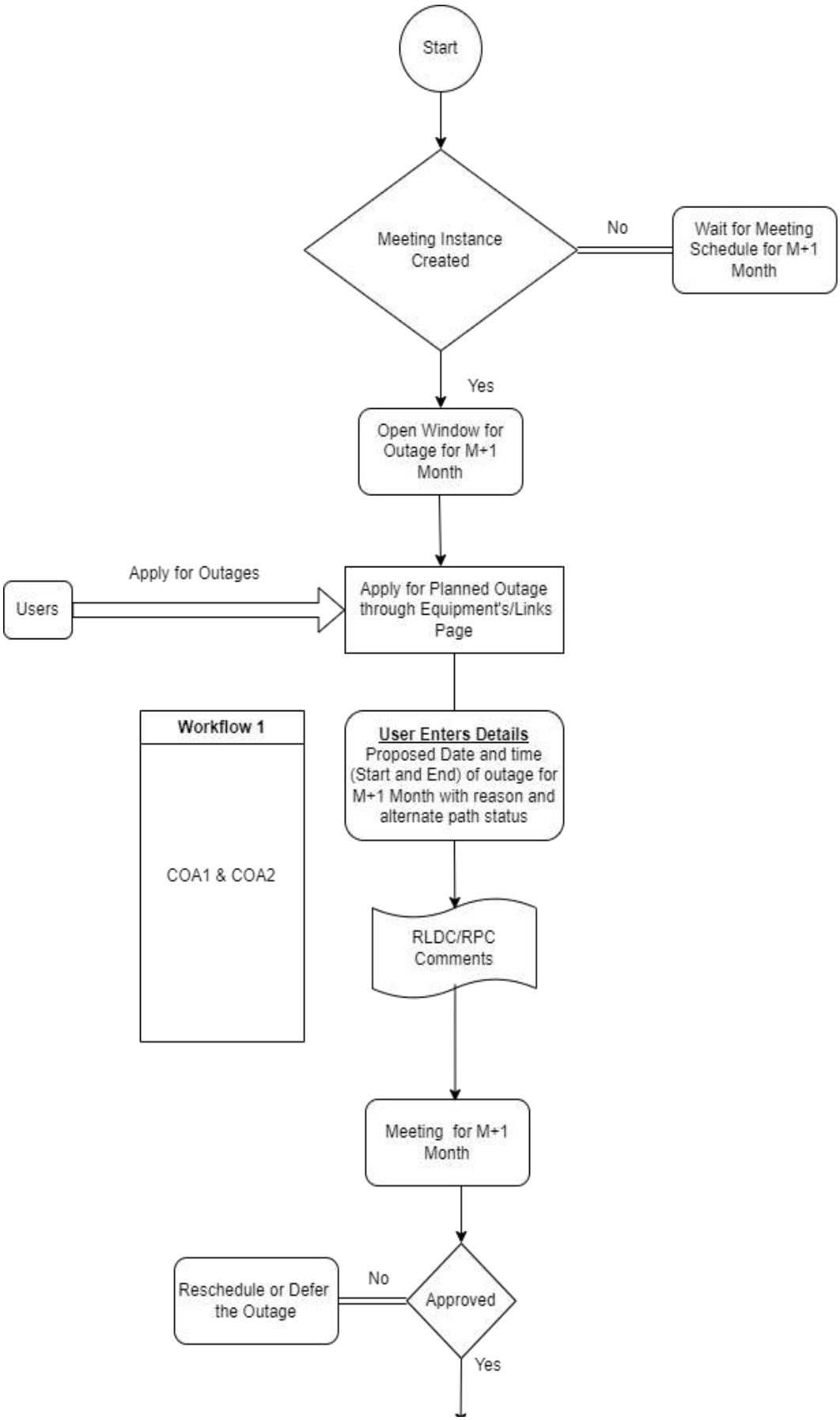


Figure 4 Flowchart for Planned Outage processing through web portal

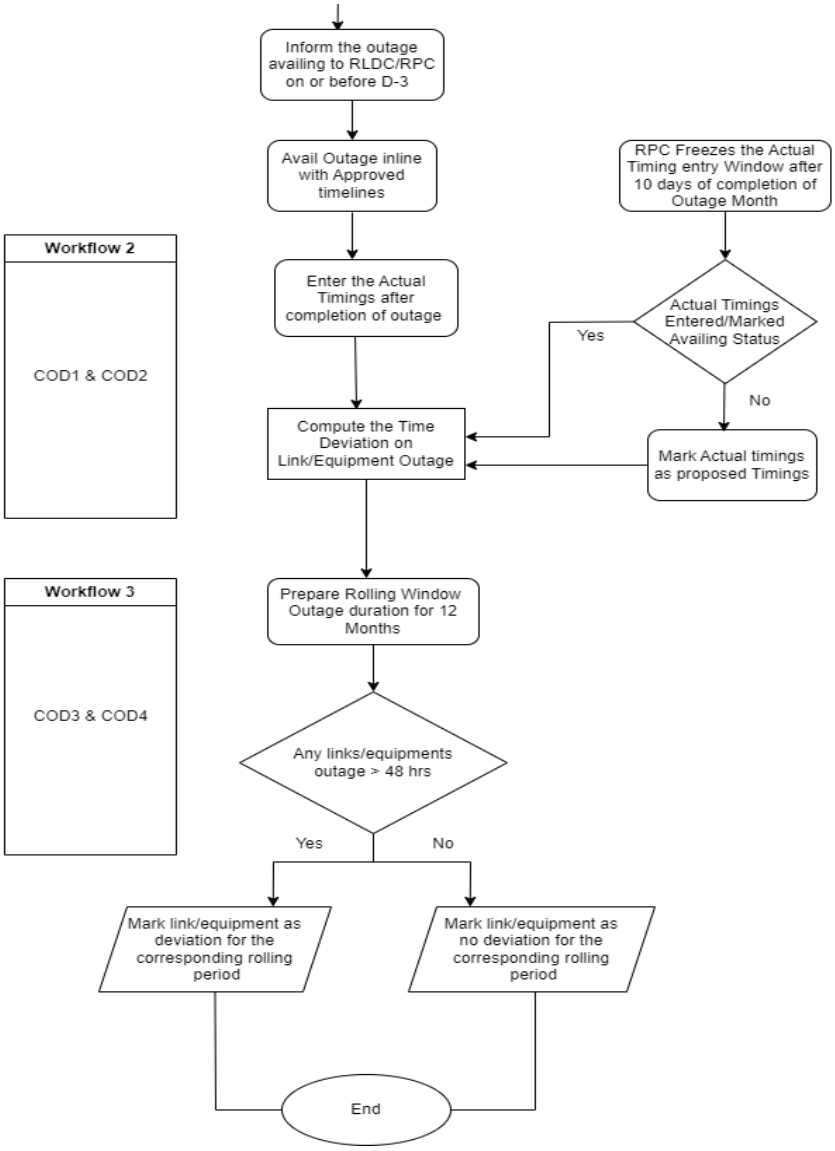


Figure 5 Flowchart for availing approved outages and entering deviations between approved/actual outage timelines through web portal

2.5.2. Emergency & Forced Outages:

- User can apply Emergency outages for D Day on D-1 Day i.e1 Day before the proposed outage. The details of applied Emergency Outage will be sent to registered email ids of RLDC and RPC for concurrence.
- User can submit details for Forced outages availed for links/equipment in previous Month (M-1) till 12th of the current Month(M). The details of reported Forced Outages will be sent to registered email ids of RLDC and RPC.

Flowchart covering various activities involved in application and approval of emergency outages is depicted in Figure 6 below.

Flowchart covering various activities involved in reporting of forced outages and its inclusion in 12 months rolling report is depicted in Figure 7 below.

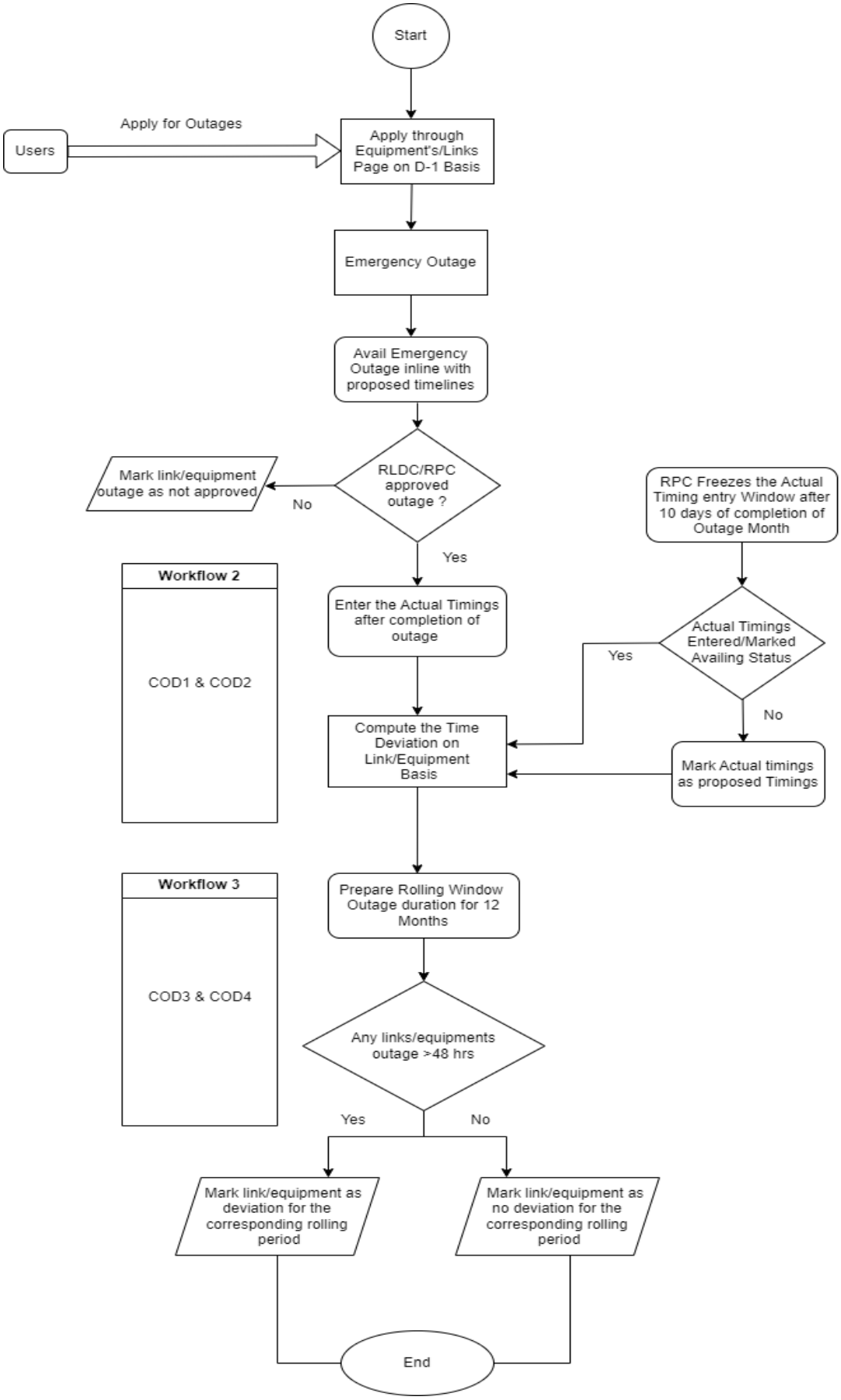


Figure 6 Emergency Outage Workflow

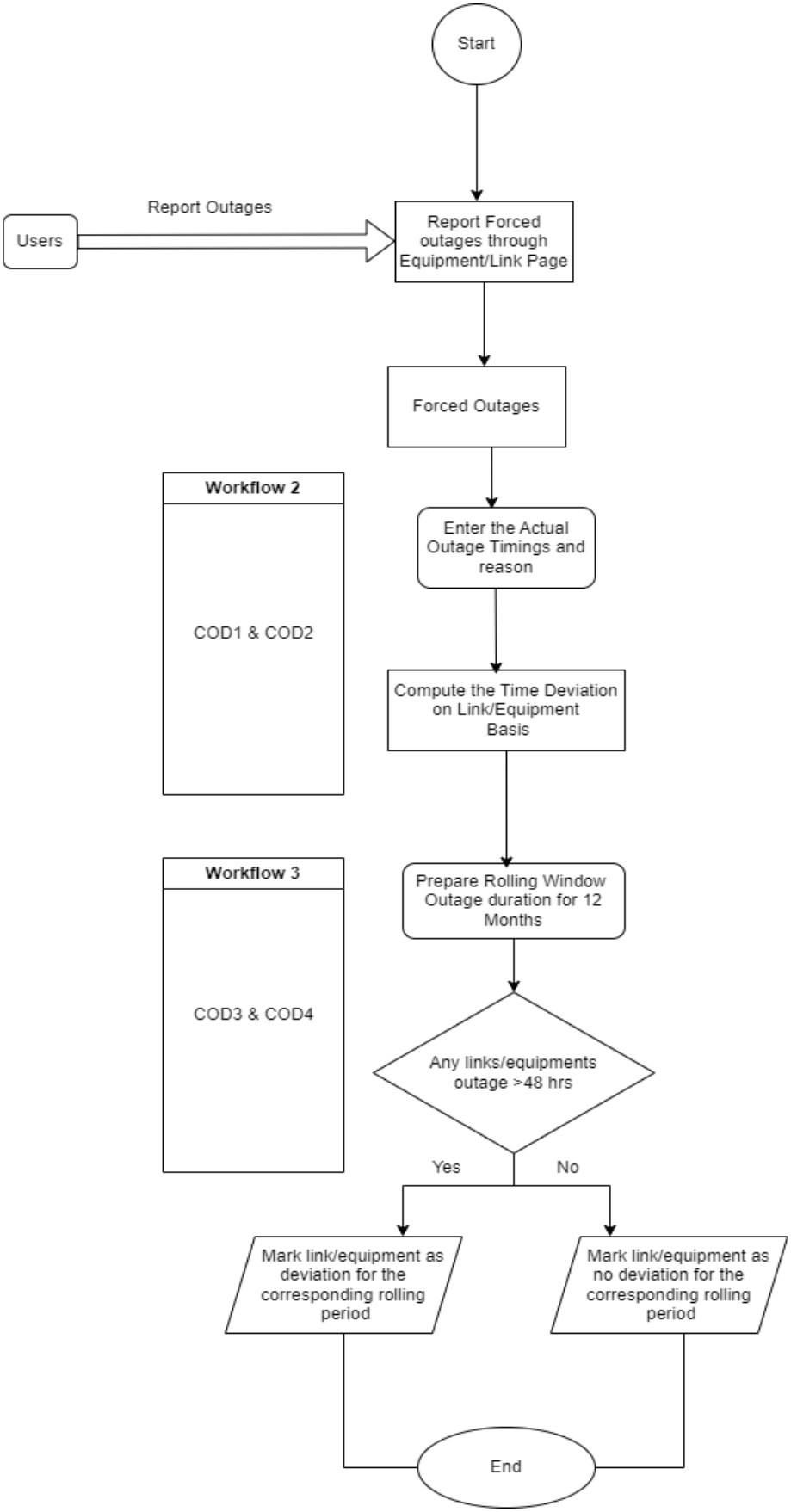


Figure 7 Forced Outage Workflow

2.6. Adding new/modified Equipment/Link to the portal database:

- Under the **Equipment** Tab, provision is there for User to add new/modified equipment details and request RPC/RLDC for addition/updating of the equipment in COMSR Database through "Request to Add new Equipment to Database option". Screenshot of the "Create New Equipment" widget is shown in Figure 8 below.

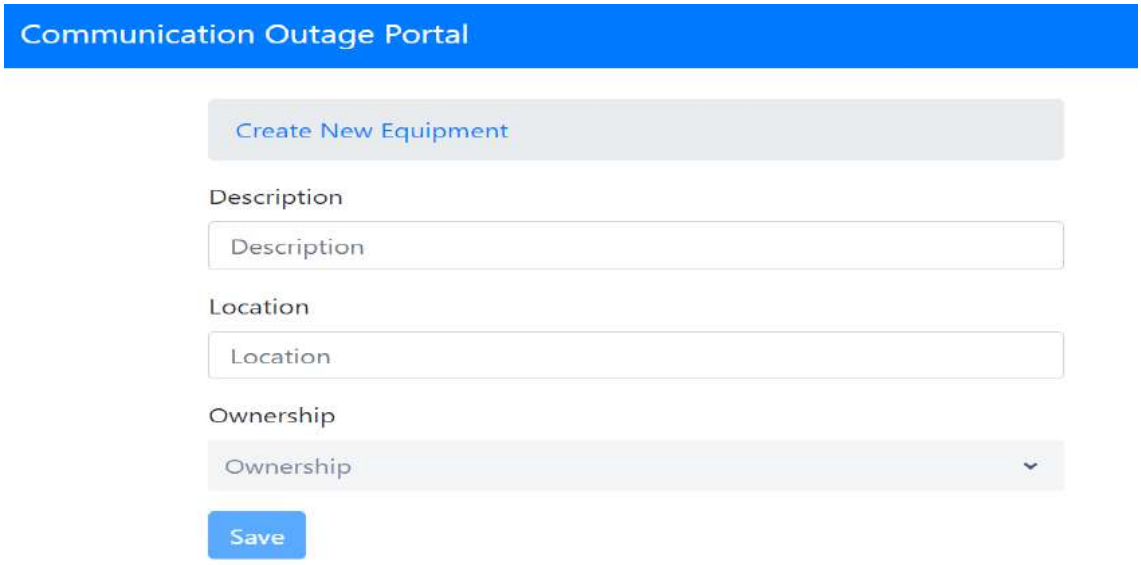


Figure 8 Create new Equipment Request screen

Similarly, any new/modified Communication Channel (links) can be added through the **Links** Tab by User and User can further request RPC/RLDC for approval of addition of the same in Communication outage portal database, Screenshot of the "Create New Link" widget is shown in Figure 9 below.

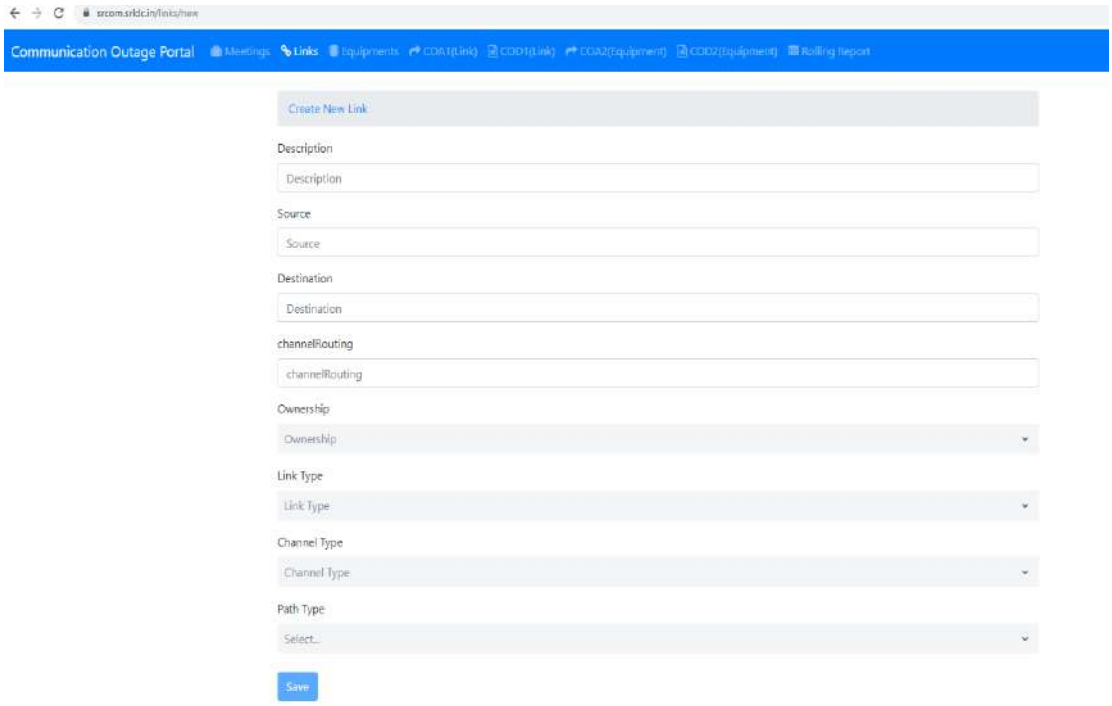


Figure 9 Create the communication Channel screen

Workflow depicting activities involved in adding new/modified Equipment/Link to the portal database is depicted below (Figure 10).

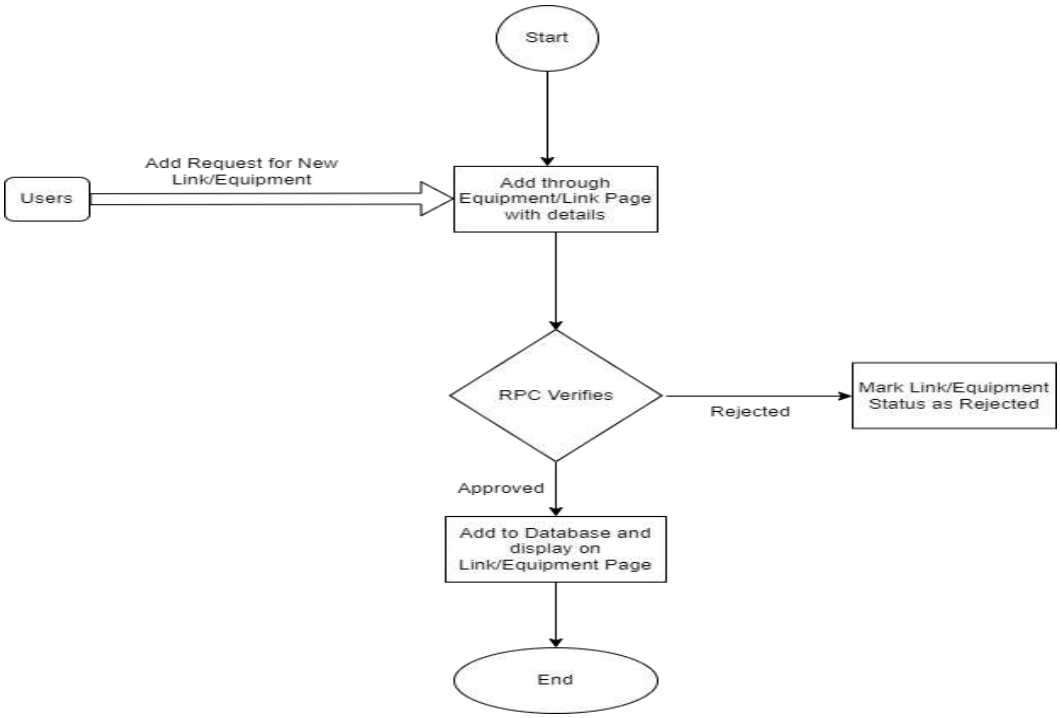


Figure 10 Adding New Links/Equipment's Workflow

Once a user requests for the addition/modification of the communication equipment or links, the request is forwarded to RPC for approval. Screenshot of widget showing the pending equipment/link approval of respective RPC/RLDC sample view is shown in Figure 11 below.

Figure 11 Pending Approval Widget for equipment's

- RPC/RLDC can add/update the Communication outage portal database with equipment/links proposed by users through **Equipment** tab on the web portal which contains a widget for **Pending Equipment to be added to Database** or through **Links** tab on the web portal with a widget for **Pending Links to be added to Database.**

2.7. Links Tab

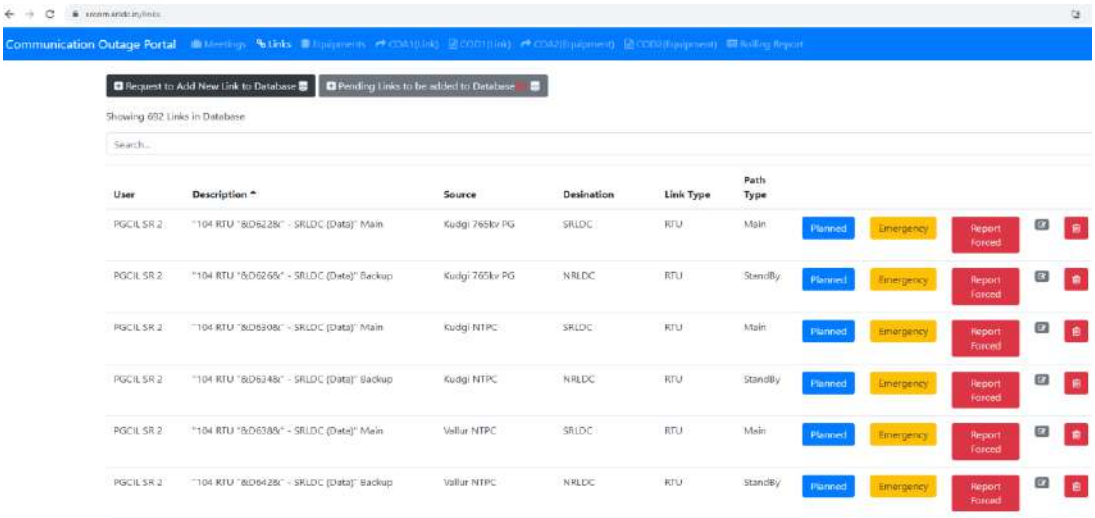


Figure 12 Links Tab sample screen

From **Links** tab, user can apply for proposed outages in communication links in either planned or emergency category and can also report the forced outages availed.

Sample View page screens for entering planned, emergency or forced outage details for communication equipment by the User are shown below in Figures 13,14 and 15 respectively.

2.7.1. Planned Outage Application for Links:

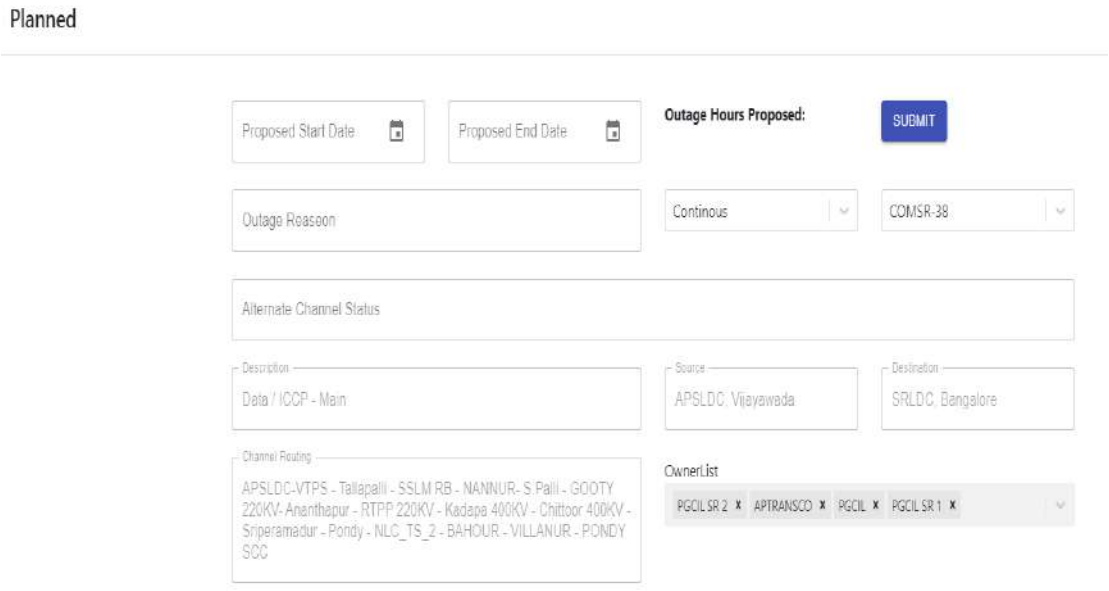


Figure 13 Planned Outage Application Screen for Links

2.7.2. Emergency Outage Application for Links:

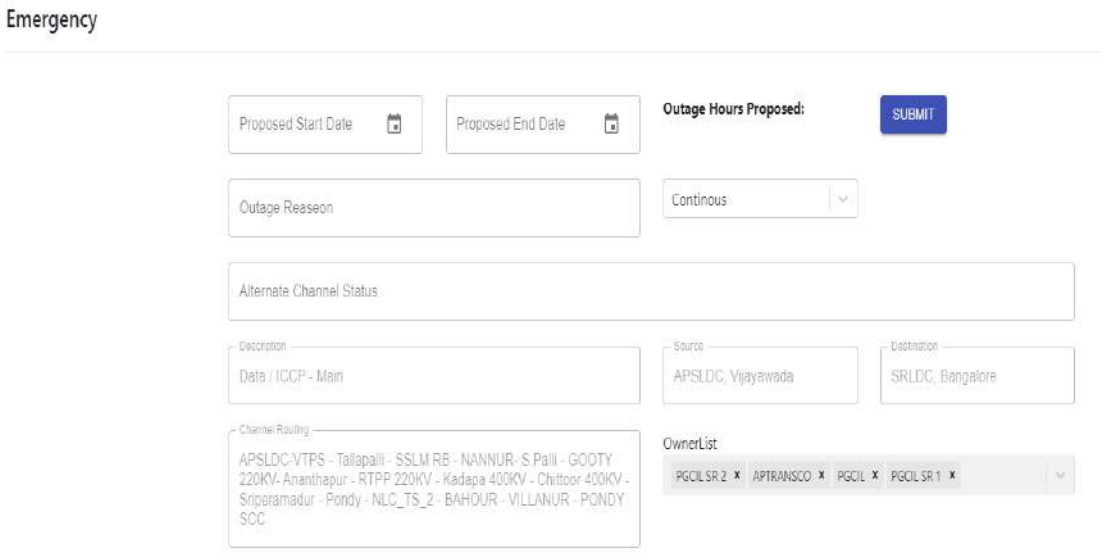


Figure 14 Emergency Outage Application Screen for Links

2.7.3. Forced Outage Reporting for Links:

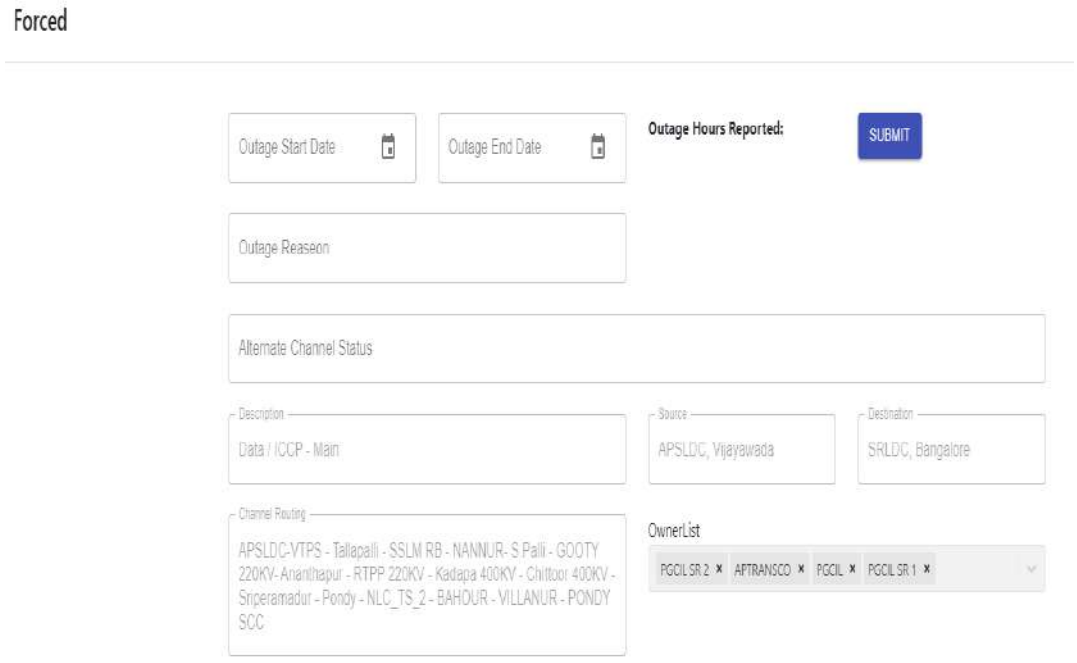


Figure 15 *Forced Outage Reporting Screen for Links*

2.8. Equipment Tab

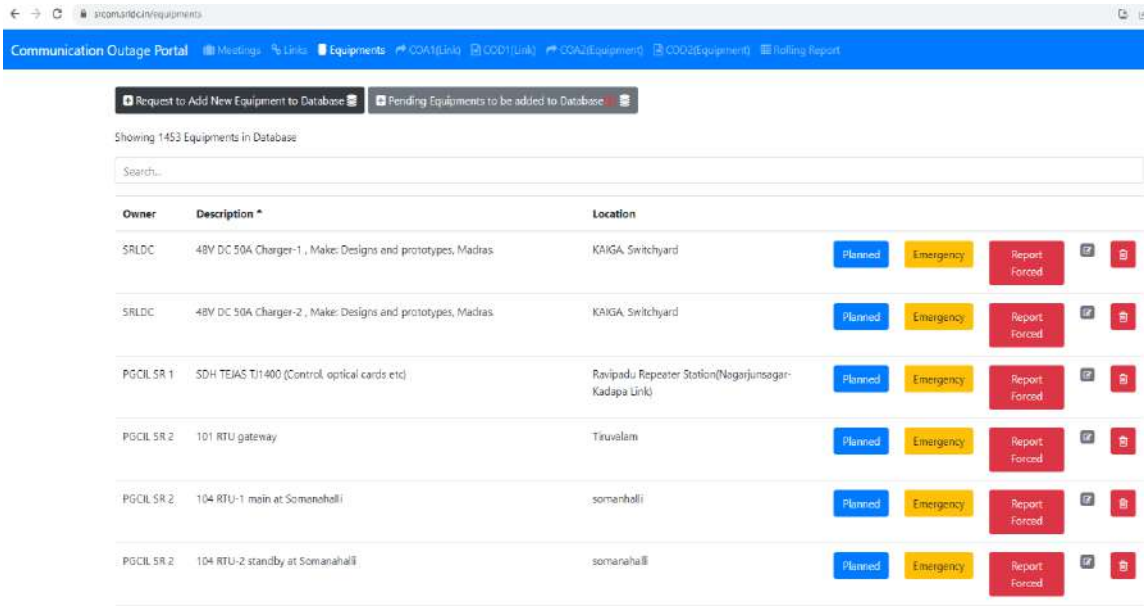


Figure 16 Equipment Tab sample screen

From **Equipment** tab (Figure 16 above), user can apply for proposed outages in communication equipment in either planned or emergency category and can report the forced outage availed. Sample View page screens for entering planned, emergency or forced outage details for communication equipment by the User are shown below in Figures 17,18 and 19 respectively.

2.8.1. Planned Outage Application for Equipment:

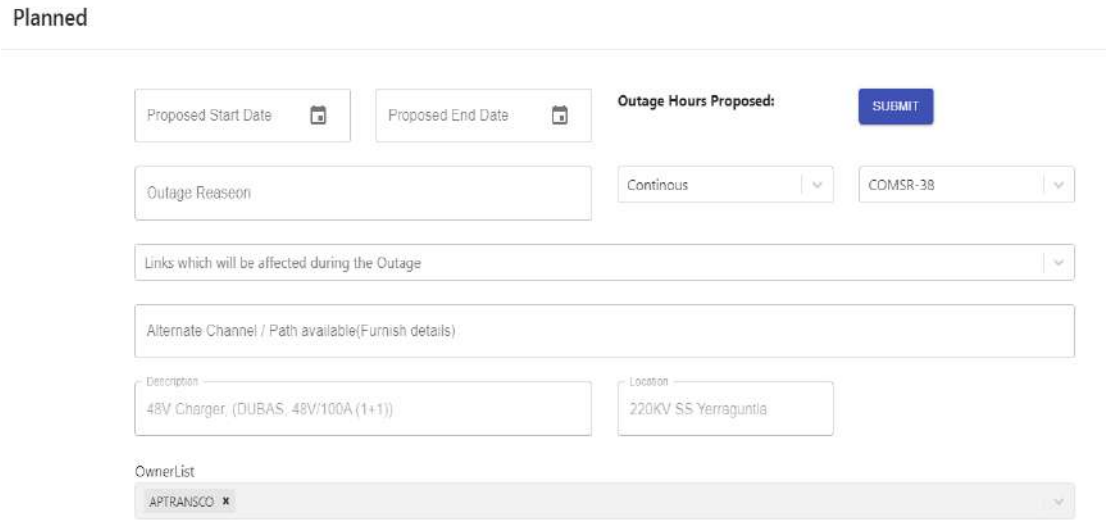


Figure 17 Planned Outage Application Screen for Equipment

2.8.2. Emergency Outage Application for Equipment:

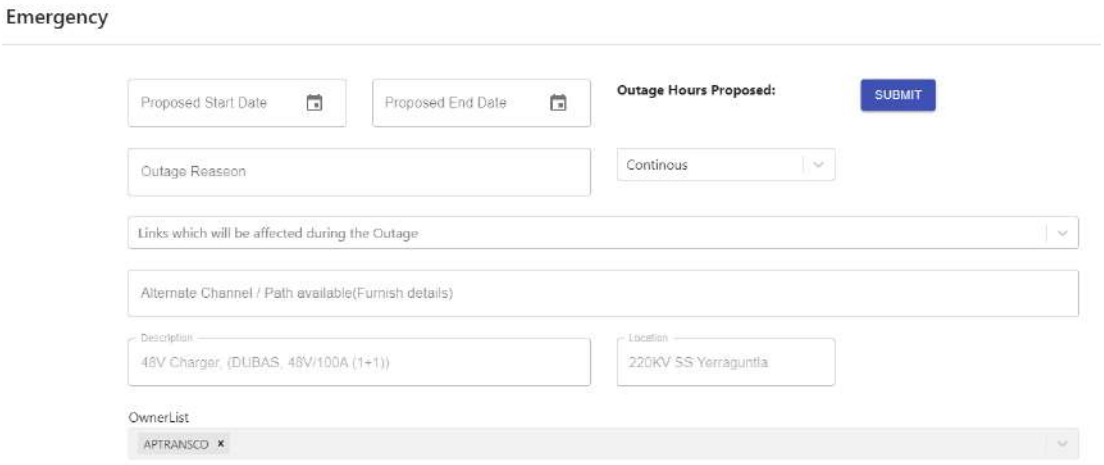


Figure 18 Emergency Outage Application Screen for Equipment

2.8.3. Forced Outage Reporting for Equipment:

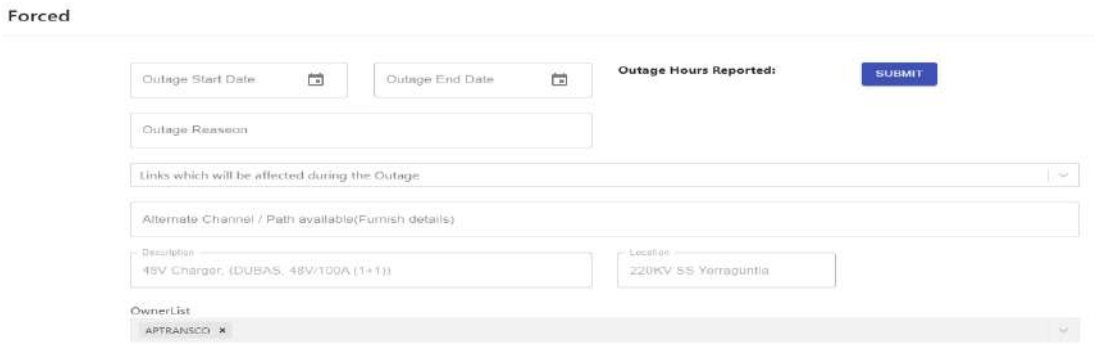


Figure 19 Forced Outage Reporting screen for Equipment

2.9. COA1(Link) - Communication Outage Approval Links

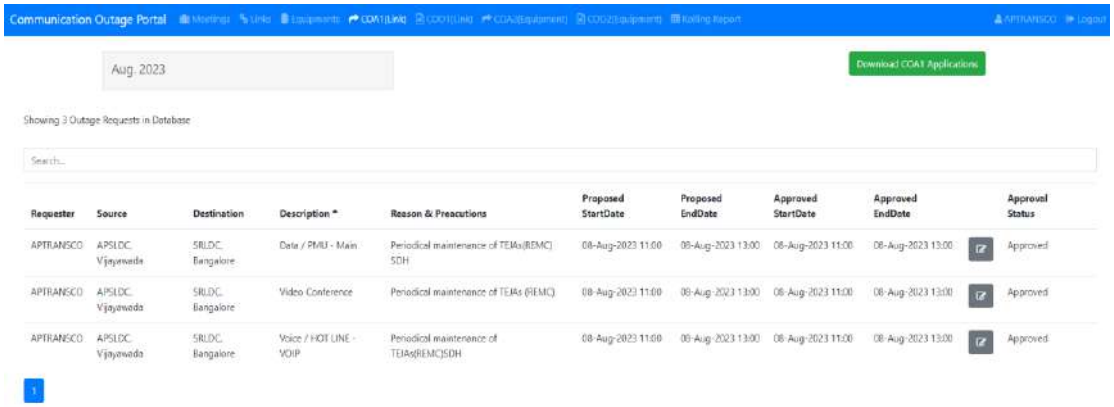


Figure 20 Communication Outage Application links (COA1) details for selected month

Through COA1 tab (Figure 20 above), Users can view the consolidated list of outage requests (for communication channels) submitted by them along with the current status of each outage request i.e., whether approved/rejected/revised (along with approved

timelines). Through this tab, users can edit their outage requests within the scheduled timeline window for submission of proposed outages.

Under Admin/Supervisor logins (RPC/RLDC) COA1 tab provides a consolidated list of all outage requests (for communication channels) from all users with proposed start and end date / time along with approved start and end date/ time for each outage.

2.10. COD1(Link) - Communication Outage Deviation - Links

Once communication link outage is approved in COMSR meeting, the final approved list for outage of communication links is communicated by RPC to all stakeholders and also updated on COMSR web portal. After availing the approved outage, concerned users have to enter the actual outage times (including start and end date, time) through COD1(Links) Tab (Figure 21 below) for communication channels

Note: In case of Emergency outage, approved start and end date times shall be null.

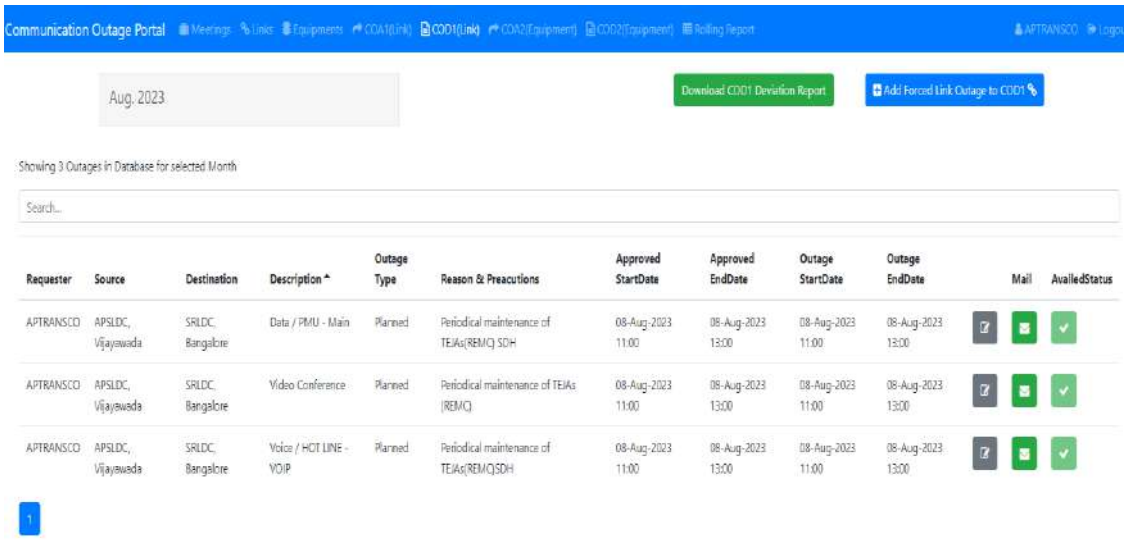


Figure 21 Communication Outage Deviation entry page for communication links (COD1)

Once the User enters the timings for actual outage duration for each approved outage, any deviation between the actual outage timing from the approved outage timing is computed and displayed in the COD1 tab. Sample screen for entry options available for Users against each approved outage under COD1 tab is shown in Figure 22 below. In case the user didn't avail the approved outage, user can select the "*Not availed*" option and submit the same in Communication Outage web portal. Similar Procedure is to be followed by Users for entering details of Emergency Category outages also.

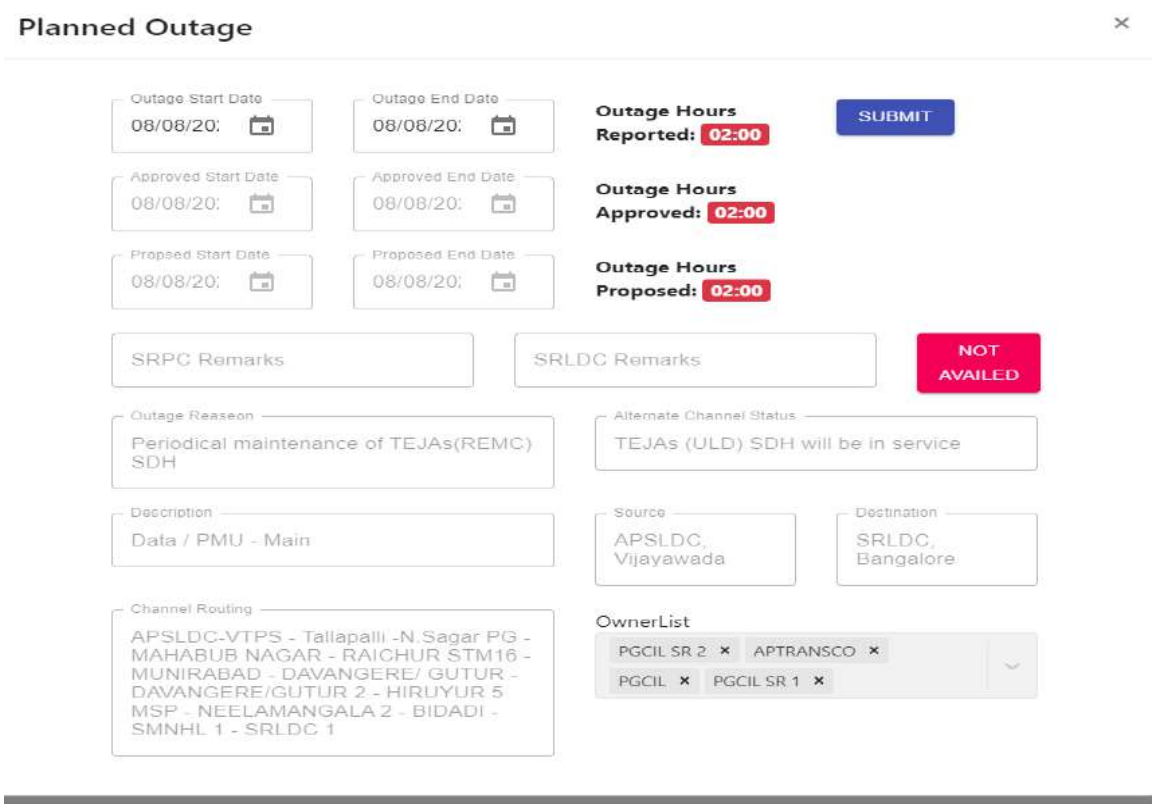


Figure 22 Planned Outage - actual time reporting entry screen

For reporting forced outages of communication links, user can use the "Add Forced Link Outage to COD1" Button which is located in the right corner of COD1(Links) Page (Fig. 22 above). On clicking this button, it shall navigate to Links Page where user can submit the details for the outage by selecting the respective links Sample screen for Forced Outage reporting widget is shown in Figure 23.

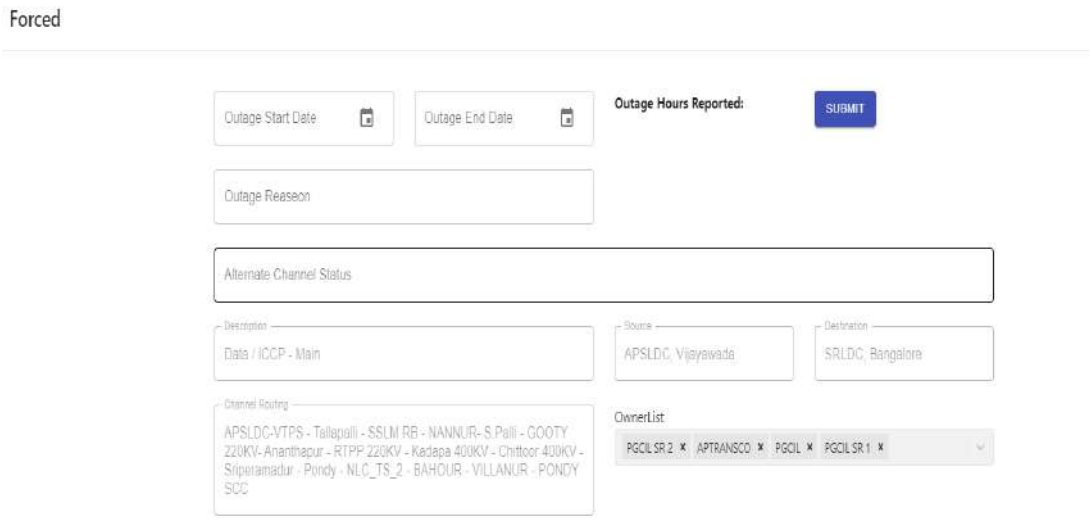


Figure 23 Forced Outage Reporting with actual outage times screen

2.11. COA2 (Equipment)- Communication Outage Approval for Equipment

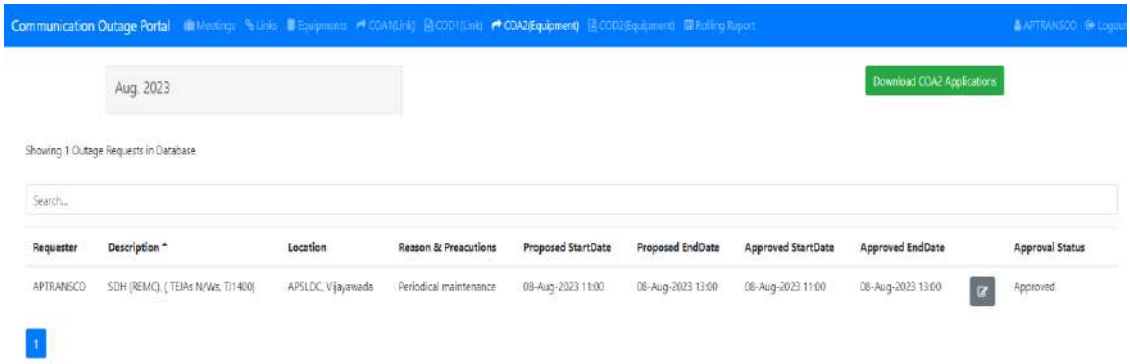


Figure 24 Communication Outage Application links (COA2) details for selected month

Through COA2 tab (Figure 24 above), Users can view the consolidated list of outage requests (for communication equipment) submitted by them along with the current status of each outage request i.e., whether approved/rejected/revised (along with approved durations). Through this tab, users can edit their outage requests within the scheduled timeline window for submission of proposed outages.

Through COA2 tab, RPC/RLDC can view consolidated list of all outage requests (for communication equipment) from all users with proposed start and end date / time along with approved start and end date/ time for each outage.

2.12. COD2(Equipment) - Communication Outage Deviation for Equipment

Once communication equipment outage is approved in COMSR meeting, the final approved list for outage of communication equipment is communicated by RPC to all stakeholders and also updated on COMSR web portal. After availing the approved outage, concerned users have to enter the actual outage times (including start and end date, time) through COD2(Equipment) Tab (Figure 25 below) for communication equipment.

Note: In case of Emergency outage, approved start and end date times shall be null.

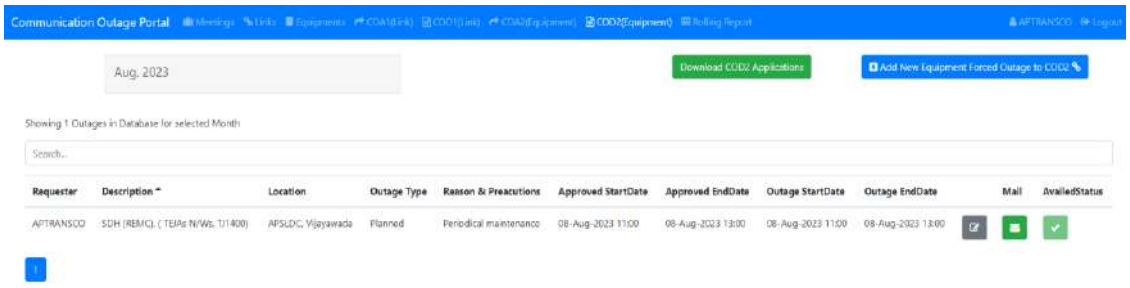


Figure 25 Communication Outage Deviation entry page for communication Equipment (COD2)

Once the User enters the timings for actual outage duration for each approved outage, any deviation between the actual outage timing from the approved outage timing is computed and displayed in the COD2 tab. The sample screen for entry options available for Users against each approved outage under COD2 tab is shown in Figure 26 below.

In case the user didn't avail the approved outage, the user can select the "Not Availed option" and submit the same in COMSR web portal. Similar Procedure is to be followed by Users for entering details of Emergency Category outages also.

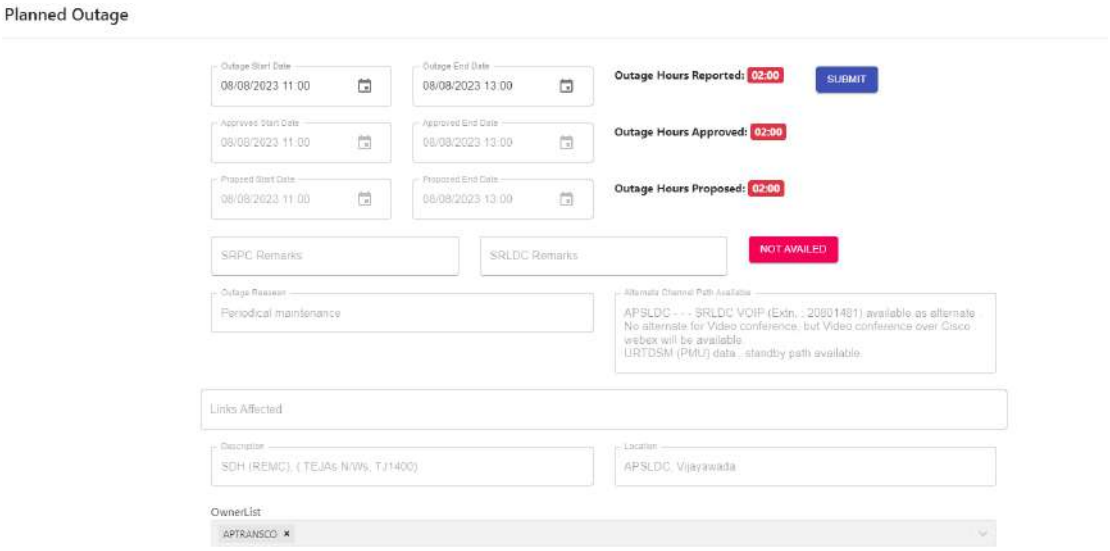


Figure 26 Planned Outage (Equipment) - actual time reporting entry screen

For reporting forced outages of communication equipment, user can use the "Add Forced Link Outage to COD2" Button located in the right corner of COD2(Equipment's) Page (Fig. 27 below). On clicking this button, it shall navigate to Equipment Page where user can submit the details for the respective Forced Outage.

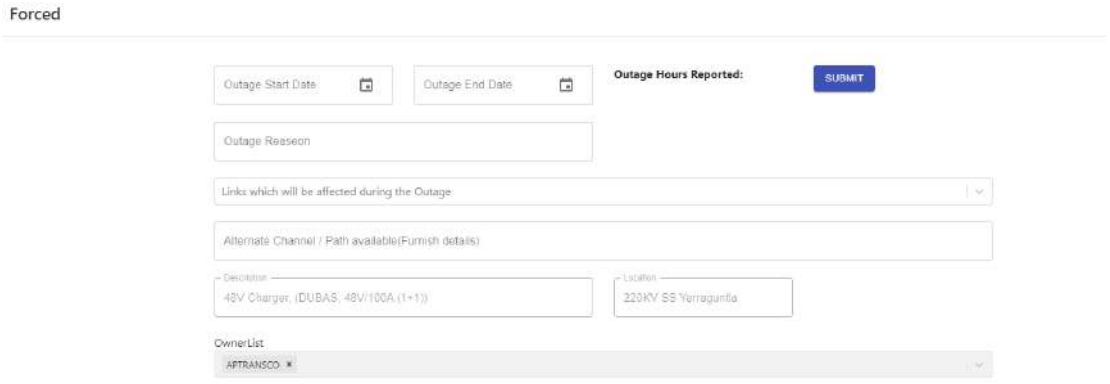


Figure 27 Forced Outage (Equipment's) Reporting with actual outage times screen

As per the approved Outage Procedure, all users/owners of communication equipment's/links need to submit the deviation report for outages availed by them in the M-1 month (considering M as current month) by 10th of the Mth Month. This requirement has been facilitated through the COD1(Links) & COD2(Equipment) tabs in the Communication Outage web portal.

Once this COD1 (links) & COD2 (equipment) is filled by respective Users/owners, RPC freezes the COD1& COD 2-page entry option after 10th of Mth month for outages availed in M-1 Month using "Freeze COD Application button" (Figure 28 and 29 below), available under Admin role login. In cases wherein the user has not entered the actual outage

timelines of approved outages, the portal automatically takes the approved outage timelines as actual outage timelines for planned outages. In case of emergency outages, if the user doesn't enter the actual outage timelines for the outage availed, the portal automatically takes proposed outage timings as actual outage timings. In all such cases, wherein User doesn't enter the actual outage timelines, the outage is deemed to be availed by respective entity.

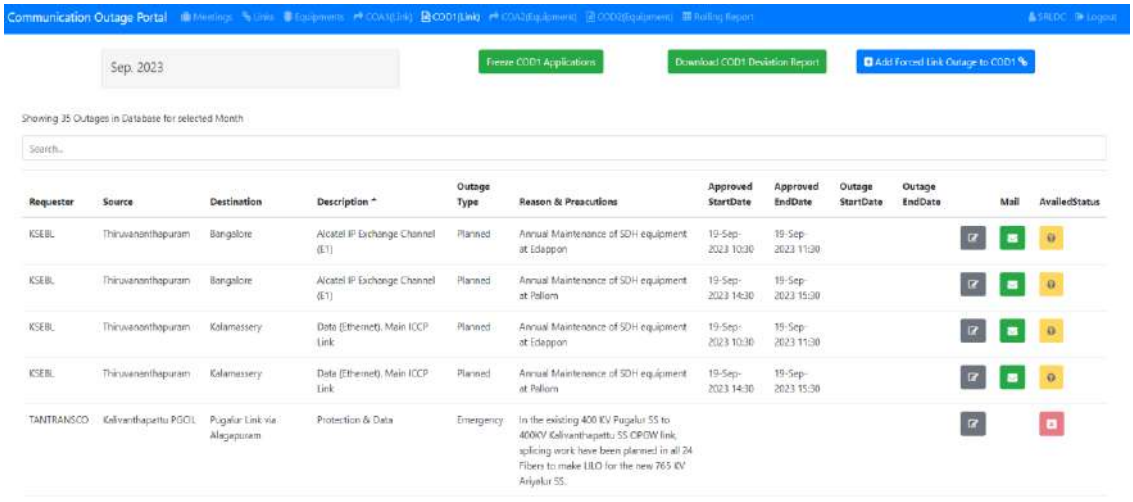


Figure 28 RPC view for Freezing COD1 Application.

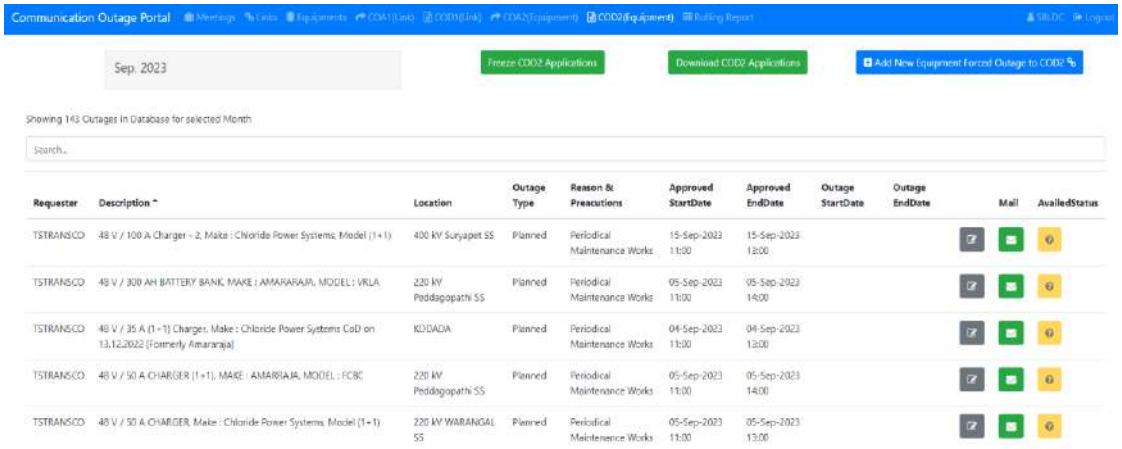


Figure 29 RPC view for Freezing COD2 Application

2.13. Rolling Report-- 12 Months Outage Time > 48hours

In order to monitor and highlight excessive outages of any of the communication link/equipment registered in the COMSR Db, Rolling Outage Reports for last twelve (12) months are provided which cumulatively adds the outage duration of communication links/equipment as per COD1/COD2 reports of last 12 months and summarizes the same in COD3 report (for communication links) and COD4 report (for Equipment). COD3 and COD4 reports are available for downloading in excel from the web portal. Sample screen showing download option is shown in Figure 30 and sample report format for COD3 (links) and COD4 (equipment) are shown in Figure 31 and Figure 32 below.

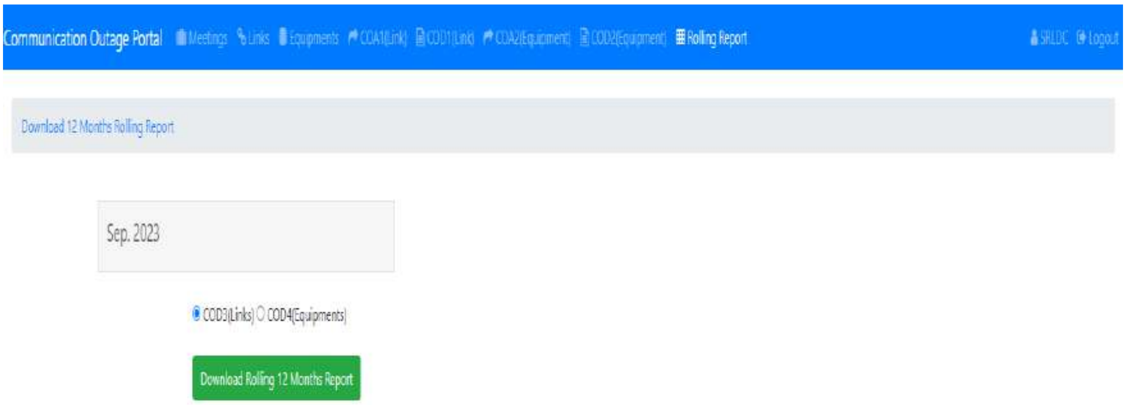
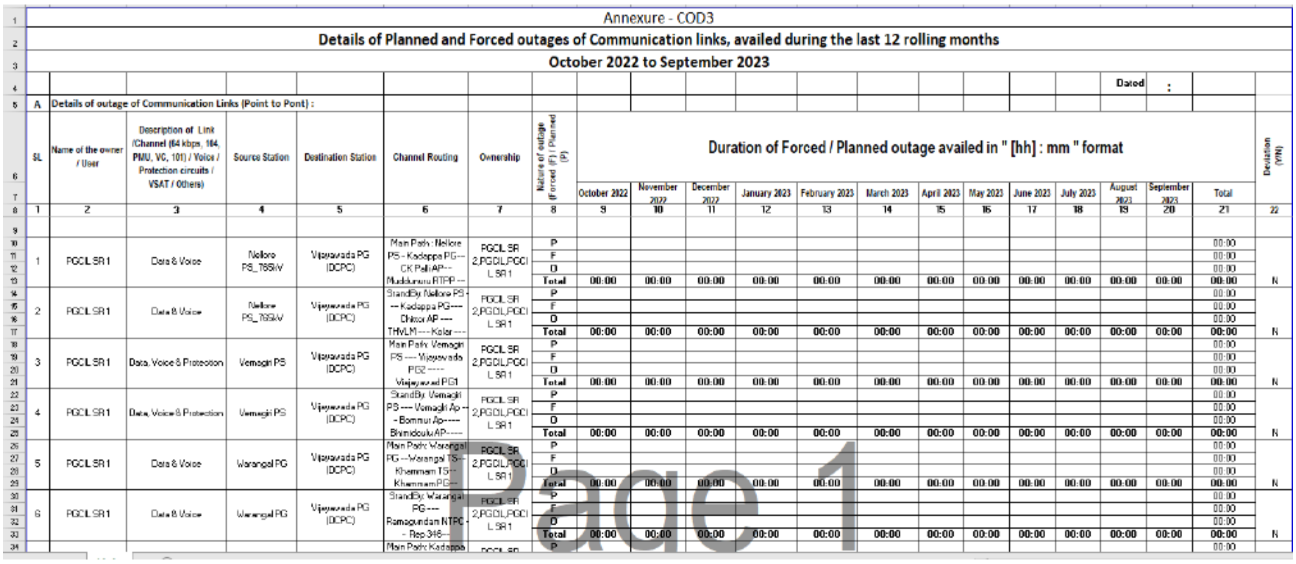


Figure 30 Rolling Report - 12 Months Outage Time download option



Annexure - COD3

Details of Planned and Forced outages of Communication links, availed during the last 12 rolling months

October 2022 to September 2023

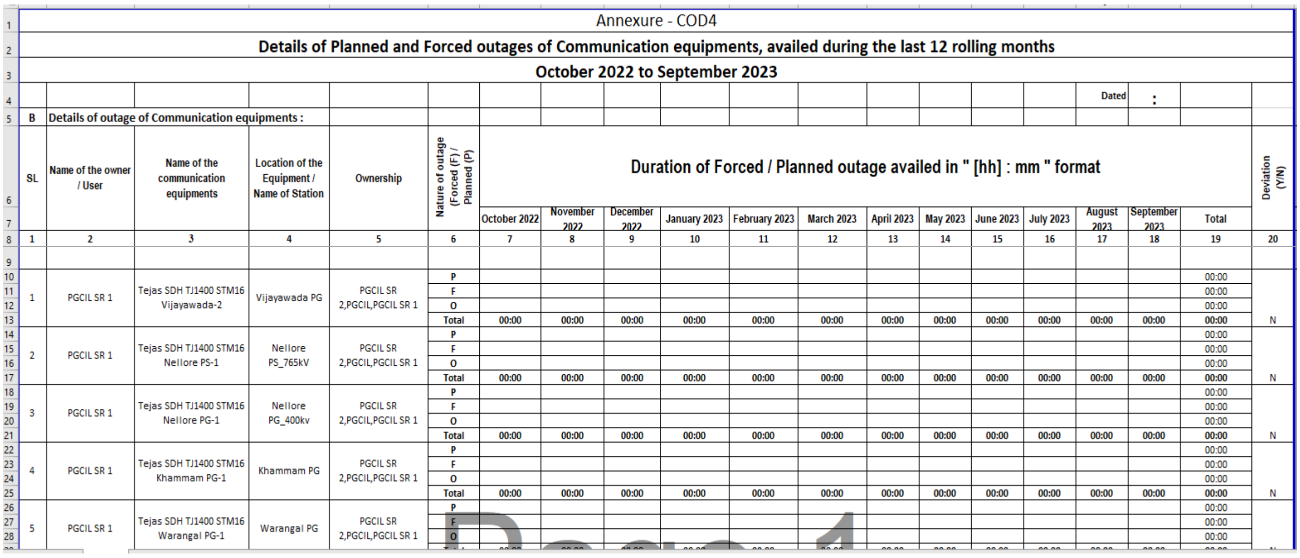
Dated :

A Details of outage of Communication Links (Point to Pont) :

Duration of Forced / Planned outage availed in " [hh] : mm " format

SL	Name of the owner / User	Description of Link /Channel (64 kbps, 104, PMU, VC, 101) / Voice / Protection circuits / VSAT / Others)	Source Station	Destination Station	Channel Routing	Ownership	Nature of outage (Forced (F) / Planned (P))	October 2022	November 2022	December 2022	January 2023	February 2023	March 2023	April 2023	May 2023	June 2023	July 2023	August 2023	September 2023	Total	Deviation (Y/N)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	PGCIL SR 1	Data & Voice	Nellore PS_765kV	Vijayawada PG (DCPC)	Main Path : Nellore PS - Kadappa PG-- CK Palli AP-- Muddunuru RTPP --	PGCIL SR 2,PGCIL,PGCIL SR 1	P													00:00	
							F													00:00	
							O													00:00	
							Total	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	N
2	PGCIL SR 1	Data & Voice	Nellore PS_765kV	Vijayawada PG (DCPC)	StandBy: Nellore PS --- Kadappa PG--- Chittor AP --- THVLM --- Kolar ---	PGCIL SR 2,PGCIL,PGCIL SR 1	P													00:00	
							F													00:00	
							O													00:00	
							Total	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	N
3	PGCIL SR 1	Data, Voice & Protection	Vemagiri PS	Vijayawada PG (DCPC)	Main Path: Vemagiri PS ---- Vijayawada PG2 ---- Viajayawad PG1	PGCIL SR 2,PGCIL,PGCIL SR 1	P													00:00	
							F													00:00	
							O													00:00	
							Total	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	N
4	PGCIL SR 1	Data, Voice & Protection	Vemagiri PS	Vijayawada PG (DCPC)	StandBy: Vemagiri PS ---- Vemagiri Ap --- Bommur Ap---- Bhimidoulu AP----	PGCIL SR 2,PGCIL,PGCIL SR 1	P													00:00	
							F													00:00	
							O													00:00	
							Total	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	N
5	PGCIL SR 1	Data & Voice	Warangal PG	Vijayawada PG (DCPC)	Main Path: Warangal PG --Warangal TS-- Khammam TS-- KhammamPG--	PGCIL SR 2,PGCIL,PGCIL SR 1	P													00:00	
							F													00:00	
							O													00:00	
							Total	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	N
6	PGCIL SR 1	Data & Voice	Warangal PG	Vijayawada PG (DCPC)	StandBy: Warangal PG--- Ramagundam NTPC -- Rep 346--	PGCIL SR 2,PGCIL,PGCIL SR 1	P													00:00	
							F													00:00	
							O													00:00	
							Total	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	N
					Main Path: Kadappa	PGCIL SR	P													00:00	

Figure 31 Sample COD3 Links Generated Report



Annexure - COD4

Details of Planned and Forced outages of Communication equipments, availed during the last 12 rolling months

October 2022 to September 2023

Dated :

B Details of outage of Communication equipments :

Duration of Forced / Planned outage availed in " [hh] : mm " format

SL	Name of the owner / User	Name of the communication equipments	Location of the Equipment / Name of Station	Ownership	Nature of outage (Forced (F) / Planned (P))	October 2022	November 2022	December 2022	January 2023	February 2023	March 2023	April 2023	May 2023	June 2023	July 2023	August 2023	September 2023	Total	Deviation (Y/N)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	PGCIL SR 1	Tejas SDH TJ1400 STM16 Vijayawada-2	Vijayawada PG	PGCIL SR 2,PGCIL,PGCIL SR 1	P													00:00	
					F													00:00	
					O													00:00	
					Total	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	N
2	PGCIL SR 1	Tejas SDH TJ1400 STM16 Nellore PS-1	Nellore PS_765kV	PGCIL SR 2,PGCIL,PGCIL SR 1	P													00:00	
					F													00:00	
					O													00:00	
					Total	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	N
3	PGCIL SR 1	Tejas SDH TJ1400 STM16 Nellore PG-1	Nellore PG_400kv	PGCIL SR 2,PGCIL,PGCIL SR 1	P													00:00	
					F													00:00	
					O													00:00	
					Total	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	N
4	PGCIL SR 1	Tejas SDH TJ1400 STM16 Khammam PG-1	Khammam PG	PGCIL SR 2,PGCIL,PGCIL SR 1	P													00:00	
					F													00:00	
					O													00:00	
					Total	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	N
5	PGCIL SR 1	Tejas SDH TJ1400 STM16 Warangal PG-1	Warangal PG	PGCIL SR 2,PGCIL,PGCIL SR 1	P													00:00	
					F													00:00	
					O													00:00	

Figure 32 Sample COD4 Links Generated Report
