सत्यमेव जयते

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

सं.उक्षेविस/ प्रचालन/108/04/2020/5279-5313 दिनांक :27.05.2020

No. NRPC/OPR/108/04/2020/ Date: 27.05.2020

सेवा में / To,

संलग्न सूची के अनुसार/As per list attached

विषय: टेस्ट उप-समिति की 17 वीं बैठक का कार्यवृत्त ।
Subject: 17th meeting of TeST Sub-Committee – Minutes.

महोदय ,
Sir,

उत्तर क्षेत्रीय विद्युत समिति की टेस्ट उप-समिति की 17 वीं बैठक दिनांक 06 मई, 2020 को वेब-एक्स विडियो कोंफ्रेंसिंग के माध्यम से आयोजित की गई थी । इस बैठक के कार्यवृत की एक प्रति आपकी सूचना व आवश्यक कार्यवाही हेतु इस पत्र के साथ संलग्न है।

17th TeST Sub-Committee meeting of NRPC was held on 06th May, 2020 via WebEx video conferencing. A copy of the minutes of the meeting is enclosed herewith for favour of information and necessary action.

भवदीय
Yours faithfully,

27/05/2020

(आर.पी. प्रधान)
(R.P. Pradhan)
अधीक्षण अभियंता
Superintending Engineer

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40. Sh. Anil Kumar Garg, General Manager(BD) , AD Hydro Power Ltd , Noida-201301 , (Fax: 0120- 4323271/4278772)
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44. Nabha Power Limited , (Fax: 01762277251 /01724646802)
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Special Invitee:

1. Sh. G.Rama Krishna Reddy, Project Manager, SIEMENS, e-mail: g.reddy@siemens.com

Minutes of
17th Meeting of Telecommunication, SCADA & Telemetry (TeST) Sub-Committee

Date: 06.05.2020 via Video Conferencing

1. Confirmation of Minutes

1. Confirmation of Minutes

SE(C), NRPC informed that the minutes of 16th meeting of TeST sub-committee, held on 14.11.2019, were issued vide letter no NRPC/OPR/108/04/2019/15141-15175 dated 17.12.2019 and no comments have been received from any stakeholder. He requested members to confirm the minutes.

The sub-committee confirmed the minutes.

List of participants is enclosed as **Annexure-1.1**.

1A. FOLLOW UP

1A Follow-up of Decisions in last TeST meeting

SE(C), NRPC informed that action points and timelines were mentioned in the minutes of last (16th) TeST meeting but NRPC has neither received any comment nor intimation regarding any progress on the action points. He requested members of sub-committee to timely comply with the decisions taken in previous TeST meetings.

2. Telecommunication Related Issues

2.1 Requirement of Fibre optic Communication for 765kV Meerut-Bhiwani T/L of POWERGRID for connectivity of LILO portion at 765kV Narela S/s (upcoming TBCB) (Agenda by POWERGRID)

POWERGRID informed that under Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II: Part G, the scope of work is as follows:

S. No.	**Scope of the Transmission Scheme**	**Capacity /km**
1	Establishment of 765/400 kV, 3X1500 MVA GIS substation at Narela with 765 kV (2x330 MVAr) bus reactor and 400 kV (1x125MVAR) bus reactor Future provisions: Space for 765/400kV ICTs along with bays: 1 765 kV line bays along with switchable line reactor: 6 400 kV line bays: 6+4 765kV reactor along with bays:2 400/220 kV ICTs along with bays:8 220 kV line bays: 12 400 kV bus reactor along with bays:2	765/400 kV, 1500 MVA ICT – 3 765/400 kV, 500 MVA spare ICT (1-phase) – 1 765 kV ICT bays –3 400 kV ICT bays –3 765 kV line bays- 4 (GIS) 330MVAr, 765 kV bus reactor- 2 765 kV bus reactor bay – 2 110 MVAR, 765 kV, 1-Ph Bus Reactor (spare unit) -1 125 MVAr, 420 kV bus reactor - 1 420 kV bus reactor bay – 1 330 MVAr, 765 kV line reactor- 2 Switching equipment for 765 kV reactor - 2 (1x110MVAr spare reactor at Khetri to be used as spare for Khetri – Narela 765 kV D/c line)
2	Khetri – Narela 765 kV D/c line 1x330MVAr Switchable line reactor for each circuit at Narela end of Khetri – Narela 765kV D/c line	Length-180 km
3	2 nos. of 765 kV line bays at Khetri for Khetri – Narela 765 kV D/c line	765 kV line bays –2 (AIS)
4	LILO of 765 kV Meerut- Bhiwani S/c line at Narela	Length – 25 km

In order to provide data & voice connectivity for Narela 765kV S/s (to be implemented in TBCB; BPC-PFC Consulting Ltd.) as ISTS, 24F OPGW each in Line IN & Line out (LILO) of 765 kV Meerut- Bhiwani S/c Line at Narela S/s with communication equipment, is proposed at the RFP stage. However, for completing the connectivity link of Narela 765kV S/s (TBCB), fibre optic connectivity is required on the existing main line 765 kV Meerut- Bhiwani S/c (173km) line of POWERGRID.

POWERGRID has proposed for fibre optic connectivity on 765 kV Meerut-Bhiwani S/c (173km) main line, to be considered in ongoing Reliable Communication Project being implemented by POWERGRID for Central Sector in Northern region (7398km) approved in 39th, 40th & 47th NRPC. The revised network size of Reliable Communication Scheme for Central Sector in Northern region will become 7571km.The estimated cost for fibre optic connectivity on Meerut-Bhiwani link is Rs 5.7Cr(approx.) for implementation on cost plus basis. The actual quantity/cost shall be discovered only after implementation. The Tariff for the investment made is to be shared by all constituents as per CERC

notification. The scheme shall become part of existing Commercial Agreement signed for ULDC Project.

SE(C), NRPC enquired whether the ongoing Reliable Communication Scheme was an open-ended scheme, in which, any new line could be added till the scheme gets concluded. POWERGRID clarified that the scheme was not open ended, however, a cushion of 20% was allowed beyond the sanctioned length for the scheme and thus, they need to check whether scope of adjustment for the proposed line, was still there or not.

MS, NRPC expressed that the proposed scheme could itself have been made part of the scheme viz. *LILO of 765 kV Meerut- Bhiwani S/c Line at Narela S/s with communication equipment*, being executed under TBCB. He further stated that if projects are taken up on cost plus basis, state utilities won't be able to know the upfront tariff. He opined that in-principle approval may be given to OPGW requirement on main line but modus-operandi on how the investment would be recovered and under which scheme, can be determined later. He further asked POWERGRID to provide complete details of all the options available under existing schemes for this project for examination and take up the matter in the next TeST meeting.

After checking details of Reliable Communication Scheme, POWERGRID informed that there was no scope for adjustment of proposed scheme in the ongoing Reliable Communication Scheme and thus, the proposed scheme could be adjusted under another scheme viz. *Communication availability from NLDC/ RLDCs to the nearest wide band node/switchyard for the generating stations under AGC.* It was enquired how the proposed scheme fits under the scope of this scheme, POWERGRID replied that it's a fact that proposed scheme doesn't fall under the ambit of AGC scheme but it was not possible for them to invite bids for the proposed scheme exclusively because of involvement of very less quantum of work and therefore, the proposed option may be agreed.

After detailed discussion, it was decided that POWERGRID would submit details of AGC scheme and justification to include the proposed scheme in the AGC scheme, in the next meeting.

2.2 Status of OPGW connectivity at NHPC Power Stations (Parbati-III) under Central Sector scheme (Agenda by NHPC)

POWERGRID stated that shutdown was taken in December and teams were mobilised for the work but due to snowfall and bad weather, the work could not be started. The work was scheduled to start in March, but due to difficulties of nationwide lockdown, it could not be started.

POWERGRID assured that once the lockdown is eased, work would be finished in 15 days' time.

2.3 **VSAT Connectivity at URI-II Power Station (Agenda by NHPC)**

POWERGRID stated that the vendor has tested for line of sight at the site and finalised a location for which NHPC has reservations concerning security reasons. POWERGRID said that if NHPC takes a decision, vendor can be asked to install.

NHPC stated that on 16th March, 2020, testing for site location was done and signal was received on surge shaft, which is 2 KM from the power house but providing security at site would be a difficult task. NHPC suggested a site which is near to power house where security and power were present and requested the vendor to test line of site at that location. NHPC requested that once the testing at their choice of site is also completed, a decision would be taken by them.

POWERGRID informed that it is difficult for vendor to make multiple visits to the site location. After deliberations, it was decided that vendor would visit the site for last time and check for line of site at the locations chosen by NHPC and an appropriate location for installation of VSAT shall be mutually finalised.

POWERGRID requested NHPC to construct a platform like a room, over which the VSAT may be installed.

Sub-Committee approved the agreed arrangement.

2.4 **Replacement of S-900 RTUs (Agenda by NHPC)**

POWERGRID informed that the installation of RTUs under the present package are being carried out as per schedule. As per contract, the deadline for the completion of the project is October, 2020. POWERGRID has sought a priority list from RLDC and the work is in progress according to the list.

POWERGRID informing that BBMB and PSTCL also have the same issue, stated that 40 nos. of RTUs, have already been received at respective sites and the remaining 41 nos. of RTUs, can be despatched if the utilities are ready to receive them. PSTCL consented for the same. PSTCL informed that vendor has stopped the installation work, for which POWERGRID assured that they would send the team.

2.5 **E-waste management for replaced S-900 RTUs (Agenda by HVPNL)**

HVPNL stated that they intend to know the e-Waste policy being followed by POWERGRID for disposal of communication equipment. POWERGRID said that they would share the e-Waste policy being followed by POWERGRID. SE(C), NRPC suggested that the document could be made available on POWERGRID website too.

2.6 **Replacement of S-900 RTUs (Agenda by BBMB)**

Discussed under Agenda point 2.4

2.7 **Replacement of S-900 Remote Terminal Units (RTUs) at 9 nos. sites of PSTCL by M/s. POWERGRID in lieu of MOU signed between M/s. POWERGRID and PSTCL (Agenda by PSTCL)**

Discussed under Agenda point 2.4

2.8 **AMC of existing S900 RTUs: (Agenda by POWERGRID)**

POWERGRID informed that under S900 RTUs replacement project, works would be completed by Sept'2020. As discussed in earlier TeST meetings, till the time of replacement of all RTUs, AMC shall be extended by POWERGRID (up to Sept'2020). However, after that, all other constituents, for whom, POWERGRID is not replacing S900 RTUs, may arrange their RTU maintenance on their own as POWERGRID won't extend the AMC contract after that.

RLDC enquired about the position of AMC if the replacement is not complete by September, 2020. POWERGRID informed that they are in a position to complete their portion of project, on time.

HPSEBL requested to extend the AMC period till December, 2020 in case the replacement is not completed by September, 2020. POWERGRID informed that MoU for AMC would be expiring in September, 2020 and they can't extend it beyond that.

2.9 **Arrangement of FRTU for monitoring of real time status of UPS and DG Set (Agenda by UPSLDC)**

POWERGRID informed that the matter has already been taken up with M/s Siemens and cards have been purchased from M/s Delta. POWERGRID informed that the system has been tested at NRLDC and there was no issue of compatibility. M/s Siemens also confirmed the same and informed that there won't be any issue for carrying out the project at UPPTCL site.

POWERGRID informed that material is ready for despatch and in a month's time, integration work will be carried out at UPPTCL site.

2.10 **Issues being faced in OPGW laying in HPSEBL (Agenda by POWERGRID)**

In view of delay occurred in the action taken, as decided during last TeST meeting, HPSEBL requested not to delete the links (approx. 155KM) from the scope of the scheme. He assured that they will strengthen the 66kV rail pole structures. POWERGRID requested that HPSEBL may inform POWERGRID month wise progress about strengthening and reconductoring work so that POWERGRID may carry out the work of laying OPGW simultaneously. HPSEBL agreed for the same.

2.11 **HPSEB Communication Related Issues (Agenda by HPSEB)**

2.11.1 <u>Implementation of OPGW under Package-I (a).</u>

Discussed under Agenda point 2.10

2.11.2 Replacement of 12 fibre OPGW with 24 fibre on the HPSEBL links i.e. 132kV Jutogh (Shimla)-Kunihar-Kangoo (Gagal)-Hamirpur-II under Reliable Communication Scheme (Package-B)

POWERGRID informed that the deadline for the project is October, 2020. The supply and type test has to be got done from China. Due to Covid-19 pandemic, the progress of the work, has been stalled.

2.12 **Annual Maintenance Contract for OPGW laid under Package-V on the HPSEBL Transmission line under "Establishment of Fibre Optic Communication in Northern Region" (Agenda by HPSEBL)**

HSPEBL stated that they wanted to know whether the AMC has to be done through POWERGRID or the utilities have to get it done directly from the vendor. It was also informed that HPSEBL has opted to do their AMC through POWERGRID. HPSEBL requested POWERGRID to give details of the cost for AMC.

POWERGRID informed that the agenda has been mutually resolved between HPSEBL and POWERGRID.

2.13 **Regarding commissioning of OPGW under Package 1(a) on various transmission lines of PSTCL (Agenda by PSTCL)**

SE(C), NRPC asked PSTCL to clarify about the contentious issue mentioned in the agenda. PSTCL clarified that the issue is about the delay in commissioning of OPGW under package 1(a).

POWERGRID informed that only 85 KM of the total length of 1378 KM is left for installation and it was scheduled to be completed by end of May/June, 2020, but has been delayed due to lockdown. POWERGRID assured that within 1 to 2 months after the restrictions are lifted, they will complete all the works related to commissioning of OPGW under Package 1(a) on various transmission lines of PSTCL.

PSTCL asked for the schedule of completion, as they have put certain links on priority for which POWERGRID has accepted. PSTCL also requested POWERGRID to provide details of cost of AMC. POWERGRID needs to provide cost of AMC for OPGW and equipment's separately.

2.14 **Implementation of Multisite Configuration between BBMB SLDC and PSTCL SLDC (Agenda by BBMB)**

M/s Siemens informed that as on today, complete data of BBMB is going to PSTCL and vice-versa. He informed that BBMB wishes to send their data to NRLDC from Backup control centre i.e. PSTCL SLDC, in case, BBMB control centre was completely shut down.

M/s Siemens informed that at present, data is being reported at NRLDC from these control centres independently and reporting of BBMB data via PSTCL

SLDC control centre, may not be possible with present setup. It may be possible only with certain changes in data base at NRLDC.

BBMB stated that it will defeat the purpose if backup control centre is unable to deliver the data to NRLDC when main control centre fails and all the utilities would be facing similar issue. Representative of NRLDC stated that a solution is necessary for all the utilities. He requested M/s Siemens to share complete solution along with changes needed at NRLDC and control centres of Utilities. M/s Siemens assured that they would check all the possibilities and inform whether a solution is feasible or not by the end of May, 2020.

2.15 **Implementation of PSTCL SLDC Grid Operations from BBMB Backup Control Centre (Agenda by PSTCL)**

M/s Siemens informed that they would check the feasibility once the restrictions of lockdown are eased. NRLDC suggested that software part can be completed remotely wherever feasible for which M/s Siemens assured they will check the feasibility with their field people.

2.16 **Strengthening of Communication System (Agenda by UPPTCL)**

POWERGRID informed that it won't be possible for them to implement the proposed work under Reliable communication scheme. POWERGRID accepted to take up the project under consultancy work. POWERGRID also informed that PSTCL has requested for a similar project. MS, NRPC suggested POWERGRID to prepare a package for UPPTCL and PSTCL and take in-principle approval.

2.17 **Replacement of Synchronous Digital Hierarchy(SDH) installed under Unified Load Despatch Centre (ULDC) Phase-I (Agenda by PSTCL)**

Discussed under agenda point 2.16. Regarding any integration issue likely to come up in future, POWERGRID suggested link wise bilateral meeting between POWERGRID and PSTCL for resolving the issue.

2.18 **OPGW cut due to diversion of Transmission Lines (Agenda by POWERGRID)**

POWERGRID informed that on several occasions, State transmission wings, without informing the ULDC group or POWERGRID, divert the transmission lines leaving the communication link damaged, thus throwing it out of service. After deliberations, the forum decided that in future, utilities would take up diversion of the transmission line with prior information to concerned parties of OPGW on the transmission lines and also include whether OPGW is laid on the transmission line in the PTW permit form.

2.19 **Fiber cut between Kishenpur-New Wanpoh (Agenda by NRLDC)**

POWERGRID informed that they could not start the work due to bad weather in December, 2019 & January/February, 2020 and further due to lockdown.

However, POWERGRID assured that the link will be rectified as soon as lockdown is lifted. In the meantime, POWERGRID assured that they will take interim link from Telecom and restore PMU/Voice data within 10 days' time.

2.20 **Reliable Voice communication between Central Sector Substations / Generating Stations and NRLDC (Agenda by NRLDC)**

NRLDC has informed that there is lot of improvement compared to last TeST meeting and gave a detailed PPT presentation of the status (Annex-II). POWERGRID assured that they have instructed the substation site to procure VOIP phones but the process was delayed due to lockdown. NHPC intimated that they have installed at 5 more locations after last TeST meeting and at present, out of 14 no. of locations, VOIP has been installed at 10 no. of locations. He assured that NHPC will ensure the installation at remaining locations through alternate means till availability of fibre optic communication at the earliest. NRLDC requested all the utilities to ensure VOIP connection at all site locations promptly.

2.21 **Communication availability from NLDC/ RLDCs to the nearest wide band node/switchyard for the generating stations under AGC as per CERC order 319/RC/2018 dated 28th August 2019 (Agenda by NRLDC/POWERGRID)**

POWERGRID informed that there are certain modifications in some of the links mentioned at Annexure 2.21.1 of the Agenda.

Initially Koteshwar – Meerut line was thought to run on the same tower, but later, it was understood by POWERGRID that there are 2 no. of Single circuits on different towers from Koteshwar – Meerut. Hence, OPGW is envisaged on these two routes. NRLDC pointed that Sewa-II shall have redundant route. POWERGRID agreed to modify the same. THDC pointed that at point no 4 of Annexure 2.21.1 of the agenda, the distance is to be corrected as 13.5 KM instead of 6 KM.

After the modifications, the total length increases to 624 KM. POWERGRID needs to resubmit the link wise details after incorporating the changes discussed in the meeting and the cost details.

2.22 **Maintenance of 48V DCPS (Agenda by POWERGRID)**

POWERGRID stated that they will not be able to supply and maintain the 48 volts DCPS. PSTCL informed that the life of batteries procured in ULDC Phase-I are about to end and sought clarification from POWERGRID whether they have to procure the DCPS on their own. POWERGRID clarified that in the ongoing project viz. Reliable Communication Scheme and future communication schemes, POWERGRID won't include DCPS and therefore, State Utilities would have to procure it themselves.

For a query by HPSEB on whether AMC is included for DCPS which were supplied in the state communication package, POWERGRID clarified that cost of AMC is included in package V.

POWERGRID informed that they would write a letter to State utilities stating that AMC of the DCPS supplied by them, has expired and State utilities have to maintain on their own.

3. Issues in Unified Load Dispatch & Communication scheme of NORTHERN REGION (Phase-II)

3.1 SCADA issues of HP-SLDC (Agenda by HP-SLDC)

3.1.1 Services (API) for Data exchange from Historian system to HPSLDC Web server

M/s Siemens informed that they were in touch with HP-SLDC and were working on the software and mostly within couple of days, they would test it and will start deploying from next week.

3.1.2 Deployment of Expert Site engineer:

HP-SLDC informed that the issue has been resolved.

3.1.3 Up-gradation of Windows 7 Operating System to higher version in respect of SCADA/EMS system installed at HPSLDC Shimla

M/s Siemens informed that this is common agenda for most of the SLDCs. They informed that Windows-7 was procured in 2012/2013 when the project was initiated and later on Microsoft has migrated to latest Windows 10 OS. M/s Siemens have also been trying to test their software tools which they have delivered under the project in Windows 10. However, IMM data base tool is non-functional in Windows 10 OS. They assured that as part of AMC, they would maintain Windows 7 OS and also stated that if any SLDC procures Windows 10, M/s Siemens would install all the software, but reiterated that IMM data base tool would not work. This has already been communicated to all SLDCs and NRLDC.

M/s Siemens have asked all the utilities whether they were facing any issue with Windows 7 OS. Representative of HVPN informed that the system has to be upgraded to Windows 10 due to security reasons as observed by NCIIPC. M/s Siemens reiterated that IMM tools would not work on Windows 10 as of now.

HVPN raised an issue of changing the Cyber security auditor by M/s Siemens in light of GoI Policies in vogue. Forum discussed and decided that as M/s Siemens had negotiated a contract with CERT-In certified auditor for a period

of 6 years, the same auditor may continue till the end of contract. It was also understood that there are technical difficulties in up-gradation to windows 10.

NRLDC stated that during 16th TeST meeting, the issue of cyber security auditors was discussed in detail and it was decided that Utilities may get the cyber security audit done separately from a different auditor. M/s Siemens has assured that they will address any cyber security concern/observation, made by any auditor, on the BoQ being delivered by them.

3.1.4 **Warranty of Hardware installed at HPSLDC by M/s SIEMENS is expired**

M/s Siemens informed that they will take up the matter with Dell and get the warranty extended till the end of AMC period for all SLDCs and NRLDC.

3.2 SCADA issues of HVPNL (Agenda by HVPNL)

3.2.1 **Rollover to IPv6**

It was decided that this agenda will be deferred till the time NRLDC successfully implements the rollover.

3.2.2 **Interruption in publishing of SCADA data on SCADA Web Server**

M/s Siemens informed that the issue has been resolved and they would communicate the same.

3.2.3 **Issue regarding functionality of IMM: Transfer failed in Graphic Job: (Error: SVG POP Error)**

M/s Siemens informed that the issue has been resolved. However, HVPNL expressed that it is frequently vulnerable to failure and that graphics issue has been resolved but there are issues with data base management. M/s Siemens assured that they will resolve the issue as and when it is raised.

3.2.4 **Issue regarding functionality of PDS**

M/s Siemens requested 2 months' time to resolve the PDS issue of HVPNL and UPPTCL. It was confirmed that they would update the status of progress, every 15 days. The forum instructed M/s Siemens to take up the issue seriously and resolve the issue within 2 months as this has been since one and half years.

3.2.5 **Regarding renewal of SSL certificates of Haryana SLDC website**

HVPNL stated that the issue has been resolved.

3.2.6 **Hardware failure issue & Services stopped thereof**

M/s Siemens informed that hardware would be installed once the restrictions of lockdown are lifted. Regarding the retrieval of Data, they assured to resolve the issue and update in a week's time.

3.2.7 **Intermittency of BBMB data**

HVPNL informed that issue has been resolved at Narela but it still pertains at BBMB, Panipat. M/s Siemens informed that they were unaware of the issue at Panipat BBMB and assured to resolve if the issue still persists.

3.2.8 **Replacement of Faulty Router**

M/s Siemens assured to resolve the issue at earliest.

3.2.9 **Regarding Contractual obligation (qualification)of Site engineer**

M/s Siemens assured to maintain qualified and expert site engineers. They are also imparting training and improving skill set.

3.2.10 **Window 7 Operating System Updation& Up-gradation**

Discussed under agenda point 3.1.3

3.2.11 **Cyber Security Auditor**

Discussed under agenda point 3.1.3

3.2.12 **Cyber Security Audit Compliance**

Discussed under agenda point 3.1.3

3.2.13 **Updation of SLDC Website**

SE (C), NRPC asked HVPNL to state the requirement clearly to M/s Siemens to look into the issue and suggested to resolve the issue bilaterally. If not resolved, the issue may be raised in the next TeST meeting.

3.3 Cyber Security of SCADA/EMS System (Agenda by BBMB)

NRLDC informed that present SCADA/EMS system is Excel based and it is technically not feasible to remove Excel and this issue can be looked after in the next version upgrading.

3.4 SCADA data loss (Agenda by BBMB)

M/s Siemens informed that the issue has been resolved.

3.5 SCADA issues of PSTCL (Agenda by PSTCL)

3.5.1 **Window 7 Operating System Updation& Up-gradation to Windows 10:**

Discussed under agenda point 3.1.3

3.5.2 **Cyber Security Audit and Compliance of Discrepancies:**

M/s Siemens shall share the complete detailed root cause analysis report by the auditor along with compliance report to PSTCL.

3.6 SCADA issues of RVPNL (Agenda by RVPNL)

M/s Siemens informed that the issue has been resolved and will address if it reoccurs.

3.7 SCADA issues of UPSLDC (Agenda by UPSLDC)

3.7.1 Networking Issues

M/s Siemens informed that once the lockdown is lifted they would send their expert to Lucknow and commence the installation.

3.7.2 Implementation of Recommendations of Cyber Security Audit Report

M/s Siemens assured that within a week's time system secure certificate would be issued.

3.7.3 Invalid Quality Flag with Historical Data

UP-SLDC informed that the issue has been resolved.

3.7.4 Appointment of competent Site Engineer at Backup SLDC Modipuram.

M/s Siemens assured to impart training and improve skill set of the existing site engineer by 31st May, 2020 and if UP SLDC is still not satisfied, they would replace him with qualified and expert site engineers.

3.7.5 E-DNA Issues

M/S Siemens requested for 1-week time to find a solution and resolve the issue.

3.7.6 Corruption of Historical Data

M/S Siemens requested for 1-week time to find a solution and resolve the issue.

3.7.7 IMM Issues

M/S Siemens informed that they would try to resolve the issue by local site engineer with remote support. If they are unable to solve, then they would be able to resolve the issue only when next time an expert engineer visits UP-SLDC to resolve networking issues.

3.7.8 PDS Console Not Operational

Discussed under agenda point 3.2.4

4. Telemetry Related Issues

4.1 Non-Availability / Reliability of Telemetry (Agenda by NRLDC)

Representative of NRLDC shared a PPT with updated statistics related to Telemetry (Annex-II). He informed that Uri-I data is unavailable from past 1 Month due to certain card issue. POWERGRID informed that cards are available but there are issues on movement. POWERGRID also assured to resolve Telemetry issues relating to other sites.

Representative of DTL informed that Telemetry from their sites is proper now. Representative of POWERGRID informed that Agra South Telemetry had been resolved recently by UPPTCL.

4.2 Telemetry of digital status (Agenda by NRLDC)

Member Secretary NRPC requested as discussed in 15th TeST Meeting all should submit detailed report of 220 kV and above stations and improvement there off. He further empathized that all should submit status of digital Points along with timeline of resolution of digital Telemetry from individual stations.

4.3 Communication plan for channel redundancy to NRLDC (Agenda by NRLDC)

NRLDC informed that Presently 123 RTU out of 134 are reporting on redundant channel. Further requested to expedite the process of providing redundant channel for the remaining locations at the earliest.

Status of availability of standby channels along with time line agreed during the meeting is given below:

S.NO.	Name of RTU	Comments	Timeline
1	KISHANGANGA	NHPC	30.11.2020
2	PARBATI-2	NHPC	30.06.2020
3	SALAL	NHPC	30.06.2020
4	SEWA-2	NHPC	31.07.2020
5	RIHAND-3	NTPC	NTPC to revert
6	BUDHIL	IPP	
7	KARCHAM WANGTOO	IPP	
8	SHREE CEMENT	IPP	
9	CHEMERA-3*	NHPC	31.05.2020
10	NATHPA JHAKRI*	RTU to be replaced	30.09.2020
11	URI-2*	NHPC	30.09.2020

NRLDC requested to kindly adhere to the timelines given.

IPPs were not available in the meeting and issue will be taken up with IPPs separately.

4.4 Unreliable Telemetry from States/Utilities (Agenda by NRLDC)

All the Utilities were requested by NRLDC to improve the Telemetry status. No representation was there from J&K to discuss issues related to Telemetry of

J&K. Sub- Committee suggested NRLDC to communicate once again with J&K, and if no response is there, the matter may be taken up at RPC level.

5. Unified Real Time Dynamic State Measurement (URTDSM) Scheme

5.1 URTDSM issue of HVPNL (Agenda by HVPNL)

Installation of PMU

POWERGRID informed that the issue was resolved. However, HVPNL denied the version of POWERGRID. SE(C), NRPC suggested to resolve the issue bilaterally, and if not resolved, can be taken up next TeST meeting.

5.2 PMUs installed under URTDSM Scheme at 400 kV Substations / Power Houses of BBMB (Agenda by BBMB)

Not discussed.

5.3 Unified Real-time Dynamic State Measurements (URTDSM) scheme (Agenda by PSTCL)

POWERGRID clarified that there are as such no guidelines available and also informed that in 3 months' time, issue related to telemetry data of GGSSTP, Ropar shall be resolved.

5.4 URTDSM PHASE -II: finalization for PMU Locations (Agenda by POWERGRID)

NRLDC stated that since 2012, when the project started, the philosophy of PMU installation has changed. Before finalising the list, they opined that the philosophy on where the PMU is to be installed shall be finalised. POWERGRID has suggested that changing the philosophy might take considerable time; hence, NRLDC may send the suggestions to update the existing philosophy. POWERGRID may integrate the suggestions.

MS, NRPC also opined that if the new requirements do not fit in the existing philosophy, issues might raise. Hence, there is a need to modify the philosophy before finalising the list.

After deliberations, it was decided that an agenda shall be placed before Standing committee for approval of new philosophy. Utilities shall prepare the list based on the updated philosophy.

5.5 Data reporting of PMU interrupted (Agenda by POWERGRID)

5.5.1 Representatives of UPPTCL/UPUUNL were not present in VC at the time of discussing this agenda point.

5.5.2 Representatives of UPPTCL/UPUUNL were not present in VC at the time of discussing this agenda point.

6. OTHER AGENDA

6.1 RVPNL other issues (Agenda by RVPNL)

POWERGRID informed that, they have not received any complaint till date. RVPNL stated that the issue of battery charger has been resolved by M/s Siemens but with long delay. POWERGRID assured to resolve the issue of UPS by taking up with M/s Insync.

6.2 Provisioning of Phasor Measurement Units (PMU) on HVDC and FACTS device locations (Agenda by NRLDC)

POWERGRID informed that at present they do not have any PMU and said they would be taking up the given sites under phase-II. NRLDC requested POWERGRID to consider to provisioning of Phasor Measurement Units (PMU) on HVDC and FACTS in case spares are available at the locations. POWERGRID said they would consider where ever possible.

6.3 Installation of PMU for all new feeders of State Network (Agenda by NRLDC)

NRLDC informed that CTU has included installation of PMUs in connectivity agreement and now all new bays which are coming up have the provision of PMU data at ISTS level. However, the same is lacking at State level.

NRLDC requested all States to kindly take up with respective STUs to include similar provision in STU connection agreement for installation/ provision of PMUs in upcoming project at intrastate level.

Members noted the same.

6.4 Requirement of details of existing Communication network for Establishment of State of the Art U-NMS System for Centralized Supervision for ISTS and State Utility Communication Network in a unified manner (Agenda by POWERGRID)

SE(C), NRPC asked all the utilities to share the input/information sought by POWERGRID. On enquiry, POWERGRID informed that they were planning to implement U-NMS for Northern Region as stand-alone, pending approval from other regions. NRLDC referred discussions held in 43rd TCC/46th NRPC where POWERGRID referred the presentation made in 15th TeST Meeting and NRPC

approved the scheme of 600 crore considering U-NMS will be implemented in unified manner

NRLDC informed that considering the need for Centralized layer of scheduling over and above the Decentralized scheduling environment for overall optimization at National level, in recent time Indian Power System has seen a number of initiative at National Level e.g. Implementation of Reserve Regulatory Ancillary Services (RRAS), Security Constrained Economic Despatch (SCED), etc. Further, different applications like Automatic Generation Control (AGC), Real Time Market (RTM), Backup-Control Centre in other regions, etc. require monitoring of links at National level/Inter-Regional level; and Regional U-NMS alone will not serve the purpose for all the applications given above. Also, If the U-NMS is not taken up in unified manner then again there will be integration challenges from Regional U-NMS to National U-NMS and will lead to additional cost & time for solving the interoperability issues between multiple U-NMS.

The Subcommittee after detailed deliberations suggested POWERGRID to implement the U-NMS Scheme in Northern Region, along with all other regions. This would help in seamless execution of the Scheme on pan India basis and would rule out the compatibility issues, if any later on.

6.5 Signing of side letters of MoU for AMC (Agenda by POWERGRID)

BBMB informed that they have signed. PSTCL assured to do it shortly. Representatives of other Utilities were not present at the time of discussion of this agenda point. All the remaining state Utilities were requested to complete the signing of side letters of MoU for AMC.

NRLDC observed that there is weak participation in meetings from PTCUL side. MS, NRPC suggested to conduct a separate meeting to discuss issues of PTCUL via VC with members from NRPC, NRLDC and POWERGRID.

6.6 Maintaining of temperature at control centres (Agenda by POWERGRID)

POWERGRID informed that the issue pertains to J&K. J&K representative was not available. MS, NRPC suggested to take up the matter by the field level officers of POWERGRID with their counterpart in J&K. If not resolved, NRPC may be informed for further necessary action.

HVPNL pointed out at the recent CPWD guidelines wherein centralised Air conditioning systems were not allowed. NRLDC expressed that it is a compulsion to run the air conditioning system for proper functioning of servers.

6.7 Delay in Payment (Agenda by POWERGRID)

POWERGRID clarified that UPPTCL amount was Rs 75 Lac and not Rs 750 Lac as mentioned in the agenda. POWERGRID wanted annual payment of AMC charges by utilities against quarterly payment done presently. POWERGRID proposed to change the MoU for taking changes annually midway of financial year as the amount is small approximately one and half Crore annually.

Sub-Committee agreed for the same subject to consent from UPPTCL.

The meeting ended with a vote of thanks to the Chair.

Annexure-1.1

List of Participants of 17thTeST Sub-Committee Meeting				
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17	Suneel Grover		HPSLDC	mdhpsldc@gmail.com
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24	Sh. Manoj Kumar Agarwal	GM	NRLDC	mkagarwal@posoco.in
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31	Sh. R.P. Pradhan	S.E.(C)	NRPC	sec-nrpc@nic.in
33	Sh. M Srikanth Reddy	E.E.(C)	NRPC	
34	Sh. Manish Maurya	A.E.E.(C)	NRPC	
35	S.Alam			msalamkhan45@gmail.com
38	paritosh			paritosh151992@gmail.com
41	Prakash Chand			prakashchand197@gmail.com
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43	HPSLDC			sehpsldc@gmail.com
44	SLDC punjab			srxen-sldc2@pstcl.org
45	XEN SCADA undefined			Xenscada@hvpn.org.in

Annexure-2

17th TeST Sub-Committee Meeting

06TH MAY, 2020

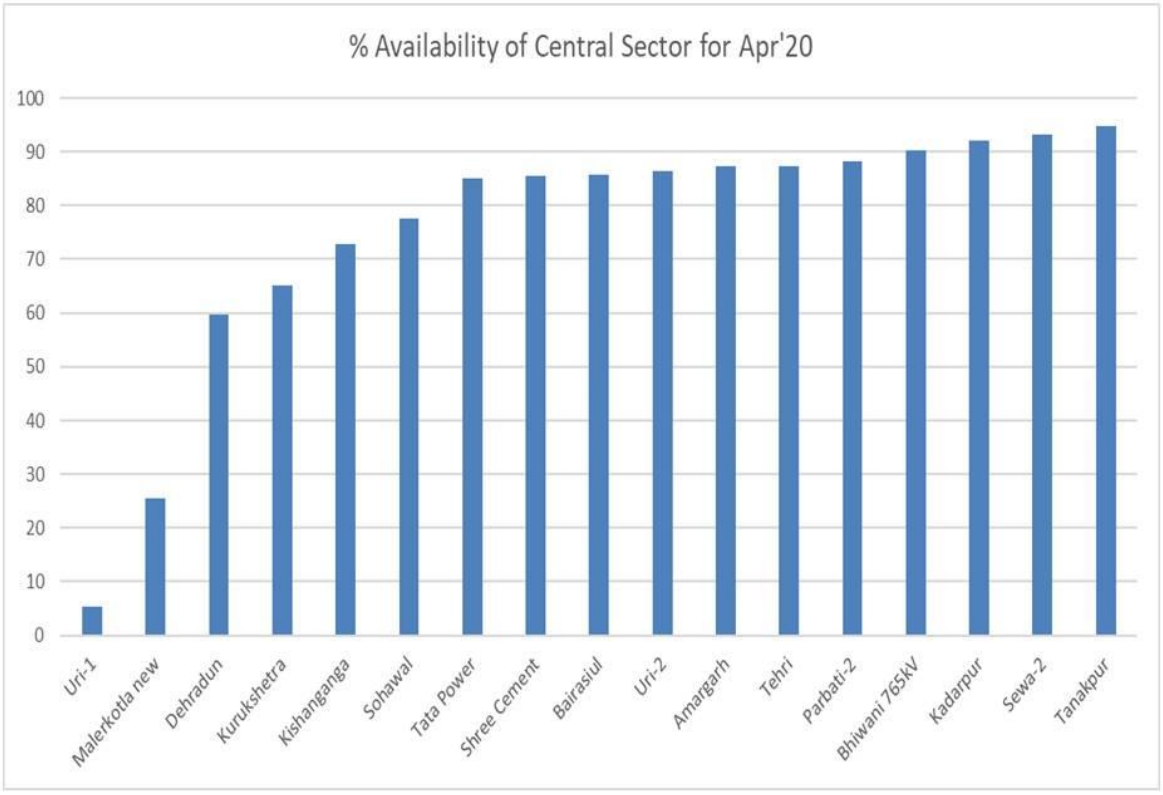
Fiber cut between Kishenpur-New Wanpoh (Agenda by NRLDC)

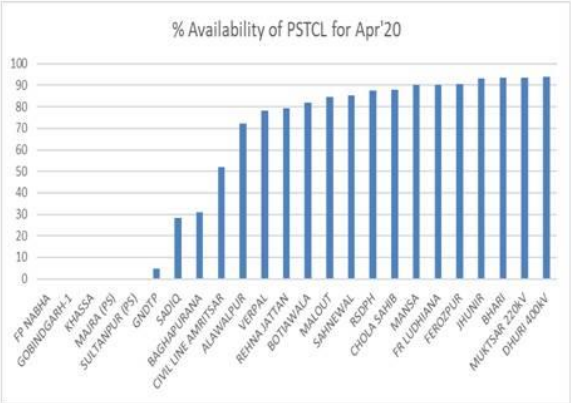
- There is a fiber cut between Kishnepur-Wanpoh since January 2019 due to which PMU data from Wagoora, Wanpoh and Uri was not available at NRLDC.
- The matter was also discussed during 15th & 16th TeST Meeting, during which POWERGRID stated that unprecedented ice deposition on OPGW in Kashmir valley has led to the breakage of the same.
- PGCIL to update the status of rectification & alternate route

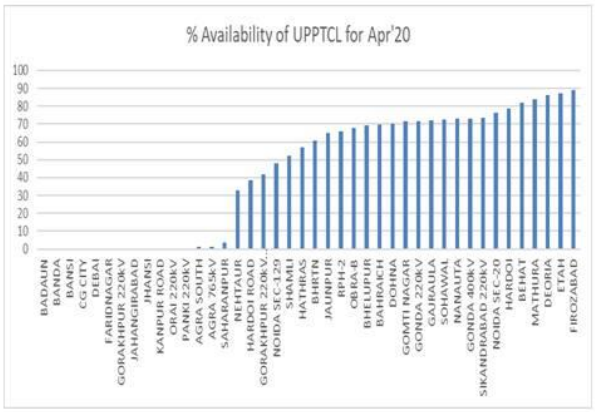
4.1 Non-Availability / Reliability of Telemetry

- Uninterrupted availability of telemetry is essential for smooth operation of grid. It is essential to ensure 100% of availability of the data. However, it is seen that even at 400 kV/765kV level, data is highly intermittent.
- The non-availability of various 400 kV / 765 kV stations was calculated for the month of June 2019. The list of stations where data availability is less than 80% is given below.
- Out of 198 number of 400 kV/765 kV sub-stations, data of nearly 15 (8%) stations are highly intermittent.

Central Sector	DTL	UPPTCL
Uri-1	Harsh Vihar	Agra South
Dehradun	CCGTB	Agra 765
Kurukshetra	HPSEBL	Obra-B
Kishanganga	BASPA	Gonda 400
Sohawal	HVPNL	Mathura
Shree Cement	Nuhiyawali	
	Kirori	PTCUL
		Srinagar




% Availability of PSTCL for Apr'20
100
90
80
70
60
50
40
30
20
10
0
FP NABHA
GOBINDGARH-1
KHASSA
MAJRA (PS)
SULTANPUR (PS)
GNDTP
SADIQ
BAGHAPURANA
CIVIL LINE AMRITSAR
ALAWALPUR
VERPAL
REHNA JATTAN
BOTAWALA
MALOUT
SAHNEWAL
RSDPH
CHOLA SAHIB
MANSA
FR LUDHIANA
FEROZPUR
JHUNIR
BHARI
MUKTSAR 220KV
DHURI 400KV


% Availability of UPPTCL for Apr'20
100
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BADAUN
BANDA
BANSI
CG CITY
DEBAI
FARIDNAGAR
GORAKHPUR 220KV
JAHANGIRABAD
JHANSI
KANPUR ROAD
ORAI 220KV
PANKI 220KV
AGRA SOUTH
AGRA 765KV
SAHARANPUR
NEHTAUR
HARDOI ROAD
GORAKHPUR 220KV...
NOIDA SEC-129
SHAMLI
HATHRAS
BHRTN
JAUNPUR
RPH-2
OBRA-B
BHEDURI
BAHRAICH
DOHNA
GOMTI NAGAR
GONDA 220KV
GAJRAULA
SOHAWAL
NANAUTA
GONDA 400KV
SIKANDRABAD 220KV
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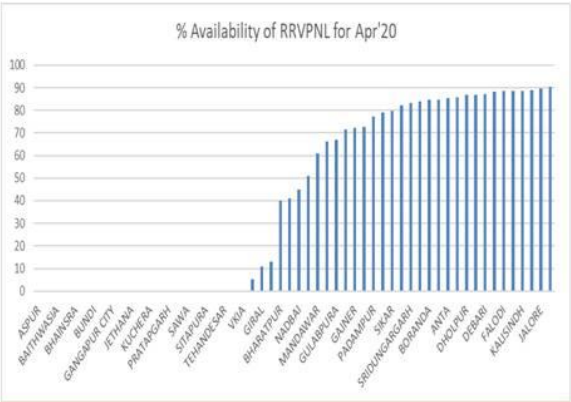
HARDOI
BEHAT
MATHURA
DEORIA
ETAH
FIROZABAD


% Availability of RRVPNL for Apr'20
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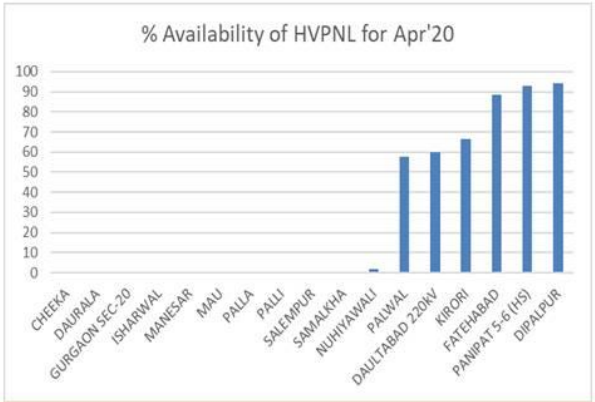
ASPUR
BAITHWASIA
BHAINSRA
BUNDI
GANGAPUR CITY
JETHANA
KUCHERA
PRATAPGARH
SAWA
SITAPURA
TEHANDESAR
VKIA
GIRAL
BHARATPUR
NADBAI
MANDAWAR
GULABPURA
GAJNER
PADAMPUR
SIKAR
SRIDUNGARGARH
BORANDA
ANTA
DHOLPUR
DEBARI
FALODI
KALISINDH
JALORE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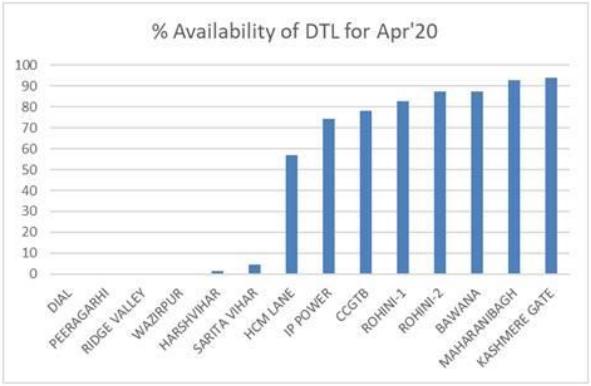
CHEEKA
DAURALA
GURGAON SEC-20
ISHARWAL
MANESAR
MAU
PALLA
PALLI
SALEMPUR
SAMALKHA
NUHIYAWALI
PALWAL
DAULTABAD 220KV
KIRORI
FATEHABAD
PANIPAT 5-6 (HS)
DIPALPUR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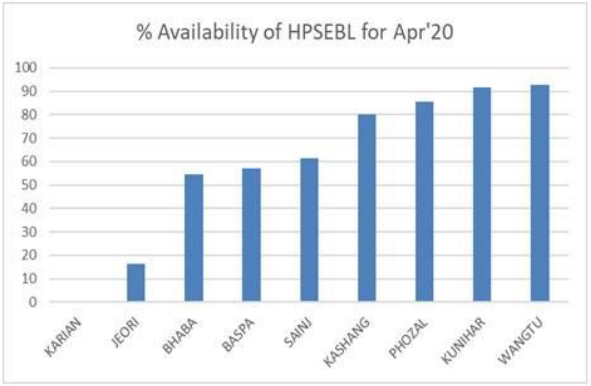
DIAL
PEERAGARHI
RIDGE VALLEY
WAZIRPUR
HARSHVIHAR
SARITA VIHAR
HCM LANE
IP POWER
CCGTB
ROHINI-1
ROHINI-2
BAWANA
MAHARANIBAGH
KASHMERE GATE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KARIAN
JEORI
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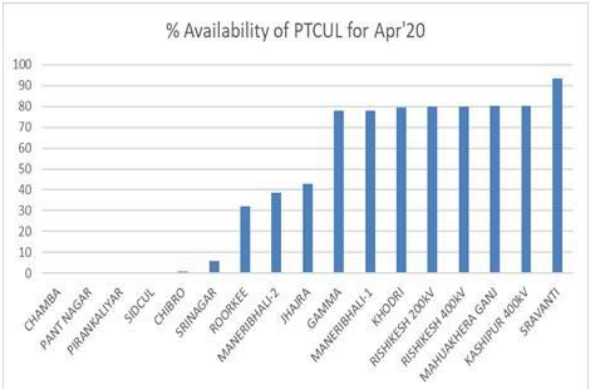
SAINJ
KASHANG
PHOZAL
KUNIHAR
WANGTU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CHAMBA
PANT NAGAR
PIRANKALIYAR
SIDCUL
CHIBRO
SRINAGAR
ROORKEE
MANERIBHALI-2
JHAJRA
GAMMA
MANERIBHALI-1
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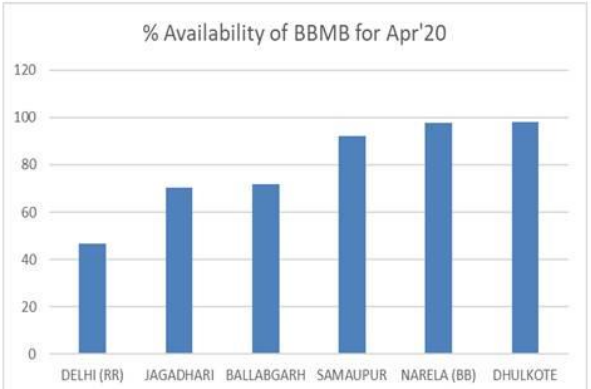
MAHUAKHERA GANJ
KASHIPUR 400KV
SRAVANTI


% Availability of BBMB for Apr'20
120
100
80
60
40
20
0
DELHI (RR)
JAGADHARI
BALLABGARH
SAMAUPUR
NARELA (BB)
DHULKOTE

4.2 Telemetry of digital status

- The importance of correct Digital telemetry was discussed in all the TeST sub-committee meeting and it is observed that there is no improvement in this regard.
- It was decided in previous TeST Sub-committee meeting that the constituents will furnish the availability status of 220 kV and above stations and improvement thereof.
- Due to non availability of Telemetry digital status , it is difficult to run State Estimator. Result of the State Estimator is poor.
- Percentage availability of Digital Status is given below:

CB Availability

S.No	Constituent	Total CB	Available	% Availability
1	Central Sector	4227	3249	76.86
2	RRVPNL	1928	1327	68.83
3	UPPTCL	2091	1477	70.64
4	BBMB	261	240	91.95
5	DTL	555	438	78.92
6	HVPNL	946	614	64.90
7	HPSEB	121	80	66.12
8	PSTCL	867	588	67.82
9	Uttarakhand	171	165	96.49

* Based on snapshot taken at 14:00 hrs of 5th May 2020

Isolator Availability

S.No	Constituent	Total ISO	Available	% Availability
1	Central Sector	10243	8465	82.64%
2	RRVPNL	6139	4391	71.53%
3	UPPTCL	6576	4355	66.23%
4	BBMB	711	546	76.79%
5	DTL	1556	1161	74.62%
6	HVPNL	2504	1616	64.51%
7	HPSEB	275	180	66.50%
8	PSTCL	2204	1391	63.11%
9	Uttarakhand	521	293	56%

*** Based on snapshot taken at 14:00 hrs of 5th May 2020**

4.3 Unreliable Telemetry from States/Utilities

										Updated Till:		31.03.2020	
Sl. No.	User Name	Total Nos of Stations		Telemetry not Provided				Telemetry Intemittent				Total non-availability of data in %	
				Total nos of		Non-availability		Total nos of		Non-availability			
		GS	SS	GS	SS	GS	SS	GS	SS	GS	SS	GS	SS
1	Punjab	17	171	-	65	-	38%	-	12	-	7%	-	45%
2	Haryana	6	69	-	-	-	-	2	16	33%	23%	33%	23%
3	Rajasthan	20	227	-	-	-	-	4	5	20%	2%	20%	2%
4	Delhi	6	43	-	-	-	-	-	8	-	19%	-	19%
5	UP	21	198	-	-	-	-	-	45	-	23%	-	23%
6	Uttarakhand	11	18	-	1	-	6%	9	14	82%	78%	82%	83%
7	HP	15	27	-	-	-	-	3	-	20%	-	20%	-
8	JK	4	17	3	12	75%	71%	1	5	25%	29%	100%	100%
9	POWERGRID	-	82	-	-	-	-	-	1	-	1%	-	1%
10	NTPC	15	-	-	-	-	-	-	-	-	-	-	-
11	NHPC	14	-	-	-	-	-	2	-	14%	-	14%	-
12	NPCIL	5	-	-	-	-	-	-	-	-	-	-	-
13	NJPC	2	-	-	-	-	-	-	-	-	-	-	-
14	THDC	2	-	-	-	-	-	-	-	-	-	-	-
15	BBMB	6	16	-	-	-	-	-	-	-	-	-	-
16	IPP/JV/Patran	10	7	-	-	-	-	4	2	40%	29%	40%	29%
	TOTAL	154	875	3	78	2%	9%	25	108	16%	12%	18%	21%
	Total (over all)	1029		81		8%		133		13%		21%	

It is to mention that non availability as on 31.03.2019 was 25% whereas non -availability as on 31.03.2020 is 21%. It is to again emphasis that very little or no improvement in this regards.

Month Wise data availability for last one year is given below:

	Average Data Non-availability
18-Jun	26%
18-Jul	24%
18-Aug	24%
18-Sep	22%
18-Oct	25%
18-Nov	24%
18-Dec	22%
19-Jan	22%
19-Feb	28%
19-Mar	25%
19-Apr	26%
19-May	23%
19-Jun	25%
19-Jul	24%
19-Aug	21%
19-Sep	21%
20-Jan	20%
20-Mar	21%

4.4 Communication plan for channel redundancy

- The provision of redundant & reliable communication was discussed in various TeST Meetings. Redundant communication is to ensure that two ports at RTU end are configured for RLDC. Also, data is configured with two different communication channel for bringing redundancy into the system and increase reliability of data to NRLDC/RLDC.
- Presently 120 RTUs out of 134 RTUs are reporting on redundant channel. It is requested to expedite the process of providing redundant channel for the remaining locations at the earliest.
- It is to note that stations where second channel is down since long is considered as single channel only.
- However redundant channels provided are not reliable and it is found that standby channel are also down due to lack of path diversity/common source of Power Supply etc. Thus it is requested that reliability of redundant channel may also be ensured.
- List of Stations with non-redundant channel is given below:

S.NO.	Name of RTU	Comments	Timeline
1	KISHANGANGA	NHPC	NHPC to revert
2	PARBATI-2	NHPC	NHPC to revert
3	SALAL	NHPC	NHPC to revert
4	SEWA-2	NHPC	NHPC to revert
5	RIHAND-3	NTPC	NTPC to revert
6	SINGRAULI HYDRO	NTPC	NTPC to revert
9	BUDHIL	IPP	
10	KARCHAM WANGTOO	IPP	
11	SHREE CEMENT	IPP	
12	CHEMERA-3*	NHPC	NHPC to revert
13	NATHPA JHAKRI*	RTU to be replaced	October 2019
14	URI-2*	NHPC	NHPC to revert

* Standby channel down since long.

* States are also requested to do similar activities and share the report with NRPC

4.5 Provisioning of Phasor Measurement Units (PMU) on HVDC and FACTS device locations

HVDC and FACT devices are important transmission components in Indian power system. As these power electronics devices are known to enhance the stability of the grid, therefore understanding behaviour of these devices during perturbations or faults in the power system, is very important besides controller- controller interactions. Apart from local high resolution recording already available at these installation, the high resolution data provided by the PMU can be very helpful in carrying out the necessary analysis/studies. The availability of PMU data will also enhance the visualization of the system parameters and help in taking appropriate timely actions by RLDCs/NLDC and also validation of study models by both RLDCs/NLDC as well as CTU/CEA.

It is important to mention that even with presence of such large numbers of PMU, the visibility of HVDC and FACT devices is still low at Control centres.

The details regarding installing of PMU on HVDC and FACTs Devices location already informed to POWERGRID vide letter no-: **POSOCO/NLDC/SO/PMU/296 DATED-03/02/2020.**

Therefore, POWERGRID is requested to confirm whether data from coupling transformer can be integrated with existing PMU installed at Sub-station or new PMU installation is required. POWERGRID to provide timeline for installation PMU/integrating coupling transformer data at following Locations.

PMU Data Availability on HVDC installed

S.No.	HVDC station	PMU installed in Substation (Y/N)	PMU data of DC-AC Inter Connector Reporting to RLDC (Y/N)
1	Mahendergarh	No	No
2	Rihand	yes	yes
3	Dadri	yes	yes
4	Balia	yes	No
5	Bhiwadi	yes	no
6	Kurukshetra	Yes	Yes
7	Agra	Yes	No

PMU Data Availability on STATCOM installed

S.No.	Statcom station	PMU installed in Substation (Y/N)	Coupling Transformer PMU data Reporting to RLDC (Y/N)
1	LUCKNOW	Yes	No
2	NALLAGARH	Yes	No

S. No.	Statcom station	ID	Rating	PMU installedin Substation (Y/N)	Coupling Transformer PMU data Reporting to RLDC (Y/N)
1	400kV KANPUR	SVC-1	+140 / - 140	Yes	No
2	400kV KANPUR	SVC-2	+140 / - 140	Yes	No
3	400 kV Ludhiana	SVC-1	600	Yes	No
4	400 kV Ludhiana	SVC-2	-400	Yes	No
5	400 kV Kankroli	SVC-1	400	Yes	No
6	400 kV Kankroli	SVC-2	-300	Yes	No
7	400 kV New Wangpoh	SVC-1	300	Yes	No
8	400 kV New Wangpoh	SVC-2	-200	Yes	No

Installation of PMU for all new feeders of State Network

- It may be noted that installation of PMUs has benefited system operator by taking preventive actions based on synchro phasor measurements in advance, avoiding large scale disturbances and operating the system in a more reliable manner. PMU data has helped a lot in system operation in real time, protection co-ordination, disturbance analysis and network model validation. Based on PMU data PSS tuning was done to avoid such oscillations. During foggy winter nights, large number of auto-reclosure operation took place and its detection in real time by system operator helped a lot in effective real time monitoring and control of the grid.
- Based on the above advantages PMU was installed under URTDSM project with following strategies:

Approach on PMU Placement:

- All 400 kV stations in State and ISTS grids
- All generating stations at 220 kV and above
- HVDC terminals and inter-regional and inter-national tie lines
- Both ends of all the transmission lines at 400kV and above: State and ISTS sector

Reliable Voice communication between Central Sector Substations / Generating Stations and NRLDC

- This is to inform that out of total 129 sub-stations/generating stations at inter-State level in Northern Region VOIP connectivity is presently available only in 98 locations and out of these available locations only 85 (i.e. just 65% of total locations) are in working condition. Further, it is understood that VOIP was not established at some locations during project implementation due to non-availability of fiber connectivity/interfacing equipment. Since now the fiber connectivity to most of these locations has been established, concerned utilities are requested to please arrange availability of Voice communication through VOIP network for these locations also at the earliest.
- The matter was also discussed in 16th TeST Meeting in which POWERGRID has confirmed that they ensure healthiness of VOIP at their substations and will procure new VOIP equipment for POWERGRID Substations by 31st December 2019.
- Also POWERGRID informed that owners/generating sub-stations shall procure centralized PABX compatible VOIP phone on their own and POWERGRID shall configure communication link from sub-station to NRLDC wherever communication links are available.

- NRLDC has also taken with various entities for restoration of VOIP communication. The present status of VOIP connectivity is given below:

Constituent/utility	No of Sub-Station	Available	Not Available	% precentage availability	Working	% Working
1 POWERGRID	77	65	12	84.42%	54	70.13%
2 NHPC	14	95*		64.29%	9	64.29%
3 NTPC	11	8	3	72.73%	7	63.64%
4 THDC	2	2	0	100.00%	2	100.00%
5 SJVNL	1	0	1	0.00%	0	0.00%
6 NJPC	1	0	1	0.00%	0	0.00%
7 NPCIL	4	4	0	100.00%	4	100.00%
8 IPP	20	146**		70.00%	14	70.00%
TOTAL	130	102	28	78.46%	90	69.23%

* Communication not Available (Uri1,Uri2,Parbati2,Parbati3,Kishanganga)
** Shree Cement , Karcham Wangtoo, AD Hydro , Budhil

locations where it was not considered earlier during project execution phase. All concerned are requested that kindly ensure healthiness and near 100% availability of VOIP connectivity at all inter-State

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THANK YOU