



सत्यमेव जयते

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

सं. उक्षेविस/ प्रचालन /108/04/2018/6402-36
No. NRPC/ OPR/108/04/2018/

दिनांक: 01 जून, 2018
Dated : 01st June, 2018

सेवा में / To,

Members of TeST Sub-Committee (As per List)
टेस्ट उप समिति के सभी सदस्य (संलग्न सूचीनुसार)

विषय: टेस्ट उप-समिति की 13 वीं बैठक का कार्यवृत्त ।
Subject: 13th meeting of TeST Sub-Committee – Minutes.

महोदय ,
Sir,

उत्तर क्षेत्रीय विद्युत समिति की टेस्ट उप-समिति की 13 वीं बैठक दिनांक 24 अप्रैल, 2018 को उत्तर क्षेत्रीय विद्युत समिति, सम्मलेन कक्ष, कटवारिया सराय, नई दिल्ली में आयोजित की गई थी। इस बैठक के कार्यवृत्त की एक प्रति आपकी सूचना व आवश्यक कार्यवाही हेतु इस पत्र के साथ संलग्न है।

13th TeST Sub-Committee meeting of NRPC was held on 24th April, 2018 at NRPC, Conference Hall, Katwaria Sarai, New Delhi. A copy of the minutes of the meeting is enclosed herewith for favour of information and necessary action.

भवदीय
Yours faithfully,

-sd-

(हेमन्त कुमार पाण्डेय)
(Hemant Kumar Pandey)
अधीक्षण अभियंता
Superintending Engineer

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- 34.Sr. Vice President, JSW Energy Ltd., New Delhi-110066 (Fax: 46032343 / 26183546)
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Minutes of 13th meeting of Telecommunication, SCADA & Telemetry (TeST) Sub-Committee Held on 24.04.2018 at NRPC, New Delhi

13th meeting of Telecommunication, SCADA & Telemetry (TeST) Sub - Committee held on 24.04.2018 at NRPC, New Delhi. The list of participants is enclosed at **Annexure-I**.

1. Confirmation of Minutes

1. Confirmation of Minutes:

SE, NRPC informed that the minutes of 12th meeting of TeST sub-committee held on 22.12.2017 were issued on 23.01.2018, which was available on NRPC website (www.nrpc.gov.in). He further stated that no comment on the MOM had been received.

Representative from NRLDC informed that the Table agenda regarding Reliability of Telemetry was discussed during 12th TeST meeting when NRLDC informed that Code for element charging and shutdown would be issued by NRLDC provided the real time of the concerned element is available at the time issuance of code which was agreed by all the members. NRLDC requested to include the same in MOM. Accordingly, following para is included in the Minutes of the 12th meeting of TeST Sub-Committee :

“ 6.4 Table Agenda: Denial of Charging /shutdown Code by NRLDC/SLDC

Representative from NRLDC informed that in some cases , though the telemetry were arranged from the stations before charging of the new element / Stations, the reliability for few substations was very poor even at 400 kV level and sometimes the restoration of telemetry took long time which impaired the visibility of the grid. He added that NRLDC was facing serious problem in decision making process in real time operation specially at the time of high voltage scenario in the grid, experienced during off - peak hours. He further emphasized that difficulties were also faced, while according clearance for shutdown due to poor visibility of the network.

The sub-committee expressed concern over the issue. It was noted that in spite of regular discussions in various meeting at NRPC forum, the intended result could not be achieved in ensuring reliable telemetry data availability in Control Centers, even during the critical operations of the elements . Various options for remedial measures including escalation of issues at higher management level of the concerned utilities and denial of code by the concerned load dispatch center were discussed. It was also deliberated that SLDCs should also make effort to ensure availability of reliable telemetry

The sub-committee advised all the utilities to ensure telemetry in real time as per CERC regulations before applying for element charging and shutdown.

After detailed deliberations, it was agreed that concerned load dispatch Centers e.g. NRLDC / SLDCs may deny the power system element charging / shutdown and may not issue code for such operations, if the reliable telemetry of the concerned element (s) / station(s) is not available in the control center.”

With the above addendum, the minutes of the 12th meeting of TeST sub-committee were approved by the sub-committee.

1A. Follow -up

1A. Follow-up of Decisions in 12th meeting of TeST Sub-Committee held on 22.12.2017

Status of important decisions taken in the 12th meeting of TeST sub-committee as updated by constituents is enclosed at **Annexure-1A**.

2. Telecommunication Related Issues

2.1 OPGW installation under central and state sectors:

2.1.1 Latest status of OPGW installation progress under central sector:

The details of balance work out of 5203 Kms. of OPGW under Central sector, as informed by POWERGRID representative is as under:

- (i) Abdullapur – Dehradun : The link had been commissioned on 30.03.2018.
- (ii) Kishenpur – Dulhasti : The link had been commissioned on 19.01.2018.
- (iii) Uri-II to Uri-I line : 10 Kms. POWERGRID had deployed their OPGW maintenance team for completion of Uri-I to Uri-II in Feb’ 2018. However, due to shelling from Pakistan side, the work could not be executed at that time. A team was redeployed again after 2 months 18.04.2018 but due to severe ROW issue, work could not be carried out. POWERGRID officials confirmed that after settlement of ROW/compensation issues with the help of District Administration, team would be deployed to complete this link (Uri-I to Uri-II).

2.1.2 Reliable Communication Scheme under Central Sector for NR.

2.1.2.1 SE, NRPC informed that, implementation of following Communication Schemes were approved in 37th TCC and 40th NRPC meeting held at Srinagar.

- a) Reliable Communication Scheme under Central Sector for Northern Region consisting of 5428 Km of OPGW along with communication equipments and associated items at a cost of Rs. 177 Cr.
- b) Replacement of OPGW along with communication equipment and associated items installed under ULDC project Phase-I consisting of 1820 Km of OPGW along with communication equipments and associated items at a cost of Rs. 60 Crs. The same is taken up as a part of Reliable Communication Scheme under Central Sector for Northern Region.

2.1.2.2 POWERGRID representative informed that NIT for Reliable scheme was published on 22.02.2018. However, due to muted participation / queries raised by bidders, date for opening of NIT was extended 3-4 times and opening was expected on 03.05.2018. The placement of award was expected by July' 2018.

2.1.3 Latest status of OPGW installation progress under state sector:

2.1.3.1 The progress as updated in the 13th TeST meeting, by POWERGRID, are as under:

| SI No | Name of Package | Award Date | Completion schedule | Status |
|-------|---|------------|---------------------|---|
| 1 | OPGW for State sector (Package-V) M/s ZTT/ECI/Steel Product | July, 2015 | May, 2018 | Out of total 1669 Kms., 1663 Kms. Completed. Balance – 6 Kms. (UPPTCL-6) |
| 2 | OPGW for State sector additional requirement (Package-I a) (supply Pkg) M/s SDGI-Offshore contract | Oct, 2015 | July, 2018 | Initial Scope: 2800 Kms. Revised Scope: 3374 Kms. Supply completed: 3068 Kms. materials for balance 173 Kms of PSTCL and 146 kms of BBMB is at Ludhiana. Balance (133Kms) will be supplied by June/July' 2018 |
| 3 | OPGW for Additional requirement for CS and SS (Package-III a) M/s Prem Power | Sept, 2015 | Sept, 2018 | Revised scope: 706 Kms. Total supply completed. 450 Kms installation completed. |

2.1.3.2 Regarding balance portion of 6 Km. under **Package-V**, on DTL line i.e. Bamnauli-Ballabgarh (8 Km), and Bamnauli- Jhatikara (2 Km.) , representative of POWERGRID informed that OPGW works had been completed on both of the DTL links. However, minor approach cable laying was pending, as DTL had shifted their transmission line to Under-ground cabling near Bamnauli premises, due to which quantity of approach cable was changed and POWERGRID had to arrange the materials for the same. He added that the work would be completed shortly.

2.1.3.3 POWERGRID informed that under **Package-V** on UPPTCL's 400kV Greater Noida - 220 kV Noida Sector 20 link, 2.7 Km. OPGW work **had been completed**. POWERGRID representative further informed that for 6.2 Km. OPGW work on UPPTCL's Muradnagar-Loni link under **Package-V**, POWERGRID had again attempted for laying of OPGW. However, due to be severe ROW issues/ opposition by landowners, work could not be taken up. Matter had been escalated to District Administration for resolving of ROW issue. POWERGRID representative reiterated that completion of this link may not be possible as the earlier dispute for compensation to landowners by UPPTCL was still unresolved and now they are demanding very high compensation for damage of crops. He informed that landowners denied permission for carrying out OPGW work without sorting out earlier issues of compensation payment.

2.1.3.4 Regarding installation of OPGW supplied under State sector additional requirement (Package-I a) - 3374 Kms POWERGRID informed that:

Installation for these OPGW links were bifurcated in two Region i.e. NR-I (810 Kms -all central sector links) and NR-II (2564 Kms Central sector & State sector). Out of 810 kms, 421 Kms had been completed, Completion target is Sept' 2018, works was delayed due PTW was not allowed by NRLDC/NLDC for 2nd peak of Dadri-Maharani Bagh (Dadri-Greater Noida link) and 765kV Agra-Greater Noida-Meerut line citing grid security. For NR-II, out of 2500 Kms, 1209 Kms had been completed which includes HPSEBL, PSTCL & Central sector links. Target completion date for NR-II links is by Dec' 2018.

2.1.4 **Status of NHPC stations**

2.1.4.1 **URI - I Power Station:**

Representative of POWERGRID informed that OPGW had not been commissioned however the data was flowing through PGCIL Telecom fibre.

2.1.4.2 **URI - II Power Station:**

Representative of POWERGRID informed that originally OPGW link was envisaged as Wagoora-Uri-II then Uri-II to Uri-I. However, due to sever ROW issues, OPGW links

was established for Wagoora to Uri-I. The status of URI-I to URI-II link is discussed under para 2.1.1 (iii)

2.1.4.3 **Bairasiul, Sewa-II and Parbati-III:**

Representative of POWERGRID informed that Pong-Bairasul link integration was delayed as DCPS at Pong did not have adequate spare capacity for new communication equipment and new DCPS was envisaged in project for Pong. However, he added that Pong-Bairasul and Hiranagar-Sewa-II links would be commissioned within 15 days.

Parbati-III link power station target is June' 2018 .

2.1.4.4 **Data telemetry of Kishanganga HE Project through OPGW**

NHPC representative stated that 330MW Kishanganga HE Project was commissioned in the state of Jammu & Kashmir and data telemetry of the Project was established through BSNL MPLS Lease line. He emphasized that data telemetry of Kishanganga HE Project through OPGW needs to be established.

Representative of POWERGRID informed that new transmission line from Kishenganga to Wagoora was under construction through Amargarh and OPGW connectivity would be established only after commissioning of the transmission line. POWERGRID representative agreed to inform the status after checking OPGW availability on this line with concerned office.

2.2 **Replacement of S900 RTUs :**

SE, NRPC informed that AMC of S900 RTUs , installed under ULDC is valid till July 2018. He added that during 12th TeST Meeting it was decided that PGCIL would replace S900 RTUs at stations owned by PGCIL and other members/constituents who had consented for their RTU replacement through POWERGRID ,by July 2018.

POWERGRID representative informed that they had sent MoU/Agreement for replacement of old S-900 RTUs to all constituents in first week of Feb' 2018. However, only two constituents namely SJVNL & THDC Limited has signed MoU/Agreement. It was informed that award shall be placed only after signing of MoU/Agreement between POWERGRID & respective constituents of Northern Region & deposit of advance payment. HPSEB informed that the matter regarding signing of MOU for replacement of old S-900 RTU's was under consideration of the Management of HPSEBL.

Representative of POWERGRID requested all concerned members to inform status and action plan for signing of MoU/Agreement & payment, so that tendering process for procurement of new RTUs may be initiated.

The sub-committee expressed concern over delay in procurement process and advised all

the concerned constituents to submit the signed copy of MoU to POWERGRID latest by 15th May 2018. It was also decided by the sub-Committee that if any Constituent doesn't submit the signed copy of MoU by 15th May 2018, it will be the concerned Utilities responsibility to make necessary arrangement for procurement on their own so that their RTUs are replaced before expiry of AMC.

2.3 AMR data through Fibre Network

Representative of NRLDC informed that it was decided in the 12th TeST Meeting that POWERGRID would do pilot. Accordingly, Pilot project was carried out by PGCIL and data from Maharanibagh was made available through fibre.

In the 38th TCC & 41st NRPC meetings held on 27th & 28th Feb,2018, POWERGRID informed that the pilot project for integration of SEM data through fibre optic network at Maharanibagh S/Stn had been successfully completed and beneficiaries should give their consent for implementation at other locations.

POWERGRID was requested to intimate the estimated cost implication for shifting the AMR data on OPGW network, wherever feasible, so that views of the members may be taken. POWERGRID agreed for the same but there is no response/ information regarding this issue .

Representative of POWERGRID informed that they did not get any confirmation from NRLDC regarding testing. NRLDC confirmed that they would submit confirmation letter to POWERGRID on AMR testing over fibre. Further, POWERGRID informed that on confirmation, they would prepare the estimate especially for kiosk station where optical fibre cable/LIU switches and FO-Ethernet converters needs to be laid and communication equipment is already available at control centre .

(Action: NRLDC , POWERGRID; Time line: 15.06.2018)

2.4 Implementation of Regulation on Communication

2.4.1 Formation of guideline for calculation of “Availability of Communication System”

NRLDC representative informed that the regulation on communication were issued on 15th May, 2017 with an effective date of 1st July,2017. As per the regulation 7.3 (ii) “The RPC Secretariat shall certify the availability of communication equipment for CTU, ISGS, RLDCs, NLDC, SLDCs based on the data furnished by RLDC”

Further, as per regulation 7.3 .(i) “ NPC shall be responsible for issuance of the guidelines with the approval of the Commission on “Availability of Communication System” in consultation with RPCs, RLDCs, CTU, CEA and other stakeholders within a period of two months from the date of notification of these regulations.”

He added that RLDC needs to keep records of the communication outage based on requirements of the guidelines to be decided by NPC and approved by Commission since 1st July, 2017. However, no data was made available by the communication service provider.

He emphasized that guidelines may be made available to NRLDC so that the necessary records could be collected from the communication service provider for calculating the “Availability of the communication System”.

The sub-committee advised all the members to send their views on the availability determination to the NPC for consideration.

2.4.2 Issuance of Technical Standards for the communication system

NRLDC representative informed that as per regulation 7.1 (ii) “CEA shall formulate and notify technical standards, cyber security requirements in accordance with the Cyber security Policy of the Govt of India from time to time, protocol for the communication system for Power Sector within the country including the grid integration with the grid of the neighboring countries.” Further, guideline for interfacing requirements needs to be formulated within 60 days from the issuance of the technical standards to be issued by CEA.

He added that draft “Technical Standards” on Communication was available on CEA website for comments from the stake holders. Cyber security requirement for communication system are also to be finalized and documented for compliance. NLDC has to prepare the guideline on interface requirements for the communication system based on the above two documents.

Representative from CEA informed that they were in process of framing Technical Standards for Communication in Power Sector and draft of the same had been uploaded on CEA website for public comments. A presentation on the important provisions in the draft Technical Standards was given by Chief Engineer, PCD,CEA. He requested all concerned to submit their comments by 26.05.2018.

The sub-committee advised the members to submit comments on the draft regulations ,directly to CEA or to NRPC secretariat for onward transmission to CEA within stipulated time period.

(Action : All Constituents; Time line: 26.05.2018)

2.4.3 Formulation of planning criteria for the communication system

As per regulation 7.1 (i) “CEA shall formulate communication planning criterion and guidelines for development of reliable communication system for power system of India duly considering requisite route redundancy ,capacity, as well as requirements of smart grid and cyber security.”

NRPC may like to inform the members the action taken in this regard, so that the TeST sub-committee may discuss the future communication requirement based on the planning criteria being decided by CEA.

The sub-committee advised the members to submit their views on planning criteria and guidelines, directly to CEA or to NRPC secretariat for onward transmission to CEA.

2.5 Communication issues of NR States

2.5.1 HVPNL communication issues :

2.5.1.1 Implementation of Multi Site Configuration between SLDC Panipat and SLDC Shimla: The HVPNL representative informed that implementation of Multisite Configuration between SLDC Panipat and backup SLDC Shimla was pending. Out of total 29 no. Stations, only 5 no. Stations of Shimla end were reporting at SLDC Panipat.

POWERGRID informed that multisite had been implemented as per approved philosophy and was working fine till date. However, there may be database issue which needs to be checked by HVPPNL/SIEMENS.

2.5.2 HPSEB Communication Related Issues:

2.5.2.1 Implementation of OPGW under Package-I (a).

HPSEBL representative stated that under package-I (a), OPGW of about 545.335 Km was to be laid on HPSEBL transmission network and as per LOA, work was to be completed by 31.03.2017. However, no stringing work was being carried by the Firm on HPSEBL transmission network.

POWERGRID informed that HPSEBL links would be commissioned by Sept/ Oct' 2018.

2.5.2.2 Installation of OLTEs under Package-V & Package IV (a).

HPSEBL representative stated that under package-V, Terminal equipments (SDH & PDH) were to be installed on 14 Nos. HPSEBL locations and DCPS system were to be installed on 08 nos. locations. As per LoA, work was to be completed by **31.03.2017**. She expressed concern about progress of the work.

POWERGRID informed that communication equipment (FOTE) would be supplied by May, 2018. However, FOTE for HPSEBL links would be commissioned once all OPGW links are commissioned.

2.5.3 DTL Communication issues

2.5.3.1 **Replacement of diverted Communication Eqpts. /addl. BOQ.**

DTL representative stated that a number of SDH/PDH communication equipments were diverted / utilized by POWERGRID for the project works, from earlier allocated DTL sites, such as 220kV Patparganj / Preet Vihar etc.

POWERGRID representative informed that plan for replacement / installation at those sites along with the additional approved BOQ for other sites, would be provided by POWERGRID shortly.

POWERGRID informed that they were procuring communication equipment for DTL under ongoing communication equipment package of FIBCOM. However DTL requested that since they have their complete network of ECI make communication equipment for seamless integration with existing equipment and proper monitoring, all diverted equipment should be replaced by ECI make communication as state sector package is still under execution and amendment may not be an issue. POWERGRID agreed for the same and informed that these supplies would be made by Dec,2018.

(Action : POWERGRID; Time line: Dec,2018)

2.5.3.2 DTL representative stated that new communication equipment (ECI make) supplied under ULDC Scheme had been installed and DTL was in process of shifting of data from the old setup (Fijitsu and Nokia equipment). After one time installation, no support / manpower is available from the vendor's side for minor tweaking in configuration and troubleshooting during data shifting process.

POWERGRID representative stated that during last TeST meeting, it was informed that all works had been completed by POWERGRID/ECI for communication equipment and channel integration for DTL. It was also clarified that data shifting activity would be responsibility of respective constituents in the same way as done by NRLDC. He added that for any support, ECI team is available for any change of configuration, once complete system is taken over then only support team would be deployed.

2.5.3.3 DTL representative also informed that since some data of central sector is also flowing through old equipment of DTL, POWERGRID should take steps for shifting of their data to newly installed communication equipment of DTL, if any. Once all data is shifted to new system, old equipment would be taken out of the service and AMC would be stopped.

POWERGRID informed that if DTL can shift their services to new communication equipment and confirm the schedule of stoppage of AMC for ULDC Phase-I communication equipment, for central sector stations, POWERGRID will take care of centre sector telemetry and voice services.

2.5.3.4 DTL representative further stated that training on newly installed communication equipments/ DCPS was to be conducted.

POWERGRID informed that nomination letter had already been issued for training on communication equipment w.e.f. 30.04.2018. UPPTCL requested to change the date. Accordingly, the training from 07.05.2018 to 11.05.2018 (one week) was agreed.

2.5.4 UP Communication issues

2.5.4.1 Replacement of S-900 RTUs : Representative of UPPTCL informed that they had already initiated the retrofitting/replacement of S-900 RTUs which is expected to be completed within a year. In case some S-900 RTUs are not replaced for any reason their AMC has to be ensured. Apart from that there are some Areva make C 264 RTUs whose AMC will be required. UPPTCL representative requested POWERGRID to extend the AMC of RTUs beyond September, 2018.

POWERGRID informed that UPPTCL should try to replace RTUs before expiry of AMC and extension of AMC for one more year may be decided later.

2.5.4.2 Commissioning of spare SDH racks: Representative of UPPTCL informed that there were some spare SDH Fiber Home makes racks available with UPPTCL which are required to be commissioned in light of additional requirements of Ethernet ports. UPPTCL requested POWERGRID to instruct Comtel to commission these spare SDH racks.

POWERGRID informed that since spares were supplied for maintenance of system and same can not to be used for extension works otherwise in case of faults, long outage of data may occur.

2.5.4.3 Phasing out of Nokia PDH : Representative of UPPTCL raised the issue of phasing out of Nokia PDH as the requirement of data availability through redundant channels would depend upon availability of PDH equipments.

POWERGRID representative informed that replacement of ULDC Phase-I scheme had already been approved and replacement of these equipment would be done under reliable communication scheme.

2.5.4.4 ECI Equipment: On the issue of delay in commissioning and integration ECI equipment under package V , raised by UPPTCL representative , POWERGRID representative informed that all communication equipment under UPPTCL had been installed and commissioned. He added that link integration could not be possible due to non-availability of OPGGW links, which were installed under the same scheme but some of the links, namely 400kV Muradnagar - 220 kV Sahibabad, Sahibabad – Noida Sector 62, Noida Sector 62 – Noida Sector 20 and Noida Sector129 – Noida Sector137-Greater Noida 400 were reported fibre cut during transmission line diversion work by UPPTCL. This affected the commissioning of ECI make communication equipment in NCR.

Bareilly-Shahjahanpur link commissioning was pending due to non-completion of OPGW laying which is in the scope of UPPTCL.

POWERGRID representative had further informed that this type of incidents of fibre cut had happened on previous occasions also, when transmission group had cut OPGW during diversion of lines without informing concerned officials of POWERGRID/Constituents which impacted data communication for longer period. Due to these fibre cuts additional OPGW & Joint Boxes are also needed for splicing due to unplanned and in some cases, shutdown is also required for OPGW installation.

The sub-committee expressed concern on this issue of fibre cut and advised all Constituents especially UPPTCL to take this issue seriously as communication is main part of all telemetry/SCADA . All Constituents agreed on the same and confirmed that they would issue necessary instruction to transmission line wings on this issue.

The sub-committee also advised POWERGRID to report the intentional fibre cut incidents during diversion etc. , in future, to NRLDC and NRPC Sectt., so that the matter may be taken at higher management level of the concerned utility.

2.5.5 Communication issues of BBMB

2.5.5.1 Installation of OPGW supplied under State Sector additional requirement (Package-I a)

Representative of BBMB raised issue of delay in OPGW work on 220 kV Bhakra - Jamalpur & 220 kV Dehar - Ganguwal lines.

POWERGRID representative informed that materials for these OPGW has been supplied and by Sept'2018, OPGW on these links would be installed and commissioned.

2.5.5.2 Non-working of Remote Consoles at Dhulkote & Pong:

Representative of BBMB stated that the remote consoles installed at Dhulkote & Pong were not working and whenever these remote consoles are put in operation, RTUs reporting to SLDC become non-operational. It had also been observed that when the Pong Remote Console port on Fibre Home was made inactive, Remote Console of Dhulkote (which is through E1 to Ethernet Converter) also becomes inactive.

Representative of POWERGRID informed that matter had been discussed with M/s Commtel. It seems there may be some duplicity of cabling creating loop as earlier these services were running on E1 to Ethernet converter, now these services have been shifted to Tejas after installation of equipment. He added that Commtel Engineer would go to site in first week of May'2018 to check complete cabling work.

2.5.5.3 Packet loss in Chandigarh – Panipat Tejas Remote Console link:

Representative of BBMB stated that this defect was persisting since last fortnight and due to this Remote Console at Panipat was not working.

POWERGRID informed that there was LAN cable cramping issue at Panipat which had been identified and rectified after changing LAN cable.

2.5.5.4 Replacement of S 900 RTUs: (Agenda by BBMB)

Representative of BBMB stated that approval of competent authority for signing the agreement for replacement of S 900 RTUs was expected within fortnight.

This issue is covered under Item 2.2.

2.5.5.5 Implementation of Multi Site Configuration between SLDC Chandigarh and SLDC Patiala:

BBMB informed that the implementation of Multisite Configuration between SLDC Chandigarh and backup SLDC Patiala was pending. Ethernet Port connectivity from Bhakra Left, Bhakra Right, Bhiwani, Pong power House & Dehar Power House was also pending.

In the 12th meeting of TeST, BBMB intimated that PSTCL RTUs stops reporting as and when Ganguwal, Kotla & Jagadhri RTUs are put on multisite configuration. It was decided that an engineer from M/s SIEMENS shall visit BBMB to resolve the issue. The issue has been resolved by M/s SIEMENS but multisite configuration of SIEMENS make RTU installed at MISS Ganguwal is still pending due to non-laying of multisite cable from RTU to communication equipment by M/s SIEMENS. Further, implementation of multisite configuration for rest of the SIEMENS make RTUs and S900 RTUs through Sub-LDCs is still pending.

POWERGRID representative informed that after implementation of communication system for BBMB, multisite links had been configured from SLDC/Sub-LDC of BBMB to SLDC Patiala (back up SLDC of BBMB). He added that same configuration was to be done for PSTCL also for fully implementation of multisite between BBMB & PSTCL. It was also informed that due to non-implementation of complete OPGW and communication system for state sector under Expansion Scheme, still some of the 104 RTUs or Sub-LDC data may not be flowing as per multisite philosophy.

The sub-committee advised POWERGRID to take necessary action for resolving the issues to ensure multisite configuration functioning by 15th June, 2018.

(Action : POWERGRID; Time line: 15th June,2018)

2.6 Requirement of Ethernet ports at NRLDC

Representative of NRLDC informed that during 12th TeST meeting, it was decided that POWERGRID would arrange and provide additional SDH equipment/Ethernet ports as per Constituent's requirement (Tejas make) and the expenditure on this work may be booked under Add-CAP of the Project. POWERGRID had requested all Constituents to

give additional requirements to place order for combined requirement of SDH equipment/Ethernet ports. Sub-committee had advised constituents to inform the requirement to POWERGRID by 31.12.2017. POWERGRID was advised to procure SDH equipment/Ethernet ports at the earliest keeping in view requirement by different agencies and future requirements.

Representative of POWERGRID informed that they did not receive the requirements from constituents.

The sub-committee advised all the constituents to submit requirement of additional Ethernet ports/SDH equipment latest by 15th May, 2018 to POWERGRID . It was also decided that after 15th May,2018 no further requirement will be entertained.

On the request of representative of NRLDC for expediting the process of procurement POWERGRID representative confirmed that additional MUX would be supplied in 6 months.

(Action: All utilities; Time line : 15th May,2018)

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

3.1 Replacement of Siemens Engineer at SLDC Panipat:

HVPNL representative stated that the SIEMENS Engineer left HVPNL office on 31.03.2018 and new Software Engineer was deployed without any prior intimation/discussion and consent of HVPNL authorities. Moreover, the new engineer deployed does not meet with the requirements as per the terms and conditions of the contract/bidding documents. He added that matter has already been taken up with M/s Siemens and POWERGRID a no. of times regarding. He stated that such incidents may lead to security issues/system threat & hamper the smooth functioning and healthiness of the system. He emphasised that SIMENS should provide the qualified and skilled engineers in accordance with the conditions of the contract to maintain the SCADA/EMS System to the desired level of availability.

Many other utilities also expressed concern over the competence of SIEMENS manpower deployed in control centers.

The sub-committee viewed this issue seriously and advised SIEMENS representative to take necessary action to avoid repentance of such complaints from SLDCs and provide quality manpower for uninterrupted smooth running of NR SCADA system . SIEMENS representative agreed to take necessary action. The sub-committee advised POWERGRID also to take steps to ensure deployment of competent manpower by SIEMENS in SLDCs.

3.2 SCADA issues of HVPNL

3.2.1 EMS tuning:

Representative of HVPNL informed that while carrying out the EMS tuning activity, certain problems/misconceptions were faced, which could not be resolved even with the help / support available from SIEMENS Engineer deployed at SLDC, Panipat.

The sub-committee advised SIEMENS representative to take necessary action during EMS training at SLDC, Haryana. SIEMENS representative agreed for the same

3.2.2 Load forecasting application not working at SLDC Panipat:-

HVPNL representative informed that load forecasting application was not operational at SLDC Panipat.

Representative of SIEMENS agreed to take up this issue with their engineer at SLDC to resolve the problem.

3.2.3 Symbol for monitoring healthiness of UFR, df/dt relays:-

HVPNL representative informed that the symbol for monitoring healthiness of UFR, df/dt relays has not been provided by M/s Siemens.

Representative of SIEMENS agreed to provide necessary help to HVPNL.

3.2.4 Rollover to IPv6:-

HVPNL representative stated that in the 12th TeST Meeting, the sub-committee advised that the necessary action regarding migration to IPv6 in compliance to Govt. directions shall be taken by the concerned utilities in co-ordination with their internet service provider. He requested POWERGRID to get this activity carried out.

Representative from NRLDC informed that changes in webserver are required to migrate to IPV6. He suggested that all the utilities should arrange IP from their respective ISP for migration to IPv6. Once the IP is available required changes in web server may be done with the help of SIEMENS.

3.2.5 Interruption in publishing of SCADA data on SCADA Web Server:-

HVPNL representative stated that the publishing of SCADA data on SCADA Web Server gets interrupted many times, resulting into inconvenience to the system user. The interruption in the publishing of SCADA data on SCADA Web Server has occurred many times during past 2 months at SLDC Panipat.

Representative of SIEMENS agreed to take action to resolve the problem.

3.2.6 Non-working / Failure of Haryana SLDC Website:-

HVPNL representative stated that Haryana SLDC website stopped working at 10:00 hrs on dated 04.03.18 and was restored on dated 06.03.18. He requested that the detailed analysis report duly validated from POWERGRID regarding non-working of SLDC

website needs to be submitted by M/s Siemens citing the reason behind the database dbf file size becoming zero, preventive action taken, any kind of data loss, etc.

Representative of SIEMENS agreed to submit report .

3.2.7 **EMS Training:** -

HVPNL representative stated that, EMS training from M/s. Siemens should be conducted at the earliest as agreed by SIEMENS in the 12th TeST Meeting.

Representative of SIEMENS informed that EMS training at HVPNL was scheduled from 21st to 25th May 2018.

- 3.2.8 **Database Synchronization:** - HVPNL representative stated that in the 12th test meeting, it was informed by HVPNL that the incremental ICCP data base should be provided along with domain data while database synchronization on monthly basis, so that changes with respect to the other constituents could become available with every database modifications. The Sub-committee had advised NRLDC to explore the feasibility of sharing updated ICCP data base. He added that the same was not being done. HVPNL and NRLDC Representatives informed that issue had been resolved.

3.3 **HPSEBL SCADA issues**

- 3.3.1 Representative of HPSEB informed that latency issue could not be resolved, due to which in data reporting, difference in SEM vs SCADA values was observed.

Representative of SIEMENS agreed to send their engineer to resolve the issue by 15.05.2018 .

- 3.3.2 HPSEB representative stated that the modalities for integration of additional bays with the SIEMENS RTU, which were not included in the BOQ, should be finalized.

Representative of SIEMENS informed that list of applicable charges was provided to POWERGRID. Many utilities told that these charges were very high and suggested that the rates should be finalised through POWERGRID. POWERGRID representative suggested that utilities may separate supply and erection work orders and may consider to avail only connectivity services of SIEMENS at the specified rate. The supply may be arranged from any alternate sources.

The sub-committee advised POWERGRID / SIEMENS to provide utilities the breakup of the charges, with separate charges for supply , installation and integration, for integration of additional bays, so that utilities may be able to decide the agencies. POWERGRID & SIEMENS representatives agreed for the same.

3.4 **DTL SCADA issues**

- 3.4.1 **Non- availability of Siemens Site Engineer**

Representative of DTL informed that two nos. Siemens Engineers were deputed at DTL under ULDC Phase 2 scheme. However, since 16th March 2018 only one engineer was reporting at site.

SIEMENS representative agreed to take necessary action regrading manpower at SLDC by 15.05.2018.

3.4.2 Immediate requirement of S900 RTU's cards

DTL representative informed that they had urgent requirement of S900 analog cards, as no analog cards were available with DTL and most of the CPU and digital cards of S900 RTUs were faulty.

All the utilities were requested to extend help to DTL , if they have spares. DTL was advised to contact utilities who are replacing S 900 RTUs.

3.4.3 Charges for bay extension in Siemens RTU's.

DTL representative stated that as already requested in previous TeST meetings, Unit charges for extension of 220 / 66 / 33 KV bays in RTU's installed by Siemens under ULDC#2 needs to be provided to the Utilities to enable the proposed bay extension work at various sites.

The issue is covered at item 3.3.2.

3.4.4 Clarification on inclusion of GST under Maintenance Contract:

DTL representative informed that according to Volume 1 Conditions of Contract 22.4 (f) at page 25, it is stated that the quoted price is inclusive of taxes and the Employer would not bear any tax liability. However, after introduction of GST, M/S Siemens has modified the AMC rates as per GST, which is not in line with the T&C of Contract. Further, GST is also not included in the final amendment of Maintenance Contract issued by PGCIL.

Representative of SIEMENS informed that bills are raised for the same amount agreed in original contract.

The Sub-committee advised SIEMENS representative to get the contract amendment from POWERGRID. Pending amendment SIEMENS may raise provisional bills so that same can be reconciled after amendment. SIEMENS representative agreed to take up the issue with their finance dept and requested members to release the pending payment at the earliest.

3.5 UPPTCL SCADA issues

3.5.1 Clarifications from Siemens

UPPTCL representative stated that clarifications from Siemens on following points raised in 12th TeST meeting held on 22.12.17 regarding total failure of SCADA & EMS on 08.12.2017 were awaited.

- (i) Standby Servers (Hot standby servers for some applications and backup Servers for some other applications) also failed. Is there any changed required in system architecture to avoid simultaneous failure of Main & standby servers.
- (ii) Why failure of Scada switch -1 resulted in non-reporting of data on consoles through Scada switch -2 ?
- (iii) Why time taken for normalization of Various system & application took more than 7 days.? Analysis report and details of sequence of actions taken for normalization of system are still awaited from Siemens.

The sub-committee suggested that the group, constituted by NRPC secretariat for analysis the SCADA failure in UP and to suggest remedial measures to avoid recurrence, should take up these issues for detailed deliberation and analysis.

3.5.2 Delay in implementation of various pending SCADA & EMS works by Siemens:

3.5.2.1 OTS & PDS issues :

UPPTCL representative stated that OTS issues raised during 12th TeST meeting were still pending unresolved from Siemens side. He informed that PDS issues had been resolved by Siemens.

SIEMENS representative agreed to resolve OTS issues after contacting local engineer about details.

3.5.2.2 STLF issues:

UPPTCL representative stated that weather adoptive function stops working frequently. Moreover, Forecasted data of weather adoptive function get erased and is not available for comparison in future and time taken by Siemens for resolving the problem is too long.

Representative of SIEMENS agreed to resolve the problem by 30.05.2018

3.5.2.3 EMS issues:

UPPTCL representative stated that number of issues had been attended /Clarified by Siemens before and during training but there were still some modeling and database issues for which timely support from Siemens was required for resolving these issues. He also suggested for Write up /user manual describing modification procedure and also procedure for using various EMS applications in study as well as in real time mode.

Representative of SIEMENS agreed to provide write up data/manual in two weeks time.

- 3.5.2.4 UPPTCL representative stated that Siemens Engineers deployed at SLDC are not conversant with EMS functionality and due to non-availability of timely support from Siemens back office, problems remain unresolved for long time.

This issue is covered under item 3.1.

3.5.3 **Networking Issues:**

UPPTCL representative stated that issues raised during previous TeST meetings are still unresolved. Failure of data reporting from RTUs/SAS has been observed on 31.03.18 & 12.04.18 also. It is proposed that some external agency having expertise in providing networking solutions may be taken for resolving networking issues.

POWERGRID representative informed that this type of issues had been reported only from UPPTCL and no other constituent had faced this type of issues. He suggested that any change in the network should be carried out in consultation with by SIEMENS Engineer posted at UP , SLDC to avoid such issues.

The Sub-committee advised SIEMENS representative to take immediate action to resolve the issues under their scope. He agreed for the same.

3.5.4 **Routine checking of Main & Backup Scheme:**

UPPTCL representative stated that the issues of testing of Back-up SLDC was pending as modification work in networking by Siemens was not completed. He added that additional data comm. links from backup SLDC to Main SLDC and also from backup SLDC to Sub LDCs are required for operator Consoles (remote consoles) in event of running Scada/EMS system from backup SLDC. Additional operator consoles are also required for viewing of data at Sub LDCs for which no provision has been envisaged in existing scheme. He further mentioned that on running Scada /EMS from backup SLDC, data of RTUs /SAS reporting on 104 protocol at Main SLDC will not be available as data routes from these RTUs /SAS to backup SLDC is still not available.

The Sub-committee advised SIEMENS & POWERGRID representative to take necessary action to resolve the issues as per the scope of the contract. Representatives of POWERGRID & SIEMENS agreed for the same.

- 3.5.5 Regarding meeting of group formed for analyzing incidence of SCADA & EMS system failure at Main UPSLDC on 08.12.2017 it was decided that the meeting would be held on 08.05.2018 in NRPC/NRLDC, New Delhi.

3.6.0 **PSTCL SCADA issues**

3.6.1 **Multisite link issue:**

Representative of PSTCL informed that due to non- functioning of multisite functionality between BBMB SLDC-Chandigarh & PSTCL SLDC-Patiala, data is being transferred through ICCP.

Representative of SIEMENS informed that this work could not be completed due to non-availability of Communication link equipment at PSTCL. POWERGRID and SIEMENS agreed to resolve the issue by 31.05.2018.

3.6.2 Interruption of publishing of SCADA data on SCADA Web Server:

Representative of PSTCL informed that it had been observed that data publishing on web server gets interrupted many times which results into inconvenience to remote user/ dispatcher, for which the matter was conveyed various times to the M/s Siemens Engineer at site; however it could not be resolved completely till date.

Representative of SIEMENS informed that no such issue was reported in recent past . However, he agreed to look into the issue and resolve the same.

3.6.3 Representative of PSTCL requested that detailed documentation regarding additional charges for work of integration in case of addition/extension of bays for Siemens RTUs, is required to be provided by M/s Siemens.

This issue is covered under item 3.3.2.

3.7 SCADA issues of BBMB:

3.7.1 WEB functions of SCADA/EMS System:

Representative of BBMB informed that as per point 8.4 (k) of chapter – 8 ‘WEB SYSTEM FUNCTIONS’ of Technical Specification No. CC-CS/275-NR1/SCADA-1602/3/G5, it has been mentioned that “*Web server shall have necessary tools/utilities to automatically transmit text messages contents for E-mail and SMS to mobile phones through a Web based E-mail and SMS service provider. The message content of SMS shall be the same as the alarm generated by the supplied system or a text string entered by a user*”. The same has not been implemented by M/s SIEMENS till date. He added that the issue was discussed in the meeting held between BBMB and M/s SIEMENS on 1-2nd February, 2018 at BBMB SLDC Chandigarh wherein M/s SIEMENS informed that the provision of E-mail Server has been removed by POWERGRID from the scope at the time of Bid stage and for application of SMS, required hardware (Modem) is to be provided by the BBMB.

As per the requirement of “Completeness of the Contract”, the functionality of E-mail and SMS through Web Server is required to be implemented by M/s SIEMENS. As such, M/s SIEMENS should be requested to expedite the implementation of the same.

Representative of SIEMENS informed that all Web functions as per contract had been implemented. He added that SMS functionality would be implemented after supply of required hardware by BBMB.

3.7.2 Preparation of Reports through Remote Consoles:

Representative of BBMB informed that the issue was discussed in 6th meeting of TeST held on 10th September 2015 at New Delhi wherein BBMB requested M/s SIEMENS to prepare log sheet reports for one Sub-Station of BBMB through Remote Consoles so that BBMB can replicate the procedure to prepare reports at other Sub-Stations/Power Houses. Accordingly, POWERGRID requested BBMB to procure the requisite MS-Excel licenses. He intimated that MS-Excel had already been procured by BBMB and installed at all Remote Consoles and same was conveyed to M/s SIEMENS. The issue was again discussed in the meeting held between BBMB and M/s SIEMENS on 1-2nd February, 2018 at BBMB SLDC Chandigarh wherein M/s SIEMENS agreed to implement the same within 45 days. However, the implementation was pending.

Representative of SIEMENS agreed to resolve all technical issues related to preparation of reports through Remote Consoles as agreed earlier by 31.05.2018. He requested BBMB to confirm the desired format for the same.

4. Telemetry Related Issues

4.1 Non-Availability / Reliability of Telemetry

Representative of NRLDC informed that the new stations at 400 kV are being integrated in the system. Though the telemetry integration is ensured before charging the new element, many times the reliability of telemetry is not at all ensured. He mentioned that the reliability of telemetry of the following stations was very poor :

| | | | |
|---------------|-------------------|----------|------------|
| Budhil | Koteshwar Pooling | Malana | Banala |
| Maharani Bagh | Ludhiana | Salal | Aligarh |
| Sewa-2 | Chittorgarh | Balia | Chamba |
| Dhanoda | 220 KV Giri | Baglihar | Gladni |
| Hiranagar | Udhampur | Ziankot | Bhadla |
| Chittorgarh | Kalisindh | Banda | Agra South |
| Greater Noida | Nehtaur | | |

The issues in the telemetry of above stations was discussed and all the concerned utilities were advised to take immediate action for resolving the issues and submit action taken report to NRLDC and NRPC Sectt. by 31st May,2018.

It was decided by the sub-committee that as agreed in the 12th meeting of the TeST sub-committee, the Load Despatch Centers may deny issuance of code for charging /shutdown control center. of elements , if the reliable telemetry for the element is not available in the concerned

4.2 Telemetry of digital status

Representative of NRLDC informed about the importance of correct digital telemetry , which had been discussed in various TeST sub-committee meetings. However, there was no improvement in this regard. It was decided in 12th TeST Sub-committee meeting that the constituent will furnish the availability status of 220 kV and above stations and improvement there of, but no communication in this regard had been received.

The sub-committee expressed concern over poor digital telemetry status, as this may be detrimental to grid security and advised all the utilities to take immediate action in this regard.

It was decided by the sub-committee that as agreed in the 12th meeting of the TeST sub-committee, the Load Despatch Centers may deny issuance of code for charging /shutdown control center. of elements , if the reliable telemetry for the element is not available in the concerned

Members were again requested to furnish the status of digital data telemetry of the stations.

4.3 Communication plan for channel redundancy and to back-up NRLDC

Representative of NRLDC informed that the issue of redundant communication had been under discussion since several meetings but, redundant data communication was yet to be ensured at NRLDC.He added that only 81 RTU out of 124 were reporting on redundant channel.

Representative of POWERGRID informed that 87 RTU out of 124 were reporting on dual channel and informed that they would provide redundant channel for pending 12 locations of POWERGRID stations within 30 days.

NTPC was advised to take necessary action to provide redundant ports at Jhajjar, Rihand-NTPC, Rrihand 3, Unchahar,Anta,Auraiya, Koldam and Badarpur, where ports not available. It was also decided by the TeST Sub-committee that a separate meeting with IPPs would be called to decide modalities for providing redundant communication channel to NRLDC.

4.4 Calculation of Actual Drawl in SCADA

Representative of HVPNL informed that the SEM and SCADA data for each points are being compared and the points for which % age errors are more than 5 % are reported for correction. The inaccuracy/mismatch (in SCADA Vs SEM) for the below mentioned points was reported in past months but the problem was not resolved.

- Hisar_PG - 220 KV Fatehabad-1&2.
- Kurukshetra HVDC_PG – 400/220KV T/F T-1 & T-2
- Hisar_BB – 132KV Rajgarh
- Hisar_BB – 132KV Amarpurthedi

- Panipat_BB – Chhajpur ckt-1&2.
- Pinjore_HS – 220kV Kunihar

HVPNL requested NRLDC to resolve the problem of SCADA data mismatch with SEM and restore accuracy of telemetry data.

NRLDC informed that it had no role in this issue and requested HVPNL & BBMB to resolve the issue. POWERGRID representative agreed to verify RTU connection & transducers at their stations.

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

5.1 URTDSM Status

5.1.1 Representative of HVPNL informed that SAT of URTDSM system installed at SLDC Panipat for better monitoring of system operation has been completed on 16.02.2018. However, during SAVT period, URTDSM system failure occurred on dated 28.03.18. Matter was taken up with PGCIL & M/s GE india Ltd. to submit the detailed report regarding failure of URTDSM system, but nothing had been received in this regard.

POWERGRID informed that SAVT was completed on 27.03.2018 and informed to HVPNL through mail and representative of HVPNL confirmed the mail receipt but requested POWERGRID to send official letter. POWERGRID agreed to send the letter.

5.1.2 Installation of PMU:

Representative of HVPNL informed that Site survey was done by M/S GE at 220KV DCRTTP Switchyard for the re-installation of PMU. Now the dismantling of PMU from PTPS 1 to 4 and installation of PMU pending.

Representative of POWERGRID informed that as per discussion in last TeST meeting, survey for shifting of PMUs has been done at new location, however at DCRTTP is having 8 feeders and we are having 3 PMUs which can cater only 6 feeders. This issue was already informed to HVPNL and their reply is still awaited on which feeders these PMUs shall be installed. After discussion, it was confirmed that NRLDC will confirm the final 6 feeders on which PMU have to be installed. POWERGRID further, informed that existing cable cannot be used as distance between CR panel and PMUs is more this station. Procurement of separate cables has been started by M/s GE.

5.2 Pending PMU installation at 220 kV Pragati :

Representative of DTL informed that two nos. PMU designated for IP Power , were to be shifted to Pragati station, as per discussions during the 12th TeST meeting. The same had not been commissioned.

Representative of POWERGRID informed that shifting would be done after receiving letter by DTL/NRLDC confirmation regarding Pragati station status.

5.3 Space at NTPC- Dadri for installation of PMUs under URTDSM Project):

Representative of POWERGRID informed that installation PMUs at various sub-stations of central and state sector utilities under URTDSM Project is in progress. There is space problem in NTPC- Dadri for installation of PMUs at control centre. Matter was pending since long back as supply of PMUs was made in Jan'2016 and installation was pending due to space issue. During the last meeting, NTPC had informed that extension works of control centre was taken up and work would be completed by end of March'2018.

POWERGRID representative requested NTPC to confirm the readiness of control room or provide space in existing control room for installation and commissioning of PMUs. Representative of NTPC agreed to resolve this issue by 15th May 2018

5.4 URTDSM Issues:

Representative of UPPTCL informed the following URTDSM issues:

- (i) Backup data communication routes from PMUs to control centre was not available.
- (ii) Out of 16 PMU locations, data was available from 13 locations only. Commissioning of PMUs at Harduaganj was pending & data from khara was not available due to communication problem. Data of Moradabad was not available since 02.04.16 due to power card failure.
- (iii) From some PMUs (Anpara, Sultanpur, Unnao, Sahupuri) data inaccuracy /mismatch issues were also pending.

Representative of POWERGRID agreed to resolve above issues by 31.05.2018 and data validation work pending at any locations shall be done by respective Constituents including NRLDC, so that any mismatch may be corrected.

5.5 Unified Real Time Dynamic State Measurement (URTDSM) Scheme:

- 5.5.1 Representative of BBMB informed that URTDSM Scheme, 2 * 60 kVA UPS system along with Battery Bank had to be provided by POWERGRID. He intimated that the civil activities including providing of earthing had been completed at BBMB SLDC Complex in March 2018. He requested POWERGRID to give definite schedule for the supply of

the UPS system, as the AMC of the existing 2 * 40 kVA UPS system has been extended only for 6 months i.e. up to 31.07.18.

Representative of POWERGRID informed that UPS supply shall be done in July' 2018 and installation shall be done in Aug/Sept' 2018.

5.5.2 POWERGRID has yet to provide Ethernet Port connectivity for PMUs from Bhakra Right Power House and Pong Power House.

Representative of POWERGRID informed that presently it is not possible as this connectivity shall be done after installation of state sector communication equipment at BBMB/PSTCL.

6. OTHER ISSUES

6.1 Pending payment of VCS from PTCUL

NRLDC representative informed that NRLDC had supplied and installed Video Conferencing System at PTCUL through M/s Siemens. The amount due from PTCUL is Rs. 20, 65,562/- was pending despite repeated reminders.

The issue could not be discussed as Representative of PTCUL not attended this meeting.

6.2 Survey off of Old Assets under ULDC Phase-I:

Representative of HVPNL informed that 21 no. RTUs and UPS had been replaced with new equipment. Hence the old equipment installed under ULDC Phase-I required survey off. In last meeting PGCIL had stated that life of ULDC Phase-I equipment would be completed in July' 2017 then these equipment will be property of constituents after recovery of payment and constituents can dispose off old equipment on their own. HVPNL requested POWERGRID to inform the procedure and road map for the same.

Representative of POWERGRID informed that each constituent can decide their own procedure to dispose off old equipment, as it is their own property after recovery of payment by POWERGRID.

6.3 State sector schemes through PSDF Funding:

Representative of HVPNL had informed that they had requested Ministry of Power that the 66 kV is an integral part of Haryana Transmission system and thus OPGW laying & communication / telemetry provisions on 66 kV & above network need to be considered under the ambit of PSDF and Ministry may consider a grant of 70% of total DPR estimate.

He added that two separate Detailed Project Reports had been prepared (One for 132KV & above Network and the other for 66KV Network). Fiber / OPGW laying had been proposed (Approx. length for 132 kV & above lines being 4551 Kms. and for 66 kV lines

being 2067Kms.) along with the provision of RTUs and Communication Equipment & Auxiliary power supply system at 66KV & above substations. The DPRs had been approved by HVPNL management and same would be submitted to PSDF. NRPC is hereby requested to recommend to CEA / Ministry of Power to consider 66KV as an integral part of Haryana Transmission system and provide 70% grant on both the DPRs.

HVPNL was advised to submit DPRs to the concerned agency and if some issue arises then matter may be brought to OCC, where there is regular agenda on PSDF schemes.

6.4 Disposal of old and obsolete SCADA equipment of ULDC I scheme:

Representative of HPSEB informed that the recovery charges against the ULDC –I Scheme was completed during July’2017 but the communication regarding the disposal of old & obsolete equipment’s under said scheme was still awaited from POWERGRID.

Representative of POWERGRID informed that they would send letters to each constituent immediately after final clearance from Finance Deptt..

6.5 OPGW cut due to diversion of Transmission Lines:

- 6.5.1 Representative of POWERGRID submitted that on several occasions some of transmission line wing has diverted the transmission lines without informing to concern offices of that constituents or POWERGRID. Due to this, OPGW installed on these transmission lines are cut and services (RTU/speech/ICCP channels) to SLDC/ NRLDC through these links are affected. These types of incident had happened on several occasions. He informed that recently several lines of UPPTCL in NCR were diverted namely 400 kV Muradnagar to Sahibabad 220, Sahibabad to Noida-Sector62, Noida-Sector62 to Noida-Sector20 and Noida-Sector129 to Noida-Sector137-Greater Noida 400 lines by transmission line group and no information was shared with UPPTCL and ULDC-POWERGRID. In this case additional OPGW and Joint Boxes are needed for splicing due to unplanned fibre cut and in some cases, shutdown is also required for OPGW installation, this affected the commissioning of ECI make communication equipment in NCR.

The sub-committee advised all the utilities to inform POWERGRID and other concerned utilities well before diversion of lines, so that necessary action for OPGW installation may be taken and communication as well as financial losses are minimised.

- 6.5.2 POWERGRID representative informed that Bareilly-Shahjahanpur link commissioning was pending due to non-completion of OPGW laying which is in the scope of UPPTCL.

Representative of UPPTCL informed that OPGW work would be completed by 30th April 2018.

6.6 Dismantling of Microwave Tower:

As per discussion in 31st NRPC and 28th meeting of TCC held on 23rd and 24th July'2014 at New Delhi, Microwave tower shall be dismantled by respective constituents, POWERGRID along with some of constituents have dismantled these microwave tower. NRLDC has also requested for dismantling of Tower at their premises. POWERGRID have awarded the contract to vendor for dismantling and shifting of materials to store, however permission for dismantling of this microwave tower is not yet received, In view of non-availability of permission, POWERGRID could not dismantle the tower and decided to short close the contract.

Members noted the information.

6.7 Delay in Payment

Representative of POWERGRID informed that POWERGRID is providing consultancy services on RTU/APS/Wideband/OPGW maintenance to constituents on overhead charges basis as per MOU signed with respective Constituents. Constituents are paying on quarterly or yearly basis with advance payment, however advance payments are being released on delay of 5-6 months and in some cases the delay is one year which is not acceptable and POWERGRID have no other option to deduct the overhead charges from advance 1% deposited with us.

Outstanding payment:

HVPNL – Rs 29 lacs (RTU, Insurance, OPGW, APS & wideband equipment)

J&K PDD – Rs 32 Lac (APS, OPGW, RTU, wideband & Insurance)

RRVNL – Rs 20 Lac (APS, OPGW, RTU, wideband & Insurance)

PTCUL – Rs 6 Lac (APS, OPGW & RTU)

BBMB – Rs 5 Lac (APS, RTU, OPGW, wideband & Insurance)

Representative of HVPNL informed that payment against RTUs, OPGW, APS and wide band is under process and Rs 15-16 Lacs has been released to POWERGRID however there is some mistake by bank, so credit of fund is not taking place, issue shall be sorted out within 2-3 days. Balance payment shall be released within 15 days. Representative of POWERGRID informed that these payments are outstanding since long and there is audit objection for these outstanding payments.

Representative of BBMB informed that invoices have been processed and payment shall be released shortly.

Representative of POWERGRID further informed that reimbursement of insurance payment is pending since 2 years in many cases and constituents are raising petty issues to deduct the payment value less than Rs. 10-20 from the invoices. POWERGRID informed that the insurance services are being provided without any overhead charges there is audit objection for these outstanding payments.

Representative of POWERGRID requested the constituents to make their own arrangements for insurance. After deliberation constituents requested POWERGRID to continue insurance for complete ULDC works. Representative of POWERGRID informed that from this year POWERGRID will do the insurance only for those constituents who pay in advance, and Invoice will be raised for advance payment based on average of last three years premium plus escalation factor and final settlement of invoices will be done after award. DTL representative informed that as per terms of MOU, there is no provision of advance payment, before placement of award, as such payment shall only be as per T&C of MOU

6.8 Pending TDS :

Representative of POWERGRID requested all Constituents to submit Quarterly TDS certificate in time against payment made to POWERGRID for Consultancy / AMC services which is required to match the books of Accounts.

He also informed that in view of non-payment of insurance charges, all constituents were requested to arrange their insurance on their own. He added that POWERGRID was not taking any overhead charges and there were audit objections for this type of works without any overhead charges and delay in payment.

All constituents agreed to release pending TDS by May 2018.

(Action: All constituents; Time line: 15.05.2018)

6.9 Signing of side letters of MoU for AMC :

6.9.1 POWERGRID representative informed that side letter of MoU for AMC contract for OPGW was going to expire on 30.06.2018. He added that POWERGRID would send side letters to constituents for signing. He requested all constituents to expedite the signing of side letters by 30.05.2018.

6.9.2 POWERGRID representative informed that letter of MoU for maintenance of RTUs was send to J&K PDD long back. However, MoU was yet to be signed by J&K PDD.

6.9.3 He further stated that POWERGRID had installed communication equipment under Microwave Replacement scheme of ULDC and AMC for this equipment was envisaged in the contract for 6 years. Payment for the scheme under the project would be recovered through tariff as per ULDC scheme. A per practice, cost of AMC would be borne by the respective constituents, accordingly, POWERGRID will raise the invoices for AMC of communication equipment installed under microwave replacement scheme. He requested that a side letter to existing MOU may be signed by constituents for reimbursement of payment to POWERGRID. DTL i representative nformed that no side letter for MOU extension of communication equipment is received & not relevant in DTL,

POWERGRID agreed to send side letters and relevant constituents agreed to send signed letters by 31.05.2018.

(Action: All relevant constituents; Time line: 31.05.2018)

6.10 Maintaining of temperature at control centres :

Representative of POWERGRID requested all Constituents to maintain the temperature in Communication, Server room, Battery room, adequate numbers of Air conditioners must be required to maintain temperature at 27 Degree Celsius. He informed that SCADA/URTDMS servers have inbuilt feature for Auto shutdown to prevent loss of data in case of over temperature (set at 33 Degree). To avoid outages all constituents were requested to maintain standard AC temperature.

POWERGRID Representative informed that as per discussion during MRM meeting, they had collected data from AMC vendor for availability of AC system at sub-station premises where DCPS with battery banks were installed, and it was observed that around 40-45% locations AC system was not provided / not adequate. To maintain room temperature at 25-27 degree.

He added that life span of installed VRLA type batteries depends on maintenance of temperature in battery room. If properly designed, built, and maintained, a battery can provide many years of reliable service. A reduction to 80% of the rated capacity is usually defined as the end of life for a lead-acid battery. Below 80%, the rate of battery deterioration accelerates, and it is more prone to sudden failure resulting from a mechanical shock (such as a seismic event) or a high discharge rate. Even under ideal conditions, a battery is expected to eventually wear out. He mentioned that life cycle of VRLA type batteries are 5-7 years only.

The sub-committee advised all the constituents to maintain standard AC room temperatures for battery room.

The sub-committee advised all the constituents to send their views on expected life of battery to NRLDC and NRPC sect. by 31.05.2018.

All the constituents were also requested to send a report to NRPC Sectt. and NRLDC regarding conditions of the batteries installed in their premises, under ULDC project. So that action plan for timely replacement of batteries, based on their healthiness and life cycle may be prepared to ensure real time data communication without any interruption
All constituents are agree on the same.

(Action: All Constituents; Time line: 31.05.2018)

6.11 Draft Communication Audit Procedure

SE, NRPC informed that CERC had issued Central Electricity Regulatory Commission (Communication System for inter-State transmission of electricity) Regulations, 2017. These regulations had come into force w.e.f. 1.7.2017.

He added that as per Regulation 10 of these Regulations, the RPC Secretariat has to conduct performance audit of communication system annually as per the procedure finalized in the forum of the concerned RPC.

A detailed presentation on the draft procedure was made by NRPC Sectt. and the procedure was discussed. The modified procedure based on deliberations in the meeting is enclosed at Annexure-II.

The sub-committee advised all the constituents to send their comments, if any, to NRPC Sectt. latest by 31.05.2018 , so that finalized procedure may be put up to TCC & NRPC for approval.

(Action; All Constituents; Time line: 31.05.2018)

Annexure-I**List of participants in the 13th meeting of Telecommunication, SCADA and Telemetry sub-committee held on 24.04.2018 at NRPC New Delhi**

| Organization | Shri/sh | DISIGNATION | Email ID |
|--------------|---|--|--|
| NRPC | Sh. MAKP Singh Sh. Upendra Kumar Sh. Hemant Kumar Pandey Sh.. K.N.M Rao Sh. Manish Maurya Sh.P R Koushik Sh. Anil Goutam | Member Secretary SE(O) SE(C) Asst. GM AE AE AEE | ms-nrpc@nic.in seo-nrpc@nic.in sec-nrpc@nic.in knmrao2003@yahoo.com sec-nrpc@nic.in seo-nrpc@nic.in seo-nrpc@nic.in |
| CEA | Sh. Naresh Bhandhari Sh. Srikant Reddy | CE (PCD) Asst Director | nbnareshbhandhari@gmail.com adptcc@gmail.com |
| POWER GRID | Sh. Y.K. Dixit Sh. A S Kushwaha Sh. N K Meena Sh. Shikha Singh Sh. Furkhan Siddique Sh. Dinesh Kumar Meena | GM (ULDC & Engg.) GM (LD&C) Dy. Manager NR-I Mgr, NR-I, Dy. Manager Engr. | ykdixit@powergridindia.com askhushwaha@powergridindia.com nkmeena@powergridindia.com Shikha@powergridindia.com fu.siddiqui@powergridindia.com dineshk@powergridindia.com |
| POSOCO | Sh. Debasis De Sh. Ankur Gulati | GM Dy. Manager | Debasis.de@posoco.in ankurgulati@posoco.in |
| PSTCL | Sh.Harvinder Pal | ASE SLDC | srxen-sldc2@pstcl.org |
| UPPTCL | Sh. R K Tiwari Md. Irfan. Alam Md.Sanshad Hussien | CE(C&C) SE(SCADA&IT) SE(Microwave) | cecc@upptcl.in uldclko@gmail.com emtclko@gmail.co , |
| DTL | Sh. Pradeep Katiyar Sh. Parvez Khan Smt. Anjali Das Sh. Mukesh kumar Smt. Parul Kapadia | DGM(SLDC) Manager(T) Manager AM (T) Mgr(T) | pradeepkatiyar@dtl.gov.in parvez.khan@dtl.gov.in anjalee@gmail.com mukeshdtlnw@gmail.com kapadiaparul@gmail.com |

| | | | |
|---------------|---|------------------|--|
| | Sh.S K Srivastava Sh. Kamlesh Kr. Verma | AM(T) AM(T) | shrivastava.dtl@gmail.com kamlesh.dtl@gov.in |
| HVPNL | Sh. R S Dahiya Sh. Mohan Dev | EE(SLDC) AE | sesldc@gmail.com xenhvpn@gmail.com |
| BBMB | Sh. S Dilbagi Sh. Rajneesh Sarwal | Addnl. SE AEE | ddlb1@bbmb.nic.in rajmeesh.sarwal@gmail.com |
| HPSEBL | Smt. Anita Sharma | AEE | pcshimla2003@gmail.com |
| NTPC | Sh. B. L.Yadav | AGM | blyadav@ntpc.co.in |
| NHPC | Sh. Rahul Ranjan | DM(E&C) | rahulranjan@nhpc.nic.in vijay.kumar239@gmail.com |
| Tata Power | Sh. L:alit wasan | DGM | basiyalsd@yahoo.co.in |
| SJVN | Sh.Anil Saini | AM(E) | Anil.saini08@gmail.com |

Annexure-IA**Follow up of 12th TeST meeting Decisions**

| Sl No | Issue | Action by | Time line | Compliance status as on 15.04.2018 |
|-------------------------|--|-----------|------------|--|
| 2.2.4.2 | Regarding underground fibre connectivity of UP SLDC Gomti Nagar with 220kV S/S Gomti Nagar. The sub-committee advised POWERGRID for expediting the award process and complete the connectivity at the earliest | POWERGRID | May 2018 | POWERGRID informed that approx. 90% work has been completed, and balance works shall be completed by end of May' 2018 |
| 2.2.5.1 | Replacement of diverted Communication Equipments /Additional BOQ for DTL | POWERGRID | 31.03.2018 | Issues mentioned in Point in 2.5.3.1, Target date for replacement of communication equipment is Dec' 2018 |
| 2.2.5.2 | Training / Drawings/documents of newly installed Communication / DCPS to DTL | POWERGRID | 15.01.2018 | Completed |
| 2.2.6.2 | Installation of OLTE under Package- V & Package IV (a). at HPSEB | POWERGRID | Feb.2018 | Issue covered in 2.5.2.2 |
| 2.2.7.1 & 2.2.8.1 | Implementation of Multisite Configuration between BBMB, SLDC and PSTCL, SLDC. | POWERGRID | Jan 2018 | Issue covered in 2.5.5.5 |
| 2.2.9.1 | Requirement of E&M card for fiber home PDH/SDH system at RVPNL | POWERGRID | Jan 2018 | POWERGRID informed that Requirement from Constituents have received in last week of Feb' 2018, these are additional spare requirement and procurement shall be done by Dec' 2018 |
| 2.2.9.2 | Repairing of HBL Make DCPS Installed by M/S COMMTEL: | POWERGRID | Jan 2018 | POWERGRID informed that Commtel has started maintenance of DCPS modules and most of the |

| | | | | |
|---------|--|---------------------|---------------------------|---|
| | | | | places rectification has been done. However, repair/replacement of battery bank is under progress. |
| 3.2.3.2 | OTS issues: UPPTCL | POWERGRID & SIEMENS | Jan 2018 | POWERGRID informed that issues related to OTS has been resolved During Siemens Engineer's visit, |
| 3.2.3.3 | PDS issues: UPPTCL | POWERGRID & SIEMENS | Jan 2018 | POWERGRID informed that issues related to PDS has been resolved During Siemens Engineer's visit, |
| 3.2.3.6 | Monitoring of UPS Status & Alarms through SCADA: | POWERGRID & SIEMENS | Jan 2018 | POWERGRID informed that During procurement of RTU, separate FRTU shall be procured for monitoring of these signal, |
| 3.2.5.2 | BBMB and UP were in process of testing their back-up SLDCs, wherein they were facing some issues. M/s Siemens representative assured to resolve the issues by Jan., 2018. | SIEMENS | Jan 2018 | POWERGRID informed that UPPTCL Networking has been resolved after change in IP configuration for SLDC/Sub-LDCs, however for BBMB, work is in progress and shall be completed by end of May' 2018. |
| 3.2.5.3 | All the SLDCs would test back-up SLDC at least once in every six month. The sub-committee advised all the members to complete this exercise by 31st March, 2018 | ALL SLDCs & SIEMENS | 31.03.2018 | <i>Respective Constituents may test their back up control room testing.</i> |
| 5.1.1 | NTPC informed that extension work of building at Dadri was going on and work would be completed by end of Feb' 2018, then POWERGRID can install PMUs in Dadri NTPC control centre. | NTPC & POWERGRID | 15 th May 2018 | NTPC revised the target to 15.05.2018 |

| | | | | |
|-------|--|--|------------|--|
| 5.1.2 | <p>Status of the installation of URTDSM system. Completion of the project in all respect by March,2018..</p> | POWERGRID | June 2018 | POWERGRID informed that System commissioned fully for NRLDC and all SLDCs of for Northern Region on 27.03.2018 |
| 5.1.3 | Information regarding change in location of installed PMUs may be sent to POWERGRID, NRLDC and NRPC Sectt. latest by 15th Feb,2018, after which no request for any relocation would be accepted. | POWERGRID and All Gen and Transmission utilities | 15.02.2018 | No request received by NRPC Sectt. |

Annexure-II

Draft Communication Audit Procedure

1. Introduction

- 1.1 This procedure has been prepared in compliance to Central Electricity Regulatory Commission (Communication System for inter-State transmission of electricity) Regulations, 2017. As per Regulation 10 of these Regulations, RPC shall conduct annual audit of the communication system annually as per the procedure finalized in the forum of the concerned RPC. 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.
- 1.2 “Communication system” is a collection of individual communication networks, communication media, relaying stations, tributary stations, terminal equipment usually capable of inter-connection and inter-operation to form an integrated communication backbone for power sector. It also includes existing communication system of Inter State Transmission System, Satellite and Radio Communication System and their auxiliary power supply system, etc. used for regulation of inter-State and intra-State transmission of electricity.
- 1.3 “User” means a person such as a Generating Company including Captive Generating Plant, RE Generator, Transmission Licensee [other than the Central Transmission Utility (CTU) and State Transmission Utility (STU)] , Distribution Licensee, a Bulk Consumer, whose electrical system is connected to the ISTS or the intra-State transmission system.
- 1.4 "Control Centre" means NLDC or RLDC or REMC or SLDC or Area LDC or Sub-LDC or DISCOM LDC including main and backup as applicable.
- 1.5 Words and expressions used in this procedure shall have the meanings assigned to them in the Act or Regulations by CERC.

2. Scope

- 2.1 This procedure shall be applicable to all Users of the communication infrastructure to be used for data & voice communication and tele -protection for the power system in the Region at Regional, inter-State and State level.
- 2.2 All Users, Control Centers and other concerned agencies shall abide by the procedures as applicable to them. The Procedure shall be applicable to the entities enumerated in Regulation 5 (ii) of the Central Electricity Regulatory Commission (Communication System for inter-State transmission of electricity) Regulations, 2017 as applicable to them.
- 2.3 The Audit for the communication infrastructure to be used for data communication and tele -protection for the power system at Regional, inter-State and intra-state level incidental to inter-state transmission of electricity shall be carried out by RPC secretariat.
- 2.4 RPC Secretariat shall issue necessary instructions to all stakeholders to comply with the audit requirements, as per relevant CERC and CEA Regulations, within the stipulated time.
- 2.5 The Audit for the communication infrastructure at intra-state level in line with this Procedure shall be carried out by respective SLDC. SLDC may seek assistance of other stake holders or any other third party for the audit. SLDC shall issue necessary instructions to all stakeholders to comply with the audit requirements as per relevant CERC and CEA Regulations, within the stipulated time.
- 2.6 SLDC shall submit half yearly reports for the Audit of the respective intra-state system, to RPC Secretariat and RLDC, by 15th October for the period April-September and by 15th April for the period October-March of the respective year.

3. Audit Procedure

- 3.1 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.
- 3.2 Each User, using inter-state transmission or the intra-state transmission incidental to inter-state, shall submit the detailed report to RPC Secretariat and

RLDC, in prescribed format on half yearly basis. The detailed report shall be submitted by 15th October for the period April-September and by 15th April for the period October-March of the respective year. This report shall be considered as self-certificate regarding availability and healthiness of the Communication system of respective user.

- 3.3 Each concerned User shall submit Report by 15th October for the period April-September and by 15th April for the period October-March of the FY Completion of periodic testing of the communication system in accordance with procedure for maintenance and testing prepared by CTU. The detailed.
- 3.4 In respect of intra-state users SLDC shall submit half yearly reports, to RPC Secretariat and RLDC, by 15th October for the period April-September and by 15th April for the period October-March of the respective year.
- 3.5 The Network Management System (NMS) report for a month shall be submitted by the Users 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.
- 3.6 All users and Control Canters shall get the third party cyber security audits done once in a financial year from a Cert-in certified vendor in compliance to Regulation 13 (iii) of Central Electricity Regulatory Commission (Communication System for inter-State transmission of electricity) Regulations, 2017. The detailed report of the Cyber Security Audit shall be submitted by 15th April for the previous financial Year.
- 3.7 RPC Secretariat may ask any other information required for Audit of the Communication system in addition to these periodic reports.

4. Phase-I Audit : Scrutiny of the Information

- 4.1 A Communication System Audit Sub-Group comprising one member each from RPC Secretariat, RLDC, CEA and One of the SLDCs in the region shall be constituted by RPC Secretariat with the approval of Member Secretary, RPC. The sub-group may co-opt any other member from any organisation for facilitating the activities of the sub-group.
- 4.2 RPC Secretariat may also engage a third party for carrying out Audit Activities.

- 4.3 The Communication System Audit Sub-group shall scrutinize the information received in RPC Secretariat as mentioned in Clause 3 of this procedure. The Sub-group may also ask any additional information necessary for its activities. All the users , RLDC, SLDCs shall provide the information to the sub-group on priority with the stipulated time period.
- 4.4 The sub-group shall also identify the nodes for physical inspection based on the scrutiny of the information.
- 4.5 The Audit would include but not limited 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 clearly specified 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 month of its commissioning.

5. Phase-II Audit : Physical Verification

- 5.1 Based on the recommendations of the sub-group Audit committee (s) shall be constituted and the physical inspection Audit plan shall be prepared by RPC Secretariat.
- 5.2 Audit Committee (s) shall be formed on regional basis.
- 5.3 Audit shall be carried out in a planned manner as included in this document by a team of three auditors. The audit committee shall comprise of one representative from the RPC Secretariat, one representatives from RLDCs and one representative from any of the Utilities or SLDCs of the Region. The Audit team shall be formed excluding the member for the Organization/Utility who's system is to be Audited.
- 5.4 Once the plan is finalised, 3 days advance notice shall be served to the concerned Auditee intimating the detailed plan so that availability of required testing equipment and the required documents is ensured by Auditee and is made available to the Audit committee during the site visit.
- 5.5 Member Secretary, RPC 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.
- 5.6 The Scope of the physical verification shall include but not limited to the following:
 - 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 the nodes including repeater stations for its recommended performance.
 - d) Documentation of the configuration of the respective site and its up-dation.
 - 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.

5.7 Audit Committee (s) 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. A copy of the report shall also be submitted to convener of Communication System Audit Sub-group and RLDC.

6. Audit Compliance Monitoring

SRPC secretariat, Communication Sub Group , RLDC and SLDC would monitor the compliance of audit observations as applicable. The Audit outcome and the compliance of Audit recommendations shall be put up to TeST Sub-committee, TCC and RPC for deliberations.

7. Approval and Review of the Procedure

- 7.1 This procedure shall be made effective after approval of TCC and RPC.
- 7.2 This procedure shall be reviewed based on the feedback received by RPC Secretariat.
- 7.3 Any amendment in the procedure shall be made effective only after approval of TCC and RPC.