सत्यमेव जयते

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

सं. उक्षेविस/ प्रचालन /108/04/2019/ 15141-15175 दिनांक: 17 दिसम्बर, 2019
No. NRPC/ OPR/108/04/2019/ Dated : 17th December, 2019

सेवा में / To,

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

विषय: टेस्ट उप-समिति की 16 वीं बैठक का कार्यवृत्त ।
Subject: 16th meeting of TeST Sub-Committee – Minutes.

महोदय ,
Sir,

उत्तर क्षेत्रीय विद्युत समिति की टेस्ट उप-समिति की 16 वीं बैठक दिनांक 14 नवम्बर, 2019 को उत्तर क्षेत्रीय विद्युत समिति, सम्मलेन कक्ष, कटवारिया सराय, नई दिल्ली में आयोजित की गई थी । इस बैठक के कार्यवृत की एक प्रति आपकी सूचना व आवश्यक कार्यवाही हेतु इस पत्र के साथ संलग्न है।

16th TeST Sub-Committee meeting of NRPC was held on 14th November, 2019 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,

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

List

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3. Chief Engineer (GM), CEA, R. K. Puram, New Delhi-110066, (Fax-011-26109750)
4. Chief Engineer, UT of Chandigarh, Chandigarh-160009, (Fax-0172-2740276)
5. General Manager (SLDC), DTL, New Delhi-110002, (Fax-011-23221012)
6. Chief Engineer ,HPGCL, Panchkula-134109, (Fax-0172-2560622 & 2565042)
7. Chief Engineer, HPPTC Ltd., Shimla-171004, (Fax-0177-2626284)
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9. Chief Engineer HPSEB Ltd, Shimla-171004, (Fax-0177-26163554)
10. Chief Engineer (SLDC) PSTCL, Patiala, (Fax-0175-2304017)
11. Chief Engineer (Distribution), PSPCL, The Mall, Patiala, (Fax- 0175-2212069)
12. SE(communication), RVPNL, Heerapura, Jaipur-302005, (Fax-0141-2250967)
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15. Development Commissioner (P), PDD, Srinagar, J&K, (Fax-0194-2452173)
16. Managing Director, J&K State Power Dev. Corp., Srinagar, J&K, (Fax-0194-2500145)
17. Managing Director, UPCL, Dehradun-248006, (Fax-0135-2768867)
18. Chief Engineer (O&M), NHPC, Faridabad-121003, (Fax-0129-2255706)
19. General Manager (OS)(NCR), NCR-HQ, NTPC,Noida-201301, (Fax-0120-2410052)
20. General Manager(ULDC) & General Manager (LD&C) POWERGRID, New Delhi-110016, (Fax-011-26564849)
21. General Manager (C&SO), SJVNL, Sharma Niwas, Below BCS, New Shimla-171009, (Fax-0177-2673283)
22. General Manager (Electrical Design),THDC, Rishikesh-249201, (Fax-0135-2438682)
23. General Manager (Technical), IPGCL, New Delhi-110002, (Fax-011-23270590)
24. GM(O&M) DTL, New Delhi-110002, (Fax-011-23232721)
25. General Manager, NRLDC, New Delhi-110016, (Fax-011-26853082)
26. Chief Engineer (SO&C), SLDC, HVPNL, Sewah, Panipat , (Fax-0172-2560622)
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32. Shree Cement Limited. Beawar - 305 901 (Fax: 01462-228117/228119)
33. Director, LancoAnpara Power Ltd., (Fax-124-2341627
34. GM (Comml.), Aravali Power Company Pvt. Ltd., NOIDA, (Fax-0120-2425944)
35. AsVP, BSES Rajdhani Power Limited, New Delhi (Fax:011-26419833)
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37. HOD power system control, TATA Power Delhi Distibution Limited, New Delhi, (Fax-011-66050601), CENNET building, Opp to PP Jewellers Netaji SubhshPlace,, New Delhi.
38. Sr. Vice President, JSW Energy Ltd., New Delhi-110066 (Fax: 46032343 / 26183546)
39. Station Head, Adani Power Rajasthan Ltd., Ahmedabad-380006 (Fax No- 079-25557176)

40. Sh. Anil Kumar Garg, General Manager(BD) , AD Hydro Power Ltd , Noida-201301 , (Fax: 0120- 4323271/4278772)
41. Sh . Amit Mittal , GM(Corporate Affairs),Talwandi Sabo Power Ltd. Distt Mansa, Punjab-151302(Fax01659-248083)
42. Sh. S.N.M Tripathi, Director, Lalitpur Power generation Company Ltd., Lucknow-226010(Fax: 0120-4045100/555, 2543939/40)
43. Sh . Harish Saran, ED (Marketing), PTC India Ltd., New Delhi (Fax- 011-41659144,41659145)
44. Nabha Power Limited , (Fax: 01762277251 /01724646802)
45. Prayagraj Power Generation Co. Ltd. Bara, Allahabad, Uttar Pradesh-212107

Special Invitee:

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

Minutes for
16th Meeting of Telecommunication, SCADA & Telemetry (TeST) Sub-Committee

Date: 14.11.2019
Venue: Conference Hall, First Floor, NRPC, Katwaria Sarai, New Delhi

1. Confirmation of Minutes

1. Confirmation of Minutes

Member Secretary, NRPC informed that the minutes of 15th meeting of TeST sub-committee held on 07.08.2019, were issued vide letter no NRPC/OPR/108/04/2019/9691-9725 dated 03.09.2019 and no comments were received. 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

MS, NRPC requested members of sub-committee to timely comply with the decisions taken in previous TeST meetings. He also informed that requisite action by the constituents along with timeline, was mentioned in minutes of last (15th) TeST meeting.

2. Telecommunication Related Issues

2.1 Issues in OPGW laying (Agenda by POWERGRID)

2.1.1 HPSEBL:

POWERGRID informed that during 15th TeST sub-committee meeting, it was discussed that, some of the links (approx. 155 Kms) (tabulated below) were on rail pole structure and OPGW cable laying on these old transmission lines, was not safe. During execution, it had been observed that at most of the tower locations, either the condition of conductor/earth wire was very poor or earth wire was not present, due to which, the work had become almost impossible with possibility of tower collapse in these conditions. A joint site inspection had been carried out with M/s HPSEB representative for ascertaining further

possibility of doing work on these links. Accordingly, work had been stopped on these links.

S/No.	Link Name	Constituent	Length	Remarks
1	Naptha Ghanvi 66KV	HPSEB	20	Rail pole structure
2	Ghanvi Jeori 66KV	HPSEB	4	Rail pole structure
3	jeori Nagoli 66KV	HPSEB	25	Rail pole structure
4	Kumarsain Nogoli 66KV	HPSEB	25	Rail pole structure
5	Guuma Jutogh 66KV	HPSEB	15	Rail pole structure
6	Gumma-Kumarsain 66KV	HPSEB	42	Rail pole structure
7	Bhaba-Nathpa 66KV	HPSEB	2	Rail pole structure
8	Sainj-Hulli 66KV	HPSEB	21	Lattice Structure
	TOTAL		**133 +21**	

He also informed that during the last TeST meeting, HPSEBL assured to look into the report including the healthiness of the towers and revert by 31st August, 2019, however, no confirmation was received till date from HPSEBL.

HPSEBL stated that a meeting was convened by HPSEBL at Hamirpur on 22.10.2019 wherein the representative of PGCIL, HPSEBL and the concerned vendor doing work of laying OPGW viz M/s Ten Dot Cable Pvt. Ltd. participated. In the meeting, vendor expressed his reservations for laying OPGW on 66kV links on account of poor condition of existing Rail pole structures as well as due to hilly & tough terrains. In the meeting, vendor requested to find out some other methodologies to sort out the issue by providing some other means in place of OPGW. It was proposed by HPSEB that in place of OPGW, ADSS fibre optic cables be laid down on 66kV links in view of the fact that all the terminal equipment already stand installed at all the locations under the said package and OPGW procured against these links be diverted to some other Central Sector locations so as to ensure healthy and uninterrupted real time data from various generating stations injecting power through these 66kV links.

Member Secretary, NRPC opined that installation of ADSS cable instead of OPGW, would be considered as departure from existing scope of work under the contract and may not be a feasible solution because of additional financial implication. Thus, representative of POWERGRID stated that HPSEBL should certify the strengthening of the link and survey report should be submitted confirming line as safe for installation/operation and thereafter, POWERGRID may proceed for installation.

Finally, representative of HPSEBL stated that they will strengthen the 66kV rail pole. He further added that reconductoring is also being carried out at some of the aforesaid locations. Simultaneously, POWERGRID, may install OPGW on these locations. POWERGRID agreed for the same. POWERGRID informed that OPGW may be installed below the conductors and additional clamping may be required for this purpose. HPSEBL agreed for the same.

POWERGRID further stated that this activity may be considered within separate time frame and project DOCO would not be affected by this.

Members of the sub-committee agreed for the same.

Member Secretary, NRPC opined that in view of the above discussion, work on other 132kV links may also be carried out.

Members of the committee, agreed with the above proposed approach.

2.1.2 **PSTCL:**

POWERGRID stated that balance 4.71 KM of 220KV Jamsher-Jadla link, for laying of OPGW was pending since more than two and half years due to severe RoW issue. He further stated that this issue was also raised during 15th TeST sub-committee meeting, and PSTCL was required to take up the issue with civil administration/SDM's for resolving the ROW issue. He informed that because of this 14 more links could not be completed and PSTCL is also suffering with further data unavailability.

PSTCL stated that by 30th November, 2019, they would arrange meeting with civil administration. He also requested POWERGRID to ensure availability of the vendor at that time.

POWERGRID agreed for the same.

2.1.3 **PSTCL comments on agenda 2.1.2**

Discussed under agenda point 2.1.2

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

2.1.4.1 Representative of PSTCL stated that they were under process of laying OPGW on its various 220kV/132kV transmission lines under Package namely 1(a) through PGCIL. It consists of 1378kms, 132kV/220kV transmission lines. He informed that so far 1130 kms has been laid out but only 400 kms (approx.) was commissioned. He further informed that approx. 200 Km was pending, only because of RoW issues being faced on Jamsher-Jadla link which would be resolved as per discussion held under agenda item no. 2.1.2 above.

2.1.4.2 Representative of POWERGRID stated that by 31st March, 2020 they would complete 1378Km OPGW installation.

2.1.5 **Reliable Communication Scheme (Additional) under Central Sector for Northern Region (Agenda by POWERGRID)**

2.1.5.1 Representative of POWERGRID stated that during 39th & 40th NRPC meetings, implementation of Reliable Communication Scheme envisaging 5474 km was approved for implementation by POWERGRID to provide connectivity of substation of 132kV and above under central sector as per directive of MOP, GOI. He further stated that in order to provide reliability and redundancy in ISTS communication system in line with CEA's draft Manual of Communication planning in power system operation 2019, and also CERC's Communication Regulation 2017, following additional fibre optic needs to be laid down for building path redundancy and route diversity for reliable data & voice connectivity:

S. No.	Name of Link	Route Length (km)	Purpose
1	400kV Panchkula-Patiala	65.494	Physical Path Redundancy & route diversity for Panchkula S/s
2	400kV Nalagarh-Patiala	93.78	Reliable ICCP link between HP, Punjab and NRLDC
3	400kV Jallandhar Moga	85.15	Physical Path Redundancy & route diversity for Jallandhar (PG) through Central Sector links.
4	400kV Parbati PS - Amritsar	250.53	Path Redundancy & route diversity of Parbati PS (Banala) & Hamirpur through Central sector network.
5	LILO of Parbati-Amritsar at Hamirpur	6.7	
6	400kV Kurukshetra-Malerkotla PG	180	Path Redundancy of Malerkotla (PG) through central sector network.
7	765kV Meerut - Moga	337.15	Route diversity of Moga S/S & creation of reliable ICCP link between Punjab, Rajasthan (through upcoming 765kV Bikaner Moga under GEC Part D & NRLDC.
8	400kV Bassi-Sikar	169.8	Redundancy of Sikar S/S
9	400kV Dehradun-Bagpat	165	Physical path Redundancy & for route diversity of Bagpat S/S
10	400kV RAPP B -Jaipur South with LILO at Kota	300	Redundancy of Kota & RAPP through Central Sector network

S. No.	Name of Link	Route Length (km)	Purpose
11	400kV Allahabad-Singrauli	200	Redundancy of Singrauli
12	400kV Allahabad-Fatehpur 765	130	Strengthening of Inter Regional Connectivity (WR-NR). (400kV Fatehpur–Mainpuri is under implementation under Reliable Communication scheme)
13	400kV Patna-Ballia	200	Strengthening of Inter Regional connectivity ER –NR.
14	400kV Kanpur-Ballabhgarh	260	Redundancy of old Agra-Kanpur link which has reached the end of its useful life of 15 years.
15	Chittorgarh 400kv RVPN to Chittorgarh 220 RVPN	52	Redundancy of Chittorgarh 220/132 through Central Sector network
16	400kV Lucknow – Kanpur	156	Redundancy of Network and avoiding multiple sub-stations
	TOTAL	**2651.604**	

2.1.5.2 He informed that during 15th TeST meeting, the proposal for implementation of above links was discussed in detail with requirement of above mentioned each link with estimated cost of approx. Rs 88.32 Cr for implementation on cost plus basis by POWERGRID. This figure was arrived on prorate basis of initial scheme. However, the actual quantity/cost was to be discovered only after implementation. The Tariff for the investment made, has to be shared by all constituents as per CERC notification. The scheme shall become part of existing Commercial Agreement signed for ULDC Project

2.1.5.3 Member secretary, NRPC informed that during the 15th TeST meeting, Sub-Committee granted in-principle technical approval to the above scheme and recommended for further deliberations in the next TCC/NRPC meetings. The matter was further discussed in 43rd TCC & 46th NRPC meeting held on 23-24th Sept'2019. Representatives of PSTCL and RRVPNL opined that they further need to discuss the above mentioned links as they are also implementing large chunk of OPGW links in their respective state network and POWERGRID can utilize their OPGW network for reporting of telemetry data up to NRLDC/NLDC.

2.1.5.4 Representative of POWERGRID stated that as per discussions held in 43rd TCC & 46th NRPC meetings, there should not be any duplicacy of the links as Rajasthan and Punjab have also been implementing their OPGW links. He further stated that Bassi-Sikar link (S.No.8 above table) may be deleted

because green corridor lines are coming there and this would fulfil N-2 contingency criteria.

2.1.5.5 Representative of POWERGRID stated that network of Punjab was frequently down, therefore redundancy of above link was thought of, however route for redundant path may be discussed with Punjab. He further informed that redundant path from Patiala to Delhi was already available and only, Panchkula to Patiala would be doubled. He further added that since around 7200 Km under reliable communication scheme, is already approved in NRPC and some of the links to the tune of approx. 2000Kms under this scheme, could not be completed and hence, this additional scheme, may not be additional burden on the states. The exact detailing would be put up before next TCC/NRPC.

2.1.5.6 Representative of Rajasthan stated that they are developing their own OPGW network and therefore, POWERGRID may use bandwidth of the same or may also use their dark fibres because this could also result redundancy of the path.

2.1.5.7 POWERGRID stated that CTU is responsible for availability of meter data & URTDMS, hence, discussion regarding utilisation of Rajasthan equipments does not seem logical because CTU itself needs to maintain equipments and CTU can't held Rajasthan accountable for non-availability of the link, in case of outage of any equipment.

2.1.5.8 Members secretary, NRPC stated that so far as utilisation of offered bandwidth is concerned, Rajasthan's proposal, may not be agreed. Moreover, use of dark fibres of Rajasthan and using the existing equipments by POWERGRID, also doesn't seem an apprpriate approach because at each sub-station, POWERGRID needs to install equipments and involvement of more equipments, would result in less reliability.

2.1.5.9 Further, POWERGRID stated that Chittorgarh 400kv RVPN to Chittorgarh 220 RVPN (S.No.15) was agreeable to Rajasthan and 400kV Bassi-Sikar (S.No.8) is considered for deletion. Regarding, 400kV RAPP B -Jaipur South with LILO at Kota (S.No.10), he stated that this link was already approved and LILO part of the link was completed but main part was inadvertently dropped and length of the link, came out to be 226Kms instead of 300Kms in the latest survey.

2.1.5.10 Regarding the links of Punjab at S.No. 1 and 2, representative of POWERGRID stated that link at S.No. 2 may be dropped because redundancy path would be available after creation of link at S. NO.1.

2.1.5.11 Sub-committee noted the deliberation and recommended to place above recommendations before NRPC, for approval.

2.1.6 **PSTCL comments on above Agenda**

Discussed under agenda point 2.1.5

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

2.1.7.1 Representative of NRLDC stated that during the Grid Disturbance in 2012, it was realized that one of the main reason for delayed grid restoration process was due to problem faced in voice communication by Control Centre Operators with other Control Centres/Generating Stations/Sub-Stations operators. Accordingly, NRPC approved POWERGRID's proposal for implementation of state of art PABX system in the 24th TCC/27th NRPC meeting held on 29/30 November 2012. After approval from NRPC, the same was implemented by POWERGIRD in 2013.

2.1.7.2 NRLDC further added that out of total 129 sub-stations/generating stations at inter-State level in Northern Region, VOIP connectivity is presently available only in 79 locations and out of these available locations, only 43 (i.e. just 50% of total locations) are in working condition. Detailed list is attached in **Annexure-2.1.7** for your reference please. Further, it is understood that VOIP was not established at some locations during project implementation due to non-availability of fibre connectivity/interfacing equipment. Since now the fibre connectivity to most of these locations has been established, concerned utilities may arrange availability of Voice communication through VOIP network for these locations also at the earliest.

2.1.7.3 NRLDC informed that the size of the Northern Grid has increased subsequently and with increasing penetration of renewable, fast and reliable voice communication is now much more critical for ensuring reliable grid operation and speedy restoration in case of any contingency.

S. No	Constituent/ utility	No of Sub-Station	Available	% availability	Working	% Working
1	POWERGRID	77	58	75.32%	32	41.56%
2	NHPC	14	5	35.71%	1	7.14%
3	NTPC	10	6	60.00%	3	30.00%
4	THDC	2	2	100.00%	2	100.00%
5	SJVNL	1	0	0.00%	0	0.00%
6	NJPC	1	0	0.00%	0	0.00%
7	NPCIL	4	4	100.00%	3	75.00%
8	IPP	20	4	22.22%	2	11.11%
	TOTAL	129	79	62.20%	43	33.86%

2.1.7.4 Representative of POWERGRID confirmed that they ensure healthiness of VOIP at their substations and will procure new VOIP equipment for remaining POWERGRID Substations.

2.1.7.5 Representative of POWERGRID informed the sub-committee that owners/generating sub-stations shall procure centralized PABX compatible

VOIP phone of any brand on their own and POWERGRID shall configure communication link from sub-station to NRLDC wherever communication links are available.

2.1.7.6 Representative of NHPC/NTPC intimated that they will ensure healthiness of VOIP at their locations and will procure new VOIP equipment for remaining locations.

2.1.7.7 Representative from SJVN, NPCIL and IPPs were not present in the meeting, sub-committee advised NRLDC to take up with them separately.

2.1.7.8 Member Secretary stated that healthiness and availability report of VOIP phones, should be submitted to NRPC by NRLDC on monthly basis. He furher stated that timeline for healthiness and new installation of VOIP shall be completed by 31st December, 2019.

2.1.7.9 Sub-committee agreed for the same.

2.1.8 **Status of OPGW connectivity at NHPC Power Stations under Central Sector scheme (Agenda by NHPC)**

NHPC stated that during 15th TeST meeting held on 07.08.2019 issue of OPGW connectivity at Parbati-III NHPC station was discussed. It was informed by POWERGRID that the issues pertaining to said agenda has been resolved and the work would be carried out by POWERGRID during the proposed shutdown between 19th and 30th September, 2019.

POWERGRID informed that the work would be completed by 31st December, 2019.

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

Representative of NHPC stated that in the 15th TeST meeting held on 07.08.2019, it was informed by POWERGRID that the contract would be awarded by 15th August, 2019 and is likely to be completed within 3 months' subject to law and order situation in the J&K.

Representative of POWERGRID stated that procurement process has been completed in the last week and work would be completed by 30th November, 2019.

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

BBMB stated that the contract agreement for replacement of S-900 RTUs installed under ULDC-1 scheme at 11 sites of BBMB and integration of 61850 compliant Numerical Relays with HMI servers for providing the functionality of Event Logger at all the sites of BBMB through POWERGRID was signed on 30.3.2019 and accordingly an advance payment was made to POWERGRID. Subsequently, site survey for 5 sites of BBMB, was carried out during April – May 2019. However, till date neither the work of installation / commissioning of

RTUs nor the integration of 61850 compliant Numerical Relays with HMI servers has been started at any of the sites of BBMB.

POWERGRID stated that inspection and FAT on 5 sites would be done by next week. He further added that there is 18-month engineering schedule involved in the exercise, accordingly the work would be completed within the time frame.

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

2.3.1 UPSLDC stated that this issue had been raised in several TeST meeting as well as in SCADA AMC meeting held recently on 17-05-19 wherein POWERGRID confirmed that the same would be supplied under RTU replacement package. He further informed that the issue is still pending, however POWERGRID, in the 15th TeST meeting, confirmed that FRTUs would be supplied in the second lot within a period of maximum 06 months.

POWERGRID assured that by December, 2019 it would be completed in NRLDC and by 31st January, 2020 it would be completed at UPSLDC.

2.4 **RTU RELATED ISSUES (Agenda by RVPN)**

2.4.1 RVPN stated that there were frequent failure/non-availability of all RTUs data (101 & 104). In the recent past, it had happened on 27.10.19. The problem had already been reported to M/s Siemens many times, even discussed in the meeting on 17.05.19 at PGCIL, New Delhi but, no concrete solution was provided by M/s Siemens.

2.4.2 M/s Siemens stated that major issues has been identified he informed that presently all RTUs are coming with IEC104 protocol hence there is communication issues occurs.

2.4.3 NRLDC informed that Siemens addressed similar issue at NRLDC on 15th August, 2019 and thereafter, no such issue occurred.

2.4.4 Representative of Siemens stated that there was additional requirement of 02 switches and 02 routers to resolve the issue.

2.4.5 Representative of Rajasthan stated that as this work is already under the scope of work therefore addition requirement,if any, shall be met by vendor itself however if spare switches/routers are available, the same would be provided to the vendor.

2.4.6 Representative of NRLDC stated that due to IEC104 protocol communication problem, there is problem in IEC101 terminal server to rectify this. NRLDC had separated the network of 101 and 104 by providing switches/routers.

2.4.7 Representative of Siemens stated that if spares are provided, they would rectify problem of Rajasthan by 15th December, 2019.

2.5 HPSEB Communication Related Issues (Agenda by HPSEB)

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

Discussed under agenda point 2.1.1.

2.5.2 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) (Agenda by HPSEBL)

Representative of HPSEBL stated that PGCIL has placed LoA for replacement of 12 fibre OPGW installed under ULDC Phase-I with 24 fibre OPGW under Reliable Communication Scheme (Package-B) and included following HPSEBL links:

S. No.	Description	Length of link	Remarks
1	132kV Jutogh-Kunihar-II	16.21 KM	Replacement of 12 fibre OPGW installed under ULDC Phase-I with 24 fibre OPGW under Reliable Communication Scheme.
2	132kV Kunihar-Kangoo (Gagal)	50.24 KM	
3	132kV Kangoo (Gagal)-Hamirpur-II	43.78 KM	
Total		110.23 KM	

In context of above links, he intimated as under-

- That on this link i.e. 132kV Jutogh (Shimla)-Kunihar-Kangoo (Gagal)-Hamirpur-II, six dark fibres have been leased to Telecom Department of PGCIL for their telecom business, one pair is being used for Central sector (Tejas SDH), one pair for Nokia–Fujitsu Communication equipments & one pair for ECI Communication equipments under Package-V and presently, there is no fibre available on this link for making connectivity of Fibcom-Tejas Communication equipments under Package-I(a).
- Under Package-I (a), 24 fibre OPGW is being/has been laid on LILO point (132KV Jutogh-Kunihar-II) to Maliana, LILO point (132KV Kunihar-Kangoo) to Bagha & LILO point (132KV Kunihar-Kangoo) to Darlaghat, therefore, splicing at LILO Point may be carried out simultaneously during the replacement of 12 fibre with 24 fibre on these links.
- The existing 12 fibre OPGW may be taken by the vendor and Credit of depreciated value may be given to the scheme.

POWERGRID stated that since single peak is available and line is double circuit, hence OPGW of 24 fibers could be installed at other circuit but this may result installation of additional 110.23km OPGW for HPSEBL. He further stated that since LILO of the line has been done on 24 fibers and existing 12 fiber link is also quite old, hence, it is recommended to replace this 12 fiber OPGW.

HPSEBL stated that there is no requirement of additional 110.23Kms OPGW, POWERGRID may ensure uninterrupted connectivity with SLDC by using telecom facility.

POWERGRID agreed to replace 12 fiber OPGW with 24 fiber OPGW after ensuring alternate arrangement with telecom for uninterrupted connectivity.

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

2.6.1 Representative of BBMB stated that this issue was discussed in 15th TeST meeting wherein BBMB conveyed that the following Multisite Configurations are yet to be implemented by M/s SIEMENS:

a) Scheduling and UI rate calculations to be implemented between Backup Control Centre and NRLDC.

b) Flow of BBMB ICCP data between Backup Control Centre and NRLDC.

2.6.2 He further informed that after deliberation, it was agreed that SIEMENS would discuss the feasibility with NRLDC and explore to implement the same.

2.6.3 Member Secretary, NRPC stated that BBMB and PSTCL should discuss the same bilaterally and accordingly, Siemens may take action.

2.7 Non synchronization of multisite database (Agenda by RVPN)

2.7.1 Representative of RVPN stated that some IP address of series 172.27.27.xx which are exclusively assigned to RVPN SCADA system and are being used by DTL SLDC. Due to this IP conflict issue, multisite database (IFS) synchronization was not possible. He further stated that without multisite database synchronization and backup control centre could not be operated from DTL SLDC and vice versa.

2.7.2 Representative of Siemens stated that they had worked out and would resolve the issue.

2.7.3 Representative of NRLDC stated that IP change of all the RTUs cannot be done in one go. It should be done in coordinated manner because once the IP of RTU is changed, data at SCADA screen would become suspected for the time being.

2.8 **Agenda for 1% advance for material supplied for repairing of OPGW networks installed under ULDC NR Project (Agenda by HVPNL)**

2.8.1 Representative of HVPNL stated that OPGW has been laid under ULDC Projects on the following HVPNL lines:

- 220KV Narwana - Safidon - PTPS.
- 220KV Nunamajra - Bahadurgarh.
- 220KV PTPS Sewah Ckt- I & II.

2.8.2 He further stated that, PGCIL has demanded 1% advance for repairing of OPGW networks installed under ULDC NR Project from all constituent of NR. However, the reconciliation statement of material procured earlier against 1% advance taken from constituents was not provided by PGCIL.

2.8.3 Representative of POWERGRID stated that they would return 1% advance to the constituents.

2.9 **Requirement of PDH Equipment for replacement of Nokia Equipment under Reliable Communication Scheme (Agenda by POWERGRID)**

2.9.1 Representative of POWERGRID stated that they were implementing OPGW installation on new transmission lines along with replacement of ULDC Phase-I OPGW and communication Equipment under Reliable Communication Scheme. Requirement of PDH was removed from all the locations citing upgradation of RTUs to 104 protocol & using of VOIP phones. Requirement of PDH equipment alongwith required nos. of channels (Voice and Data channel for replacement of Nokia), if any under this scheme may be intimated to POWERGRID on priority, so that requirement can be freezed. Till date, only UPPTCL has conveyed their requirement and BoQ for the same has been approved and suppply will be commenced within 3-4 months.

2.9.2 Representative of Rajasthan and Punjab assured to intimate requirement, if any, by 30th November, 2019.

2.10 **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**

Representative of POSOCO stated that CERC, in the matter of Automatic Generation Control (AGC) implementation in India, has issued the direction that all thermal ISGS stations with installed capacity of 200 MW & above and all hydro stations having capacity exceeding 25 MW excluding the Run-of-River Hydro Projects irrespective of size of the generating station and whose tariff is determined or adopted by CERC, to install equipment at the unit control rooms

for transferring the required data for AGC as per the requirement to be notified by the National Load Despatch Centre (NLDC).

He further stated that in the Order, CERC directed the Central Transmission Utility (CTU) to commission communication facility from NLDC/ RLDCs to the nearest wide band node/ switchyard for the generating stations in a redundant and alternate path ensuring route diversity and dual communication. The list of plants identified for AGC operation by NLDC as per CERC Order was attached as Annexure-1 of the agenda.

Relevant extracts from the CERC Order 319/RC are given as below:

…The Central Transmission Utility (CTU) is directed to have communication availability from NLDC/ RLDCs to the nearest wide band node/ switchyard for the generating stations in a redundant and alternate path ensuring route diversity and dual communication.

…The expenditure as a result of compliance of the above directions may be claimed as per relevant regulations or provisions of the PPA.

Considering the importance of communication links being used for automatic controls, same common points may not be used along the path to ensure near 100% availability. Also, in line with the CERC Order, all the power plants are supposed to take necessary action for arranging the communication (through redundant and alternate paths) from the existing nearest wideband communication node to the unit control room through two fibre optic cables, in coordination with Central Transmission Utility (CTU).

He informed that ISGS stations whose tariff is determined or adopted by CERC should be AGC-enabled before 28th February 2020 as per the Order of the Hon'ble Commission.

He stated that on 27th September 2019, nominated nodal officers from CTU discussed the detailed action plan regarding the communication to AGC power plants at NLDC, New Delhi. Two Ethernet ports would be made available from existing SDH node available near generating station, wherever spare ports are available. In case of constraint, upgradation of equipment / cards as required shall be considered while working out requirement for AGC communication connectivity. RLDCs/NLDC will coordinate with concerned generating station for connectivity of Ethernet port to RTU at generating station for AGC application.

He further state that in some cases, requirement of usage of STU network for AGC connectivity is expected. The same shall be brought out by CTU. RLDCs/NLDC shall facilitate necessary coordination between STU & CTU for providing fibres, equipment, if required.

Representative of CTU stated that out of 30 stations in NR only diversity is available only in 4 stations namely, Naptha Jhakri HEP, Dehar HEP, Rampur

HEP and Bhakra Right HEP. He further stated that network upgradation required for rest 26 stations 14 of them would be covered under ongoing various schemes, however it would be difficult to complete all locations by 28th February, 2020. He added that there are 5 links of PTCUL need to be used.

Member Secretary, NRPC stated that since representative of PTCUL was not present a separate meeting would be called between PTCUL, CTU, NRLDC, NLDC and NRPC Sectt.. He further stated that single path is available for all 30 stations except Parbati-III which is likely to come by 31st December, 2019.

Representative of POWERGRID informed that presently ULDC communication is not available from Anta GPP and data is coming through telecom facility.

Sub-committee advised POWERGRID to plan for remaining redundant connectivities at remaining stations.

2.11 Fibre cut between Kishenpur-New Wanpoh (Agenda by NRLDC)

2.11.1 Representative of NRLDC stated that there was a fiber cut between Kishnepur-Wanpoh since January 2019 due to which PMU data from Wagoora, Wanpoh and Uri was not available at NRLDC. It was mentioned that data from these stations is critical for monitoring of Kashmir Valley.

2.11.2 He informed that the matter was also discussed during 15th TeST Meeting, POWERGRID intimated that unprecedented ice deposition on OPGW in Kashmir valley has led to the breakage of the same and data from alternate route has been restored. However alternate arrangements are yet to be made.

2.11.3 Representative of POWERGRID informed that tower strengthening work was in progress and OPGW work was expected to be completed by March 2020. He added that alternate channel for PMU data would be provided within 15 days.

2.12 Upgradation of STM-16 to STM-64 Communication Equipment (Agenda by POWERGRID)

2.12.1 Representative of POWERGRID stated that during 14th TeST sub-committee meeting, NRLDC requested to explore the possibility of upgradation of communication equipment from STM-16 capacity to STM-64 or adopt other latest technology to cater additional requirement for future projects including RTU/SAS data reporting on 104 protocol, new PMUs under WAMS System, AGC Project, establishment of inter-regional control centres of SCADA/ PDC, upgradation of NLDC and establishment of REMC control centres and backup control centre at Kolkata for WAMS system and other new schemes. In this regard, POWERGRID have examined the possibility and 17 Equipment needs to be upgraded from STM 16 to 64 for Tejas make Communication Equipment,

their associated SFPs and amplifiers are required. Further in view of shortage of Ethernet Ports, new cards also required as per the discussion at several locations/ specially NLDC, NRLDC and all SLDCs, of Northern Region along with some of station where most of the ports has been utilized for grid operation services (RTU/SAS, PMU, VOIP, AMR, TWFL, Pilot project PMU, some inter-connections for other sub-stations). The estimated cost for above proposal is approx. Rs 2.77 Cr for implementation on cost plus basis. However, 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 under Reliable Communication Scheme. The scheme shall become part of existing Commercial Agreement signed for ULDC Project.

2.12.2 Representative of HVPNL stated that usability of STM-16 should be justified before upgrading to STM-64.

2.12.3 TeST Committee members In-Principle agreed for the upgradation of Tejas make equipment, their associated SFPs, amplifiers, ethernet cards, etc and POWERGRID agreed to share location wise utilised bandwidth details with sub-committee before next going for approval in NRPC.

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

3.1 SCADA issues of HVPNL (Agenda by HVPNL)

3.1.1 Interruption in publishing of SCADA data on SCADA Web Server

Representative of HVPNL stated that there was frequent interruption in publication of SCADA data on SCADA Web Server that result into inconvenience to the system user.

Representative of Siemens stated that there was multiple reason for occurrence of the problem during the debugging, they found that lock was created in the temp directory and it stop update of static data, for clearance of this problem, they have deployed a script which runs periodically in hourly basis. Site engineers were already informed about the required steps to be taken if this problem occurs.

He requested HVPNL to inform local site engineer as and when issue occurs.

3.1.2 Rollover to IPv6

Representative of HVPNL 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. However, work is still pending, he requested POWERGRID to carry out this activity.

3.1.3 **Non-working / Failure of Haryana SLDC Website**: Representative of HVPNL stated that there were number of instances of non-working of Haryana SLDC Website had occurred for the past 1 year. The website during its failure has been restored by M/s Siemens in a long span of time. He requested M/s SIEMENS to make an alternate arrangement during such instances.

Representative of Siemens stated that this incident happened only once due to deletion of database during maintenance. Siemens had taken appropriate measures to rectify the database and trained site engineer to take appropriate steps during maintenance in future.

3.1.4 **Non Availability of Site Engineer: -** Representative of HVPNL stated that in the recent past due to non-availability of engineer at site, problem could not be resolved on time. He added that in the meeting held on 17.05.2019 at NR-1, POWERGRID office, it was decided that M/s Siemens would provide dedicated back office support for the AMC of NR SCADA project to avoid any delay in problem resolving by 31st May, 2019, However it has not been provided yet.

It is pertinent to mention that the non-availability of site engineer is a serious issue keeping in view the importance of SCADA System directly affecting the System operation activities & Grid Security. He requested to Siemens to ensure the availability of site engineer to avoid such type of incidents in future.

Representative of Siemens stated that new Site engineer has been placed at site in Sep'19 and he was staying in Panipat and was available for the support and meet contractual obligations.

He further stated that training would be organized for site engineers to manage the system locally.

3.1.5 **Issue regarding functionality of IMM: -** Representative of HVPNL stated that during the activation of a display job in IMM there was always SVG POP error and 'transfer job failed error' occurs every time. He added that each time during the solution of these type of error M/s SIEMENS site engineer gives a temporary solution by deleting the display of other constituents. He requested M/s SIEMENS to intimate the reason & remedial action to resolve these type of problems.

Representative of Siemens stated that for solution of this issue, Siemens creates a dummy job in IMM which prevents occurring of this error. He requested HVPNL not to remove this job for error free working of display activity.

3.1.6 **Issue regarding functionality of PDS: -** Representative of HVPNL stated that the PDS system of SLDC, Panipat has not been working for last one year and

same has been communicated to several time to M/s SIEMENS. He added that it was decided with M/S Siemens that they would provide dedicated back office support for the AMC of NR SCADA project to avoid any delay in problem resolving by 31st May, 2019, However it has not been provided yet by M/s SIEMENS till now.

Representative of Siemens requested to allow him till 15.12.2019 to resolve the issue.

3.1.7 **Addition of another link on website of SLDC Haryana:** Representative of HVPNL stated that as per Govt. of Haryana direction, Antyodaya Saral link has to be added by every Haryana department sites and the same has to be added at SLDC Haryana site by M/s SIEMENS. Regarding the same message has been conveyed to M/s SIEMENS many times. But the said job yet to be completed by M/s SIEMENS.

Representative of Siemens stated that they would create the link.

3.1.8 **Regarding functionality of STLF:** Representative of HVPNL stated that the STLF (Short Term Load Forecasting) is essential for the load forecasting on short term basis for optimum utilization of available power sources and for the smooth functioning of Grid. However, the feature available in SCADA, either shows error or load forecast w.r.t. the actual load shows huge mismatch. It is important to mention that there was no training organized by M/s SIEMENS to familiarize with STLF feature. He requested M/s SIEMENS to organize training for STLF.

Representative of Siemens stated that they would require an order from HVPNL in this regard to proceed further.

3.1.9 **EMS tuning:** Representative of HVPNL stated that during the EMS tuning activity, certain problems/misconceptions were being faced which were not been resolved even with the help / support available from M/s. Siemens Engineers deployed at SLDC, Panipat as they were not conversant with the EMS functionality of the system.

Representative of Siemens stated that the support for modeling of EMS network is not in scope of AMC. However, Siemens Mumbai office has been providing the remote support to HVPNL since Jan-2019 with which HVPNL was able to modify and create HVPNL specific network model in EMS. Subsequently support was extended to HVPNL in order to make OTS functional as well. Please refer the screenshot attached as **Annexure-3.1**, indicates that OTS was made functional by Siemens in June-2019.

He further stated that, they have already shared the proposal for maintenance of EMS database and applications. He requested HVPNL to issue a change order for the same for further support in this regard.

3.1.10 **Frequent changes of Site Engineer deployed by M/s SIEMENS at SLDCs:**

Representative of HVPNL stated that at the TeST meeting forum, the issue of frequent changes in the deployment of third party Site Engineers at SLDCs by M/s SIEMENS has been raised time and again. They have been withdrawing experienced manpower by replacing them with inexperienced engineers having inadequate knowhow of the system. Despite regular follow-up, compliance has not been made by M/s Siemens. Frequent changing of site engineers has challenged the performance & smooth working of the system. They are unable to resolve even petty issues/events at site and always seek back office support from Bombay. This leads to very poor response time. The engineers so deployed are engaged through third party and are paid low in general. Such manpower may be a threat against the system security and thus M/s SIEMENS should ensure to deploy manpower which is on their own roll.

Representative of Siemens stated that new Site engineer has been placed at site in Sep'19 and he was staying in Panipat and was available for the support and meet contractual obligations.

He further stated that training would be organized for site engineers to manage the system locally.

3.1.11 **Cyber Security Issues:**

Representative of HVPNL stated that a team of National Critical Information Infrastructure Protection Centre (NCIIPC) visited at Haryana SLDC, Panipat on 05.08.2019 to assess the suitability of SLDC system for declaring it as Critical Information Infrastructure (CII). He informed that NCIIPC vide MoM dated 05.08.2019 stated that in the present scenario none of the Business Process of SLDC Panipat is considered to be identified as CII. However, followings suggestions have been made by them to improve the Cyber Security posture of SLDC.

(a) Cyber Security Auditor:

Representative of HVPNL stated that the SCADA system was commissioned in the NRLDC/SLDCs under ULDC Phase-II during Jan, 2015. It was executed by POWERGRID on the behalf of NR constituent states through M/s SIEMENS. As per contract, there was a provision of cyber security audit from a third party CERT-IN empaneled vendor. Accordingly, M/s SIEMENS was performing the cyber security audit on annual basis from M/s AKS Information Technology Services Pvt. Ltd. since 2016. The cyber security audit is being done by same third party CERT-IN empanelled vendor continuously for the last three years. NCIIPC suggested that in future, the cyber audit should be got carried out from different CERT-IN empanelled auditors annually.

Representative of Siemens sated that they could send proposal or quotation for security audit from other vendor but the cost and overheads need to be borne by utility only.

Member Secretary, NRPC stated that since it is additional requirement by utility therefore utility may get it done through a separate tender.

(b) Window 7 Operating System Updation & Up-gradation:

Representative of HVPNL stated that the operator consoles and some server part of SLDC SCADA system is running on Windows 7 Operating System. NCIIPC observed that rarely any updation is being done by the vendor and the support of Windows 7 is also likely to be stopped very soon. Thus, it was proposed that the Operating System should be migrated to higher version of Windows and provision needs to be included for regular offline/online updates. Accordingly, M/s SIEMENS was asked to do the needful but till to date no response has been received.

Representative of Siemens stated that they have tested SP7 1.0 s/w using windows10, preliminary observations that operator work stations could be made functional without IMM upgradation however for IMM work stations windows 7 OS to be used.

(c) Preparation of Information Security Management System (ISMS) Policy & Cyber Crisis Management Plan (CCMP):

Representative of HVPNL stated that NCIIPC team suggested for preparation of ISMS policy and Cyber Crisis Management Plan (CCMP) for the SLDC SCADA system.

He further stated that in the NR Region, NRLDC is looking in to the supervision, monitoring and control of integrated operation of Regional grid in coordination with all State power utilities, Central generating Stations etc. with the help of modern state-of-the-art SCADA system set up in NRLDC and all SLDCs. The SCADA Systems of all the Northern Region SLDCs are identical and closely integrated with NRLDC. Thus, all the SLDCs SCADA Systems are required to implement policy / plan with respect to Information Security Management System (ISMS) Policy & Cyber Crisis Management Plan (CCMP) in a unified manner.

He suggested that NRLDC may chalk` out a unified ISMS policy and CCMP for all the NR constituent State SLDCs and implementation thereof.

Representative of NRLDC stated that they would share their policy with state SLDCs which would help them to prepare their own policy.

3.2 SCADA issues of PSTCL (Agenda by PSTCL)

3.2.1 Information Model Management problems:

Representative of PSTCL stated that recently problem occurred in database development tool i.e. IMM on Aug 8, 2019 (due to failure of SAN hard disks)

and persisted for few days, due to which database development work got affected at large. He requested M/s Siemens to take necessary steps to avoid similar issue in future.

Representative of Siemens stated that the checklist has already been shared with site engineers to monitor the healthiness on daily basis so that similar problem can be avoided in future.

3.2.2 **Updation of SCADA data in Web Server**:

Discussed under agenda point no. 3.1.1

3.3 SCADA issues of UPSLDC (Agenda by UPSLDC)

3.3.1 **Web Server Issues:-** Representative of UPSLDC intimated following issues to Siemes.

- Non-Working of Web Server-2
- Frequent stoppage/interruption of data viewing on COL consoles through web server-1.
- Non-inclusion of new updates in COL data viewing automatically. It needs to be done manually
- Even when Col data is viewed through cable or through public IP, availability of data is not satisfactory causing annoyance at senior management level very frequently. In spite of regular pursuance with Siemens, no concrete solution has been provided so far.

Representative of Siemens stated that above problems have been resolved.

3.3.2 **OTS issues:**

Representative of UPSLDC stated that OTS applications could not be utilised due to data sync problem of OTS. He informed that in SCADA AMC Meeting held on 17th May'19 at PGCIL New Delhi, M/s Siemens agreed to send EMS Engineer in 1st Week of June'19 for resolving the issues. Siemens EMS Engineer reached SLDC on 17-06-19 and remained up to 22-06-19 but issue could not be resolved. Further action from Siemens is still pending. At present, OTS server's STATUS is Not in Service.

Representative of Siemens stated that database synchronization is not in scope of AMC. He requested UPPTCL to tune the network in order to have power flow solution which can be transferred to OTS as base case. He intimated that this is required to make OTS functional.

3.3.3 **Data Sync / EMS Issues:**

Representative of UPSLDC stated that the database at UPSLDC is not synchronized with NRLDC & other constituents. If they sync domain database,

EMS model becomes very large whereas data availability in EMS is very less as ICCP data bases are not synced. Therefore, they were unable to run EMS modules at UPSLDC, results come very poor & not of any use for system control.

Representative of Siemens stated that this require coordination between NRLDC and UPPTCL for modelling of required ICCP points to collect analog and digital values from NRLDC.

3.3.4 **SCADA AMC Meeting date 17-05-19 pending issues:**

- POWERGRID requested Siemens to submit the names of reserve engineers within one month but the same has not yet been intimated by Siemens.
- M/s Siemens agreed to resolve all issues in complaint portal within 15 days but the issues are still pending even after lapse of more than two months.
- M/s Siemens informed that there is change in hierarchy and POWERGRID asked Siemens to inform new escalation matrix to SLDCs, NRLDC and Powergrid by 23rd May 2019. No action has been taken by Siemens even after lapse of more than 05 months.

Sub-committee advised to take up the matter bilaterally.

3.3.5 **Networking Issues:**

Representative of UPSLDC stated that the issue was raised in previous TeST meetings and still unresolved. He further stated that failure of data reporting from RTUs/SAS on account of this was observed on a number of times and also observed on 25-10-2019. In the meeting related to SCADA AMC on 17-05-2019, Siemens agreed that for IP conflicts issues, an Engineer of Siemens shall visit at SLDC. Siemens Engineer reached SLDC on 11-06-19(A.N) and remained up to 12-06-19 forenoon, but issue could not be resolved.

Further action to be taken has not been communicated by Siemens. It is proposed that some external agency having expertise in providing networking solutions may be taken for resolving networking issues. It may be noted that above problem causes complete failure of real time data.

Representative of Siemens stated that they will implement the solution similar to NRLDC, However additional requirement of h/w i.e 2 nos switches (24 ports) and 2 nos of Routers (4 ports), shall be arranged by UPPTCL.

3.3.6 **IMM Issues:** Representative of UPSLDC intimated following issues to Siemens:-

- Issues of frequent shut down of IMM workstation has been reported to Siemens through complaint portal several times and also reported to their site engineers but problem is still unresolved even after lapse of 6-7 months.

- **PSOS disconnection problem -** IMM frequently disconnected from PSOS.

Representative of Siemens stated that above problems have been resolved.

3.3.7 **PDS issues –** Representative of UPSLDC stated that database is not in sync with master database due to Relational database size limit problem. Representative of Siemens stated that back office team will discuss with site engineers and try to resolve the issue by 30.11.2019.

3.4 Action on CERT-in advisory C/AD-2019-0012 regarding end of life for windows 7 (Agenda by UPSLDC)

3.4.1 Discussed under agenda item 3.1.11(b)

3.5 EDNA issues (Agenda by UPSLDC)

Representative of UPSLDC stated that history data of many parameters got corrupted for the following period.

a. 12/08/2019 09:30 HRS to 20/08/2019 13:30 HRS.

b. 29/08/2019 21:30 HRS to 03/09/2019 15:30 HRS.

c. 03/10/2019 08:30 HRS to 03/10/2019 17:00 HRS.

He stated that no concrete action has been taken by Siemens to analyse the root cause of the problem.

Representative of Siemens stated that it may not possible to retrieve the data however Siemens will take necessary steps to prevent reoccurrence such incidents in future.

3.6 Web server issue of RVPN (Agenda by RVPN)

Discussed under agenda item 3.1.1

3.7 Inclusion of HBL make charger in AMC (Agenda by RVPN)

Representative of RVPN stated that HBL make charger which are provided under microwave replacement scheme may be included in the AMC by POWERGRID.

Representative of POWERGRID informed that since new AMC tender has been published HBL charger would be included through an amendment to the tender document.

3.8 DTL SCADA issues (Agenda by DTL)

3.8.1 **New display creation getting transfer failed in IMM.**

Representative of DTL stated that there is transfer failed through IMM error while creating new SCADA display. Ticket for this problem was generated on 09-08-2019 at 10:49:59 IST with Ticket No. 8411 and the complaint is still in open stage. Resolution has been repeatedly asked from Siemens but only temporary solution was provided which does not fulfill the requirement as many new substations are adding in DTL network in the near future.

Representative of Siemens stated that they create a dummy job in IMM which prevent occurring this error, he requested DTL not to remove this job for error free working of display activity.

3.8.2 **HIS data loss**

Representative of DTL stated that replay function is not able to retrieve data from Historian sever. Data lost from 25th Aug, 2019 at 11.00 AM to 30th Aug, 2019 at 7.00 AM. Ticket for this was generated on 2019-09-04 at 12:46:02 IST with ticket no. 8521 and the complaint is still in open state.

Representative of Siemens stated that it may not possible to retrieve the data however Siemens will take necessary steps to prevent reoccurrence such incidents.

3.8.3 **IMM failure**

Representative of DTL stated that the tool for the database updation i.e. IMM was down from 16th Oct 2019 at 3PM to 21st Oct. 2019 at 11AM. (Total for 116 Hrs). The response for the complaint resolution was very slow and the works got affected severely. Ticket was generated on 2019-10-16 at 15:08:38 IST with ticket no. 8744. Representative of Siemens stated that they will take necessary steps to prevent reoccurrence such incidents.

4. Telemetry Related Issues

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

4.1.1 Representative of NRLDC stated that in order to have proper visualization and Situational awareness to control room operator for ensuring reliable grid operation, uninterrupted availability of telemetry is essential. It is essential to ensure 100% availability of the data from all the Sub-stations. However, it is

seen that data is highly intermittent even for some of the 400kV/ 765kV Sub-stations.

4.1.2 He further stated that the non-availability of various 400 KV / 765 stations was calculated for the month of September 2019. The list of stations where data availability is less than 80% is given below.

4.1.3 Out of 200 number of 400/765 sub-stations data of nearly 20 (10%) is highly intermittent.

Central Sector		
Malana	Faridabad Gas	Azure 34
Amargarh	Roorkee	Bhadla Saurya Urja
Pithoragarh	Dulhasti	Koteshwar THDC
TPREL	Rihand-3	Jhajjar
PTCUL		
Kashipur		
HVPNL		
Kirori		
UPPTCL		
Dasna	Agra South	Aligarh (UP)
Mainpuri	Muzzfarnagar	Vishnu Prayag

*Intermittency based on September month data availability

4.1.4 He stated that since, the Reliability of telemetry is essential for smooth monitoring and operation of the grid, the matter has been discussed in various TeST Meetings. Though, there is some improvement since last TeST meeting but still 10% station data at 400 KV and above is intermittent.

4.1.5 He informed that the matter was also discussed in 15th TeST Meeting wherein MS NRPC has emphasized the importance of telemetry and requested all to ensure 100% availability of telemetry.

4.1.6 Member Secretary, NRPC and representative of NRLDC emphasized the importance of telemetry for smooth grid operation and requested all to resolve the issue by 31st December 2019 and submit the report to NRPC.

4.2 Telemetry of digital status (Agenda by NRLDC)

4.2.1 Representative of NRLDC stated that 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 constituent will furnish the availability status of 220 kV and above stations and improvement there off.

4.2.2 He further stated that the matter regarding availability of correct digital status is being regularly taken in various TeST Meeting since 2016 but still there is negligible improvement in availability of digital status.

4.2.3 He informed that the matter was also discussed during 15th TeST Meeting where it was decided that all constituents would submit the digital status availability report to NRPC/NRLDC on quarterly basis but till date no report has been submitted by constituents.

4.2.4 Availability of digital status based on snapshot of 28th October is given below:

S. No.	Constituent	Total CB	Available	Not Available	% Availability
1	Central Sector	3344	2708	636	85.31%
2	RRVPNL	1851	1264	587	68.29%
3	UPPTCL	2076	1437	639	69.22%
4	BBMB	261	247	14	94.64%
5	DTL	549	444	105	80.87%
6	HVPNL	806	557	249	69.11%
7	HPSEB	121	89	32	73.55%
8	PSTCL	838	587	251	70.05%
9	Uttarakhand	152	100	52	65.79%

4.2.5 List of Sub-Stations having poor digital telemetry is given below:

Central Sector			
Bhiwadi	Malerkotla	Vindhyanchal	
HVPNL			
Daultabad	Kabulpur	Dhanoda	
PSTCL			
Muktsar	Talwandi Saboo		
RRVPNL			
Suratgarh	KTPS		
DTL			
Bamnauli	Bawana	CCGTB	Harsh Vihar
UPPTCL			
Anapara T	CB Ganj	Greater Noida	Muradnagar

Obra B	Panki 1	Unnao	Vishnu Prayag
HPSEBL			
Baspa			

4.2.6 NRLDC emphasized the importance of reliable/correct digital telemetry for reliable grid operation and reliable telemetry is also essential for functioning of EMS functions like State Estimator etc.

4.2.7 Member Secretary NRPC requested all to submit the quarterly status of digital points and requested all to resolve the issue in above mentioned stations by 30th November 2019.

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

4.3.1 Representative of NRLDC presented the telemetry status as on 30.09.19 tabulated below:

	Northern Region summary sheet and details of current status of implementation of telemetry system												
										Updated Till:		30.09.2019	
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	5	71	-	12	-	17%	-	-	-	-	-	17%
3	Rajasthan	20	225	-	-	-	-	6	14	30%	6%	30%	6%
4	Delhi	6	43	-	-	-	-	-	5	-	12%	-	12%
5	UP	21	195	-	-	-	-	3	32	14%	16%	14%	16%
6	Uttarakhand	10	29	-	-	-	-	6	27	60%	93%	60%	93%
7	HP	15	25	-	-	-	-	3	-	20%	-	20%	-
8	JK	4	17	3	12	75%	71%	1	5	25%	29%	100%	100%
9	POWERGRID	-	81	-	-	-	-	-	4	-	5%	-	5%
10	NTPC	14	-	-	-	-	-	3	-	21%	-	21%	-
11	NHPC	14	-	-	-	-	-	1	-	7%	-	7%	-
12	NPCIL	5	-	-	-	-	-	-	-	-	-	-	-
13	NJPC	2	-	-	-	-	-	-	-	-	-	-	-
14	THDC	2	-	-	-	-	-	1	-	50%	-	50%	-
15	BBMB	6	16	-	-	-	-	-	-	-	-	-	-
16	IPP/JV/Patran	9	5	-	-	-	-	3	2	33%	40%	33%	40%
	TOTAL	150	878	3	89	2%	10%	27	101	18%	12%	20%	22%
	Total (over all)	1028		92		9%		128		12%		21%	

4.3.2 He mentioned that non availability as on 30.06.2018 was 26% whereas non - availability as on 30.09.2019 is 21%. He again emphasis that very little or no improvement in this regards.

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

He requested members of the sub-committee expedite the availability of data at SLDC/NRLDC.

4.4 Communication plan for channel redundancy and to back-up NRLDC (Agenda by NRLDC)

4.4.1 Representative of NRLDC stated that 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.

4.4.2 He added that the reliability of communication channel to NRLDC was discussed in various TeST Meeting since November 2016(8th TeST Meeting). He informed that still 21 RTUs are reporting to NRLDC on single channel.

4.4.3 He further added that presently 113 RTU out of 134 were reporting on redundant channel.

4.4.4 He informed committee that redundant channels provided are not reliable and it has been found that standby channel were also down due to lack of path diversity/common source of Power Supply etc. Thus it was requested that reliability of redundant channel may also be ensured.

4.4.5 List of RTUs with single channel is given below:

S.NO.	Name of RTU	Comments	Timeline
1	BHADLA (PG)	Will be arranged along with Fiber connectivity of 765 KV Bhadla-Bikaner	September 2019
2	KISHANGANGA	NHPC	NHPC to revert

3	PARBATI-2	NHPC	NHPC to revert
4	SALAL	NHPC	NHPC to revert
5	SEWA-2	NHPC	NHPC to revert
6	RIHAND-3	NTPC	NTPC to revert
7	SINGRAULI HYDRO	NTPC	NTPC to revert
8	BHADLA (ADANI)	Will be arranged along with Fiber connectivity of 765 KV Bhadla-Bikaner	September 2019
9	BHADLA (SAURYA URJA)	Will be arranged along with Fiber connectivity of 765 KV Bhadla-Bikaner	September 2019
10	BUDHIL	IPP	
11	KARCHAM WANGTOO	IPP	
12	MALANA	IPP	
13	SHREE CEMENT	IPP	
14	CHEMERA-3*	NHPC	NHPC to revert
15	KOLDAM*	NTPC	December 2019
16	NATHPA JHAKRI*	RTU to be replaced	October 2019
17	URI-2*	NHPC	NHPC to revert
18	APTFL		
19	TPREL		
20	ACME POWER		
21	Mahoba Power (Adani)		

*Standby channel down since long.

4.4.6 Members of the sub-committee submitted the revised timeline for establishment of secondary communication channel and restoration which are as under:

S.NO.	Name of RTU	Comments	Timeline
1	BHADLA (PG)	Will be arranged along with Fiber connectivity of 765 KV Bhadla-Bikaner	Completed
2	KISHANGANGA	NHPC	31st march 2020
3	PARBATI-2	NHPC	31st December 2019
4	SALAL	NHPC	30th November 2019
5	SEWA-2	NHPC	15th December 2019
6	RIHAND-3	NTPC	December 2019
7	SINGRAULI HYDRO	NTPC	
8	BHADLA (ADANI)	Will be arranged along with Fibre connectivity of 765 KV Bhadla-Bikaner	Completed
9	BHADLA (SAURYA URJA)	Will be arranged along with Fibre connectivity of 765 KV Bhadla-Bikaner	November 2019
10	BUDHIL	IPP	
11	KARCHAM WANGTOO	IPP	
12	MALANA	IPP	
13	SHREE CEMENT	IPP	

14	CHEMERA-3*	NHPC	December 2019
15	KOLDAM*	NTPC	December 2019
16	NATHPA JHAKRI*	RTU to be replaced	December 2019
17	URI-2*	NHPC	November 2019
18	APTFL		November 2019
19	TPREL		November 2019
20	ACME POWER		November 2019
21	Mahoba Power (Adani)		Completed

4.4.7 Representative of Karcham Wangtoo stated that for reliable communication OPGW is proposed.

4.4.8 Representative of NRLDC staed that it would take one more year to come they should explore other possibility for redundant channel.

4.5 Frequent Interruption of data from NR-II stations

4.5.1 Representative of NRLDC stated that there is frequent interruption in Power supply has been observed at PSTCL stations resulting in non-availability of RTU data from NR-II stations and wrong computation of drawal data of Punjab. Various dates were outage was observed is given below:

Date	**Power Supply Issue**
25th June 2019	Ajitwal
28th June 2019	Jagraon
28th June 2019	Rajpura

4.5.2 He informed that it is noted that battery backup at many locations in Punjab is not available. It is requested to replace battery banks for uninterrupted telemetry.

4.5.3 He further informed that as per draft “Manual of Communication Planning in Power System Operation” by CEA which is under draft stage also mandates that there should be redundancy in DCPS supply as well as battery bank.

4.5.4 NRLDC informed PSTCL/POWERGRID that in 15th TeST meeting it was decided that POWERGRID/PSTCL will submit the status of DCPS healthiness / Battery backup of all the locations of NR-II to NRPC/NRLDC within a period of one month. However no such report has been received from POWERGRID/PSTCL.

4.5.5 NRLDC requested all to submit the report to NRLDC/NRPC by 30th November 2019.

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

5.1 URTDSM issue of HVPNL (Agenda by HVPNL): -

Representative of HVPNL stated that 3nos. of PMU have been shifted from PTPS to the DCRTP. The SAT (Site acceptance test) has not been carried out till now.

Representative of POWERGRID stated that same would be accomplished by 30th November, 2019.

5.2 URTDSM issue of PSTCL (Agenda by PSTCL):

5.2.1 Representative of PSTCL stated that under 1st phase of URTDSM scheme implemented by PGCIL, 3 nos. generating stations of Punjab i.e. 1) GGSSTP, Ropar 2) GNDTP, Bathinda 3) GHTP, Lehramohabat were covered. Real time data from GGSSTP, Ropar plant is not reporting at SLDC Ablowal since long and already under the knowledge of PGCIL.

5.2.2 He requested POWERGRID to resolve the telemetry data issue of GGSSTP, Ropar in a time bound manner and also intimate the tentative time line.

5.2.3 Representative of POWERGRID stated that at Ropar new equipment's need to ne procured it would be done by them by doing an amendment to ongoing project.

5.2.4 Representative of NRLDC stated that a one day workshop could be organised for utilities for PMU operation and utilization in December.

5.2.5 Member Secretary, NRPC stated that the same suggestion by NRLDC could be discussed among OCC members in OCC meeting so that operational staff could schedule the workshop and benefitted with it.

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

5.3.1 Representative of BBMB stated that due to phase mismatch of 400 kV viz-a-viz 220 kV system at 400 kV Substations / Power Houses of BBMB, phasor mismatch is being observed in the PMUs installed under URTDSM Scheme. In the 15th TeST meeting, POWERGRID intimated that necessary instructions shall be imparted to M/s GE to alter the phase sequence wiring in PMUs installed at Dehar Power House, Bhiwani & Panipat. However, this work has yet to be executed, as such, POWERGRID is requested to get this work completed at the earliest.

5.3.2 Representative of POWERGRID stated that they would rectify the phasor mis-match issue.

5.3.3 Representative of BBMB stated that it has been intimated by POWERGRID that necessary wideband channel through OPGW for reporting of PMUs installed at Bhakra Right & Pong PH to SLDC Chandigarh have been configured. The same was intimated to M/s GE, however, till date PMUs installed at these sites are not reporting. POWERGRID is requested to impart necessary instructions to M/s GE to take necessary action in this regard.

5.3.4 Representative of POWERGRID agreed to take up the issue.

5.3.5 Representative of BBMB stated that the issue of defective GPS System installed for PMU at Bhiwani has been taken up with M/s GE repeatedly. The site engineer of M/s GE stationed at BBMB Chandigarh had E-mailed to M/s GE Noida office regarding the rectification of this GPS on 05.09.2019, but till date no action has been initiated.

5.3.6 Representative of POWERGRID stated that maintenance contract would start from 1st December, 2019 and it would be rectified in accordance with the maintenance plan.

5.3.7 Representative of BBMB stated that for 2*80 kVA UPS system installed under PMU project at BBMB SLDC, a console has been provided to monitor the UPS parameters at Control Room. However, necessary action to view the UPS parameters through the console has not been undertaken by M/s GE.

5.4 Maintenance of PMUs installed under URTDSM (Agenda by NRLDC)

5.4.1 Representative of NRLDC stated that data from many PMU locations was not available at NRLDC due to GPS issue at site. Issue has already been raised with PGCIL but there is very little progress in that effect. PGCIL was requested to please take up with vendor for restoration of data. Further there is a need for some guidelines for attending faults in PMU (any fault in PMU data goes unattended for long time) due to non-availability of personal for maintenance of PMUs.

5.4.2 Representative of NRLDC informed that during 15th TeST Meeting it was discussed that PMU maintenance is not in place and had requested POWERGRID to start the maintenance activities through GE. However no action for PMU Maintenance has been taken yet.

5.4.3 Representative of POWERGRID informed that PMU maintenance contract would start from 01st December 2019.

6. OTHER AGENDA

6.1 Delay in Payment (Agenda by POWERGRID)

Representative of POWERGRID stated that they are 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 even advance payments are being released on delay of 5-6 months and in some cases the delay is of up to one and more years, our Audit team has also observed this issue and POWERGRID have no other option to deduct the overhead charges from advance 1% deposited with us and cancellation of AMC with immediate effects.

Outstanding payment:

DTL – approx. Rs. 8 Lacs (RTU/OPGW)

J&K PDD – Approx. Rs 22.58 Lac (APS, OPGW, RTU, wideband & Insurance)

PTCUL – approx. Rs 5 Lac (RTU, APS, OPGW & short payments)

UPPTCL – approx. Rs 60 Lac (APS, RTU, OPGW, wideband)

He further stated that above outstanding amounts are pending since long and POWERGRID is regularly pursuing the case with respective Constituents however settlement of payment issue was not closed till date even after repeated reminders. Now POWERGRID have no other option to stop AMC works for UPPTCL, PTCUL and J&K PDD where payment has not been released since long and total outstanding is also very huge. It may be noted that after stoppage of AMC, data availability may be impacted and respective constituents may take care of their telemetry data and voice connectivity.

Representative of DTL stated that bills has been sent to their finance department within 10 days payment would be made.

Representative pf UPPTCL stated that payment is in under process.

Since representative of PTCUL and J&K PDD were not present, latest status could not be ascertained.

DATE AND TIME OF THE NEXT MEETING

The date and venue of next (18th) meeting of the Telecommunication, SCADA & Telemetry (TeST) will be intimated later.

Annexure-1.1

List of Participants of 16th TeST Sub-Committee Meeting				
S. No.	**Name**	**Designation**	**Organisation**	**E-mail**
1	Sh. Y.K.DIXIT	CGM	POWERGRID	ykdixit@powergridindia.com
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44	Sh. Ratnesh Kumar	E.E.(C)	NRPC	
45	Sh. Manish Maurya	A.E.E.(C)	NRPC	

Annexure-2.1.7

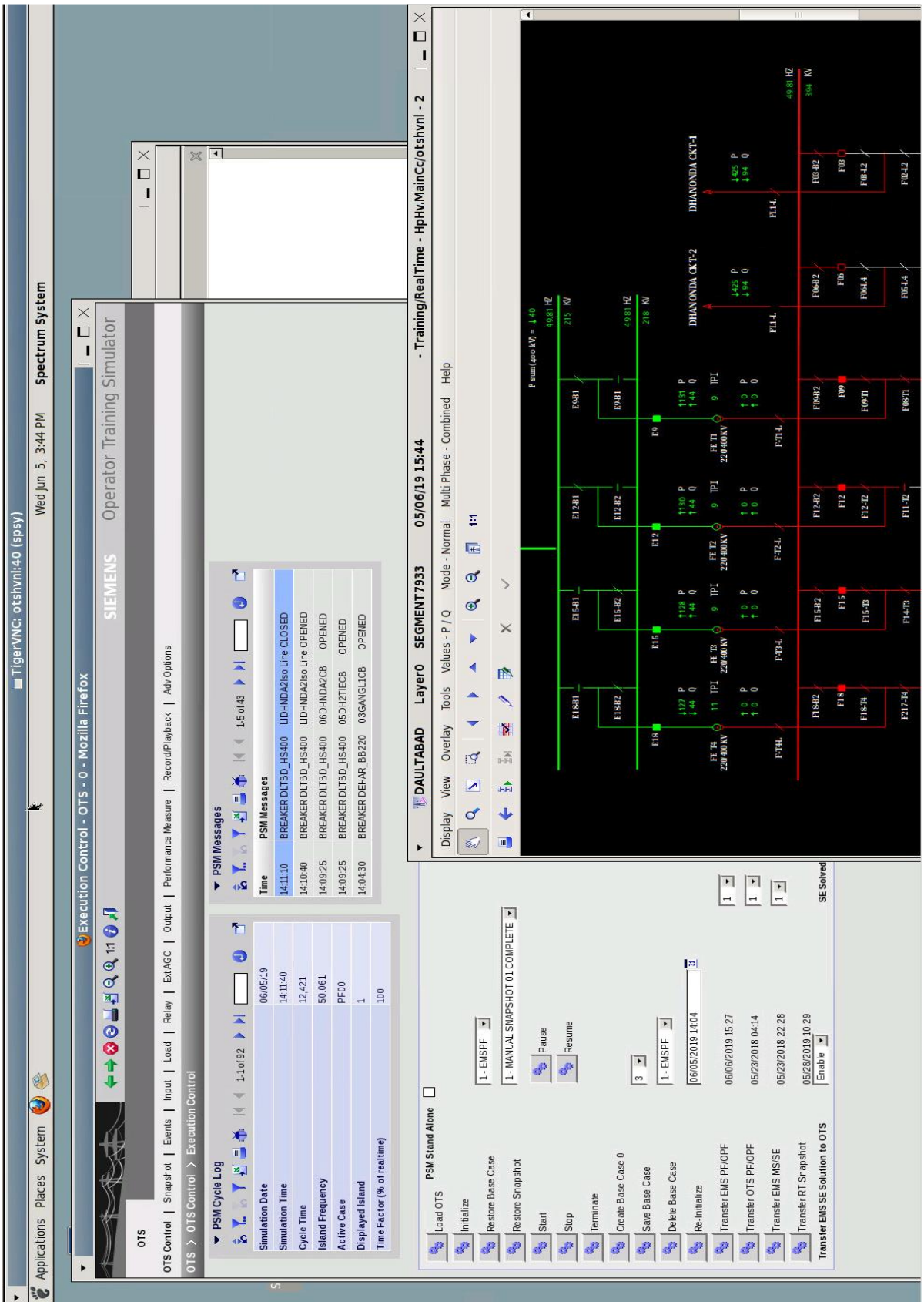
NRLDC Remote sites EXT NO LIST				
Sr No	**RTU Site name**	**Utility**	**Hotline Connectivity**	**Current Status**
1	ABDULLAPUR	POWERGRID	Yes	Not Working
2	ADHYDRO	ADHYDRO	No	
3	AGRA HVDC	POWERGRID	Yes	
4	AGRA 400	POWERGRID	Yes	Not Working
5	AJMER	POWERGRID	No	Working
6	ALIGARH	POWERGRID	Yes	Working
7	ALLAHABAD	POWERGRID	Yes	Working
8	AMARGARH	STERLITE	No	
9	AMRITSAR	POWERGRID	Yes	Call Not Attended
10	ANTA	NTPC	No	
11	AURIYA	NTPC	Yes	Call Not Attended
12	BADARPUR	DTL	Yes	Not Working
13	BAGHPAT	POWERGRID	No	
14	BAHADURGARH PG	POWERGRID	Yes	Call Not Attended
15	BAIRSUIL	NHPC	No	
16	BALLIA 400	POWERGRID	Yes	Working
17	BALLABHGARH	POWERGRID	Yes	Not Working
18	BANALA	POWERGRID	No	
19	BAREILLY 400	POWERGRID	Yes	Working
20	BAREILLY 765	POWERGRID	Yes	Working
21	BASSI	POWERGRID	Yes	Not Working
22	BHADLA	POWERGRID	No	
23	BHADLA (ADANI)	ADANI	No	
24	BHADLA(SAURYA URJA)	SAURYA URJA	No	
25	BHINMAL	POWERGRID	Yes	Not Working
26	BHIWADI 400	POWERGRID	No	
27	BHIWADI HVDC	POWERGRID	Yes	Not Working
28	BHIWANI 765	POWERGRID	Yes	Not Working
29	BIKANER	POWERGRID	No	
30	BUDHIL	BUDHIL	Yes	Not Working
31	CHAMBA	POWERGRID	Yes	Not Working
32	CHEMERA-II	NHPC	Yes	Not Working

33	CHEMERA-III	NHPC	Yes	Not Working
34	CHEMERA -I	NHPC	Yes	Working
35	CHITTORGARH	POWERGRID	No	
36	DADRI GAS	NTPC	No	
37	DADRI-THERMAL	NTPC	Yes	Not Working
38	DADRI-HVDC	POWERGRID	Yes	Not Working
39	DEHRADUN	POWERGRID	No	
40	DHAULIGANGA	NHPC	Yes	Not Working
41	DULHASTI	NHPC	No	
42	FARIDABAD-PP	NTPC	Yes	Not Working
43	FATEHPUR PG	POWERGRID	Yes	Working
44	FATEHABAD	POWERGRID	Yes	Call Not Attended
45	GORAKHPUR	POWERGRID	Yes	Working
46	GURGAON	POWERGRID	Yes	Working
47	HAMIRPUR PG	POWERGRID	Yes	Not Working
48	HISSAR	POWERGRID	Yes	Not Working
49	JAIPUR SOUTH	POWERGRID	Yes	Working
50	JALLANDHAR	POWERGRID	Yes	Working
51	JHAJJAR	APGCL	No	
52	JHATIKARA	POWERGRID	Yes	Call Not Attended
53	JIND	POWERGRID	No	
54	KAITHAL	POWERGRID	Yes	Working
55	KALAAMB	POWERGRID	No	
56	KAKROLI	POWERGRID	Yes	Not Working
57	KANPUR PG	POWERGRID	Yes	Working
58	KANPUR 765	POWERGRID	No	
59	KARCHAM	JAYPEE	No	
60	KISHANGANGA	NHPC	No	
61	KISHANPUR	POWERGRID	No	
62	KOLDAM	NTPC	Yes	Working
63	KOTA	POWERGRID	Yes	Call Not Attended
64	KOTESHWAR-PG	POWERGRID	Yes	Working
65	KOTESHWAR-UK	THDC	Yes	Working
66	KOTPUTLI	POWERGRID	Yes	Working
67	KURUSHETRA	POWERGRID	Yes	Working
68	LUCKNOW 400	POWERGRID	Yes	Not Working
69	LUCKNOW 765	POWERGRID	No	
70	LUDHIANA	POWERGRID	Yes	Not Working
71	MAHRANIBAG	POWERGRID	Yes	Working
72	MAINPURI PG	POWERGRID	Yes	Not Working
73	MALERKOTLA	POWERGRID	Yes	Not Working
74	MANDOLA	POWERGRID	Yes	Not Working

75	MANESAR	POWERGRID	Yes	Call Not Attended
76	MEERUT	POWERGRID	Yes	Not Working
77	MOGA 400	POWERGRID	Yes	Not Working
78	MOGA 765	POWERGRID	Yes	Not Working
79	Mohindargarh HVDC	ADANI	No	
80	NALAGARH	POWERGRID	Yes	Call Not Attended
81	NAPP	NPCIL	Yes	Call Not Attended
82	NATPHA JHAKRI	NJPC	No	
83	NIMRANA	POWERGRID	Yes	Working
84	ORAI	POWERGRID	No	
85	PARBATI 2	NHPC	No	
86	PARBATI 3	NHPC	No	
87	PATIALA	POWERGRID	Yes	Not Working
88	PATRAN	PKTCL	Yes	Working
89	PITHORGARH	POWERGRID	Yes	Working
90	PANCHKULA	POWERGRID	Yes	Not Working
91	RAIBAREILLY	POWERGRID	Yes	Call Not Attended
92	RAMPUR	SJVNL	No	
93	RAPP-I & II (A)	NPCIL	Yes	Working
94	RAPP-III & IV (B)	NPCIL	Yes	Not Working
95	RAPP C	NPCIL	Yes	Call Not Attended
96	RAWRA	ADANI	No	
97	RIHAND NTPC	NTPC	Yes	Not Working
98	RIHAND HVDC	POWERGRID	Yes	Not Working
99	ROORKI	POWERGRID	Yes	Not Working
100	SAHJAHANPUR	POWERGRID	Yes	Call Not Attended
101	SAHARANPUR	POWERGRID	Yes	Call Not Attended
102	SALAL	NHPC	No	
103	SAMBHA	POWERGRID	No	
104	SEWA-2	NHPC	No	
105	SIKAR	POWERGRID	Yes	Not Working
106	SOHAWAL	POWERGRID	Yes	Call Not Attended
107	SINGRAULI	NTPC	Yes	Working
108	SHREE CEMENT	SCL	No	
109	SONIPAT	POWERGRID	Yes	Not Working
110	SITARGANJ	POWERGRID	Yes	Not Working
111	TANAKPUR	NHPC	Yes	Not Working

112	TEHRI	THDC	Yes	Working
113	TUGHLAKABAD	POWERGRID	Yes	Working
114	UNCHAHAR 1 &3	NTPC	No	
115	UNCHAHAR 4	NTPC	No	
116	URI-1	NHPC	No	
117	URI-2	NHPC	No	
118	VARANASI	POWERGRID	No	
119	VINDHYANCHAL	POWERGRID	No	
120	WAGOORA	POWERGRID	No	
121	WANPOH	POWERGRID	No	
122	PIRTHALA	STERLITE	Yes	Working
123	Bikaner Renew	Renew Power	Yes	Working
124	Adani Power	IPP	Yes	Working
125	Saurya Urja	IPP	No	
126	Tata Power	IPP	No	
127	Azure Power 34	IPP	No	
128	Mahoba Power	IPP	Yes	Working
129	ACME Power	IPP	No	

Annexure-3.1


TigerVNC: otshvnl:40 (spsy)
Applications Places System
Wed Jun 5, 3:44 PM
Spectrum System
Execution Control - OTS - 0 - Mozilla Firefox
SIEMENS
Operator Training Simulator
OTS
OTS Control | Snapshot | Events | Input | Load | Relay | ExtAGC | Output | Performance Measure | RecordPlayback | Adv Options
OTS > OTS Control > Execution Control
PSM Cycle Log
PSM Messages
Simulation Date
Simulation Time
Cycle Time
Island Frequency
Active Case
Displayed Island
Time Factor (% of realtime)
PSM Stand Alone
Load OTS
Initialize
Restore Base Case
Restore Snapshot
Start
Stop
Terminate
Create Base Case 0
Save Base Case
Delete Base Case
Re-Initialize
Transfer EMS PF/OPF
Transfer OTS PF/OPF
Transfer EMS MS/SE
Transfer RT Snapshot
Transfer EMS SE Solution to OTS
SE Solved
DAULTABAD Layer0 SEGMENT7933 05/06/19 15:44 - Training/RealTime - HpHv.MainCc/otshvnl - 2
Display View Overlay Tools Values - P / Q Mode - Normal Multi Phase - Combined Help
DHANONDA CKT-1
DHANONDA CKT-2