फोन-26511211 , 6868681
फैक्सFax :26865206
ई मेल e- mail: seo-nrpc@nic.in
वेबसाईटWebsite : www.nrpc.gov.in

भारत सरकार
उत्तर क्षेत्रीय विद्युत समिति
18-ए, श.जीत सिंह मार्ग, कटवारिया सराय,
नई दिल्ली- 110016
Government of India
Northern Regional Power Committee
18-A, S. Jeet Singh Marg, Katwaria Sarai,
New Delhi-110016

स.उक्षेविस/ प्रचालन /108/04/ 2014 / दिनांक : 30.10.2014

No. NRPC / OPR /108/04 / 2014 / Dated: 30.10.2014

Subject: Minutes of 2nd meeting of Telecommunication, SCADA & Telemetry (TeST) Sub Committee

The summary record of discussion of the 2nd meeting of Telecommunication, SCADA & Telemetry Sub Committee held on 12th August 2014 at New Delhi have been issued and are available on NRPC's Website at www.nrpc.gov.in.

Sd/-
(Ajay Talegaonkar)
S.E. (Operations) &
Member Convener TeST sub-committee

To: **All members of of TeST sub-committee**

Members

1. Chief Engineer(SLDC), PTCUL, Dehradun-248001, (Fax-0135-2530336)
2. Dy Chief Engineer BBMB, Chandigarh-160019, (Fax-0172-2549548)
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)
8. Superintending Engineer, SLDC, HP Load Dispatch Society, Totu, Shimla, (Fax-0177-2837543)
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. DY.Chief Engineer, RVPNL, Janpath, Jaipur-302005, (Fax-0141-2740794)
13. Chief Engineer (TO), UPRVUNL, Lucknow-226001, (Fax-0522-2287861)
14. General Manager (Operation), UJVNL, Dehradun-248006, (Fax-0135-2761549)
15. Chief Engineer (O&M), NHPC, Faridabad-121003, (Fax-0129-2255706)
16. Addnl. General Manager I/c(OS)(NCR), NCR-HQ, NTPC, Noida-201301, (Fax-0120-2410052)

17. General Manager(ULDC) & General Manager (LD&C) PGCIL, New Delhi-110016, (Fax-011-26564849)
18. General Manager, SJVNL, New Delhi, (Fax-011-41018826)
19. General Manager (Electrical Design),THDC, Rishikesh-249201, (Fax-0135-2438682)
20. Addl. Chief Engineer Jaiprakash PVL, Noida, (Fax-0120-4516101/4516201)
21. General Manager (Technical), IPGCL, New Delhi-110002, (Fax-011-23270590)
22. GM(O&M) DTL, New Delhi-110002, (Fax-011-23232721)
23. General Manager, NRLDC, New Delhi-110016, (Fax-011-26853082)
24. Chief Engineer (SO&C), SLDC, HVPNL, Sewah, Panipat , (Fax-0172-2560622)
25. Dy. General manager, Rosa PSCL , (Fax-05842-300003)
26. Chief Engineer(SLDC), UPPTCL, Lucknow.(Fax 0522-2287880)
27. Chief Engineer(Transmission), NPCIL, Mumbai-400094, (Fax-022-25993570/25991258)
28. DGM, Electrical, Jhajjar Power Ltd., Haryana, (Fax-01251-270155
29. Director, Lanco Anpara Power Ltd., (Fax-124-2341627
30. GM (Comml.), Aravali Power Company Pvt. Ltd., NOIDA, (Fax-0120-2425944)

Utilities which have not submitted nominations

31. BSES Yamuna vihar Power Ltd., New Delhi, (Fax-011-39992076) 2nd Floor, B Block, Shakti Kiran Building, Near Karkardooma Court, New Delhi
32. Sr. Vice President, JSW Energy Ltd., New Delhi-110066 (Fax: 46032343 / 26183546)
33. Managing Director, UPCL, Dehradun-248006, (Fax-0135-2768867)
34. Development Commissioner (P), PDD, Srinagar, J&K, (Fax-0194-2452173)
35. Managing Director, J&K State Power Dev. Corp., Srinagar, J&K, (Fax-0194- 2500145)

Minutes of Meeting of second (2nd) Meeting of Telecommunication, SCADA & Telemetry (TeST) Sub Committee held on 12th August 2014 at NRPC New Delhi

(List of participants is enclosed at Annex –I)

Member Secretary (I/C), NRPC welcomed all participants to the second meeting of Telecommunication, SCADA & Telemetry (TeST) Sub Committee. He stressed on the importance of these issues in the system operation and requested members to deliberate on the agenda items with earnest. Thereafter, he requested SE(O) NRPC to take up the agenda items for discussion.

1. Confirmation of Minutes of 1st TeST sub-committee meeting

TeST Sub-committee confirmed the minutes of 1st TeST sub-committee meeting held on 17th April 2014 with the following amended point 7 based on amendment proposed by UPPTCL:

*"**7. Signing of AMC Contract***

"Representative of POWERGRID stated that in the 28th NRPC meeting it was decided that all the constituents would sign the agreement for maintenance contract for SCADA/EMS system with M/S SIEMENS by 15th May 2013. It was informed by representative of POWERGRID that only UPPTCL, PDD (J&K), HVPNL and RRVPNL have done so. During deliberations all other constituents members agreed to send signed letters by 15.05.14."

All other amendments proposed by UPPTCL were withdrawn

2.0. Status of upgradation projects at SLDCs of Northern Region

A presentation was made by POWERGRID and copy of the same is attached at **Annex-II.** Following was agreed:-

I) All efforts would be made to start the parallel operation of existing and new SCADA at remaining SLDCs from 19th August 2014.

II) The important displays required for grid operation would be made operational, so that drawal, and deviation calculations can be observed in new system.

III) The displays made by NRLDC shall be shared with all the constituents by 19th August 2014 and all the Over-Drawal, Under-Drawal calculations shall be transferred to other constituents on ICCP.

IV) Regarding other system displays required for monitoring of over drawls(OD)/Under drawls(UD) of their discoms for DTL, the specific calculation and displays shall be made by SIEMENS before start of parallel operation.

V) The resolution and Action plan for closure of variances observed during SAT shall be shared with constituents by POWERGRID by 23rd August 2014. All critical variances would be closed during parallel operation.

VI) Training for operators may be conducted in two batches, first batch of training shall commence in first week of Sept'15. Second batch training may also be carried out during parallel operation.

VII) Training of SCADA and URTDSM may be planned in such a way that it should not coincide/overlap.

VIII) Guideline to be followed during parallel operations made by BBMB was circulated and it was agreed that the same may be followed by other constituents. The same is attached at **Annex-III.**

IX) During parallel operation, the new displays and new RTUs would be integrated. All constituents would put in their best efforts to make the database and displays themselves. In this direction, all necessary assistance would be provided by SIEMENS.

2.1 **State wise details and problems for projects under execution (Agenda by POWERGRID)**

2.1.1 **PSTCL:**

A. Certain issues raised by POWERGRID regarding PSTCL, were discussed and following was agreed:

a. **Independent Power Supply for POWER ON the UPS system**:- PSTCL informed that the issues regarding MCB and Independent Power supply has been resolved and the testing for the same would start from 12.08.2014

b. **Space constraint for installation of furniture which is supplied in the project:-** POWERGRID and PSTCL would discuss bilaterally and resolve.

c. **Repeated equipment/card (Fiberhome and Nokia) failure and data outage problem occurs at Moga due to non-adequate earthing. PSTCL should take immediate action to sort out the problem.:-** PSTCL informed that they would strengthen the earthing system within 10 days. Member Secretary NRPC, advised POWERGRID to carry out the earthing strengthening work on behalf of PSTCL, if they are not able to complete it within 10 days .

B. The issues raised by PSTCL were deliberated and following was agreed::

i. **UPS commissioning**: PSTCL requested POWERGRID to expedite UPS commissioning. POWERGRID informed that with resolution of issue mentioned at 2.1.1 A(a), UPS would be commissioned immediately.

ii. **Furniture related issues**: Representative of PSTCL stated that as per the approved BOQ, total 8 nos. U-shape wooden tables were to be supplied to Punjab SLDC. Firm supplied 4 nos. U-shape tables and 2 nos. E-shape tables i.e. considering 1 no. E-shape table= 2 U-shape tables. 1 no. E- Shape table has been placed in the control room whereas the other remaining 1 no. E-shape table could not be adjusted being larger in size. Matter regarding furniture was conveyed to POWERGRID to supply 2 nos. U-shape tables in place of 1 no. E-shape table discussed above. PSTCL had requested that the matter needs to be resolved at the earliest as final locations of the equipment depends upon the availability of type of furniture. SE (O), NRPC requested PSTCL and POWERGRID to resolve these trivial issues by mutual discussion.

iii. **Observations during SAT**: Representative of PSTCL informed that SAT of SCADA has been completed at SLDC Patiala by M/s Siemens Limited, Mumbai from 10.06.2014 to 02.07.2014. Observations pointed out by PSTCL during SAT are to be complied by the firm. PSTCL requested POWERGRID to take up the matter with the firm. POWERGRID informed that major issues have been resolved and any remaining issues would be resolved during parallel operation

iv **RTUs commissioning**: Representative of PSTCL informed that material in respect of all the 9 RTUs had been received at site. Installation work of these RTUs was getting delayed and the matter needed to be taken up by POWERGRID to expedite the installation/commissioning in all respect. Representative of POWERGRID informed that they had already taken up the issue with the vendor and the same would be completed by 30th September 2014.

2.1.2 UPPTCL:

A. Issues pointed out by POWERGRID

a) SAT of SCADA system for UPPTCL is in progress and to be completed by 05.08.2014 at existing control room, however building construction at Gomatinagar is yet to complete:-UPPTCL informed that building readiness in all aspects would take at least 6 more months and was expected to be completed by

March 2015. POWERGRID further stated that decision for VPS supply for Main SLDC may be taken up by UPPTCL on priority as M/s SIEMENS had informed POWERGRID that they might not be able to supply the VPS at the same cost, if it is further delayed. UPPTCL informed that they would convey their decision in this regard within 10 days.

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b) DG set foundation at Lucknow and Modipuram yet to be completed.

This agenda item is covered under **2.1.7 A.**

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c) POWERGRID stated that the Vendor has supplied furniture for UPPTCL. However, due to non completion of building, it was under temporary storage at Shakti Bhawan. UPPTCL informed that there was no space in Shakti Bhawan and supplied furniture may be shifted to Gomatinagar. They would provide secure indoor space for storage of the same.

d) Installation of Air Conditioners in Server and Battery room

This agenda item is covered under **2.1.7 B.**

B. Following issues were raised by UPPTCL:

(i) Excessive heating by Isolation T/F(80 KVA) of UPS causing extra burden on Air Condition Installed.

Representative of POWERGRID informed that they had already taken up this matter with OEM, who in turn had communicated that they had modified the cabinet design and the same would be changed within a day or two at NRLDC, Katwaria Sarai site. The same shall be monitored for a week's time. If the functioning/operation of the transformer is satisfactory then modification shall be applied at all sites.

(ii) Installation & Commissioning of equipment at sub LDC is pending. Even status of communication system has not been provided so far.

Representative of POWERGRID informed that the communication equipment are likely to be available at site within one month and the same would be commissioned progressively within 3 months at all sites.

(iii) Representative of UPPTCL stated that Integration of following number of RTUs was pending –

- Sub LDC Modipuram : 17
- Sub LDC Varanasi : 02
- Sub LDC Moradabad : 01
- Sub LDC Panki : 00
- SLDC Lucknow : 04

Representative of POWERGRID assured that the same would be completed during parallel operation.

(iv) Database and Display of 12 nos. Sub-stations has not been prepared :
Representative of POWERGRID agreed that UPPTCL's requirement would be completed during parallel operation

(v) Representative of UPPTCL informed that DB and Display of no. of recently added feeders needs to be added in already prepared DB & display.
Representative of POWERGRID assured that the same would be completed during parallel operation.

(vi) Regarding UPPTCL's issue of preparation of pending Display & report generation, representative of POWERGRID agreed that same would be completed during parallel operation

(vii) Representative of UPPTCL stated that Supply of Splitters and OTS were pending. POWERGRID informed that EMS and OTS SAT would be done after parallel operation. Further there were some FAT issues related with OTS. After resolving those issues the same shall be dispatched at site

(viii) Representative of UPPTCL stated that Integration work of Open access, scheduling and metering applications was missing in received BOQ. Representative of POWERGRID informed that the integration work was covered under installation i.e services contract.

(ix) Representative of UPPTCL stated that Work of Backup SLDC at Modipuram had not started. Representative of POWERGRID informed that the work at Modipuram was pending due to AC problem. Further POWERGRID informed that all attempts were being made at main Control centre so that the new system is commissioned before AMC expiry of existing system. The Backup control centre would be commissioned after completion of shifting of operation to new system

(x) Representative of UPPTCL stated that VLAN connectivity details of presently working communication network and finally desired communication network and its present status needed to be provided by POWERGRID in respect of following:

- Terminal Servers installed at Sub LDCs to IFS Servers at SLDC LKO & Backup SLDC Modipuram.
- SLDC LKO & Backup SLDC Modipuram.
- SLDC LKO & Backup Sub LDCs (Panki, Modipuram, Moradabad, Varanasi)for connecting remote consoles, Printers etc.

Representative of POWERGRID informed that the final commissioning would be completed within 3 months. The communication network diagram was also shared in the meeting. Till the commissioning of New communication system, the system would work with existing communication channel hired from Telecom department of POWERGRID and E1 to Ethernet converters on ULDC network The packet loss in the communication route in E1 to Ethernet converter was being analysed for rectification, if required.

(xi) Representative of UPPTCL informed that Installation & commissioning of operator consoles, printers, remote consoles etc had not started. POWERGRID agreed that same would be completed at the time of parallel operation

2.1.3 RRVPNL:

a) Representative of POWERGRID informed that Honeywell RTUs should be directly connected in master mode with Siemens system as the performance with listening mode is acceptable. It was decided that during parallel operation the same would be shifted to SIEMENS system progressively. Representative of. NRLDC enquired about the schedule of replacement of old Siemens make RTUs which are not being integrated presently as the same are under replacements and major number of stations will not be available in new system till replacement. RRVPNL informed that efforts are being made to replace these RTUs by end of September'14. NRLDC requested RRVPNL to further expedite the installation. It was agreed that Member Secretary, NRPC would impress upon RVPNL about the criticalities of the Honeywell RTUs installation during parallel operation and switch over to the new system.

b) Signature on SAT reports

Representative of RRVPNL agreed to sign the SAT reports of Hardware.

2.1.4 HVPNL:

A. POWERGRID informed that webserver testing could not be completed due to lack of coordination between Siemens engineer and the HVPNL. After deliberations, It was agreed that testing would be done as per schedule and observations of HVPNL would be recorded in the testing format.

Regarding access of displays and reports through web server from public IP, it was clarified that the system has been designed for access through username password so that the same could be viewed by identified users only from data security point of view.

POWERGRID informed that hosting SLDC websites in the SCADA webser may be an additional requirement, which involves changes in design, may be taken up with Siemens separately.

On enquiry by HVPNL regarding accessibility of web server from public IP, it was informed that the facility may be provided after discussion with Siemens with due regard to cyber security.

B. The issues raised by HVPNL were discussed as under:

(i) **SAT for the SCADA Part:** HVPNL informed that SAT of Information Model Management (IMM), Data Processing (DP), User Interface (UI), Data Historian (eDNA), External Interfaces, Computer Network Management (CNM), Network Management System (NMS), Independent Front End System (IFS) and Control Centre Communication Protocol (ICCP) at SLDC, Panipat was carried out by M/s SIEMENS during 06.06.2014 to 08.07.2014. However, there are many variances and some tests results were recorded with observations / Remarks. HVPNL requested POWEGRID to ensure that variances & HVPNL remarks / observations on the SAT test point should be attended by M/s Siemens in a time bound manner. Further, if any code change/modification is required due to the observations/remarks by any of the constituent state, the same should be implemented in a uniform manner at all Control Centres.

Representative of POWERGRID informed that the resolution and schedule for closure of variances shall be shared by 23rd August 2014.

(ii) Representative of HVPNL informed that **the real time calculations** running in the present Areva system was yet to be established in the New Siemens system. It was expressed that these calculations were of utmost important for the system operational point of view.

Representative for POWERGRID informed that the summary display required for operation shall be made by 19th August 2014. And other calculations and displays shall be made available during parallel operation.

(iii) At the time of meeting, around 56 nos. substations of HVPN were connected with the SLDC system. The Validations of field values vis-à-vis SCADA values appearing on the Siemens system displays were pending (12 monitored stations were pending). It was agreed that the same would be done during parallel operation. It was also suggested that validation activity may be done by HVPNL themselves and hand over the variance to SIEMENS.

(iv) HVPNL stated that system operators were preparing various MIS reports from the Areva's system which also needed to be established with the Siemens system. Representative of POWERGRID agreed that HVPNL's requirement would be complied during parallel operation**.**

v) Issue of hosting of Website already covered at item 2.1.4 (A).

vi) Representative of HVPNL stated that the displays for UFR, df/dt relays operation and load relief due to operation of relay has not been prepared by M/s Siemens so far and to meet the CERC requirement**.** After deliberations It was decided that the reports would be fetched from Historain system as the display cannot be made in real time as it needs the data of before the operation of UFR.

vii) **HARDWARE pending works:** Representative of HVPNL informed that Siemens has not installed the remote consoles at Narwana, Dadri and HO Panchkula. POWERGRID was also requested to provide Ethernet connectivity of suitable bandwidth for these sites Representative of POWERGRID agreed that HVPNL requirement would be complied during parallel operation

viii) Representative of HVPNL informed that Siemens had not installed the standby cable at CFE and also the splitter installation was pending. Representative of POWERGRID agreed that HVPNL requirement would be complied during parallel operation

ix) Representative of HVPNL informed that **t**he Power cabling for all the equipment was pending. Representative of POWERGRID agreed that HVPNL requirement would be complied during parallel operation**.**

x) Representative of HVPNL informed that installation of Time, Date, Frequency displays was pending. POWERGRID informed that above activity was pending as HVPNL had not decided the location where these displays were to be installed. It was agreed that HVPNL requirement would be complied during parallel operation**.**

VPS SAT was carried out during April-2014 but as per HVPNL observations / remarks i.e. Mounting arrangement for VPS controller, VPS body earthing, Power cable laying, Cable tagging were yet to be attended by Siemens.

xi) Representative of POWERGRID agreed that HVPNL requirement would be complied during parallel operation

xii) Representative of HVPNL informed that MCU and its associated equipments installation was pending in Video Conferencing System since long. The rack supplied for MCU and its associated equipments was of small size. POWERGRID informed that this had been incorporated in amendment and the schedule for the same would be informed to HVPNL within a week.

xiii) Representative of HVPNL stated that supply of the battery banks for UPS and its installation was pending. POWERGRID informed that this had been incorporated in amendment and the schedule for the same would be informed to HVPNL within a week**.**

2.1.5 DTL:

(a) POWERGRID expressed concern over repetitive failure of 48V DC power supply at Bawana, IP POWER, Kanjhawala and Gazipur sub-stations. After grid failure POWERGRID had procured DC power source for various sites, but DTL had informed that they had placed the orders for DTL sites, accordingly POWERGRID had shifted the materials to other sites. However, till that date 48V DC power source had not been installed at these sites which affected data availability for other stations as well at NRLDC due to integrated network system. He requested DTL to install DC power supply on immediate basis. Representative of DTL informed that the award for battery has already been placed and would be commissioned within 3 months.

(b) POWERGRID expressed concern over data outage at SLDC, Delhi due to frequent cut in underground optical fibre between IP Power to SLDC, Minto Road. ULDC phase-II system was also connected through this link which affected the system and parallel operation. DTL was requested to take necessary action in this regard. DTL informed that they had requested POWERGRID to spare fibers(2nos) laid under Fiber Optic project and it would give sufficient redundancy. POWERGRID stated that DTL should take up the issue with their telecom department.

2.1.6 <u>J&K PDD:</u>

POWERGRID representative informed the status of project in J&K as below:

a) DG set foundation at Jammu and Srinagar were yet to be completed
b) Link connectivity and 48V DC power source not available for installation of RTUs

No representative of PDD, J&K was present.

2.1.7 Common issues of ongoing projects executed by POWERGRID

A) **DG set Foundation:** It was decided during the 1st TeST sub-committee meeting that all civil work including DG set foundation work shall be completed by end of May' 14. POWERGRID Informed that DG Set foundation work at Lucknow, Modipuram, Jammu and Srinagar were still pending. UPPTCL informed that they had already sent the proposal to their management for approval and the same was likely to be approved within a day or two. After approval it would be completed within 15 days. SE(O), NRPC suggested that DG foundation for Gomti Nagar may be taken up on priority as the civil work is already in progress. UPPTCL informed that they would take up the matter accordingly.

B) **Air Conditioner**: POWERGRID stated that to maintain the temperature in Server room / Battery room, air conditions were required. Auto shutdown feature was inbuilt to prevent loss of data in case of over temperature. Member secretary NRPC advised all constituents to expedite AC installation.. Representative of UPPTCL informed that they had already sent the proposal for Lucknow & Modipuram stations to their management for approval and the same is likely to be approved within a day or two. After approval it would be completed within 15 days.

C) **Working on Saturday/Sunday**: During the 1st meeting of TeST sub-committee, it was decided that all the constituents would permit to work at SLDCs during Saturday/Sunday for SAT and other activities. Representative of POWERGRID stated that some of the constituents had not allowed Siemens to work on Saturday and Sundats and concerned engineers were not available to witness SAT. During deliberations all the constituent members informed that they were cooperating with SIEMENS to work on weekends as decided in the previous meeting. SE(O), NRPC requested POWERGRID to inform any specific constraint in this regard.

3.0 REPLACEMENT OF SDH EQUIPMENTS ESTABLISHED UNDER ULDC PROJECT

POWERGRID representative informed that the upgraded SCADA system ULDC -II and URTDSM projects require Ethernet based connectivity. The requirement of bandwidth for these services cannot be met by the SDH equipment installed under ULDC-I Scheme, which were in service from last 12 years and also became obsolete. Accordingly, replacement of existing SDH equipment of ULDC with new SDH Equipment with STM-16 was felt essential for meeting all the requirement of grid operation.

14 nos. of additional STM -16 & 06 nos. of STM-4 SDH equipments along with associated Optical Cards was to be provided under ongoing project for Fiber Optic Communication System for Central Sector Stations at an additional cost of approx.

Rs. 3.2 Crores to meet the requirements and include the same under FO Expansion Project approved in 18th NRPC meeting. It was also proposed to replace the existing SDH equipments (STM-1) installed under ULDC project in state sector by STM-16.

SE(O), NRPC requested members to deliberate so that appropriate recommendation can be made to NRPC.

POWERGRID informed that replacement for SDH equipment required for integration of SLDCs and RLDC would be covered under central sector expansion project and the remaining equipment which are left within state sector would be covered under state sector fibre optic expansion projects.

On enquiry by NRLDC regarding schedule of implementation of the communication between main NRLDC and Back-up NRLDC, POWERGRID informed that the equipment had already been ordered and commissioning was expected to be completed within three months' time.

Regarding placement of terminal server at the communication node for data transfer from RTUs to man and back-up with redundancy, POWERGRID informed that the channel planning would be carried out after implementation of the communication equipment as enough provision has been made for the channels.

Implementation of VLAN for ICCP communication between SLDCs and NRLDC shall be done as per requirement of SCADA/EMS system to facilitate failover requirement of the SCADA system.

POWERGRID further shared the presentation of implementation of communication channel plan for various communication project which has been approved. **Ethernet Plan for communication network** is attached at **Annexure-IV.**

It was agreed in principal by all participating members that all SDH equipment installed under ULDC phase-I would be replaced with STM-16**.**

4.0 Fibre Optic Communication system in Northern Region under Expansion Project - Additional Requirement

Regarding additional requirement of Fibre Optic Communication system in Northern Region under Expansion Project POWERGRID informed the following

4.1 To provide fiber connectivity to Aligarh 765KV s/s of POWERGRID , it was proposed to lay the OPGW on Agra – Meerut (765 kV line) with LILO at Aligarh 765 kV (line length - about 267 Kms) under Fiber Optic Expansion Project being implemented by POWERGRID as per approval of 18th NRPC. The revised communication network of Northern Region is enclosed as **Annexure-V**

4.2 As per request letter dtd. 24.02.2014 from UPPTCL, OPGW on two nos. of 400 kV lines (a) Agra 400 (UPPTCL) – Agra 400 (PG) (about 30 Kms) & (b) Gorakhpur 400 (UPPTCL) – Gorakhpur 400 (PG) (about 46 Kms) was proposed to be included under Central Sector. UPPTCL also requested for implementation of OPGW connectivity for Tanda Thermal – Sohawal (PG) under Central Sector.

Further, UPPTCL vide above letter had requested for additional OPGW requirement on their following lines :

a) LILO of 220 kV C.B. Ganj – Moradabad(4) at Rampur S/s (about 10 Kms)
b) LILO of Khara – Saharanpur at Behat S/s (about 3 Kms)
c) LILO of Mirzapur(2) – Jigna line at Mirzapur S/s (about 6 Kms)
d) Surajpur – Greater Noida (4) 132 kV line (about 11 Kms)

SE(O) NRPC requested members to deliberate above proposals to make further recommendations to NRPC. All members agreed to the proposal. This proposal would be put up to NRPC for approval. Regarding the issue of Tanda, it was agreed that Tanda should be included in the Central sector, similar to Badarpur and Faridabad gas Power plants

4.3. In the 28th TCC & 31st NRPC Meetings held on 23rd and 24th July, 2014, APCPL had requested for inclusion of OPGW requirement for 400 KV Jajjar-Mundka line since this line has been declared as ISTS. NRPC had referred to the matter to TeST sub-committee to make appropriate recommendations. In this meeting, POWERGRID informed that OPGW requirement of this line will be provided under URTDSM phase-II. SE(O), NRPC requested POWERGRID to explore possibility of expediting OPGW on this line as successful data communication on this line is critical for Delhi islanding scheme.

5.0 URTDSM Project

5.1.1 Issues and Update

In the first TeST sub-committee meeting held on 14th April 14, it was agreed that members nominated by each constituent for TeST subcommittee would be Nodal officer for URTDSM project. It was also agreed that nominated members for TeST sub-committee would be coordinators for URTDSM project. Representative of

POWERGRID informed that some member constituents had not shown interest for URTDSM project. SE(O) NRPC requested POWERGRID to intimate the name of the constituents where such problem was being faced so that NRPC Sectt would take up this issue to higher authorities .

Representative of POWERGRID also informed the following:

a) Control room (SLDC) survey yet to be done at HVPNL, PTCUL, HPSEBL and UPPTCL.
b) Signature on survey reports for 11 nos. sites was pending for UPPTCL as sub-station in-charges informed that they had not received any communication from their higher officers.
c) Space constraint at SLDCs in installation of UPS, to be supplied under URTDSM project
d) Training on Phasor Measurement Unit (PMU) would start from 1st week of Sept' 14.

SE(O), NRPC requested member constituents for their cooperation for smooth execution of this project.

5.1.2 Issues & Clarifications

Representative of UPPTCL requested POWERGRID to provide following documents:

(i) Conditions of contract (Vol. I DOC No: DC-1925-12605, June'13).
(ii) Contract copy of URTDSM project.

POWEERGRID representative circulated soft copies of the documents(on CDs) in the meeting.

5.2. Equipment details and involvement of constituents in development activities

5.2.1. BBMB informed that the site survey for installation of PMUs and its associated SCADA equipment was being undertaken by ALSTOM, however POWERGRID had not supplied any technical details about the project. BBMB informed that some vital details such as power supply requirements & space requirements were not clear during site survey, which may cause difficulty during the commissioning of Project. POWERGRID informed that they also did not have much details regarding PMUs and its associated SCADA equipment, as engineering was still in progress. However POWERGRID agreed to share a copy of the specifications and copy of the contract. POWERGRID also assured to share other details as and when they are available with them.

5.2.2 BBMB informed that they do not have space to install separate 40kVA UPS for URTDSM project. Accordingly, they requested POWERGRID to supply 120 KVA

UPS, which can cater to the load of SCADA/EMS System as well as URTDSM System. In addition, BBMB had also requested POWERGRID to depute an expert to BBMB Control Centre to finalize the installation arrangement of 120 KVA UPS in the room measuring 10700 x 3350 mm. POWERGRID confirmed that the requirement of 120kVA for BBMB had been incorporated in the project.

5.2.3 POWERGRID agreed to share the details regarding development of various applications and also to involve the constituents in development activities.

6.0 Telemetry Issues

6.1 Submission of Status

While submitting status of telemetry, NRLDC representative informed that format for submission of telemetry status was agreed during 1st TeST subcommittee meeting. However, NRLDC had received the status in the format only from DTL, Rajasthan and Punjab.

DTL : As per report submitted, telemetry of all the generating stations and substations was available however, 6 substations were reported to be intermittent. DTL informed that the communication problems of these stations were being looked into and would be resolved within 15 days.

RRVPNL : As per report submitted by Rajasthan, telemetry of 2 nos generating stations and 11 no substations was yet to be made available whereas telemetry of 2 nos generating station and 10 nos substations was intermittent. NRLDC informed that 2 nos generating stations i.e Kawai and Kalisindh were operating since long but the telemetry was not being arranged, though the same was discussed repeatedly during OCC and TeST subcommittee meetings. This was creating serious problem in day to day monitoring. SE(O), NRPC enquired about the schedule of arranging telemetry of these stations. However, no definite plan was made available. He requested RRVPNL to take up the matter with concerned generating stations on priority basis.

NRLDC also informed that the Old Siemens RTUs were being replaced by Honeywell make RTUs in RRVPNL system and progress of the replacement was very slow. Since the OLD Siemens RTUs are not going to be integrated with new system, the data from these stations would not be available in case the replacement is not ensured before change over. RRVPNL representative confirmed that the replacement shall be done with two months' time and the critical stations shall be taken up on priority basis.

PSTCL : As per report submitted by PSETCL, 4 nos generating station and 108 nos substations were not integrated and telemetry from 3 nos generating stations and 23 nos stations was intermittent. It was pointed out by NRLDC that the telemetry of

PSETCL was highly intermittent and non-availability of real time data was causing serious difficulties in day to day system operation and monitoring. NRLDC also informed that the telemetry of 400 kV system though integrated was highly intermittent and requested PSTCL to ensure reliability of data.

Regarding, integration of telemetry of the new stations, it was informed that the LOA for new RTUs was under process and was expected to be integrated within six month time. On enquiry regarding the communication availability for these new RTUs for integration, it was informed that request had been made to POWERGRID for communication. However, no specific time schedule could be furnished. SE(O), NRPC requested PSTCL to furnish the exact schedule for integration of the balance RTUs along with communication availability within a fortnight so that it could be monitored.

Other Constituents : NRLDC requested all the constituents to furnish the telemetry status as per format decided to NRLDC on monthly basis with a copy to NRPC so that the same could be monitored at NRPC level.

6.2 Non-Availability of Telemetry

NRLDC informed that telemetry was yet to be made available from a large number of stations, which was leading to serious monitoring problem in day to day shift operation. A specific schedule should be furnished by all the constituents for arranging the telemetry of the stations which are already operation. NRLDC also informed that new SCADA system had been installed and there was no constraints in database in the new SCADA system and all the RTUs could be integrated. SE(O), NRPC requested all the constituents to furnish the schedule to NRPC so that the same could be monitored at Sub-committee level.

6.3 Reliability of Telemetry

It was informed that the stations on PLCCs were mainly intermittent which needed to be monitored on continuous basis and tuning needed to be carried out properly, so that the data is received on reliable basis at SLDC as well as NRLDC.

6.4 Telemetry of Digital Status

NRLDC informed that digital status were to be telemetered correctly along with the analog values to alert the system operators in case of trippings so that correct restorative action could be taken. The correct status monitoring was also required to facilitate running of state Estimator where the status is used for network formation. NRLDC requested all the constituents to monitor the availability of circuit breaker initially so that the tripping get recorded in SCADA. The status taken out from SCADA of NRLDC is attached at Annex –VI

6.5 Non-telemetry of New Element

NRLDC informed that the new elements were required to be added to database and telemetry be arranged before the commissioning of the element. It was observed that the new elements were not integrated though the stations were integrated leading to visualization problem and non-zero node in SCADA leading to data validation error in SCADA. Often the information of charging of new element was being received at the time of first time charging of the station / element. It was desired that information related to new Stations / element i.e. SLD as implemented, communication link details and RTU / SAS details should be made available at least 15 days in advanced to facilitate database development and testing of telemetry. It was also informed that it will be difficult for NRLDC to issue charging code in case the information was not furnished 15 days in advanced and telemetry is tested at least 3 days before the first time charging. NRLDC requested all the constituents to ensure Zero bus-sum at least at 400 kV and 220 kV buses.

6.6 Non-availability of redundant communication channel

NRLDC requested all the constituents to ensure availability of redundant channel for all the stations to ensure reliable telemetry. NRLDC informed that 11 stations were integrated at NRLDC with single channel and alternate channel of 18 nos direct reporting stations were not working leading non-reliable data availability at NRLDC. NRLDC requested POWERGRID to look into the matter so that all the channel provided are made operational. The details are attached at Annex- VII.

6.7 Telemetry over GPRS system

NRLDC also informed that around 21 nos RTUs were on GPRS system with GPRS system being used either as stand-by channel or as main channel. It was observed that the GPRS system was not a very reliable system and should be used only as interim arrangement for SCADA telemetry. This system was implemented as a temporary solution, however, alternate arrangement of communication was not done till date. It was also informed by NRLDC that the hardware installed at NRLDC hangs occasionally. NRPC requested all the members to implement the alternate reliable communication system.

6.8 Communication failure due to non-availability of Auxiliary power supply

The repeated communication failure was reported due to auxiliary power supply failure at Bawana and IP Extension Power house leading to telemetry failure. DTL inform that the schedule for installation of Battery sets was Oct'14.

6.9 Prolonged outage of correct telemetry

NRLDC informed that the telemetry for Ludhiana and Rookee has been restored however, the telemetry of bus data from Gurgaon was yet to be made available to NRLDC. POWERGRID was requested to take necessary action to ensure the data availability from Gurgaon bus.

6.10 Database co-ordination

NRLDC requested all the constituents to incorporate necessary database modification / up gradation for smooth parallel operation of old ALSTOM and new Siemens systems. It was also informed that database development in the Siemens system shall be in decentralized manner and request all the SLDCs to incorporate changes and send to NRLDC the change log so that the data is properly maintained at all the locations. It was also informed that database synchronization shall be tested in the Siemens system after stabilization of the Siemens SCADA.

7.0 NHPC stations telemetry issues

In accordance with decision taken in the 30th NRPC meeting held on 28.02.2014, a meeting was held at NRPC New Delhi on Telemetry issues of NHPC stations and It was agreed by POWERGRID and NHPC would share responsibility of one time restoration of PLCC link for following stations as under:

POWERGRID to restore PLCC at-

1) Dhulasti HEP (2) Salal HEP (3)Uri HEP –I and (4)Chamera –II HEP

a) NHPC to restore PLCC at-SEWA- II HEP (2) Bairasul HEP (3)Tanakpur HEP (4)Dhauliganga HEP

Representative of NHPC informed that telemetry had been restored at Tanakpur HEP through leased line. Further, telemetry was operational for Sewa-II and Bairasiul stations through GPRS and they were in the process of establishing more reliable telemetry to NRLDC from these stations by alternative communication(through lease line) which would be completed by end of Oct 2014.

Representative of POWERGRID informed that one time restoration of telemetry at three NHPC stations namely Dhulasti, Chamera-II and URI-I had been completed. However, representative of NHPC stated that telemetry from Chamera-III was not functional on PLCC and from Dulhasti & Uri was not reliable.

Representatives of NHPC stated that permanent solution for reliable telemetry was only through OPGW connectivity and requested POWERGRID to complete the work of installation of OPGW for NHPC stations on top priority.

Representative of POWERGRID stated that progress of installing OPGW gets hampered due to several constraints but assured that connectivity for NHPC stations would be completed by March 2015.

8.0 Signing of AMC Contract

BBMB intimated that the original copy of the main & supplementary agreement had been given by POWERGRID, however the supplementary agreement was not as per the approved format. POWERGRID agreed to provide the supplementary agreement as per the approved format within a week.

9.0 Starting the Parallel Operation of new SCADA/EMS System to dispense the old system before the expiry of its AMC

Constituents pointed out that there were various deficiencies in the SCADA System installed by M/s SIEMENS, which needed to be corrected by them before the parallel operation. POWERGRID and NRLDC intimated that the AMC of existing SCADA/EMS System would expire on 30th Sept., 2014 and it would not be possible to extend the AMC of existing system as the installation of new system was nearing completion. Constituents pointed out that the SAT of EMS System was still to be carried out, variances observed during SAT and FAT were yet to be addressed by M/s SIEMENS, various important calculations, displays and reports had not been prepared so far. BBMB proposed that the parallel operation may be started with SCADA functions only to dispense the old system before the expiry of its AMC and M/s SIEMENS be directed to address all pending discrepancies including SAT of EMS during the parallel operation itself. BBMB further opined that the 1000 hrs availability test should be conducted only after all pending issues are addressed and EMS System was made functional at all control centers. After detailed deliberations, it was decided to start the parallel operation with SCADA functions only and POWERGRID was requested to ensure that all pending issues are addressed by M/s SIEMENS before the completion of parallel operation.

10.0 Strengthening of SLDC-NRLDC (UGFO) link of DTL-Path redundancy

Representative of POWERGRID informed that data outage at SLDC of DTL is due to frequent cut in underground optical fibre between IP Power to SLDC, Minto road. ULDC phase-II system was also connected through this link, which affect the system and parallel operation. DTL was requested to take necessary action in this regard.

DTL informed that they had requested POWERGRID to spare fibers(2nos) laid under Fiber Optic project and it would give sufficient redundancy. POWERGRID informed that UGFO is of Telecom and DTL should take up the matter with their telecom department.

11.0 Communication between Main and Back-up Control Centre

The matter regarding establishing the communication between main and backup control centers was discussed in the first meeting of TeST sub-committee wherein it was intimated by POWERGRID that the availability of communication between main and backup control centers including NRLDC Main and backup was expected to be completed by July, 2014.

POWERGRID informed that equipment were under dispatch and communication would be established by Oct'14.

12.0 Balance trainings on SCADA/EMS System

Representative of BBMB stated that the installation of new SCADA/EMS system was nearing completion at almost all the control centers and the system was likely to be put under commercial operation in the month of October. However, training on various important software modules such as SCADA, EMS, HISTORIAN etc. were yet to be provided by M/s SIEMENS. He added that as per the provisions of the contract, M/s SEMENS were to provide a one week dispatchers training, which also needed to be conducted on urgent basis, so that the control room personnel have requisite know how for effective use of new SCADA/EMS system. POWERGRID agreed to arrange the dispatchers training on priority during the month of September and to expedite other pending trainings under the project.

13.0 Increase of bandwidth of Video Conferencing System supplied by M/s SIEMENS under ULDC Phase – II

Representative of BBMB requested POWERGRID to increase the bandwidth of their video conferencing system from 2 Mbps to 3 Mbps as per decision taken in the first meeting of TeST subcommittee. POWERGRID confirmed that they had already advised their telecom department for the same.

14.0 Replacement of 48 V DC Battery Bank at Pong

The matter regarding replacement of defective 48 V DC battery bank had been taken up by BBMB with POWERGRID many a times. POWERGRID vide office Ref: NR/ULDC/Up gradation – EMS/SCADA/06 dated 28.03.2014 had informed that necessary action for supply & installation of 48 V DC Battery Bank at Pong Power House had been initiated, but till that date the replacement was pending. POWERGRID informed that they had supplied and installed one no 48V battery bank & DC Charger at Pong. However, for 48V Dc supply for RTU, DCPS was to be arranged by BBMB.

15.0 Commissioning of OLTC Transducers & Weather Sensors at various Substations / Power Houses of BBMB

OLTC Transducers had not been commissioned at any of the Sub-Stations / Power Houses of BBMB, as the OLTC Transducers supplied by M/s Siemens werenot compatible with the Resistance output of OLTC sensors installed on the transformers. Also Weather Sensors had yet not been commissioned at the Sub-stations / Power Houses of BBMB. POWERGRID informed that they would depute engineer from SIEMENS and OLTC transducer supplied by RISHABH at one of the substation for resolution of issue. Once modification required is freezed same would be implemented at other sites.

16. Commissioning of GANGUWAL RTU

Representative of BBMB informed that the analog / digital data of Ganguwal Power House was not appearing at the Control Centre. M/s Siemens should be requested to supply the requisite cables so that the commissioning of Ganguwal Power House is fully accomplished. POWERGRID informed that they had already advised SIEMENS to supply 70C cable at Ganguwal.

17.0 Replacement of battery Banks by DTL

This agenda item is already covered under 2.1.5 a.

18.0 RTU related issues

18.1 Procurement of new RTUs:

SE(O), NRPC informed that a letter dated 1st July 2014 to all TCC members and Managing Directors of STUs was issued by NRPC regarding specifications and procurement of new RTUS in line with new SIEMENS system. All members agreed to adopt the specification requirement as mentioned in NRPC website while placing orders for new RTUs requirement

18.2 RTUs Database

Representative of POWERGRID informed that new RTU Database incorporation would be done in the SIEMENS system during parallel operation. It was proposed to continue the Project work and parallel operation without changing existing RTU database. Any update would be incremental without disturbing existing database shared and checked in Siemens system. Members noted this information from POWERGRID

18.3 RTU Integration

Representative of POWERGRID informed that all RTUs at present were directly reporting to Existing SCADA system working as Master and connected through Y cable to new SCADA system, out of these RTUs some were continuously hanging in old system due to terminal server issue. These RTUs were required to be connected to new SCADA terminal server. Members noted this information from POWERGRID.

19.0 OPGW Communication links priorities of PSTCL

Representative of PSTCL requested that following PSTCL lines be taken on priority list in the OPGW installation plan:

a) 220kV Moga- Muktsar line with LILO at 220kV Bajakhana
b) LILO of220kV Muktsar- Bajakhana line at 220kV Sandhwan
c) LILO of220kV Rajpura- Mohali line at 220kV Banur

Representative of PSTCL also requested POWERGRID to intimate schedule of completion of Replacement of additional 210 kms of Earth wire with OPGW (alongwith some modifications) for following lines which are also on priority list .

a) Goindwal Sahib TPS- 220kV Sultanpur- 220kV Jamsher line
b) **400kV Makhu-220kV Rashiana line**

Representative of POWERGRID assured that requirement of PSTCL would be included in state sector expansion project.

20.0 OPGW CONNECTIVITY TO PTCUL

PTCUL had submitted request for OPGW connectivity from 220 KV Rishikesh s/s to 132 KV Majra s/s at Dehradun by POWERGRID to facilitate integration of SLDC Dehradun to NRLDC New Delhi on OPGW. OPGW connectivity was already provided by POWERGRID to 220 KV Rishikesh. POWERGRID advised PTCUL to put up the agenda for approval in NRPC. Meanwhile PTCUL should arrange leased line for connectivity with NRLDC.

21.0 Signing of MOU for maintenance of OPGW

MoU for AMC contracts for Wide Band and OPGW maintenance had been sent to Constituents long back. However, MoUs were yet to be signed by BBMB, PSTCL,PTCUL, DTL, PDD for OPGW and PSTCL, DTL, UPPTCL, PTCUL, HPSEB, for wideband. SE(O),NRPC requested all constituents to expedite signing of MOUs so that AMC work is not hampered..

22. Running of State Estimator

(i) Furnishing of load data

RLDC informed that Siemens had started tuning of power application software packages based on the site conditions and started entering the model parameters required for the power application packages. The typical power flow pattern in the 765/400, 400/200 & 220/132 kV transformer needed to furnished for different seasons for network parameterization as the model network contains 220 kV network and above. NRLDC had already furnished the details except 220/132 kV transformers which may be furnished as the earliest.

(ii) Uniform sign convention across Northern Regional SCADA

NRLDC informed that Uniform sign conversion needs to be implemented in the SCADA system for proper operation of the State Estimator. The sign convention to be followed had already been specified in the SCADA/EMS technical specification which was needs to be followed. It is observed that in some of the ICTs at 220 / 132 kV level where telemetry from primary and secondary is available are having same sign in SCADA which needs to be changed accordingly to SCADA sign convention. Necessary calculation also needs to be changed in case these are taken into calculation of drawal. NRLDC requested all the constituents to check the sign convention of the telemetry as per the validation rule and incorporate the changed with an intimation to NLRDC.

(iii) Validation of SCADA data

NRLDC informed that Regional network model was under preparation by Siemens with 220 kV and above network as mentioned in the technical specification. However, it was observed that many stations active & reactive power bus sum was not achieved either due to non-telemetry, scaling error and sign error as indicated above. All constituents were requested to assign top priority in data validation to ensure bus sum to be zero otherwise it may not be possible to a validated state estimator output and hence it may not be possible to run any power application link contingency and Optimum power flow and other study mode applications

SE(O), NRPC requested NRLDC to write a letter separately to all the constituents indicating the requirement so that priority is given to these activities as it relates to the commissioning of the new SCADA project.

23. Regarding Planning, monitoring and maintenance of telecommunications system for data and speech

PSTCL informed that to cover all the remaining 132/220 kV sub-stations an action plan was prepared and replacement of another 1197 kms of earth wire with OPGW along with allied Termination Equipment was approved by BOD and entrusted to POWERGRID in July 2013 under OPGW expansion project. POWERGRID was requested to intimate current status. POWERGRID informed that they would revert back to PSTCL on the issue after verifying list of lines on which OPGW is covered under state portion.

24.0 Urgent Requirement of OPGW for reliable operation of Delhi Islanding Scheme

In the first meeting of TeST sub-committee held on 17.04.2014, it was agreed that 107 Kms of OPGW will be provided by POWERGRID to Delhi Transco Limited. In the meantime POWERGRID had transferred 37 Kms of OPGW out of which about 8 Kms had been installed over 220kV Maharani Bagh-Gazipur Transmission Line. The work was carried out through POWERGRID's existing contractor. Representative of POWERGRID informed that due to very high number of tension towers in DTL lines, commensurate hardware is not available. However, requirement can be met if NHPC agrees to give up any of their line for said work. Representative of NHPC stated that there is no objection from NHPC side for temporary diversion of hardware provided completion of all NHPC OPGW works by March 2015 is ensured.

25.0 Telemetry System of Tehri HEP

Representative of THDC informed that there is regular monitoring of the Station data at Tehri RTU which is always available. But due to equipment/transmission faults between KPS (Koteshwar Pooling Station) to Meerut/CPCC end, it was suspected that correct information was not reaching NRLDC Control Room and THDCIL had been wrongly held responsible for the intermittency in the report prepared by NRLDC. . As per the affidavit filed by NLDC on dated 30th June-14, in the matter of petition no. SM/007/2013, they had furnished the progress of implementation of Telemetry system for Tehri HEP with 29% intermittency (updated till 18.06.14 showing as 50%). Representative of THDC stated that they had intimated POWERGRID station at Koteshwar station time to time to sort out the PLCC

problems as it was routed through Koteshwar Pooling Station and often rectified at POWERGRID end by the concerned Engineers. An alternate arrangement was provided by installing GPRS Modem at Tehri RTU in July-13. However, it has been found that in case of failure of PLCC link the data transmission to NRLDC does not automatically switch-over to GPRS (stand-by), and on several occasions on noticing it, NRLDC (SCADA) team had been requested for manual Polling on GPRS. This generates a gap (intermittency) in data transmission. He stated that the automatic switching scheme to GPRS transmission at NRLDC end needed to be corrected/rectified by POWERGRID/NRLDC so that intermittency is avoided.

After discussion of this issue in detail and it was observed that main cause of intermittency of data was transmission of the data through the GPRS system. NRLDC requested THDC to restore the PLCC at the earliest to improve the reliable data availability at NRLDC. THDC and NRLDC requested POWERGRID to integrate Tehri over FO backbone network, which is more reliable than PLCC. POWERGRID informed that they were trying their level best to complete the FO installation activity and it was expected that Tehri will be in FO backbone network within four months time.

Additional Agenda

AA1. Incorrect schedule versus actual drawl shown on the website in respect of Chandigarh

UT Chandigarh had informed that they do not have any online SCADA system or SLDC and it was only dependent on the online data provided on NRLDC website. It had been observed that incorrect online data was being shown on the website and it appears that some RTUs are not working.

NRLDC informed that telemetry failure is leading to the non-updation / wrong data of Chandigarh drawal and reliable data telemetry needs to be ensured for correct drawal calculation at NRLDC SCADA. NRLDC requested UT-Chandigarh to inform NRLDC as when wrong drawal is displayed on NRLDC website. So that the necessary corrective action could be taken. No representative of Chandigarh was present in the meeting.

AA2. OPGW connectivity to NHPC stations

In the 28th TCC and 31st NRPC meeting held on 23-24th July 2014, POWERGRID had agreed to complete OPGW connectivity to NHPC stations as per priority basis.

NHPC had already submitted a priority list of Transmission circuits and/power stations to POWERGRID.

NHPC had suggested that since their power stations in J&K, except salal, witness heavy snowfall during Dec-Feb period, working season for these power stations was limited and hence these power stations should be taken up on top priority for OPGW connectivity .

POWERGRID agreed to inform the priority schedule for each NHPC power station for OPGW connectivity to complete NHPC works by March 2015

AA3. Intermittency of telemetry from Koteswar HEP

Intermittency of telemetry in respect of Koteshwar HEP was reported and it was placed on record that GPRS system had been installed at Koteshwar end for communicating the plant data to NRLDC on the real time basis. NRLDC informed that presently there is no maintenance contract (AMC) for the GPRS system installed at NRLDC. POWERGRID agreed to arrange AMC contract of the GPRS system installed at NRLDC.

It was clarified again by NRLDC that the GPRS system was accepted only as a temporary communication and alternate communication needs to be established for reliable data telemetry. NRLDC requested THDC to make necessary arrangement for reliable communication as reliability may not be available with GPRS system being in operation.

Annex-I

List of participants for 2nd Telecommunication, SCADA and Telemetry sub-committee meeting at NRPC New Delhi

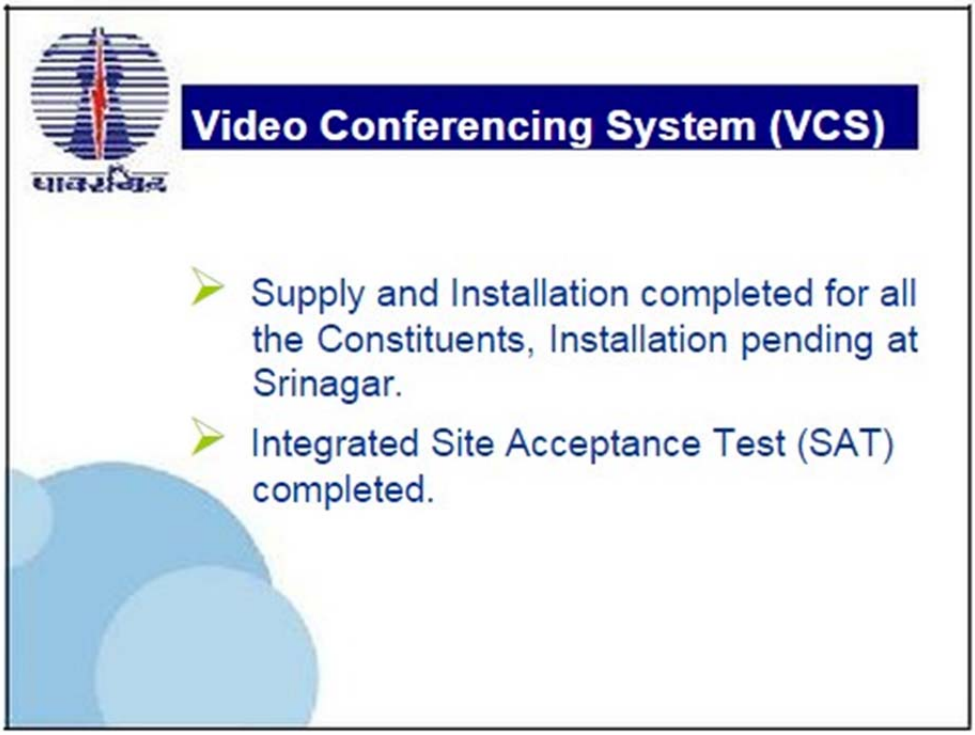
Organization	Shri/sh	**DISIGNATION**	Contact Number	Email ID
NRPC	Sh. P.S. Mhaske Sh. Ajay Talegaonkar . Sh. K.N.M Rao	Member Secretary SE(O) CM		Ms-nrpc@nic.in Seo-nrpc@nic.in knmrao2003@yahoo.com
POWERGRID	Sh. V.K. Gupta Sh. A S Kushwaha Sh H H Saran Sh. Y.K. Dixit Sh. Sunil Kumar Sh. Rajiv Sudan Sh. Ansul Verma	GM(ULDC) GM (LD&C) AGM(LD&C) AGM(ULDC) Ch.Mgr DGM Dy.Mgr	9873549011 9873549012 9873549014 9811309921 9910045812 9419213490 9650033367	vkgupta@powergridindia.com askushwaha@powergridindia.com sharan@powergridindia.com ykdixit@yahoo.com sunilkumar@powergridindia.com sudanrajiv@gmail.com ansul.avj@gmail.com
NRLDC	Sh. Awadesh Mani Sh. Debashish De Gitanjali Sharma Sh.S P Singh	GM(NRLDC) DGM(NRLDC) Dy.Mgr Dy.Mgr	9873088797 9560665333 9910953644 9910953650	amanipg@gmail.com de.debasis@gmail.com gitanjali.nrldc@gmail.com palktosurendra@gmail.com
PSTCL	Sh. G.S. Sodhi (CE) Sh. Anil Kaplush Sh. R.K. Sharma S B S Slingla	CE(SLDC) CE CE SE(SLDC)	9646118001 9646117802 9846118202 9646118024	ce.sldc@pstcl.org anil_kaps@yahoo.co.in ce.pm@pstcl.org bssinglapatiala@yahoo.com
UPTCL	. Md. A. Alam . Sh. G M Agrawal Sh.A K Varma	EE(ULDC) SDO AE(ULDC)	8004921057 9412783907 9415311813	uldclko@gmail.com gmagrawal99@yahoo.in akverma.kl@gmail.com
DTL	Sh.Prem Prakash Sh. P K Gupta Sh. S K Sharma Sh. Dinesh singh Sh. A K Gahlout	GM(O&M) i GM SLDC) DGM(SLDC) Manager(T)com Manager(SLDC)	9999533630 9999533626 9999533640 9999533680 9999533954	premnimbekar@gmail.com psdpvr2012@gmail.com dineshsinghdtl@gmail.com ak.gahlaut@dtl.gov.in
JAJJAR POWER	Sh Rajib Mohanty Sh Manoj Kumar	Manager Dy.Mgr	8198900923 9996789264	Rajib.mohanty@clpindia.com manojkumar@clpindia.com
HVPNL	Sh. Sunil Sethi Sh. R.K. Kaushik	SE EE	9315016201 9315016209	sesldc@gmail.com xen.hvpn@gmail.com

HPPTCL	Sh. S.S. Dehal	CE	9418472054	gmproj.hpptcl@gmail.com
THDCIL	Sh. Neeraj Verma Sh. Rajesh kumar Sh.Rakesh Singh Sanjay Rawat	DGM Sr.Manager(E) Dy Mgr Tehri Dy.Mgr(OMS) Rishikesh	9997999111 9997994053 8171000347 9997190385	nvermathdc@gmail.com rajesh.arzore@yahoo.com rakeshpanwar200@gmail.com srthdc@gmail.com
RRVPNL	Sh. P.C. Trivedi	Dy.CE	9414061387	pctrivedi2@yahoo.com
JAYPEE	Sh. Anil Kumar	Addl. CE	8860870743	amit.jauhari@jalindia.co.in
BBMB	Sh. S DILBAGI Sh. Naveen Gupta	Addl.SE(SLDC) Addl.SE	7589301645 7589301631	sdilbagoi@hotmail.com nkg.chd@gmail.com
HPSEB	Sh. N.P. Gupta	Addl. SE(SCADA)	9418316465	npgupta_sldc@yahoo.co.in
IPPGN	Sh. M. Shukla	GM(T) protection	9717698228	mshukla.ipgpp@nic.in
SJVNL	Sh. Rajeev Agarwal	Dy.Mgr(C &SO)	9418045426	rajiv_ssjvnl@rediffmail.com
PITCUL	Sh.Hare RAM	AE	8006128707	hare_ram@pitcul.org
NTPC	Sh. B.L.YADAV	AGM(OS)	9650993044	blyadav@ntpc.co.in
APCPL	Sh. N N Sada sivan	AGM	9650990848	nnsadasivan@gmail.com
NHPC	Sh. Janardhan Choudhary Sh. S K Mishra	GM (O&M) Manager(E)	9958819003 9910103478	jchoudhary@nhpc.nic.in skm.nhpc@yahoo.com

Annexure - II

Presentation of SCADA project status By POWERGRID

(circulated to all participants through e-mail)



Video Projection System (VPS)

Sr no	Location Name	Supply	Installation	SAT Status	Remarks
1	HPSEBL	Yes	Completed	Completed	
2	BBMB	Yes			
3	PSTCL	Yes	Completed	Completed	
4	HVPNL	Yes	Completed	Completed	
5	RRVPNL	Yes	Completed	Completed	
6	DTL	Yes	Completed	Completed	
7	NRLDC- Main	Yes	Completed	Completed	
8	Backup NRLDC	Yes	Completed	Completed	
9	UPPTCL	Yes	Completed	Pending	Supply Pending due to non readiness of site
10	J&K (Jammu)	Pending	Pending	Pending	Material shall be dispatched on 20.08.2014
11	J&K (Srinagar)	Yes	Completed	Pending	Installation Completed, SAT Pending

UPS

Sr No	Location	Supply	Installation	SAT	Remarks
1	NRLDC	Completed	Completed	Completed	
2	DTL	Completed	Completed	Completed	
3	UPPTCL	Completed	Completed	Completed	
4	HPSEBL	Completed	Completed	Completed	
5	PSTCL	Completed	Completed	Pending	On request of PSTCL, M/s Siemens is supplying Breakers
6	RRVPNL	Completed	Completed	Pending	SAT started on 12.08.2014
7	Modipuram	Completed	Completed	Pending	Could not POWERED ON due to non availability of A/C in Battery room
8	Jammu	Completed	Pending		M/s Siemens to supply cables by 20.08.2014
9	Srinagar	Completed	Pending		
10	Kolkata	Completed	Pending		Civil work under progress by ERLDC

DG set

- Material delivered for all sites
- Jaipur, DTL installation shall be starting from 19.08.2014
- DG Set foundation yet to be completed at Lucknow, Modipuram, Jammu and Srinagar

SCADA SAT Status

Sr.No	Location Name	Status	Parallel Operation	Remarks
1	HPSEBL	Completed	07.08.14	
2	BBMB	Completed	11.08.14	
3	PSTCL	Completed		
4	HVPNL	Completed		Web Server pending due to additional requirement
5	RRVPNL	Completed		Signature pending on Hardware verification Report
6	DTL	Completed	11.08.14	
7	NRLDC	Completed	11.08.14	
8	UPPTCL	Pending		SAT under progress
9	J&K	Pending		SAT under progress

Furniture

Sr. no	Location	Supply	Installation	Remarks
1	NRLDC	Yes	Completed	
2	DTL	Yes		
3	HVPNL	Yes	Completed	
4	PSTCL	Yes	Completed	1 E shape could not be installed due to space constraint
5	BBMB	Yes	Completed	
7	HPSEBL	Yes	Completed	
6	RRVPNL	Yes	Completed	
8	Jammu	Yes	Pending	Team will visit on 19.08.2014
9	Modipuram	Yes	Completed	
10	Srinagar	Yes	Pending	Team will visit on 20.08.2014
11	UPPTCL	Yes	Pending	Material delivered at existing Control Room i.e. Shakti Bhawan

RTU Integration

Sr no	Location	Total RTUs	Reporting in Alstom	Reporting in Siemens	Remarks
1	NRLDC	102	93	93	
2	DTL	39	33	30	Okhla, Dwaraka-I & Subzi mandi not reporting
3	HVPNL	56	41	41	
4	BBMB	21	21	21	
5	PSTCL	76	56	54	Mukerain 400 (C_DAC) and Pakwal not reporting
6	HPSEBL	23	23	23	
7	RRVPNL	118	96	47	27 not reporting due to cable disconnected for Honeywell RTU, 14 Nos old SINAUT RTUs are being replaced by Honeywell new RTU by RRVPNL, 8 Nos RTUs are being modelled by M/s siemens
8	UPPTCL	117	87	77	6 Nos at Modipuram , 2nos at Varanasi , 1 No (Local) at Lucknow, 1 No. at Moradabad
9	J&K	9	3	3	

RTU Installation

Supply:

- Materials Supplied for BBMB, PSTCL, HPSEBL & J&K PDD (78 out of 80 nos)

Installation Status:

- BBMB Completed except MISS Ganguwal DI points
- J&K PDD: 3 Nos completed (Additional requirement of D/O, I/O points including 33kV level & LDMS for each S/S)
- HPSEBL: Installation under progress and to be completed by 15.09.14
- PSTCL: Installation under progress and to be completed by 15.09.14

Training Schedule

Modules	Duration	Schedule
Dispatcher	1 week	8th to 12th Sept' 2014 at NRLDC
Cyber Security	2 Days	15th and 16th Sept' 14 at NRLDC
Auxiliary Power Supply (UPS)	3 Days	17th to 19th Sept' 14 at NRLDC
Application Software, ISR and DTS	6 Weeks	Schedule to be discussed with constituents
Computer System Software & Hardware	1 Week	
Aux. Power Supply (DG Set)	2 days	

Issues

- **Working on Saturday/Sunday**

  During the 1st meeting of TeST on 17th April'14, it was decided that all the constituents should permit to work at SLDCs during Saturday/Sunday/Holiday. However, some of the constituents have not allowed to work and nobody is available for witness of SAT during Sat/Sunday/Holiday.

- **Parallel Operation of SCADA Start from 19.08.2014**

  Parallel Operation have started at HPSEBL, BBMB, NRLDC & DTL. PSTCL, RRVPNL and UPPTCL should ensure commencement of Parallel Operation before 19.08.2014

- **RTU Integration**

  Presently all RTUs are directly reporting to Existing SCADA system working as Master and connected through Y cable to new SCADA system. Out of these RTUs some are continuously hanging in old SCADA system of M/s Alstom due to terminal server issue. These RTUs required to be connected to new SCADA terminal server as Master.

Issues

- **DG set Foundation**

  It was decided during 1st TeST meeting on 17th April'14 that all civil work including DG set foundation work shall be completed by end of May'14. However, till date UPPTCL & J&K PDD yet to complete.

- **Air Conditioner**

  To maintain the temperature in Server room / Battery room, air conditioner should be required. Auto shutdown

  temperature.

Annex – III

Subject: Operational Guidelines to be followed during Parallel Operation of New and Existing SCADA Systems.

The new SIEMENS make SCADA system has been commissioned at BBMB SLDC and all other SLDCs and NRLDC under the ULDC Phase – 2 Project. The new system has been installed in parallel with the existing ALSTOM make system, without affecting the operation of the existing system. At present both the systems are operating in parallel, however the real time operations at all control centres are being carried out on the old system. As per the provisions of the contract, the old and new systems shall be operated in parallel for **minimum three months** before shifting the real time operations to the new system. During the parallel operation efforts shall be made to bring the new SIEMENS System at par with the existing ALSTOM System so that the operations can be shifted with minimal disturbance. The additional features and functionalities available in the SIEMENS System shall be gradually introduced in the real time operations after the completion of parallel operation. The broad purpose and procedure to be followed during the Parallel Operation is summarized as under:

1. Purpose of Parallel Operation

- To make the control room staff familiar with the new SCADA system features.
- To facilitate smooth transition of real time operations from old system to new system.
- To fine-tune the new SCADA System and expeditiously weed out any teething problems faced during parallel operation.
- To stabilize the new system for continuous operations in control room conditions before dismantling the old system.

2. Guidelines during Parallel Operation:

During the first 15 days of the first month of parallel operation, the existing ALSTOM system will be running under normal operating conditions with regular day to day dispatching functions being performed by the users on ALSTOM system. The users shall be provided access to the SIEMENS System in parallel with the existing system. The description of functions to be made operational on the SIEMENS System and respective roles of the System Operation Engineers, Maintenance

Engineers and SIEMENS Engineers in successful running and fine-tuning these functions is as under:

Sr. No.	System Function	Roles		
		Operation	**Maintenance**	**SIEMENS**
1.	Monitoring of RTU signals from Existing and New RTU's	To check the correctness of RTU data being received on new system & report any discrepancy to the Maintenance Engineers.	To debug the problem and get it resolved from the respective vendor or M/s SIEMENS as defined in the approved procedure.	To rectify the problems as reported by Maintenance engineers at respective sites as per the approved procedure.
2.	ICCP Data Exchange between NRLDC and respective constituent.	To observe the availability of data of other constituents on new system and report any failures.	- do -	- do -
3.	Report Generation.	To generate & compare the reports on old & new systems and report any discrepancies.	- do -	- do -
4.	Manual Update of Non-Telemetered signals	To manually update the non-telemetered data in the new SCADA System and report any problems faced in this regard.	- do -	- do -
5.	Graphical and Tabular Trending	To observe the graphical and tabular trends and report any discrepancies observed in this regard.	- do -	- do -
6.	Data Historian	To be able to retrieve and historical data and report any problems faced in this regard.	- do -	- do -
7.	Web Applications (Remote Consoles)	To be able to see the real time data through Remote Consoles any report and problems/ interruptions in data availability.	- do -	- do -
8.	Alarm Management	To verify the alarms on old and new systems and report any problems.	- do -	- do -

9.	Database and Display creation (Upon intimation to Siemens before doing IMM activities)	To check the correctness of single line diagrams, network topology and real time data on new SCADA System and report any discrepancies observed in this regard.	- do -	- do -

The new SCADA System shall be closely monitored by control room engineers, load dispatch engineers as well as by SIEMENS engineers as per their respective roles. In case any discrepancy in database or display or functions is identified, the same will be rectified expeditiously as per the procedure defined in the approved document. However, if any modification requires system failover, then the modifications will either be postponed or if Constituent/NRLDC agrees that the modification is necessary and the failover will not be considered for calculation of parallel operation time, then these modifications will be implemented immediately. All out efforts shall be made to weed out any teething problems and fine tune the SIEMENS System during the first 15 days of first month.

3. During the next one month of parallel operation (starting from 16th day of first month to 15th day of next month), the existing ALSTOM system will be running under normal operating conditions, but the regular day to day dispatching functions shall be shifted to new SIEMENS System progressively. In case of any major bottleneck, fallback to the old system shall always be available. The displays on Video Projection System shall be shifted to new SIEMENS System, however the operator consoles of both SIEMENS and ALSTOM Systems shall be available to the user. During this period all the reports shall be prepared by Operation Staff on both the systems and comparison shall be made for any discrepancies. Any discrepancies in the database, displays or reports of new SIEMENS System shall be rectified immediately. Efforts shall be made to stabilize the SIEMENS System for continuous operation during this period. All efforts shall be made to complete this exercise before 30th September, 2014 i.e, before the expiry of AMC Contract of ALSTOM system.

4. During the second half of second month of parallel operation all the existing RTUs reporting to ALSTOM System and integrated to SIEMENS System in listen mode shall be gradually shifted to SIEMENS System in master mode. It may be pertinent to note that once an RTU is shifted to SIEMENS System, its data shall not be available on the ALSTOM system. It is therefore imperative that before starting this exercise, all the displays and reports etc., be cross verified. Efforts shall be made to complete this work within 15 days.

5. During the third month of parallel operation, the performance of SIEMENS System in master mode shall be observed and the system shall be stabilized for continuous operation in control room conditions.

Thus by the end of third month of parallel operation, all real time operations shall be shifted to new SIEMENS System and old ALSTOM system shall be ready to be dismantled.

ANNEXURE IV

Ethernet Channel Plan for NR-Communication System

Channel Planning Requirements for Proposed NR N/W under Master Communication Plan

Central Sector					
Service Name	**Service Type**	**Service details**	**Description of Links**	**Bandwidth**	**Remarks**
N1	Point to Point	Communication of NRLDC Main to NRLDC Backup	NRLDC Main (Router-1) - NRLDC Backup (Router-1)	100 Mbps	NRLDC Main - New Dlehi NRLDC Backup - Kolkata
N2	Point to Point		NRLDC Main (Router-2) - NRLDC Backup (Router-2)	100 Mbps	
N3	VLAN	Communication of Terminal Servers to NRLDC	**Terminal Servers (Main) - NRLDC (Main) - NRLDC** (Backup)	2 Mbps	**Terminal Server : Dadri** Terminal Server : Ballabhgarh
N4	VLAN		Terminal Servers (Backup) - NRLDC	2 Mbps	Terminal Server : Dadri Terminal Server : Ballabhgarh
N5	VLAN	Communication of NRLDC to SLDCs	NRLDC Router 1 - SLDCs Router1	10 Mbps	List of SLDCs/RLDCs Locations is attached
N6	VLAN		NRLDC Router 2 - SLDCs Router2	10 Mbps	
N7	**VLAN**	Video Conferencing between NLDC, NRLDC & SLDCs	**Vid**eo **C**on**f**erenci**n**g	**10 Mb**ps	**Li**st o**f Vid**eo **C**on**f**erenci**n**g **L**ocat**i**ons **i**s attac**h**e**d**
N8	VLAN	VOIP Communication between NRLDC PABX to all NR Wideband Locations (through VoIP Gateway)	VOIP Communication	4 Mbps	List of Wideband Locations (VoIP Gateway Locations) is attached
N9	VLAN	Communication of PMU with RLDC PDC main/backup	.PMU(CS) - RLDC PDC Main	10 Mbps	List of PMU locations is attached
N10	VLAN		PMU(CS) - RLDC PDC Backup	10 Mbps	
N11	VLAN	Communication of RLDC PDC main with RLDC PDC backup and SLDC PDC main with SLDC PDC backup	RLDC PDC Main-RLDC PDC backup	100 Mbps	
N12	VLAN		SLDC PDC main-SLDC PDC backup	100 Mbps	
UPPTCL					
Service Name	**Service Type**	**Service details**	**Description of Links**	**Bandwidth**	**Remarks**
N1	Point to Point	Communication of SLDC Main to SLDC Backup	SLDC Main (Router-1) - SLDC Backup (Router-1)	100 Mbps	SLDC Main: Lucknow SLDC Backup: Modipuram
N2	Point to Point		SLDC Main (Router-2) - SLDC Backup (Router-2)	100 Mbps	
N3	VLAN		Terminal Servers (Main) - SLDC (Main) - SLDC (Backup)	2 Mbps	Terminal Server : 1. Varanasi * 2. Sultanur*

N4	VLAN	**Communication of Terminal** Servers to SLDC & Backup SLDC	Terminal Servers (Backup) - SLDC (Main) - SLDC (Backup)	2 Mbps	3. Panki 4. Moradabad* 5. Meerut 6. Lucknow

HVPNL					
Service Name	**Service Type**	**Service details**	**Description of Links**	**Bandwidth**	**Remarks**
N1	Point to Point	Communication of SLDC **Main to SLDC Backup**	SLDC Main (Router-1) - SLDC Backup (Router-1)	100 Mbps	SLDC Main: Panipat **SLDC Backup: Jutogh (HPSEB SLDC)**
N2	Point to Point		SLDC Main (Router-2) - SLDC Backup (Router-2)	100 Mbps	
N3	VLAN	Communication of Terminal **Servers to SLDC & Backup** SLDC	Terminal Servers (Main) - SLDC (Main) - SLDC (Backup)	2 Mbps	Terminal Server : 1. Charkhi Dadri 2. Narwana* **3. Panipat**
N4	VLAN		Terminal Servers (Backup) - SLDC (Main) - SLDC (Backup)	2 Mbps	
HPSEB					
Service Name	**Service Type**	**Service details**	**Description of Links**	**Bandwidth**	**Remarks**
N1	Point to Point	Communication of SLDC Main to SLDC Backup	SLDC Main (Router-1) - SLDC Backup (Router-1)	100 Mbps	SLDC Main: Jutogh SLDC Backup: Panipat (HVPNL SLDC)
N2	Point to Point		SLDC Main (Router-2) - SLDC Backup (Router-2)	100 Mbps	
N3	VLAN	Communication of Terminal Servers to SLDC & Backup SLDC	Terminal Servers (Main) - SLDC (Main) - SLDC (Backup)	2 Mbps	Terminal Server : 1.Jutogh
N4	VLAN		Terminal Servers (Backup) - SLDC (Main) - SLDC (Backup)	2 Mbps	
RVPNL					
Service Name	**Service Type**	**Service details**	**Description of Links**	**Bandwidth**	**Remarks**
N1	Point to Point	Communication of SLDC Main to SLDC Backup	SLDC Main (Router-1) - SLDC Backup (Router-1)	100 Mbps	SLDC Main: Heerapura SLDC Backup: Minto Road (DTL SLDC)
N2	Point to Point		SLDC Main (Router-2) - SLDC Backup (Router-2)	100 Mbps	
N3	VLAN	Communication of Terminal	Terminal Servers (Main) - SLDC (Main) - SLDC (Backup)	2 Mbps	Terminal Server : 1. Kota* 2. Bhilwara*

N4	VLAN	Servers to SLDC & Backup SLDC	Terminal Servers (Backup) - SLDC (Main) - SLDC (Backup)	2 Mbps	3. Ratangarh* 4. Heerapura

DTL					
Service Name	**Service Type**	**Service details**	**Description of Links**	**Bandwidth**	**Remarks**
N1	Point to Point	Communication of SLDC Main to SLDC Backup	SLDC Main (Router-1) - SLDC Backup (Router-1)	100 Mbps	SLDC Main: Minto Road SLDC Backup: Heerapura (RVPNL SLDC)
N2	**Point to** Point		**SLDC Main (Router-2) - SLDC Backup (Router**-2)	**100 Mb**ps	
N3	VLAN	Communication of Terminal **S**ervers **t**o **SLDC & B**ac**k**up SLDC	Terminal Servers (Main) - SLDC (Main) - SLDC (Backup)	2 Mbps	Terminal Server : 1.Minto Road
N4	VLAN		Terminal Servers (Backup) - SLDC (Main) - SLDC (Backup)	2 Mbps	
J&K PED					
Service Name	**Service Type**	**Service details**	**Description of Links**	**Bandwidth**	**Remarks**
N1	Point to **Point**	Communication of SLDC Main to SLDC Backup	SLDC Main (Router-1) - SLDC Backup (Router-**1)**	100 Mbps	SLDC Main: Gladini SLDC Backup: Bemina*
N2	Point to Point		SLDC Main (Router-2) - SLDC Backup (Router-2)	100 Mbps	
N3	VLAN	Communication of Terminal Servers to SLDC & Backup SLDC	Terminal Servers (Main) - SLDC (Main) - SLDC (Backup)	2 Mbps	Terminal Server : 1. Gladini 2. Bemina*
N4	VLAN		Terminal Servers (Backup) - SLDC (Main) - SLDC (Backup)	2 Mbps	

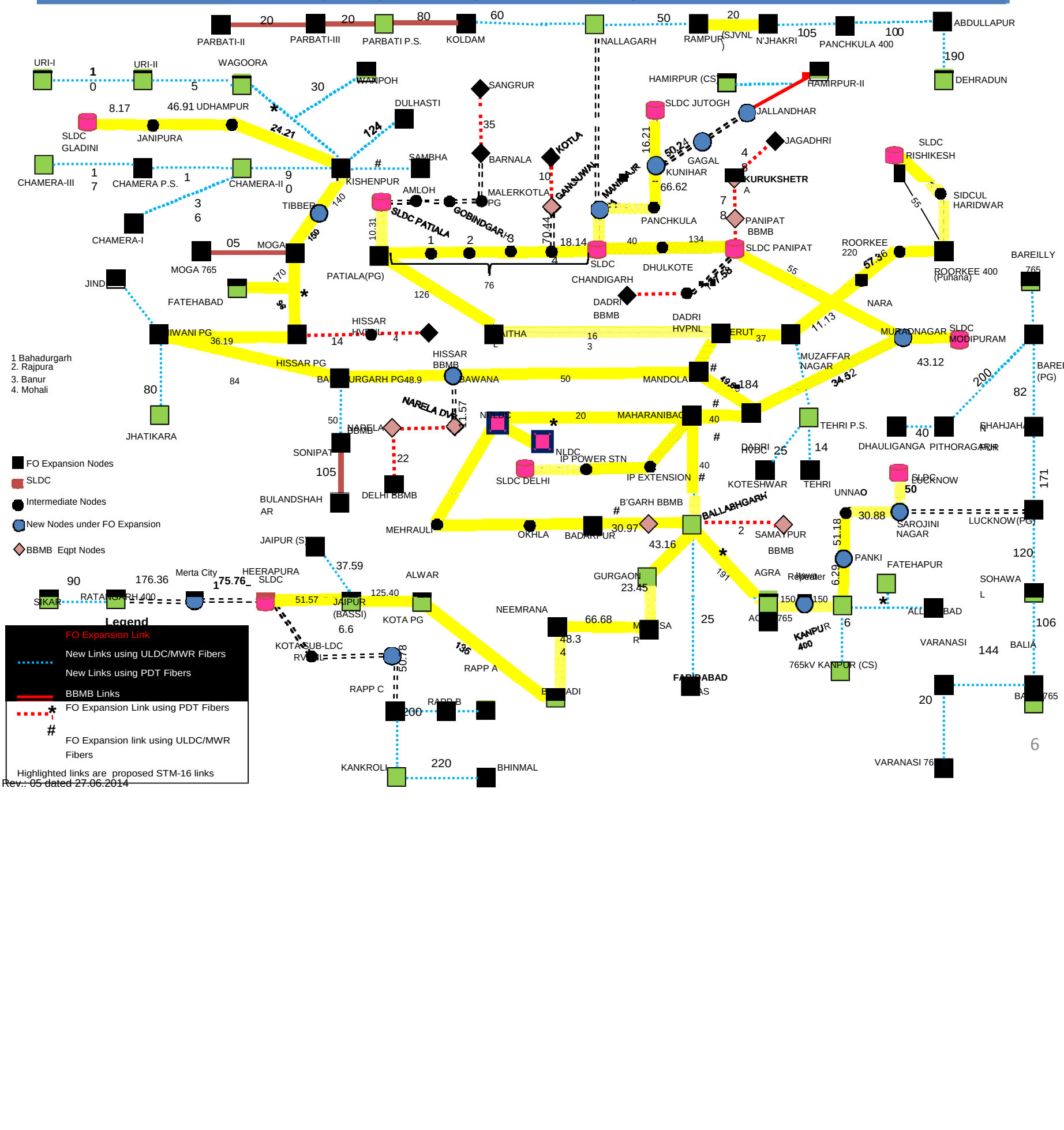
NOTE: * Ethernet connectivity of these locations is being provided separately

List of Locations for Implementation of services

List of SLDC
Patiala SLDC
Chandigarh SLDC
Jaipur SLDC
Delhi SLDC
Panipat SLDC
Shimla SLDC
Lucknow SLDC
Meerut SLDC
Dehradun SLDC
Jammu SLDC
Bemina SLDC
List of Video Conferencing
NLDC VC
Panipat VC
Jaipur VC
Shimla VC
Patiala VC
Delhi VC
Lucknow VC
Dehradun VC
Chandigarh VC
Jammu VC

List of Wideband	
Bhinmal	BAWANA
RAPP A	BHIWADI
RAPP B	BHIWANI PG
Bareilly PG	DADRI HVDC
Shahjahan Pur	FATEHABAD
Kota PG	GURGAON
Allahabad	HEERAPURA SLDC
Fatehpur PG 400	HISSAR PG
Balia	ITAWA(Regenerator)
RAPP C	JAIPUR South
KANKROLI	JAIPUR BASSI
SONEPAT	KAITHAL
SOHWAL	KANPUR 400
LUCKNOW PG	KISHENPUR
Dadri BBMB	KUNIHAR
FATEHPUR	MAHARANI BAGH
PANIPAT BBMB	MANDOLA
AGRA	MANESAR
ALWAR	MANIMAJRA
BADARPUR	**MEERUT**
BAHADUR GARH PG	MOGA
BALLABHGARH PG	MUZAFARNAGAR
BALLABHGARH BBMB	MURADNAGAR 400
NATHPA JHAKARI	SLDC CHANDIGARH
NEEMRANA	SLDC DELHI
NLDC	SLDC GLADINI
NRLDC	SLDC JUTOGH
PANKI	SLDC LUCKNOW
PATIALA PG	SLDC MODIPURAM
RAMPUR	SLDC PANIPAT
ROORKEE 400(PUHANA)	SLDC PATIALA
SAROJINI NAGAR	SLDC RISHIKESH
	TIBBER

Fibre Optic Expansion Project of Northern Region – FO Network



Rev.: 05 dated 27.06.2014

Communication Requirement for SCADA-EMS and PMU

1. **RTU**: RTUs report to Control centre either on IEC 60870-5-104 or IEC 60870-5-101. Most of the existing RTUs is presently reporting on IEC 60870-5-101 protocol to Sub LDC or SLDC on serial port with speed from 300 to 1200baud. Under the new scheme these existing RTUs would be reporting with the same speed serially to DCPC or Terminal Server located at wide band Location.

2. **New RTUs**: The NEW RTUs shall support both IEC 60870-5-101 and IEC 60870-5-104 protocol. If the communication nodes would have Ethernet connectivity to control centre then it would be connected directly to the FEP Router of control **centre on IEC 60870- -104 protocol**. **Since the FEP router has only two Ethernet ports**, **VLAN would have to be provisioned**.

.

3. **Control Centre to Control Centre**: Control centre communication is of two types : i. between SLDC to RLDC/RLDCs to NLDC on **ICCP** protocol **ii**. **B**etween main an**d b**ack**u**p **C**on**t**ro**l** cen**t**re. **Th**e **t**ypi**c**a**l** requi**r**emen**t f**or eac**h** o**f th**e **SLDC**s **t**o **b**o**th** ma**i**n and backup RLDC and similarly from each of the RLDCs to both main and Backup NLDC is minimum 2 Mbps. on ICCP. The typical requirement for communication between main and backup control centre is minimum 100 Mbps.

   At each control centre for both of the above requirements a dedicated router with Ethernet port shall be installed . A redundant VLAN would of sufficient bandwidth of minimum 10 Mbps (depends on the number of control centres X 2 mbps) for ICCP and a dedicated redundant connectivity of 100 Mbps between main and backup control centre would have to be made for meeting the above requirement.

Communication Requirement for SCADA-EMS and PMU – Contd.

4. **Video Conferencing requirement**: Video conferencing system is being installed at SLDCs, RLDC and NLDC. RLDC main should have facility to connect to each SLDC and NLDC main. Similarly, RLDC backup would also require video conferencing with all SLDCs in case of problem with RLDC main. In view of the above requirement a minimum 10 Mbps connectivity on **VLAN would be required for video conferencing system**.

   At each Control centre, a dedicated pair of router with Ethernet ports shall be installed for Video Conferencing.

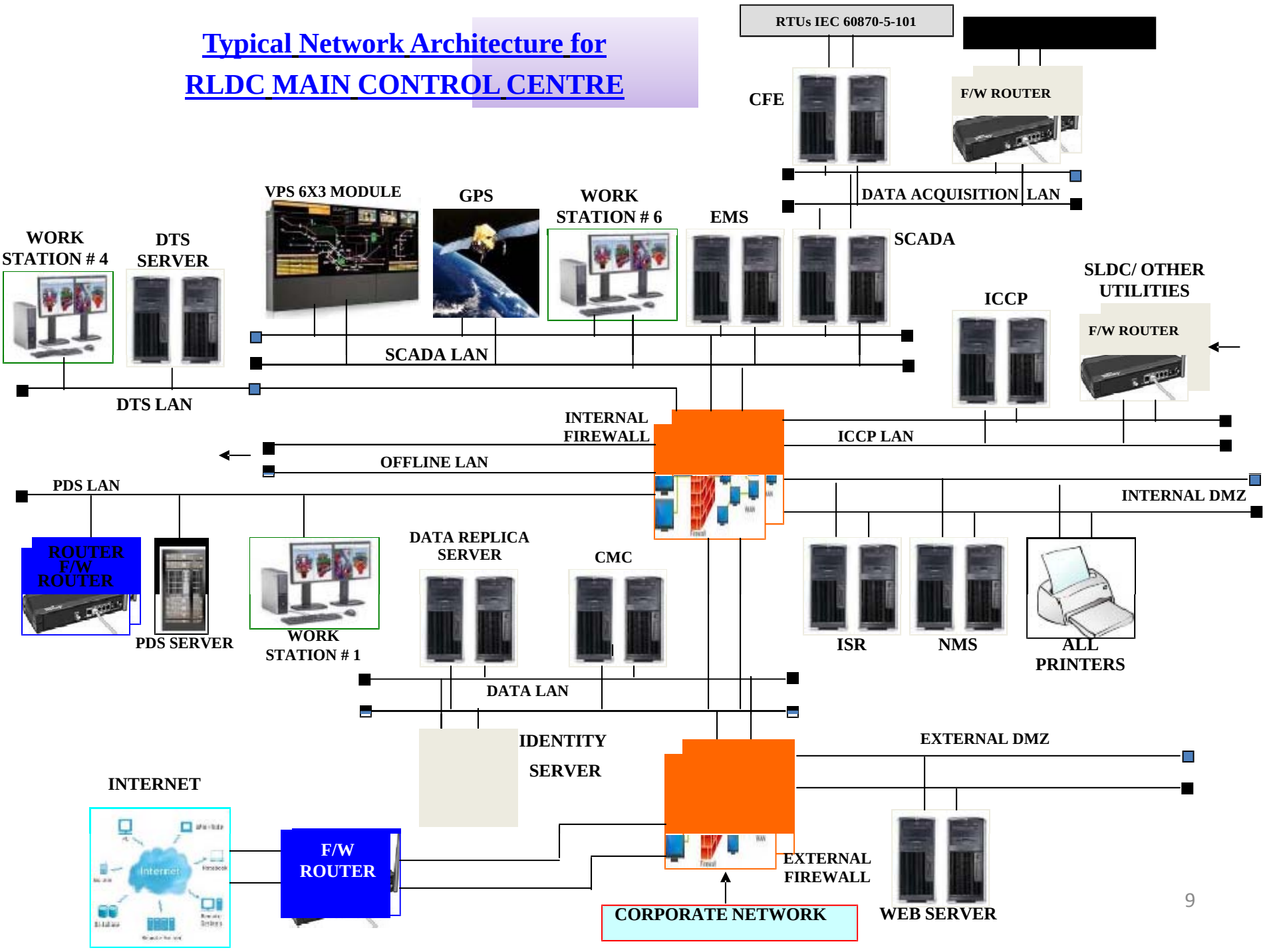
5. **PMU (Phasor Measurement Unit)**: PMU s**h**a**ll** report to PDC **(**P**h**asor Data Concentrator**)** at Contro**l** centres on Et**h**ernet port.

6. Communication of PDCs at Control centres : Communication of PDCs at Control centres is of two types : i. between Master PDCs at SLDC and Super PDC at RLDC ii. Between Super PDC at RLDC and Super PDC at NLDC main and NLDC backup iii. Between Super PDC at NLDC main and Super PDC at NLDC backup. The typical requirement for each of the Master PDC at SLDC to Super PDC at RLDC and similarly from Super PDC at RLDC to both main and Backup NLDC PDC is minimum 2 Mbps. The typical requirement for communication between Super PDCs at main and backup NLDC is minimum 100 Mbps.

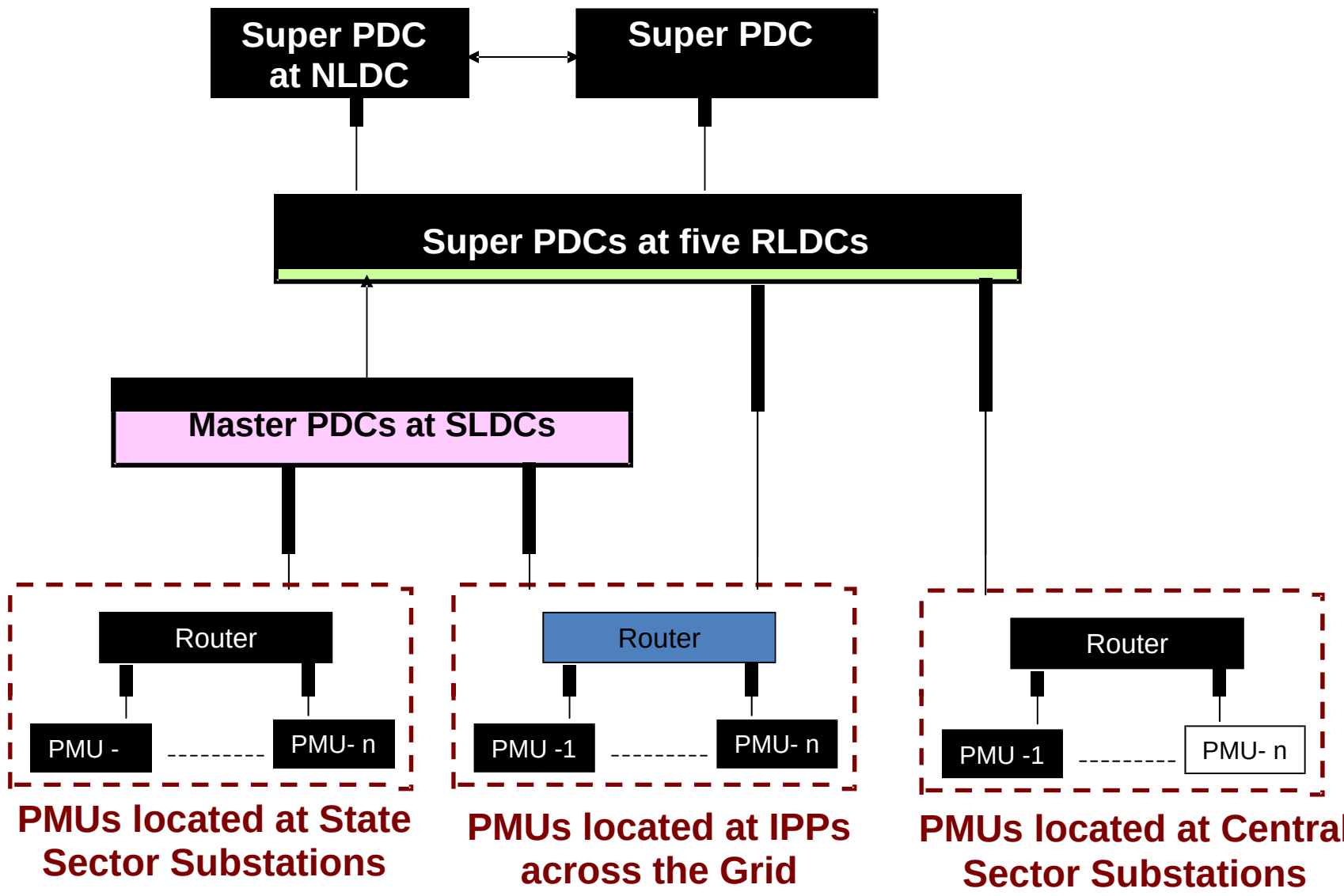
At each control centre for each of the above requirements (PMU & PDC,) a dedicated pair of router with Ethernet port shall be installed . A redundant VLAN of minimum 10 Mbps (depends on the number of control centres X 2 mbps) for Master PDC at SLDC to Super PDC at RLDC /Super PDC at RLDC to Super PDC at NLDC main and backup and a dedicated redundant connectivity of 100 Mbps between PDCs at main and backup NLDC would have to be made for meeting the above requirement.

7. At each Control centre, a dedicated pair of router with Ethernet ports shall be installed for VOIP data.

Typical Network Architecture for RLDC MAIN CONTROL CENTRE



PMU Reporting at PDC

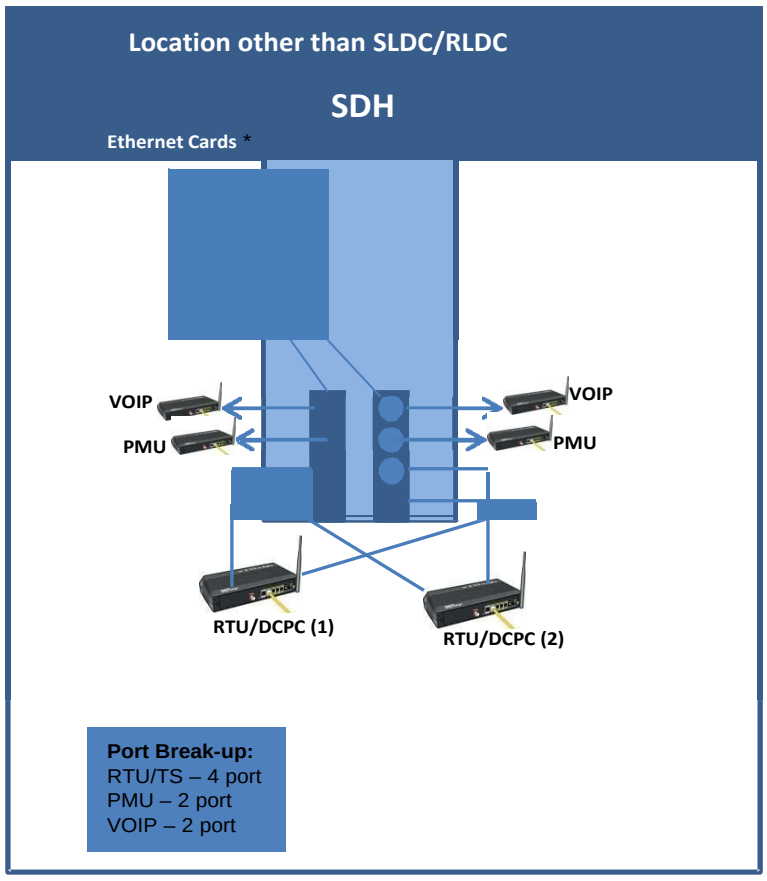


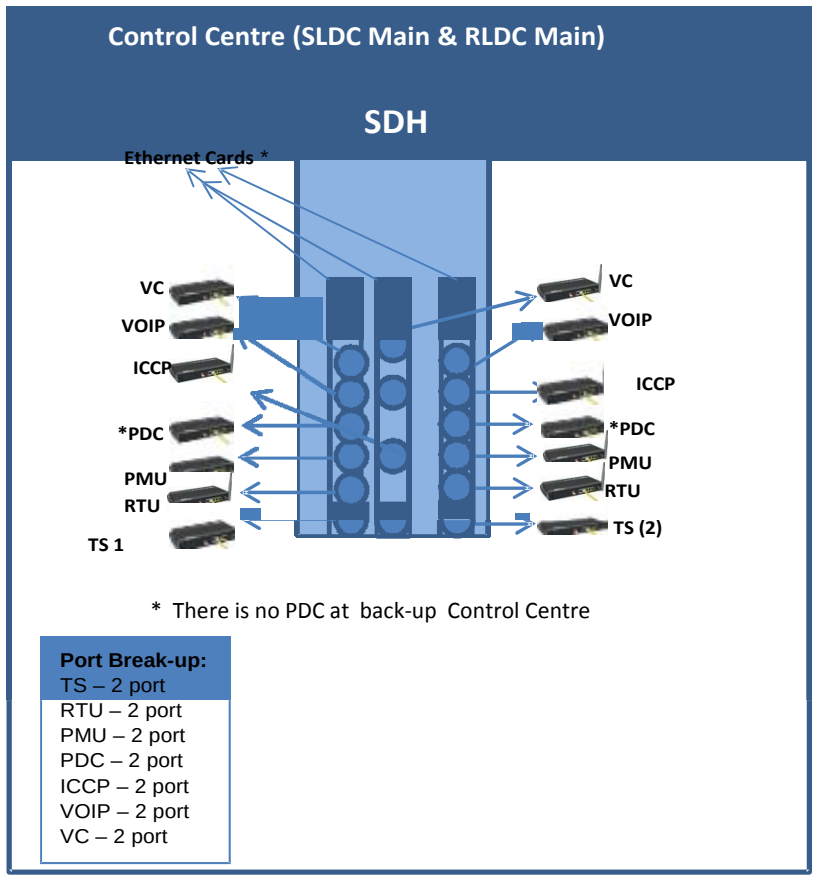
PMUs located at State Sector Substations

PMUs located at IPPs across the Grid

PMUs located at Central Sector Substations

Ethernet Port Requirement at Sub-Station/SLDC/RLDC

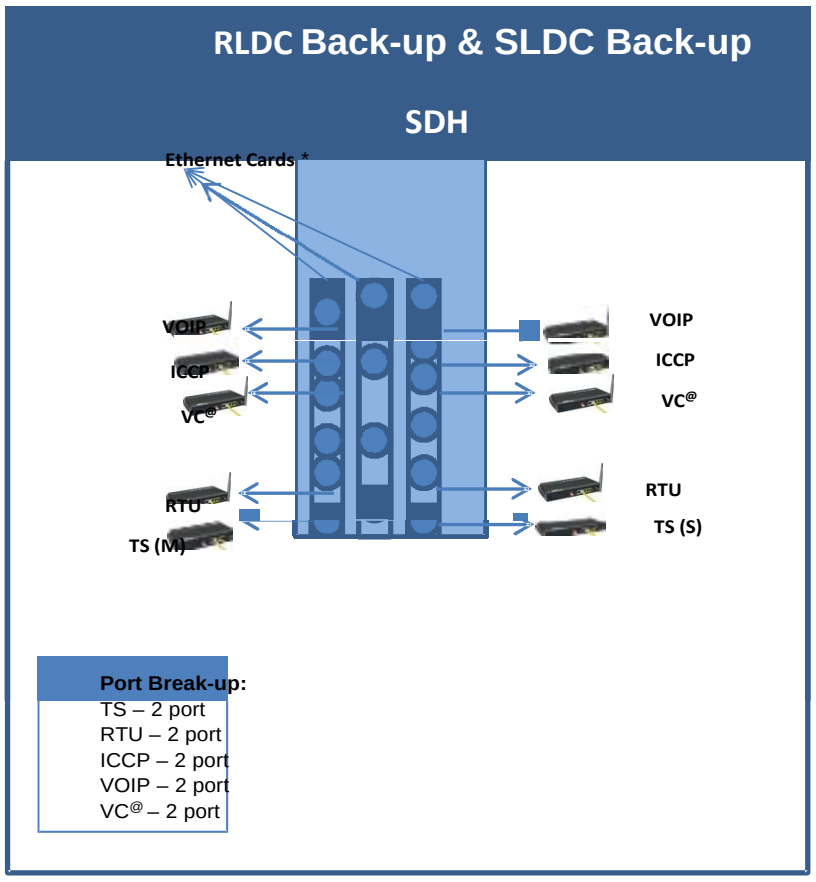




Ethernet Port requirement in SDH Equipment:

1. At locations other than SLDC/RLDC/Sub-LDC – 8 ports
2. **At RLDC** Main **– 14 ports**
3. At SLDC Main– 14 ports

Ethernet Port Requirement at Back-up RLDC/SLDC



Ethernet Port requirement in SDH Equipment:

1. At Back-up RLDC – 8 ports
2. At Back-up SLDC – 10 ports

Channel Routing Design Considerations for Communication System in NR

1.Transportation Mechanism: Ethernet over SDH (EoS)

2. **Encapsulation Techniques**: GFP (Generic Framing Protocol)

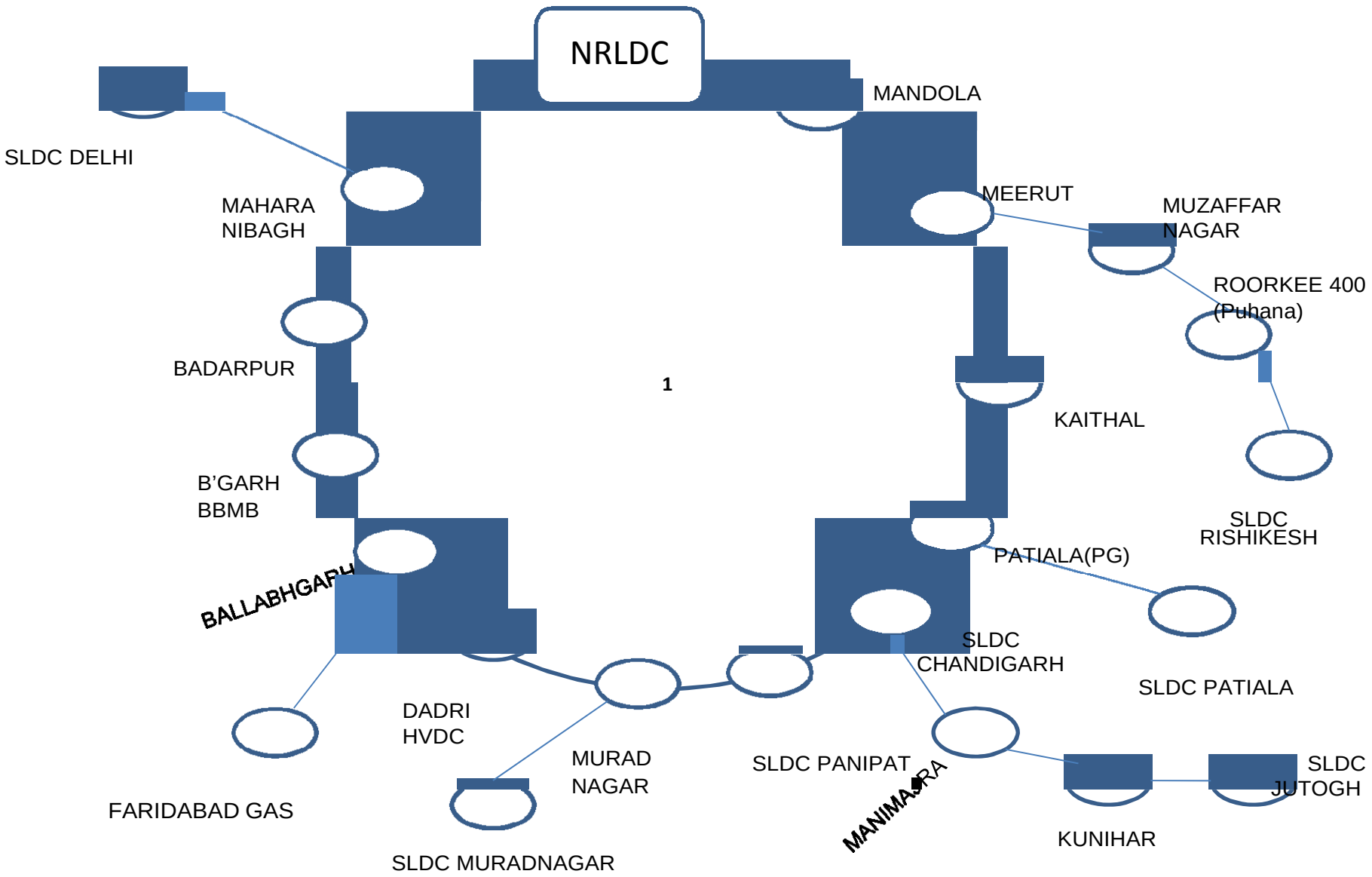
3. Service Provisioning: ERPS (Ethernet Ring Protection Switching) – ERPS is one of the most proven technology for preventing loop in Ethernet rings and provide network convergence in sub-50ms.

- Network would be divided into various logical ERPS rings (Ethernet rings) depending upon the network size (16 NEs would be considered in a logical ERPS ring but as per requirement upto 20 NEs can be **considered)**.
- Proposed NRLDC N/W under Master Communication Plan would be divided into 5 logical ring or linear path so that 2 to 5 will have upto 16NEs and ring 1 will form ERPS ring. 2 to 5 shall be used for PMU/RTU traffic aggregation to NRLDC and NLDC (backup RLDC). Ring 1 shall be used to connect the various SLDCs to **the RLDC and RTU locations**.
- All services shall be provisioned in this ERPS rings under different VLANS if optical ring is available.
- 100 Mbps bandwidth shall be allocated to each logical linear path 2 to 5 and 300 Mbps bandwidth shall be allocated to the ERPS ring 1.
- **All sites should have VC4 unique VLAN for each service type with ingress QOS to assure bandwidth**.

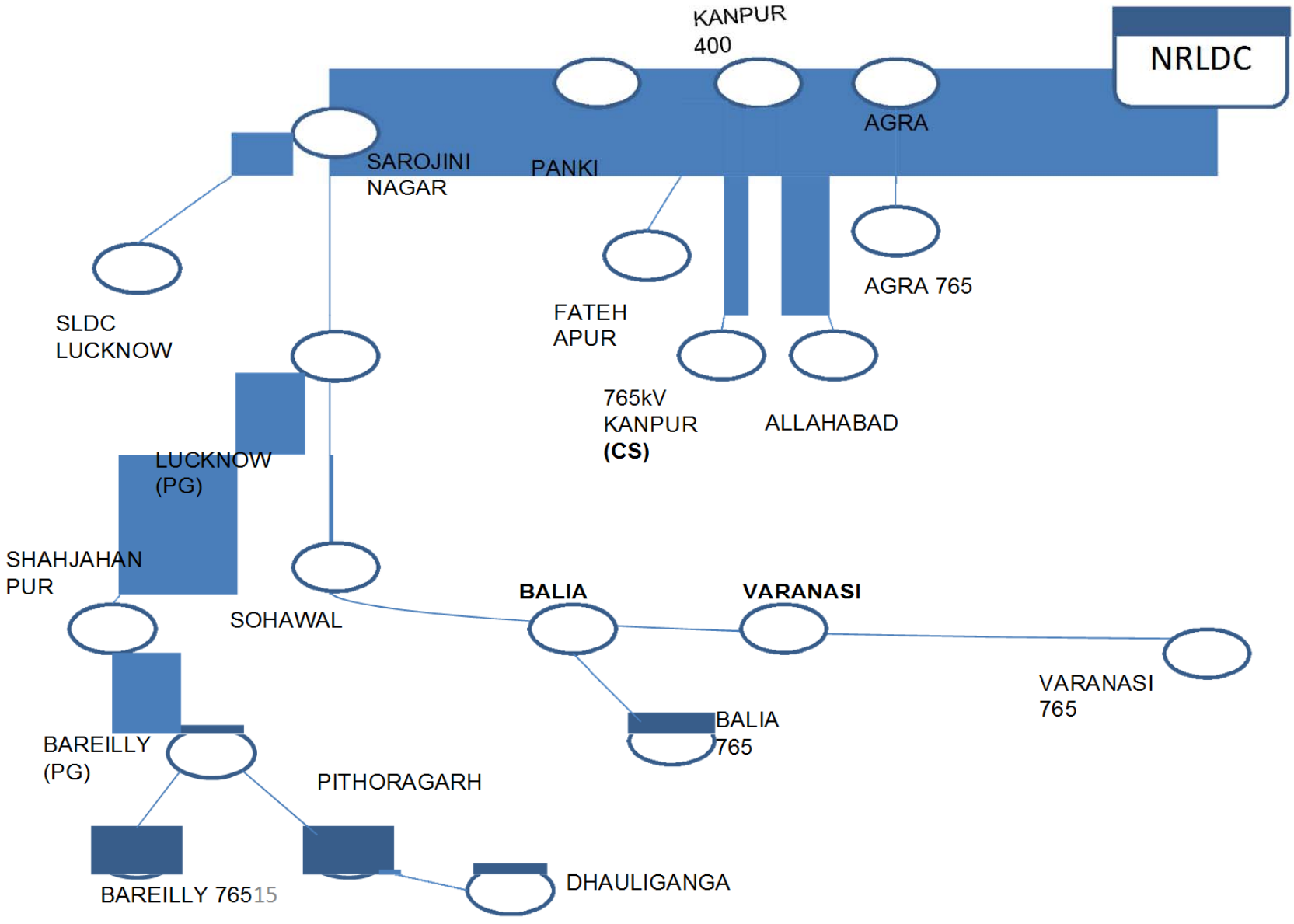
4. **Path Protection**: In case of ring network, two physical paths will be used to form the Ethernet protected rings. All traffic in spur nodes would be protected with MSP/SNCP in case of dual fiber to form the Ethernet **protected rings**.

5. **Latency**: Every SDH equipment will exhibit the maximum latency of 275µs and the fiber latency is 5µs/km.

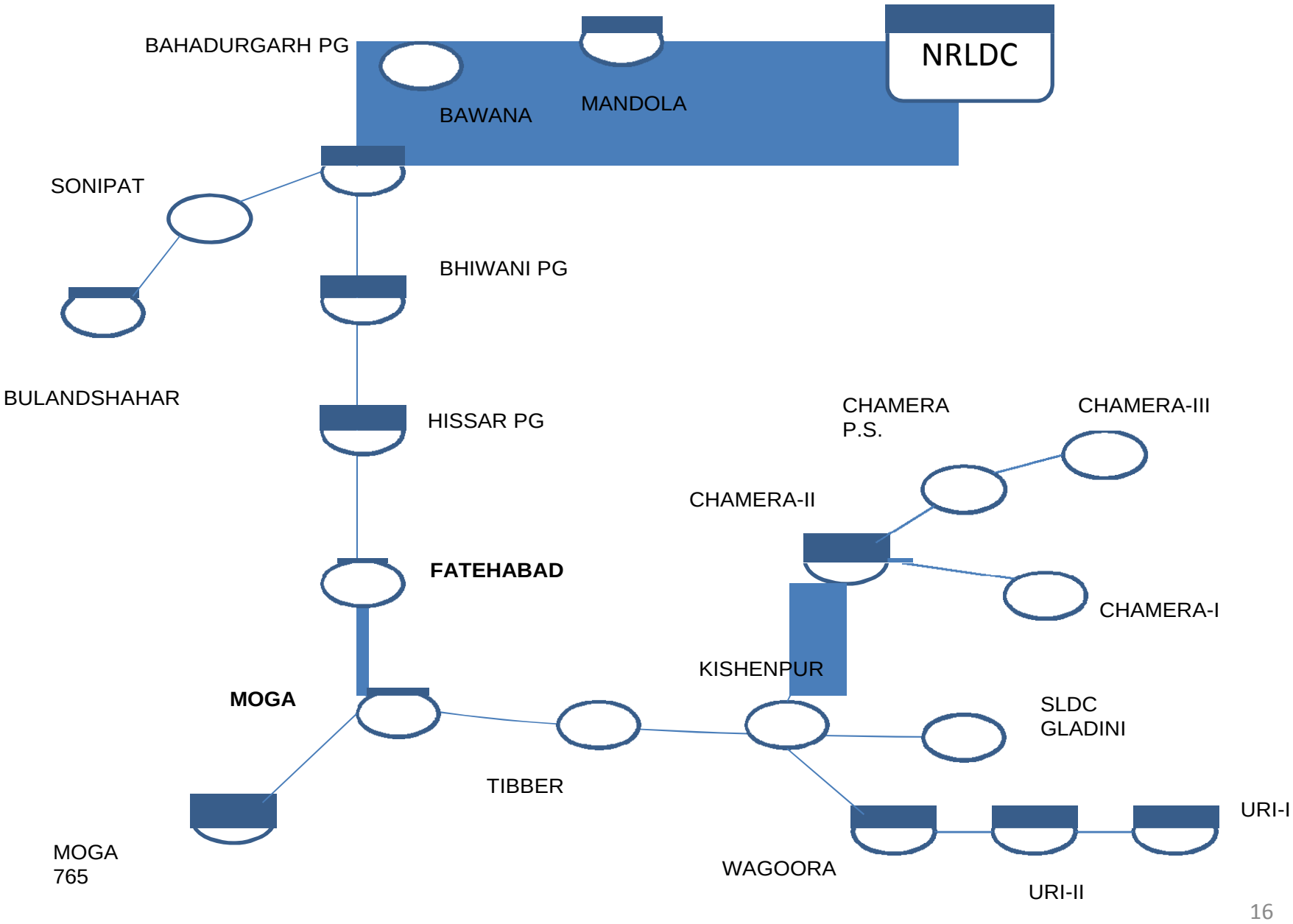
Logical ERPS Traffic Aggregation Rings for PMU/RTU/Terminal Server to NRLDC



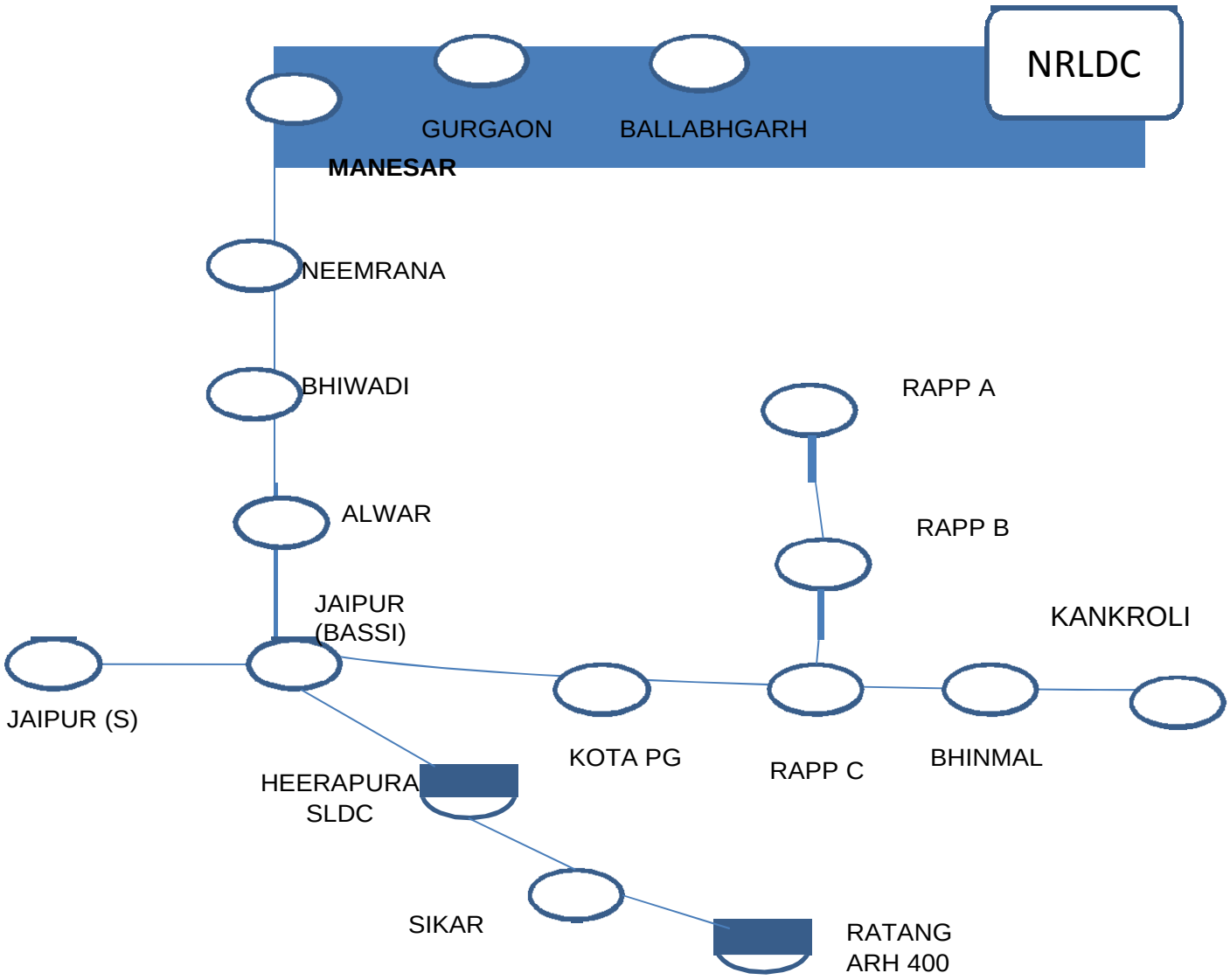
Logical Emulated LAN services for PMU/RTU/Terminal Sever to NRLDC



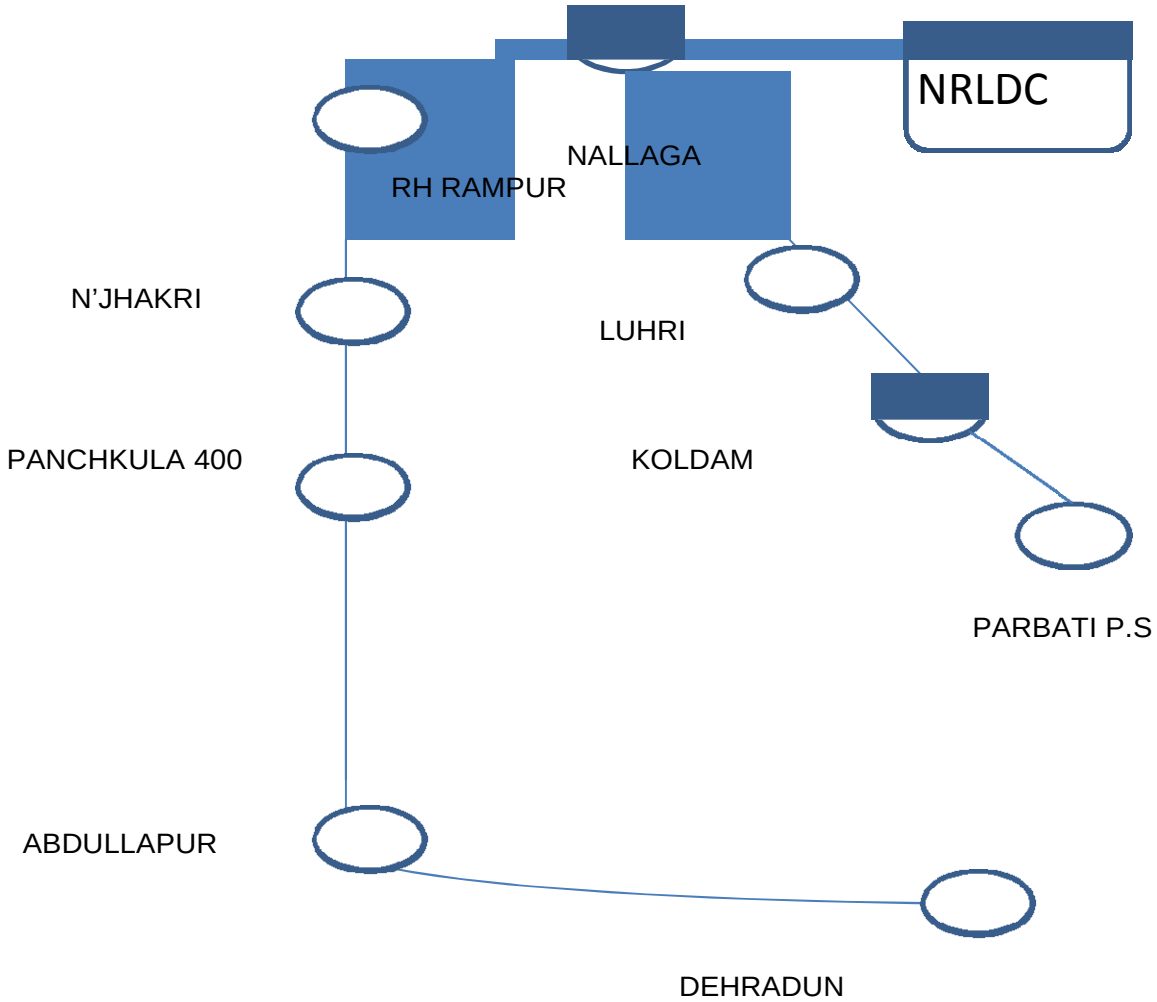
Logical Emulated LAN services for PMU/RTU/Terminal server to NRLDC



Logical ELAN services for PMU/RTU/Terminal Server to NRLDC



Logical Emulated LAN services for PMU/RTU/Terminal Server to NRLDC



ANNEX- V

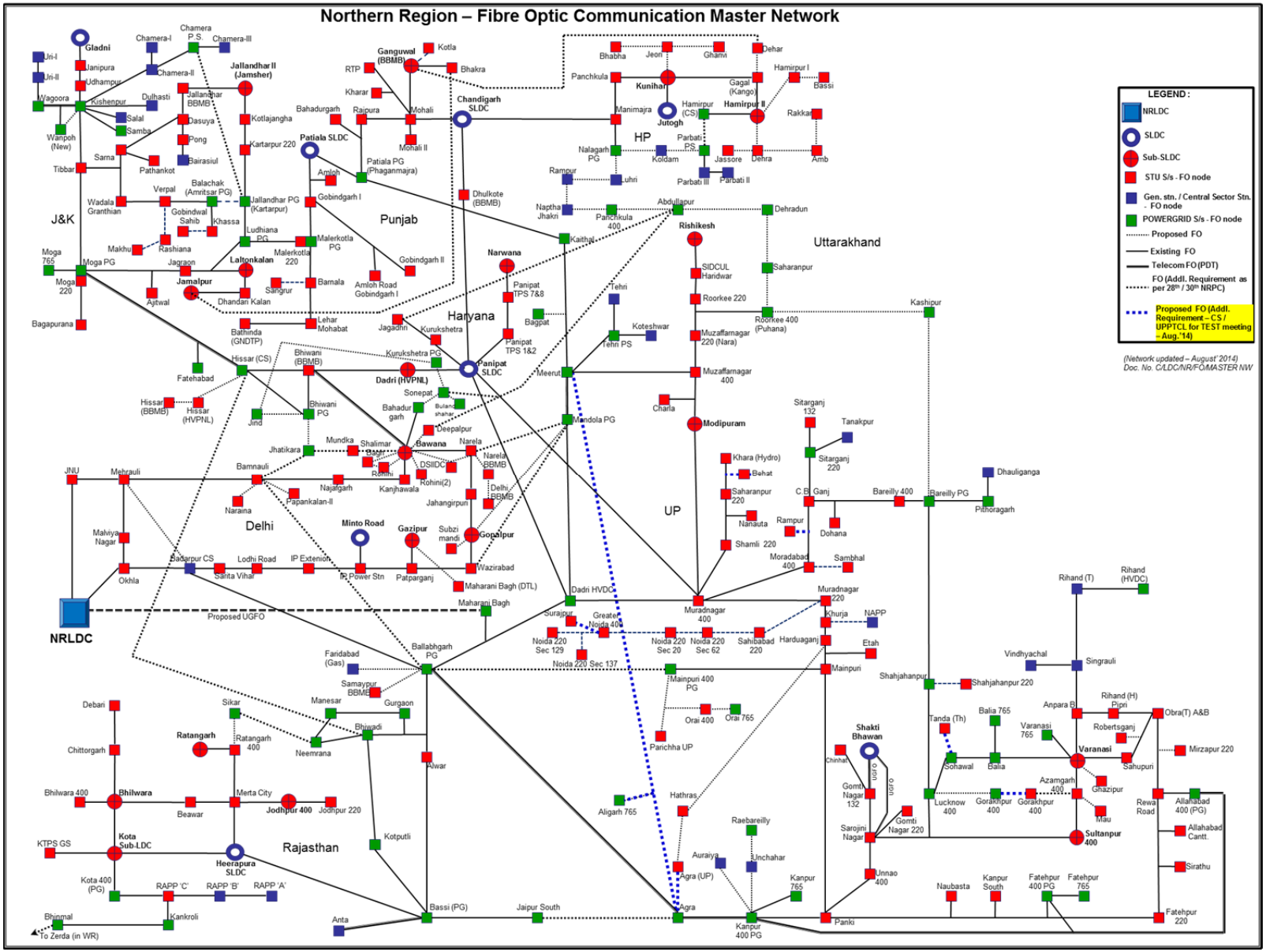
OPGW for Fibre Optic Communication system in Northern Region under Expansion Project (Additional Requirement)

Central Sector :

	Additional OPGW requirement on following lines :	Kms	Remarks
1	Agra – Meerut (765 kV line) with LILO at Aligarh 765 kV	267	Approved as additional requirement for U/C - LILO section as per 30th NRPC. For Live-line installation on existing line.
2	Agra 400 (UPPTCL) – Agra 400 (PG)	30	Earlier incl. for UPPTCL as per 28th NRPC. Only OPGW qty. for regularization under CS.
3	Gorakhpur 400 (UPPTCL) – Gorakhpur 400 (PG)	46	Earlier incl. for UPPTCL as per 28th NRPC. Only OPGW qty. for regularization under CS.
	Total (for CS)	**343**	

UPPTCL :

	Additional OPGW requirement on following lines :	Kms	Remarks
1	LILO of 220 kV C.B. Ganj – Moradabad(4) at Rampur S/s	10	Additional requirement as per UPPTCL letter dtd. 24.02.2014
2	LILO of Khara – Saharanpur at Behat S/s	3	-do-
3	LILO of Mirzapur(2) – Jigna line at Mirzapur S/s	6	-do-
4	Surajpur – Greater Noida (4) 132 kV line	11	-do-
	Total (for UPPTCL)	**30**	


Northern Region – Fibre Optic Communication Master Network
LEGEND :
NRLDC
SLDC
Sub-SLDC
STU S/s - FO node
Gen. stn. / Central Sector Stn. - FO node
POWERGRID S/s - FO node
Proposed FO
Existing FO
Telecom FO (PDT)
FO (Addl. Requirement as per 28th / 30th NRPC)
Proposed FO (Addl. Requirement – CS / UPPTCL for TEST meeting – Aug.'14)
(Network updated – August' 2014)
Doc. No. C/LDC/NR/FO/MASTER NW
J&K
Punjab
Haryana
HP
Uttarakhand
Rajasthan
UP
Delhi
NRLDC
Gladni
Chamera P.S.
Chamera-I
Chamera-II
Chamera-III
Uri-I
Uri-II
Janipura
Udhampur
Wagoora
Kishenpur
Dulhasti
Salal
Samba
Wanpoh (New)
Sarna
Pathankot
Tibbar
Dasuya
Pong
Bairasiul
Jallandhar BBMB
Jallandhar II (Jamsher)
Kotlajangha
Kartarpur 220
Balachak (Amritsar PG)
Jallandhar PG (Kartarpur)
Verpal
Wadala Granthian
Gobindwal Sahib
Khassa
Ludhiana PG
Rashiana
Makhu
Moga 765
Moga PG
Moga 220
Jagraon
Laltonkalan
Jamalpur
Ajitwal
Dhandari Kalan
Sangrur
Barnala
Malerkotla 220
Malerkotla PG
Lehar Mohabat
Bathinda (GNDTP)
Bagapurana
Ganguwal (BBMB)
Kotla
RTP
Bhakra
Kharar
Bahadurgarh
Rajpura
Mohali
Mohali II
Chandigarh SLDC
Patiala SLDC
Patiala PG (Phaganmajra)
Amloh
Gobindgarh I
Gobindgarh II
Amloh Road Gobindgarh I
Dhulkote (BBMB)
Narwana
Panipat TPS 7&8
Panipat TPS 1&2
Baghpat
Jagadhri
Kurukshetra
Kurukshetra PG
Panipat SLDC
Hissar (CS)
Fatehabad
Hissar (BBMB)
Hissar (HVPNL)
Bhiwani (BBMB)
Bhiwani PG
Jind
Dadri (HVPNL)
Sonepat
Bahadur garh
Bulandshahar
Deepalpur
Jhatikara
Mundka
Shalimar Bagh
Bawana
Narela
Rohini
DSIIDC
Rohini(2)
Kanjhawala
Najafgarh
Papankalan-II
Bamnauli
Naraina
Jahangirpuri
Narela BBMB
Delhi BBMB
JNU
Mehrauli
Malviya Nagar
Okhla
Minto Road
Gazipur
Subzi mandi
Gopalpur
Wazirabad
Maharani Bagh (DTL)
Patparganj
I.P Power Stn
IP Extension
Lodhi Road
Sarita Vihar
Badarpur CS
Maharani Bagh
Proposed UGFO
Ballabhgarh PG
Faridabad (Gas)
Samaypur BBMB
Manesar
Gurgaon
Bhiwadi
Neemrana
Alwar
Kotputli
Sikar
Ratangarh
Ratangarh 400
Chittorgarh
Debari
Bhilwara 400
Bhilwara
Beawar
Merta City
Jodhpur 400
Jodhpur 220
KTPS GS
Kota Sub-LDC
Kota 400 (PG)
RAPP 'C'
RAPP 'B'
RAPP 'A'
Heerapura SLDC
Kankroli
Bhinmal
To Zerda (in WR)
Bassi (PG)
Jaipur South
Anta
Dadri HVDC
Surajpur
Greater Noida 400
Noida 220 Sec 129
Noida 220 Sec 137
Noida 220 Sec 20
Noida 220 Sec 62
Sahibabad 220
Harduaganj
Muradnagar 400
Muradnagar 220
Khurja
NAPP
Etah
Mainpuri
Mainpuri 400 PG
Orai 400
Orai 765
Parichha UP
Aligarh 765
Hathras
Auraiya
Agra (UP)
Agra
Raebareilly
Unchahar
Kanpur 765
Kanpur 400 PG
Panki
Unnao 400
Gomti Nagar 132
Gomti Nagar 220
Sarojini Nagar
Shakti Bhawan
Chinhat
Lucknow 400
Naubasta
Kanpur South
Fatehpur 400 PG
Fatehpur 765
Fatehpur 220
Sultanpur 400
Azamgarh 400
Gorakhpur 400
Ghazipur
Mau
Varanasi 765
Varanasi
Sahupuri
Sohawal
Balia
Balia 765
Tanda (Th)
Anpara B
Rihand (H) Pipri
Robertsganj
Obra(T) A&B
Mirzapur 220
Rihand (T)
Rihand (HVDC)
Vindhyachal
Singrauli
Shahjahanpur
Shahjahanpur 220
Rewa Road
Allahabad 400 (PG)
Allahabad Cantt.
Sirathu
Fatehpur 220
Kunihar
Panchkula
Bhabha
Jeon
Ghanvi
Dehar
Hamirpur I
Bassi
Gagal (Kango)
Hamirpur II
Rakkar
Manimajra
Jutogh
Hamirpur (CS)
Parbati PS
Jassore
Dehra
Amb
Nalagarh PG
Koldam
Parbati III
Parbati II
Rampur
Luhri
Naptha Jhakri
Panchkula 400
Abdullapur
Dehradun
Kaithal
Rishikesh
SIDCUL Haridwar
Roorkee 220
Saharanpur
Roorkee 400 (Puhana)
Kashipur
Tehri
Koteshwar
Tehri PS
Muzaffarnagar 220 (Nara)
Muzaffarnagar 400
Meerut
Charla
Modipuram
Mandola PG
Sitarganj 132
Tanakpur
Sitarganj 220
Khara (Hydro)
Behat
Saharanpur 220
Nanauta
Shamli 220
C.B. Ganj
Bareilly 400
Bareilly PG
Dhauliganga
Pithoragarh
Rampur
Dohana
Moradabad 400
Sambhal

Annexure – VI

Digital Status availability of CBs

Description	PSTCL	HVPNL	RRVPNL	UPPTCL	DTL	BBMB
Analog	740	665	1021	1260	338	58*
Digital (Only CB)	305	277	504	454	156	19**
Total	1045	942	1525	1714	494	77

Note : * OLTC 40 Nos * * Mainly of Bhiwani and Dehar
Above status is for the network of 220 kV and above

Annexure - VII

Sl. No.	Name of Station	Volt. Level (kV)	Station Type	Owner Utility	Reason for non-availability
1	Agra	765 kV	SS	POWERGRID	Alternate channel not working
2	Anta	400 kV	GS	NTPC	Alternate channel not working
3	Bhinmal	400 kV	SS	POWERGRID	Alternate channel not working
4	Budhil HEP	220 KV	GS	LANCO	Alternate channel not working
5	Chamba	400 KV	SS	POWERGRID	Alternate channel not working
6	Dhauliganga	220 kV	GS	NHPC	Alternate channel not working
7	Faridabad	400 kV	GS	NTPC	Alternate channel not working
8	Gorakhpur	400 KV	SS	POWERGRID	Alternate channel not working
9	Gurgaon	400 KV	SS	POWERGRID	Alternate channel not working
10	Jaipur South	400 KV	SS	POWERGRID	Alternate channel not working
11	Kankroli	400 KV	SS	POWERGRID	Alternate channel not working
12	Ludhiana	400 kV	SS	POWERGRID	Alternate channel not working
13	Mainpuri	400 kV	SS	POWERGRID	Alternate channel not working
14	NAPS	400 KV	GS	NPC	Alternate channel not working
15	RAPP-A	400 KV	GS	NPC	Both channel not working
16	RAPP-B	220 kV	GS	NPC	Both channel not working
17	RAPP-C	400 KV	GS	NPC	Alternate channel not working
18	Roorkee	400 KV	GS	NPC	Alternate channel not working
19	Sikar	400 KV	SS	POWERGRID	Alternate channel not working
20	Unchahar	400 kV	GS	NTPC	Alternate channel not working