File No.CEA-GO-17-14(13)/1/2023-NRPC

भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

उत्तर क्षेत्रीय विद्युत समिति

Northern Regional Power Committee

सं. उक्षेविस/वाणिज्यिक/209/आरपीसी/69 वीं/2023/ दिनांकः 01.11.2023

सेवा में/To,

उ.क्षे.वि.स. के सभी सदस्य एवं विशेष आमंत्रित (संलग्न सूचीनुसार)
Members of NRPC & Special Invitees (As per List)

विषय: उत्तर क्षेत्रीय विद्युत समिति की 69 वीं बैठक का कार्यवृत।
Subject: Minutes of 69th meeting of Northern Regional Power Committee.

महोदय/महोदया,

उत्तर क्षेत्रीय विद्युत समिति की 69 वीं बैठक दिनांक **27.09.2023 (10:30 AM)** को वीडियो कॉन्फ्रेंसिंग के माध्यम से आयोजित की गयी थी। बैठक का कार्यवृत संलग्न है। यह उ.क्षे.वि.स. की वेबसाइट (http://164.100.60.165/) पर भी उपलब्ध है।

The 69th meeting of Northern Region Power Committee (NRPC) was held on **27.09.2023 (10:30 AM)** via video conferencing. MoM of the same is attached herewith. The same is also available on NRPC Sectt. Website (http://164.100.60.165/).

भवदीय
Yours faithfully

Signed by Vijay Kumar Singh
Date: 03-11-2023 13:18:20
Reason: Approved

(वी.के. सिंह)
(V.K. Singh)
सदस्यसचिव
Member Secretary

प्रतिलिपि: मोहम्मद शायिन, एमडी, एचवीपीएनएल एवं अध्यक्ष, एनआरपीसी (md@hvpn.org.in)

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सत्यमेव जयते

उत्तर क्षेत्रीय विद्युत समिति

NORTHERN REGIONAL POWER COMMITTEE

Minutes of

The 69th meeting of

Northern Regional Power Committee

Date: 27th September 2023

Time: 10:30 AM

Via: Video Conferencing

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Minutes of the 69th Meeting of Northern Regional Power Committee

Time & Date of meeting: 27th September 2023
Venue: Video-conferencing

Member Secretary, NRPC welcomed the Chairperson, NRPC and MD, HVPN. Further, he welcomed participants from all power sector utilities of Northern Region connected in the meeting. Meeting started with consent of Chairperson, NRPC.

A.1 Approval of MoM of the 68th NRPC meeting

A.1.1 EE (P), NRPC apprised that minutes of the 68th NRPC meeting (held on 18.08.2023) have been issued vide letter dated 11.09.2023.

A.1.2 Comments, received from CTUIL on above minutes were discussed and forum approved the MoM with inclusion of CTUIL comments as below:

Agenda of MoM Issued	***Text as per MoM Issues***	***Amended Text***
(12) Transmission System for Evacuation of Power from Shongtong Karchham HEP (STKHEP) and Tidong HEP in Himachal Pradesh (agenda by HPPCL)	-	A.12.8 CTUIL requested HPPCL to reconfirm preponed schedule (Jul'25) in next 1-2 days as proposal is to be discussed for approval in ensuing meeting of NCT to be scheduled on 25.08.2023.
(16) Notification of CERC Regulations (agenda by NRPC Secretariat)	A.16.8 Chairperson, NRPC highlighted that all utilities need to go through CERC Grid code. A.16.9 Member Secretary, NRPC stressed that detailed discussion would be done and a separate workshop would be arranged in NRPC/NRLDC on IEGC 2023 for familiarization of all NR utilities.	A.16.8 CTU mentioned that as per GNA regulation 2022, clause 18.1 (e); Deemed grant of GNA, *GNA deemed to have been granted to STU under clause (d) of this Regulation, shall be segregated for each intra-State entity, including distribution licensee, by the respective SLDC, and intimated to STU, Nodal Agency and NLDC within 1 month of publication of details by the Nodal Agency under clause (d) of this Regulation. Provided that in case an SLDC fails to provide such segregation, the pro rata GNA shall be allocated to each*

		intra-State entity in the ratio of their Long Term Open Access and Medium Term Open Access, as included in the first bill raised in the previous month under the Sharing Regulations. CTU mentioned that they had sent request to all SLDCs along with reminders in this regard. UPSLDC has already submitted the information and SLDC of other constituent states of NR are requested to expedite submission of above information. A.16.9 Chairperson, NRPC highlighted that all utilities need to go through CERC Grid code. A.16.10 Member Secretary, NRPC stressed that detailed discussion would be done and a separate workshop would be arranged in NRPC/NRLDC on IEGC 2023 for familiarization of all NR utilities.

A.2 Construction of 220/132 kV, 80/100 MVA Sub-station at Tahliwal (Distt. Una in Himachal Pradesh) by S/C LILO of 220 kV D/c Bhakra to Jamalpur D/c line of BBMB with provision of SPS to restrict drawl at 50 MVA and to ensure no drawl of Power from Jamalpur side in case of outage of Bhakhra - Tahliwal circuit (agenda by HPPTCL)

A.2.1. EE (P), NRPC apprised the agenda of construction of 220/132 kV, 80/100 MVA Sub-station at Tahliwal (Distt. Una in Himachal Pradesh) by S/C LILO of 220 kV Bhakra – Jamalpur D/c line of BBMB.

A.2.2. HPPTCL representative informed that the agenda was placed for BBMB constituent's approval in 199th Power Sub-committee meeting held on 29.04.2013, wherein it was agreed that H.P. may LILO 220 kV Bhakra-Jamalpur (Punjab) D/C line of BBMB, which is passing through H.P. and establish 220/132 kV Sub-station at Tahliwal in Himachal Pradesh. It was further desired by BBMB that the proposal be

got concurred by Northern Region Constituents in the meeting of Standing Committee.

A.2.3. The matter was discussed in 33rd meeting of Northern Region Standing Committee held on 23.12.2013 and 36th meeting of Northern Region Standing Committee held on 13.07.2015, wherein it was decided that in case HPSEBL desires to draw 80 MW Power at Tahliwal, the LILO of 220 kV Bhakra (Right) – Jamalpur D/C line at Tahiliwal and reconductoring of the portion of the line between Bhakra(R) –LILO point with HTLS conductor be carried out by HPSEB at their own cost. HPSEB should restrict the loading on the LILO portion to 80 MW by installing SPS. The proposal was subsequently approved in 123rd Power Subcommittee of BBMB held on 27.07.2015.

A.2.4. Considering that the decisions were taken in 2015 and significant time has passed, before taking up the construction in year 2020, HPPTCL took the matter with BBMB, wherein it was desired to ascertain the present situation and any changes required in the decisions taken in 36th Standing Committee and 123rd Power Subcommittee, the proposal shall again be placed before BBMB constituents for approval. The matter was discussed in 144th, 145th & 146th meeting of Power Subcommittee wherein in 146th meeting of Power Subcommittee, Haryana and Rajasthan intimated no objection to HP proposal but PSTCL informed that they have some reservations and are not in agreement with the proposal of HP. So, it was concluded that the HPPTCL shall discuss the matter with PSTCL to explore the possibility of consensus for further progress in the matter.

A.2.5. Subsequently, the matter was again discussed with PSTCL by HPPTCL, wherein after deliberations PSTCL consented for drawl of 50 MVA instead of earlier committed 80 MVA by S/C LILO of 220 KV Bhakra Jamalpur line of BBMB (without HTLS reconductoring) with provision of SPS to restrict drawl at 50 MVA and to ensure no drawl of Power from Jamalpur side in case of outage of Bhakra - Tahliwal circuit. Accordingly, the scheme has been revised as Construction of 220/132 KV, 80/100 MVA Sub-station at Tahliwal (Dist. Una in Himachal Pradesh) by S/C LILO of 220 KV D/C Bhakra Jamalpur line of BBMB. The revised plan was placed for discussion in the 148th meeting of Power Sub-committee of BBMB held on 25.08.2023 and was approved by BBMB constituents.

A.2.6. HPPTCL representative stated that the Sub-station is required on urgent basis to provide construction power to Bulk Drug Pharma Park proposed in Haroli Distt-Una of Himachal Pradesh (A Project of National Importance). The foundation stone laying ceremony of which has been done by Hon'ble Prime Minister in October 2022. Since the overall requirement of BDP (Bulk Drug Park) is to the tune of 120 MVA, HPPTCL has already submitted proposal to CEA for approval of the following elements as long term plan i.e. Construction of 220/132 kV, 220 MVA Sub-station nearby Una and 220 kV (Twin Zebra) D/C line from 220/132 kV Nehrian Sub-station to Proposed 220/132 kV, 220MVA Sub-station near Una. This proposal shall require time frame of 3 years for construction after approval. The area is already facing acute supply shortage irrespective of upcoming BDP (Bulk Drug Pharma Park).

A.2.7. In view of above, HPPTCL proposed that forum may approve construction of 220/132 kV, 80/100 MVA Sub-station at Tahliwal (Distt. Una in Himachal Pradesh) by S/C LILO of 220 kV D/C Bhakra Jamalpur D/C line of BBMB with Provision of SPS to restrict drawl at 50 MVA and to ensure no drawl of Power from Jamalpur side in case of outage of Bhakhra - Tahliwal circuit (**Annexure-I**), in line with approval of Power Subcommittee and BBMB constituents.

A.2.8. MS, NRPC conveyed that above agenda was approved with provision of SPS to restrict drawl at 50 MVA and to ensure no drawl of power from Jamalpur side in case of outage of Bhakhra - Tahliwal circuit in the 211th OCC meeting held on 19.09.2023.

A.2.9. GM, NRLDC highlighted that as per CEA regulation there is need to have a double bus or 2 main bus or 2 main bus and 1 transfer bus scheme for 220 kV Sub-station.

A.2.10. HPPTCL representative requested that it is an interim arrangement with one bus. As for long term, proposal for construction of 220/132 kV, 220 MVA Sub-station nearby Una has already been submitted. Based on approval of CEA, if required, double bus arrangement may be done for Sub-station at Tahliwal.

Decision of the Forum:

Forum approved the proposal in principle for Construction of 220/132 kV, 80/100 MVA Sub Station at Tahliwal by S/C LILO of 220 kV D/c Bhakra to Jamalpur D/c line of BBMB with provision of SPS to restrict drawl at 50 MVA and to ensure no drawl of

Power from Jamalpur side in case of outage of Bhakhra - Tahliwal circuit subject to approval of bus arrangement from CEA.

A.3 Furnishing of Data for finalization of Generation programme for FY 2024-25 (agenda by OPM Division, CEA)

A.3.1. EE (P), NRPC apprised that annual assessment and finalization of the generation program for the year 2024-25 is being undertaken by OPM Division, CEA. In this regard, the deadline provided to the generating stations for furnishing the data was 31.08.2023.

A.3.2. As on 12.09.2023, only 114 stations have furnished the data for the Generation programme for FY 2024-25. List of stations in Northern Region whose data for Generation programme 2024-25 has not been received (as on 12-09-2023) is attached as **Annexure-II.**

A.3.3. In view of the mild response from the generating companies and to adhere to the timelines for the finalization of the Generation Programme for 2024-25, it was requested to furnish the data to CEA at the earliest.

A.3.4. Chairperson, NRPC conveyed that planning of every project depends on data and therefore information shall be made available to CEA timely.

A.3.5. OPM Division, CEA representative informed that Uttar Pradesh has submitted data of all stations on 22.09.2023.

Decision of the Forum:

Forum requested all concerned stations in northern region to expedite the data submission to OPM division, CEA.

A.4 Implementation of 400/220kV Gopalpur Sub-station by DTL (agenda by CTUIL)

A.4.1 CTUIL representative apprised that in the 39th meeting of the Standing Committee on Power System Planning of Northern Region held on 29-30th May 2017, following intra state transmission scheme was agreed for implementation by DTL:

i. Establishment of 4x500MVA, 400/220kV GIS Sub-station at Gopalpur along with 125 MVAR bus reactor - by DTL.

ii. LILO of Maharanibagh–Bawana 400 kV D/C line at Gopalpur 400/220 kV Sub-station on multicircuit towers.

A.4.2 In view of above, system studies were carried out considering Gopalpur Sub-station and a new 765/400kV Narela Sub-station (ISTS) was planned as part of transmission scheme for Rajasthan SEZ Ph-II (8.1GW) transmission scheme considering connectivity with 400/220kV Gopalpur Sub-station. The scheme was agreed in 5th NRSCT meeting held on 13.09.2019 with following transmission elements as part of transmission schemes of Rajasthan SEZ (8.1 GW) under Phase-II:

i. LILO of both circuits of Bawana – Mandola 400kV D/c (Quad) line at 765/400kV Narela S/s.

ii. Removal of LILO of Bawana – Mandola 400kV D/c (Quad) line at Maharani Bagh/Gopalpur S/s. Extension of above LILO section from Maharani Bagh/Gopalpur upto Narela S/s so as to form Maharanibagh – Narela 400kV D/c(Quad) and Maharanibagh -Gopalpur-Narela 400kV D/c(Quad) lines.

A.4.3 From the studies, it emerged that in absence of LILO of Narela – Maharani Bagh D/c line at Gopalpur S/s, huge power will flow to 400kV Maharanibagh S/s through 400kV Narela -Maharanbagh 2xD/c lines and 400/220kV ICTs at Maharanbagh become overloaded. Goplapur Sub-station will also share some load of downstream of Maharanibagh S/s.

A.4.4 Subsequently, in the 2nd Meeting of Northern Region Power Committee (Transmission Planning) (NRPCTP) held on 01.09.2020, Chairperson, CEA enquired about the status of Gopalpur S/s. DTL replied that the Gopalpur S/s is at tendering stage and will be commissioned by 2023.

A.4.5 The Rajasthan SEZ Ph-II (8.1GW) is under advance stage of implementation (part system commissioned) and 765/400kV Narela Sub-station along with its connectivity to Maharani Bagh (as per Sr. No 1 & 2 above) is expected to be commissioned by Mar 2024.

A.4.6 The issue was also highlighted in the 209th OCC meeting held on 19.07.2023. At present 400/220kV Maharani Bagh S/s has 2x315MVA ICTs in one section (Sec-1) and 2x500MVA ICTs on another section (Sec-2). As per information available, Gopalpur Sub-station is not even yet awarded by DTL. In absence of Gopalpur Sub-station, loadings on 400/220kV ICTs at Maharani Bagh may become critical (on Sec-2) in solar maximized scenario which may impact RE evacuation.

A.4.7 As per information available, there is space constraint for augmentation of new 400/220kV ICTs at both sections of 400/220kV Maharani Bagh S/s. Confirmation is sought from POWERGRID in this regard.

A.4.8 CTUIL proposed that DTL may expedite the implementation of 400/220kV Goplapur Sub-station and POWERGRID/DTL may explore the space availability for 400/220kV ICT augmentation at Maharanibagh S/s (Sec-2) as DTL also owned 08 Nos 220kV System at Maharani Bagh S/s.

A.4.9 CTUIL also suggested that in the meantime DTL may explore load segregation at Maharani Bagh Sub-station so as to contain ICT loadings in solar maximized scenario for 2024-25 & beyond till availability of Gopalpur S/s.

A.4.10 There was no representative from DTL or SLDC, Delhi in the meeting. Chairperson, NRPC expressed concern on absence of DTL representatives.

A.4.11 GM, NRLDC mentioned that no commissioning schedule is made available with NRLDC for this scheme. He further commented that presently 220kV bus sectionalizer is closed at Maharanibagh Sub-station, therefore there is no N-1 compliance issue now.

A.4.12 GM, CTUIL highlighted about commissioning of proposed Narela Sub-station which will lead to enormous loading at Maharanibagh Sub-station. He expressed concern that the Gopalpur project is still under tendering stage even after 7 years from proposal.

A.4.13 CGM, POWERGRID opined that space constraint at Maharanibagh Sub-station may be solved by replacing 125 MVAr reactor with new 500 MVA ICT, since due to good loading pattern there is no such issue of high voltage at Maharanibagh Sub-station.

A.4.14 In view of absence of DTL representatives, forum deferred the agenda and agreed to discuss separately.

Decision of the Forum:

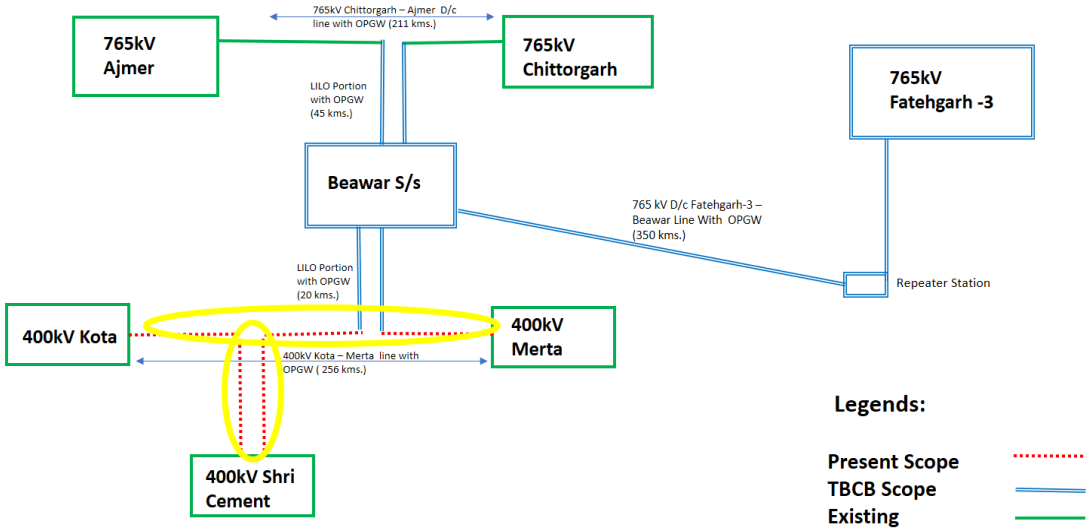
Forum decided that a separate meeting may be convened by NRPC secretariat with DTL, POWERGRID, CEA, NRLDC and CTUIL to resolve the issue.

A.5 OPGW installation on existing 400 kV Kota – Merta line which is LILOed at Shri Cement & proposed to be LILOed at 765/400 kV Beawar (ISTS) S/s (agenda by CTUIL)

A.5.1. EE (P), NRPC apprised that 400 kV Kota – Merta line (256kms) was constructed without OPGW by POWERGRID and this line is also LILOed at Shri Cement (Captive Merchant Generator). LILO portion of approx. 55 kms. was constructed by M/s Shri Cement. This line is further proposed to be LILOed at 765/400 kV Beawar

(ISTS) S/s under TBCB scheme "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) Phase III –Part F", where OPGW has been considered on LILO portion & FOTE at Beawar under TBCB scheme. Connectivity of Shri-Cement and Beawar (ISTS) is as below:

Connectivity diagram of Shri Cement (Generator) to ISTS communication network



A.5.2. As stated by Grid-India, data of Shri Cement is intermittent due to GPRS/ PLCC connectivity at present. Hence Grid-India has requested CTU to plan OPGW based connectivity for the same. Moreover, Grid-India further mentioned that in future PMUs may also be planned for Shri Cement station under URTDSM Ph-II project. As PMU data transmission on GPRS/PLCC connectivity is not sufficient therefore OPGW based communication shall also be required to send the PMU/SCADA/AMR data to NRLDC in a secured & reliable manner.

A.5.3. The agenda for OPGW installation on 400 kV Kota – Merta line (256kms.) along with OPGW installation on LILO portion of Shri Cement terminal equipment was discussed in the 57th NRPC meeting held on 31.08.2022. In the same meeting, OPGW installation was agreed for the 400 kV Kota – Merta line (256kms.) costing approximately 11.5 Crs. However, no consensus was made for the OPGW installation on LILO portion of Shri Cement (55 kms) costing approx. 2.5 Crs. NRPC forum further stated that decision regarding laying of OPGW in the Sri Cement LILO portion may be taken in the upcoming NRPC meetings after inputs received from Shree Cement.

A.5.4. The proposal was taken up in the 11th NCT meeting held on 28.12.2022 & 17.01.2023, for OPGW installation on 400 kV Kota – Merta line (256kms.) excluding

LILO portion of Shri-Cement, wherein NCT opined that implementation of OPGW while bypassing LILO at Shree Cement is not desirable.

A.5.5. The agenda was put up again by CTU in the 64th NRPC meeting held on 24.03.2023, where NRPC forum stated that a separate meeting shall be convened by them with CTU, Sri Cement & NRLDC for reviewing Shri Cement connectivity.

A.5.6. NRPC Secretariat called the meeting on 01.09.2023 among CTU, NRLDC & Shri Cement. In the meeting Shri Cement stated that as a small generator, it is difficult for them to bear OPGW cost. Further they stated that OPGW connectivity for some of the private IPPs e.g. Budhil, Soreng, AD Hydro, Karcham Wangtoo were previously done under ISTS schemes in sharing tariff mechanism. In similar way Shri Cement connectivity shall also be provided. MS, NRPC requested CTU to put up the agenda in the upcoming NRPC meeting along with the details of approval of OPGW for Budhil, Soreng, AD Hydro, Karcham- Wangtoo generators.

A.5.7. CTUIL mentioned that in the 39th & 40th NRPC meeting held on 02.05.2017 & 28.10.2017 respectively, the OPGW system was approved for Budhil, Soreng, AD Hydro, Karcham- Wangtoo IPPs under ISTS in reliable communication scheme of Northern Region being implemented by POWERGRID in RTM mode (the relevant extracts of MoM of stated NRPC meetings are attached as **Annexure -III**).

A.5.8. CTUIL representative consented that based on deliberation in separate meeting on 01.09.2023, the agenda may be approved in pursuance to similar decision taken for for Budhil, Soreng, AD Hydro, Karcham- Wangtoo IPPs earlier.

A.5.9. POWERGRID representative informed about change in cost for the OPGW installation from 11.5 Crs. to approximately 15 Crs. for 400 kV Kota – Merta line (256kms) and from 2.5 crs. to approximately 3.5 Crs. for LILO portion of Shri Cement (55 kms).

Decision of the Forum:

Forum accorded approval to proposal of CTUIL for OPGW installation on LILOed portion of existing 400 kV Kota – Merta line at Shri Cement under RTM.

A.6 Allotment of 315MVA ICT available as regional spare at POWERGRID Ludhiana Sub-station to RVPN's 400kV GSS Jodhpur as interim arrangement and commissioning of ICT at Bhinmal Sub-station of POWERGRID by shifting the ICT available at POWERGRID Bhiwadi Sub-station (agenda by POWERGRID)

A.6.1. EE (P), NRPC apprised that M/s RVPN vide letter dated 06.07.2023 had requested NRPC for allotment of 500MVA ICT available as regional spare at PGCIL's 400kV GSS Jaipur(S) to RVPN's 400kV GSS Jodhpur (Surpura).

A.6.2. Based on the request from RVPN, a meeting was held on 07.07.2023 (MoM attached as **Annexure-IV**) for discussion on allotment of 500MVA ICT for RVPN's 400kV GSS Jodhpur. During deliberations, it was decided that RVPN shall physically check the healthiness of regional spare 400kV 315MVA ICT available at POWERGRID Mandola Sub-station and submit report, based on which next round of discussion shall be held.

A.6.3. During the second round of discussion on 10.07.2023 (MoM attached as Annexure-IV), RVPN informed that the transportation of 315MVA ICT from Mandola Sub-station towards main highway for Jodhpur is not possible due to ongoing construction work for ring road flyover outside Mandola Sub-station due to which proper clearance is not available & shifting of transformer is not possible for at least next 03 months.

A.6.4. Further, it was deliberated that in view of difficulties involved in shifting of transformer from Mandola, 315MVA ICT available at POWERGRID Ludhiana Sub-station may be allotted to RVPN instead of ICT from Mandola. RVPN was requested to put in their best efforts to get the 500MVA ICT of RVPN's Bhadla S/s repaired at the earliest and return the 315MVA ICT to POWERGRID by Oct'2023.

A.6.5. Meanwhile, for timely commissioning of POWERGRID Bhinmal Sub-station, POWERGRID checked the feasibility of installation of 315MVA spare ICT available at POWERGRID Mandola Sub-station and it was found that the orientation of radiator Bank in Mandola ICT is on the left-hand side (LHS from HV side) and as per the space availability at Bhinmal Sub-station, this ICT cannot be placed at Bhinmal, since space availability for radiator bank at Bhinmal Sub-station is on the Right-hand side (RHS from HV side). This opposite orientation of radiator bank will reduce the clearance between upper strung bus (between 400KV side and 220KV) and existing LM tower near the proposed bay.

A.6.6. Therefore, POWERGRID decided to shift the 315MVA ICT (CGL make) available at POWERGRID Bhiwadi Sub-station to POWERGRID Bhinmal Sub-station for timely commissioning.

A.6.7. RVPN representative informed that ICT from Ludhiana will be arriving at Jodhpur by first week of October 2023.

A.6.8. Further, RVPN representative conveyed that the 315MVA ICT of Ludhiana Sub-station will possibly be returned by March 2024 as there will be high demand up to March due to Rabi crop in Rajasthan.

A.6.9. CGM, POWERGRID raised the concern over delay in the shifting of the ICT. He highlighted that, it was decided to return the ICT by October 2023 itself.

Decision of the Forum:

Forum acknowledged the proposed shifting plan of ICTs of POWERGRID and approved. RVPN was requested to return the ICT by March 2024 without further delay.

A.7 Shutdown of 400kV Kankroli-Jodhpur S/C transmission line for reconductoring with twin HTLS conductor (agenda by POWERGRID)

A.7.1. POWERGRID representative apprised that the reconductoring work of 400kV Kankroli-Jodhpur S/C transmission line was approved in the 9th meeting of NCT held on 28.09.2022. Consequent to the approval, the work of reconductoring was awarded to M/s Apar Industries on 01.03.2023. The length of the 400kV Kankroli-Jodhpur S/C transmission line is 188 kms and agency has fully mobilized at site with all resources.

A.7.2. The work schedule of the said work is 14 months in which retrofitting of switchyard equipment will also take place at both the ends of transmission line. In view of the reliable operation of the grid and to relieve the constraints of power flow in the local network, the work of dismantling of existing conductor and reconductoring of the said line have been planned on war-footing basis within 04 months with large scale mobilization of manpower and resources. The supply of new conductor (HTLS) and other material has been received at site and manpower has been deployed at site for starting the work.

A.7.3. He further stated that the request for shutdown of 400kV Kankroli-Jodhpur line from 20th June 2023 has been submitted to NRLDC since 8th June'2023 (email dtd 8th June'2023 and letter dtd 16th June 2023 attached as **Annexure-V**).

A.7.4. POWERGRID requested to facilitate shutdown of the aforementioned line so that the reconductoring work can be started and highlighted that the reconductoring of 400kV Kankroli-Jodhpur line will help in relieving the transmission constraints on the nearby

network and will play an effective role in power evacuation from renewable energy pockets of western Rajasthan.

A.7.5. GM, NRLDC highlighted that the above shutdown was formalized to allow later because of wind season.

A.7.6. EE (P), NRPC conveyed that the shutdown has already been granted for the same in the 211th OCC (on 19.09.2023) and outage has been approved for 01-31st October 2023.

Decision of the Forum:

Forum deferred the agenda as shutdown has already been approved for reconductoring of 400kV Kankroli-Jodhpur S/C transmission line with twin HTLS conductor from 01.10.2023 to 31.10.2023 in 211thOCC meeting.

A.8 Extension of AMC for Hot Line Speech Communication System through M/s ORANGE (agenda by POWERGRID)

A.8.1. EE (P) apprised that the issue was discussed in the 67th NRPC meeting held on 30.06.2023, wherein AMC extension for two (02) years for Hot Line Speech Communication System (comprising EPABX system along with VOIP and Analog phones) was approved at cost of approx. 60 Lac INR per year for which AMC has expired on 31.07.2023.

A.8.2. However, M/s Orange has communicated to POWERGRID that to facilitate long term visibility and smooth planning, the AMC extension for all the Control Centre sites shall be planned together.

A.8.3. POWERGRID representative highlighted that there are 11 nos. control center sites for which AMC is currently valid and is expiring on 14.06.2024.

A.8.4. CGM, POWERGRID informed that equipment are old and services are not fully available from them based on requirements of NRLDC, NLDC for communication.

A.8.5. Therefore, POWERGRID proposed to award AMC as below-

i. For 42 sites – w.e.f. 01.08.2023 to 31.07.2025
ii. For 11 sites – w.e.f. 15.06.2024 to 31.07.2025

A.8.6. The estimated cost of AMC extension for all sites shall be around Rupees 1.72 Cr Crores (excluding GST).

A.8.7. Chairperson, NRPC & MD, HVPN advised that upgradation should be integral part of an AMC but the AMC must be comprehensive as much as possible.

Decision of the Forum:

Forum approved the proposal of extension of AMC for Hot Line Speech Communication System subject to negotiation to be undertaken by POWERGRID with M/s ORANGE for appropriate cost.

A.9 Shutdown of 400/220kV buses for commissioning of 500MVA ICT-3 at Kurukshetra Sub-station (agenda by POWERGRID)

A.9.1. POWERGRID representative apprised that the 400/220kV, 500MVA ICT-3 along with associated 400 & 220kV GIS bays are under commissioning stage at Kurukshetra Sub-station. All non-shutdown activities like erection of ICT, GIS bays & GIB's, other associated equipment along with standalone testing have already been completed. Accordingly, the shutdowns of 400/220kV buses were sought to integrate the new Bays / ICT-3 with existing 400/220 kV GIS. However, due to non-availability of shutdown of 400& 220kV Buses (rejected in 207th & 209th and approved conditionally in 208th OCC, but not provided by NRLDC), POWERGRID is unable to commission the new Transformer.

A.9.2. The 500MVA 400/220 kV ICT-3 is being installed to augment the existing transformation capacity of 1000MVA at Kurukshetra Sub-station to cater peak demand in Haryana. The need for new ICT was agreed in 4th NRPC (TP) meeting. Accordingly, best efforts are being made to commission ICT-3 as early as possible. Moreover, M/s HVPNL has repeatedly emphasized for early commissioning of this ICT-3 at Kurukshetra Sub-station.

A.9.3. Keeping in view of grid constraints, our earlier proposal for 400kV Bus-3&4 for 5 days each (continuous basis) and 220kV Bus-1&2 was reviewed and accordingly shutdown of both 400kV and 220kV buses split in two ways, was proposed in OCC 210, mentioned as below:

<u>For each of 400kV Bus-3 and Bus-4</u>

a) 3 days shutdown on continuous basis for interconnection activities i.e. erection of interface module (between existing Bus and new upcoming bay).
b) 2 days shutdown on daily basis for HV test of GIS.
c) 2 days shutdown on continuous basis for erection of main conductor and bus bar stability testing.

<u>For each of 220kV Bus-1 and Bus-2</u>

d) 1 day shutdown on daily basis for HV test of GIS

e) 2 days shutdown on continuous basis for erection of internal conductor and bus bar stability testing.

A.9.4. However, NRLDC has rejected 03 days continuous shutdowns of 400kV Bus-3&4 and approved other daily based shutdowns as per our proposed shutdown requirement in Sept 2023. It is pertinent to mention here that continuous shutdown of each Bus-3 &4 for 03 days is essentially required (i.e. for erection of interface module with existing 400 KV GIS Buses) before availing other approved daily basis shutdowns. These daily basis shutdowns are required for carrying out HV test and bus bar stability test which is a subsequent activity after completion of bus bar erection activities.

A.9.5. POWERGRID requested to facilitate shutdown of 400kV Bus-3 and Bus-4 and 220kV Bus-1 and Bus-2 at Kurukshetra Sub-station w.e.f. 01st Oct 2023 for erection of interface modules with existing GIS as per **Annexure-VI**.

A.9.6. EE (P), NRPC apprised that the agenda has been discussed in 211th OCC (on 19.09.2023) and outage has been approved starting from 1st October 2023.

A.9.7. GM, NRLDC conveyed that shutdown was denied earlier because of high demand season of paddy crop in Punjab, Haryana and in that scenario Kurukshetra Champa bus becomes an important element.

A.9.8. GM, NRLDC suggested to get new transmission element commissioned before May month in Punjab, Haryana and Uttar Pradesh region because later it becomes difficult to facilitate shutdown due to paddy crop load demand. In Rajasthan, it is recommended to do the same before December due to Rabi crop.

Decision of the Forum:

Forum deferred the agenda as shutdown was already approved in 211th OCC (on 19.09.2023). However, utilities were requested to schedule their commissioning before demand season as far as possible.

A.10 Issuance of Trial run certificate for STATCOMs commissioned at POWERGRID Bhadla-2 and Bikaner-2 (PBTSL) Sub-station (agenda by POWERGRID)

A.10.1 EE (P), NRPC apprised that POWERGRID has commissioned STATCOM Station-I and Station-II (each 400/34.5kV, 3 X 183.33MVA 1-Ph Coupling Transformer bank, 2 X +/-150MVAr VSC, 2 X 125MVAr MSC and 1 X 125MVAr MSR) at Bhadla-II Sub-

station and STATCOM station at PBSTL Bikaner-2 Sub-station as per following schedule:

STATCOM station-I at POWERGRID Bhadla-II Sub-station:

Item	Mode of Operation	Description	Time	Details
1	STATCOM Operation in Manual control Mode for trial run	Only MSR in operation	24 hrs	22.05.2023, 18:36Hrs
2	STATCOM Operation in Manual control Mode for trial run	Only MSC1 and MSC 2 in operation	24 hrs	23.05.2023, 23:40Hrs
3	STATCOM Operation in Voltage / Automatic control mode	All the branches available for operation	72 hrs	30.05.2023, 22:48Hrs

STATCOM station-II at POWERGRID Bhadla-II Sub-station:

Item	Mode of Operation	Description	Duration	Details/Time
1	STATCOM Operation in Manual control Mode for trial run	Only MSR in operation	24 hrs	29.06.2023, 22:53Hrs
2	STATCOM Operation in Manual control Mode for trial run	Only MSC1 and MSC 2 in operation	24 hrs	30.06.2023, 23:36Hrs
3	STATCOM Operation in Voltage / Automatic control mode	All the branches available for operation	24 hrs	02.07.2023, 00:16Hrs

STATCOM station at PBSTL Bikaner-II Sub-station:

Item	Mode of Operation	Description	Duration	Details/Time
1	STATCOM Operation in Manual control Mode for trial run	Only MSR in operation	24 hrs	20.07.2023, 14:55Hrs
2	STATCOM Operation in Manual control Mode for trial run	Only MSC1 and MSC 2 in operation	24 hrs	21.07.2023, 16:22Hrs
3	STATCOM Operation in Voltage / Automatic control mode	All the branches available for operation	24 hrs	23.07.2023, 19:30Hrs

A.10.2 POWERGRID representative informed that all relevant data for application of trial run operation of above STATCOMs at Bhadla-2 and Bikaner-2 Sub-stations have been

submitted, however certificate for successful trial run operation of the same is yet to be issued by Grid-India.

A.10.3 POWERGRID requested NRLDC to expedite the issuance of trial run certificates for STATCOMs at Bhadla-2 and Bikaner-2 Sub-stations.

A.10.4 NRLDC representative briefed the forum about the issue of submission of generic models as below:

i. PSSe and PSCAD Models of Grid Elements are to be shared with Grid-India before First Time charging of Elements as per FTC procedure which is required for performing transient and switching simulation studies.

ii. Such models and studies become all the more important given the number of issues being encountered in the RE complex including LVRT/HVRT non-compliance of generators, sustained oscillations etc.

iii. For STATCOMs commissioned earlier also i.e. Nallagarh & Lucknow, models were provided by POWERGRID.

iv. STATCOMs in RE complex are awarded to M/S Siemens which wants to sign Non-Disclosure agreement with Grid-India before sharing the user defined models.

v. Grid-India is of the view that these are statutory requirements and models are being submitted by RE developers also without any NDA. It will slow down interconnection process as legal vetting required.

vi. Subsequently, meetings were taken by Member (GO&D), CEA on 12.06.2023 & Member (Power System), CEA on 21.07.2023. In the meeting chaired by Member (GO&D), CEA on 12.06.2023 it was agreed that

“Member (GO&D), CEA suggested that Grid-India may proceed with the generic models for under commissioning STATCOMs and for future STATCOMs suitable provisions in RfP may be incorporated for sharing of the modelling data. “

vii. NRLDC had even issued advisory during First time Charging that

“POWERGRID shall submit mathematical models and study reports, as requested by Grid-India for understanding the behavior of STATCOM under different settings, for proper tuning of POD controller as well as for facilitating 72 hrs trial run of STATCOM in Voltage Control Mode (VCM).”

viii. POWERGRID had agreed to submit the generic models that were being developed in association with IIT-B.

ix. Thereafter, several discussions took place between Grid-India & POWERGRID team in July & August months, latest discussion on 08.08.2023 at PAL, Manesar.

x. Latest models submitted by POWERGRID on 22.09.2023 and NRLDC reply to these models was submitted vide mail dtd 24.09.2023. The issues still persisting were also presented in detail in the meeting.

xi. POWERGRID vide email dated 26.09.2023 agreed to submit:

a) *revised report for PSSe model*

b) *revised PSCAD model by 06.10.2023.*

A.10.5 POWERGRID representative informed that they are developing the model in association with IIT-Bombay, but since the development of generic model from user defined model is new and tricky exercise, the same is taking some time. They requested that trial run certificates of STATCOMs commissioned may be issued with available models, meanwhile POWERGRID will work with IIT-B and submit the required generic models.

A.10.6 NRLDC representative stated that submission of models is part of NRLDC First Time Charging Procedure. Moreover, NRLDC has already facilitated all testing and charging related activities since April-Sep 2023 on confirmation from POWERGRID that they will submit the generic models to GRID-INDIA in line with decisions of meetings taken by CEA. Since sufficient time has already passed from the commitment made by POWERGRID, it was requested that final tuned models may be submitted at the earliest.

A.10.7 Chairman NRPC stated that, NRLDC may become a part of committee along with POWERGRID and IIT-B for finalization of generic models of STATCOMS. He asked POWERGRID and NRLDC to resolve the matter with mutual discussions in association with IIT-B.

Decision of the Forum:

Forum requested POWERGRID and NRLDC to form a joint team with IIT BOMBAY to study desired features and accordingly trial run certificate may be issued by NRLDC.

A.11 Disaster Management Plan for Power Sector-Northern Region (agenda by NRPC Secretariat)

A.11.1. EE (P), NRPC apprised that as per section 37 of the Disaster Management Act 2005, each Ministry is required to prepare a Disaster Management plan related to their sector. Accordingly, MoP in association with CEA has prepared a Disaster Management Plan (January 2021) for Power Sector and the same is available at CEA website.

A.11.2. In the plan, a four–tier institutional structure has been envisaged i.e. at central level, regional level, state level, and local unit/plant level to effectively deal with disaster situations in power sector. The Regional Level Disaster Management Group (RDMG) has been constituted with composition as below:

a) Member Secretary (RPC) – Chairman
b) Representative of Secretary in-charge of Rehabilitation and Relief of the affected State of the Region
c) Representatives of each State Civil Defence
d) Regional HODs CPSUs (NTPC, NHPC, PGCIL etc.)
e) CMDs State TRANSCOs/Power Departments
f) SLDC in charge of each state.
g) Chief Engineer, Central Water Commission (CWC), for floods related early warnings
h) Deputy Director-General, Indian Metrological Department (IMD), for Earthquake, and Cyclone related early warnings
i) Group Head, Ocean Information and Forecast Services Group (ISG), for Tsunami related early warnings.
j) Head of RLDC

A.11.3. The group shall be handling following associated responsibilities as below:

a) To interact with CDMG for proper coordination.
b) To ensure that disaster management plans are in place.
c) To provide inter-state emergency & start-up power supply.
d) To coordinate the early restoration of the regional grid.
e) To participate in damage assessment.
f) To facilitate resource movement to affected state (s) from other regional states.

A.11.4. EE (P), NRPC also conveyed that similarly, a group at each state level and plant level has been outlined in Disaster Management Plan for Power Sector.

A.11.5. MS, NRPC stated that nomination will be sought from constituents of the group and a meeting will be convened to decide future course of action as per guidelines.

A.11.6. Chairperson, NRPC suggested to form an SOP for roles and responsibilities of each member of the above group.

Decision of the Forum:

Forum acknowledged the constitution of Regional Level Disaster Management Group (RDMG) in Northern Region and decided to conduct a meeting after taking nominations from each member of group.

A.12 Restructuring of committee for physical inspection in cases of tower collapse and equipment failure in Northern Region (agenda by NRPC Secretariat)

A.12.1 EE (P), NRPC apprised that a committee has been formed in the 59th NRPC meeting held on 31.10.2022 for verification of cause of tower collapse and equipment failure so that it may facilitate monthly availability certification of transmission licensee as report from CEA takes generally years in case of tower collapse and equipment failure.

A.12.2 Following members were approved for the committee:

i. Superintending Engineer, NRPC (dealing availability matters) as Chairperson
ii. Superintending Engineer (Transmission), STU of concerned circle of State/UT
iii. Concerned General Manager or equivalent of concerned licensee/owner of asset
iv. One representative of PSETD Division, CEA
v. Executive Engineer, NRPC (dealing availability matters) as Member Convener
vi. Any other member as considered necessary by Chairperson

A.12.3 Further, it was decided that the committee may submit its preliminary report to Member Secretary, NRPC. Based on preliminary report, availability shall be certified by Member Secretary, NRPC. However, availability certificate may be revised, if required, due to recommendation report of CEA Standing Committees.

A.12.4 It was decided that Licensees/owner of the system (tower/equipment/etc.) has to intimate failure of asset within 24 hours of the incident in prescribed format so that committee can visit the place preferably within next 3 working days.

A.12.5 EE (P) apprised that, arranging a committee for visit within 3 days is non-practicable. Therefore, it was proposed to make small committee (of at least 3 members) as below-

i. Representative(s) of NRPC Secretariat;

ii. Any other member as considered necessary by MS, NRPC such as officers from STU, or any other transmission licensee in region.

A.12.6 EE (P), NRPC conveyed that licensees/owner of the system (tower/equipment/etc.) may intimate failure of asset within 24 hours of the incident. The committee shall visit site within 3 days (preferably). The inspection report is to be submitted by committee within 2 weeks after site visit. Logistic support for inspection team, is to be provided by concerned utility.

A.12.7 MS, NRPC highlighted that report of the standing committee of experts on failure of EHV transmission line towers comes once in a year. However, NRPC Secretariat issues the Transmission System Availability Certificate on monthly basis. In order to have inspection report timely, this small size committee is being proposed.

A.12.8 MS, NRPC stated that depending on final report of the standing committee of experts on failure of EHV transmission line towers, Transmission System Availability Certificate may be revised, if required.

A.12.9 Chairperson NRPC appreciated proposal and advised to incorporate experts from tower design and quality inspection field, experts from IITs or NITs. Accordingly, this committee may be constituted at bigger scale and quorum may be of small size depending upon available officers. He also suggested to have nomination of such officers in hand so that they may be sent for inspection, when need arises.

A.12.10 CGM, POWERGRID admired the proposal and stated that it will help in expediting the issuance of Transmission System Availability Certificate by having proper decision of committee.

Decision of the Forum:

Forum approved constitution of Committee (at least 3 members) as below:

i. Representative(s) of NRPC Secretariat;

ii. Any other member as considered necessary by MS, NRPC such as officers from STU, or any other transmission licensee in region, or officials of academic institutes such as IIT/NIT/etc.

It was also decided that NRPC Secretariat may circulate a letter to seek nominations of experts for physical inspection of site in cases of tower collapse and equipment failure from all STUs and other transmission licensee in northern region so that committee may be sent for inspection in case of failure, without any delay.

A.13 Details of current rating of terminal equipment for EHVAC lines (agenda by NRLDC)

A.13.1 NRLDC representative apprised that for conducting studies for assessment of inter control-area transfer capability or any other related simulation studies, thermal ratings of lines as specified in CEA's Manual on Transmission Planning Criteria 2023 are being considered as safe capacity limit of lines based on anticipated ambient temperature.

A.13.2 He stated that it is being observed in number of cases, especially in RVPN control area that the rating of terminal equipment is lower than thermal capacity of transmission line. This is leading to under-utilisation of line capacity due to limited switchgear rating and even leading to constraints in RE evacuation from Western Rajasthan RE complex.

A.13.3 Some of the lines in RVPN control area wherein this issue was observed are listed below:

- 400kV Bikaner(PG)-Bikaner(RJ) D/C: Issue in ISTS-RE evacuation in Dec 2022 and SPS logic had to be implemented to avoid RE curtailment.
- 400kV Bhadla(PG)-Bhadla(RJ) D/C: N-1 non-compliance observed. SPS proposal under discussion, difficult to provide shutdown in the RE complex.

For these lines, thermal capacity is 1700MVA for design @ 75deg & 2180MVA for design @85deg. However, equipment rating is only 2kA which translates to 1.732*400*2= 1385MVA only, thus limiting line power transfer capacity to 1385MVA only.

Similar issues were earlier observed at 400kV Mahendragarh, Dhanonda and Nawada Sub-station in HVPN control area and most recently in Vishnuprayag for 400kV Vishnuprayag-Muzaffarnagar line.

A.13.4 NRLDC representative further conveyed that the issue of lower line equipment rating has also been discussed in the past in 2018 in NRPC/OCC level wherein NPC had asked RPCs to furnish such details. It was requested that the terminal equipment ratings of STUs' and other transmission licensees' transmission lines in region, may be compiled and furnished to Grid-India with a copy to NPC Division, CEA on priority basis. Communication is attached as **Annexure-VII** of agenda.

A.13.5 Subsequently, the agenda was discussed in number of OCC meetings and transmission utilities were asked to submit the data. Latest status as available with Grid-India is attached as **Annexure-VIII.**

A.13.6 HVPN representative stated that switchgear upgradation works at Dhanonda and Nawada have been awarded by HVPN in Aug this year and would be completed shortly.

A.13.7 CTUIL representative enquired about the actions being taken by RVPN regarding the communication sent from NRPC earlier. RVPN agreed to communicate their response through mail.

A.13.8 POWERGRID representative informed that terminal equipments at RVPN end are of lower rating, however circuit breaker has sufficient rating. The bays were constructed by RVPN and later purchased by POWERGRID.

A.13.9 Chairperson NRPC expressed concern on the under-utilisation of line capacity due to limited switchgear rating and asked NRLDC to circulate format to all utilities to submit the details of terminal equipments and line ratings as highlighted by NRLDC. NRLDC agreed to submit the format and to request the details in next OCC meeting.

Decision of the Forum:

Forum decided the following action points to be taken up by utilities-

- All utilities to furnish the details to Grid-India /CTUIL/NRPC for consideration in future studies and planning of actions well in advance as per format to be circulated by Grid-India.
- Special attention is required by transmission utilities & CTUIL in this regard so as to avoid such issues in future, including for the cases of conductor upgradation.
- Requirement of uprating switchgear ratings in 400kV Bhadla(PG)-Bhadla(RVPN) D/C line to avoid issues in RE evacuation/ facilitating shutdowns during high solar generation period may be taken up in upcoming OCC meeting.

A.14 System Protection Scheme (SPS) in Western Rajasthan ISTS RE Complex (agenda by NRLDC)

A.14.1 NRLDC representative apprised that significant number of grid events (over 30 incidents) involving RE generation loss have occurred between January 2022 and

May 2023. The most severe event resulted in a maximum RE generation loss of 7120 MW, which took place on 15th May 2023. Such substantial losses in RE generation pose a serious threat to grid security, as they have the potential to trigger cascade tripping and lead to electricity supply disruptions over wide areas.

A.14.2 He highlighted that to evacuate the mentioned ~12.4 GW of ISGS RE generation, the Northern Region relies on 16 number of 765kV lines. These transmission lines play critical role in transferring the renewable energy from the generating sources to the consumption centers. Ensuring the reliability and proper functioning of these lines is of utmost importance to maintain grid stability and meet the increasing demand for renewable energy in the region.

A.14.3 In 209th OCC meeting, NRLDC representative addressed the recent outage of 400kV and above transmission lines due to tower collapses and proposed several measures to enhance the reliability and resilience of the grid, especially in the context of the Rajasthan RE complex. The proposed suggestions are as follows:

a. Review of Wind Zones
b. Single Circuit Lines in Critical Corridors
c. n-2 Reliability Criteria for Prone Areas

A.14.4 However, while these long-term suggestions are being implemented on the field, NRLDC representative proposed a SPS Scheme logic for the ISTS RE complex to ensure n-1-1/n-2 compliance during events like tower collapse. NRLDC representative also briefed the forum about the base case assumptions considered while doing the study for SPS requirement. He highlighted that the matter has been discussed in 209, 210 & 211th OCC meetings.

Assessment of Generation backdown of n-2 SPS requirement for 765kV lines of Rajasthan RE pocket

Basecase assumption

400kV Bhadla(RS)-Bikaner(RS) D/C	in service
400kV Bikaner(PG)-Bikaner_2(PG) D/C	in service
STATCOM -1 and 2 @ Bhadla_2	in service
STATCOM-1 @ Bikaner_2	in service
All 400kV lines presently out in Rajasthan	in service
Rajasthan demand	15500 MW
Raj Solar	3400 MW
Raj Wind	1500 MW

Result :

Contingency / Line Loading	Loading of 765kV Fatehgarh2-Bhadla2 D/C > 2000 MW and < 2200 MW	[Loading of 765 kV Fatehgarh2-Bhadla D/C > 1350 and < 1450] or [Loading of 765kV Fatehgarh2_Bhadla2 D/C > 2200 And < 2400]	[Loading of 765 kV Fatehgarh_2-Bhadla D/C > 1450] or [Loading of 765kV Fatehgarh2_Bhadla2 D/C > 2400] or [Loading of 765kV Bhadla2-Ajmer D/C > 3200]
765kV Fatehgarh2-Bhadla D/C	no SPS required	200 MW generation backdown at Fatehgarh-1/2	500 MW backing at Fatehgarh-1/2
765kV Fatehgarh2-Bhadla2 D/C	100 MW backing at Fatehgarh_1	500 MW backing at Fatehgarh-1/2	800 MW backing at Fatehgarh-1/2
765kV Bhadla-Bikaner D/C	no SPS required	no SPS required	no SPS required
765kV Bhadla2-Bikaner D/C	no SPS required	no SPS required	no SPS required
765kV Bhadla2-Ajmer D/C	no SPS required	400 MW backing at Bhadla_2 (due to overloading of Jodhpur-Kankroli/ Bhadla-Jodhpur)	500 MW backing at Bhadla_2 (due to overloading of Jodhpur-Kankroli/ Bhadla-Jodhpur)
765kV Bikaner- Moga D/C	no SPS required	no SPS required	no SPS required
765kV Bikaner- Khetri D/C	no SPS required	no SPS required	no SPS required

A.14.5 He added that CTUIL has also provided their comments in this regard suggesting that with commissioning of STATCOMs at Fatehgarh-II S/s and Transmission Scheme Phase-II Part–A i.e. Establishment of 400kV Fatehgarh-III PS (Sec-1) along with its interconnection to Fatehgarh-II PS and Jaisalmer (RVPN), there will not be requirement of SPS for contingency of 765kV Fatehgarh2-Bhadla D/C and 765kV Fatehgarh2-Bhadla2 D/C.

A.14.6 POWERGRID representative agreed that the logics can be implemented without any issues as decided in NRPC/OCC forum.

A.14.7 Accordingly, following was agreed in 211th OCC meeting (held on 19.09.2023):

- No requirement of SPS for 765kV Fatehgarh2-Bhadla D/C and 765kV Fatehgarh2- Bhadla2 D/C lines given the commissioning of new transmission elements in Sep-Oct 2023
- SPS may be implemented for 765kV Bhadla2-Ajmer D/C contingency as follows:

Contingency / Line Loading	**Antecedent loading of 765kV Bhadla2-Ajmer D/C > 3200**
765kV Bhadla2-Ajmer D/C	400-500 MW backing/generation tripping at Bhadla_2

A.14.8 NRLDC representative stated that NTPC Kolayat (400MW) is connected at 765kV Bhadla2 (through 400kV line) which is evacuating power under short term arrangement. In case of above contingency, 400kV Bhadla2-Kolayat line may be tripped to achieve the desired loading relief.

A.14.9 The above SPS will be reviewed based on further network commissioning and its need will be once again deliberated after commissioning of 765kV Sikar-II and its interconnections.

A.14.10 The proposed SPS will be implemented by POWERGRID at the earliest given that Bhadla-2 is SAS based Sub-station.

A.14.11 CTUIL representative suggested for RE curtailment on pro-rata or rotational basis so that only NTPC is not affected alone. It was further informed that the LTA for present short term projects at Bhadla-II would only be operationalized after commissioning of Sikar-II Sub-station which is expected to take 1-2 years.

Decision of the Forum:

Forum approved the SPS scheme and directed POWERGRID to implement it at the earliest. It was also agreed to trip the generation on rotational basis as per SPS operation.

A.15 Supply and installation of OPGW on 400kV Fatehgarh I (Adani) - Fatehgarh-II (PG) line (6.5 kms), (Fatehgarh-I (Adani) – Bhadla(PG) line LILOed at Fatehgarh-II) as redundant communication for Fatehgarh-I (Adani) (agenda by CTUIL)

A.15.1. CTUIL apprised that presently Fatehgarh-I (Adani) is connected with Bhadla (PG) via LILO point at Fatehgarh-II (PG) with 24F OPGW on one E/W peak of Fatehgarh-I – Bhadla (PG) line. Further on the other E/W peak OPGW (24F) is also installed from Fatehgarh-II (PG) up to the LILO point of Fatehgarh-I (Adani) – Bhadla (PG) line, which is being used for earth wire functionality only as it is not continued up to Fatehgarh-I (Adani) end.

A.15.2. As per the inputs received from Adani & POWERGRID, present connectivity is shown in the figure-1 below where 12 nos. of fibre are used for LILO of Fatehgarh-I (Adani) – Bhadla at Fatehgarh-II and 12 nos. of fibre bypassed towards Bhadla (PG) station.

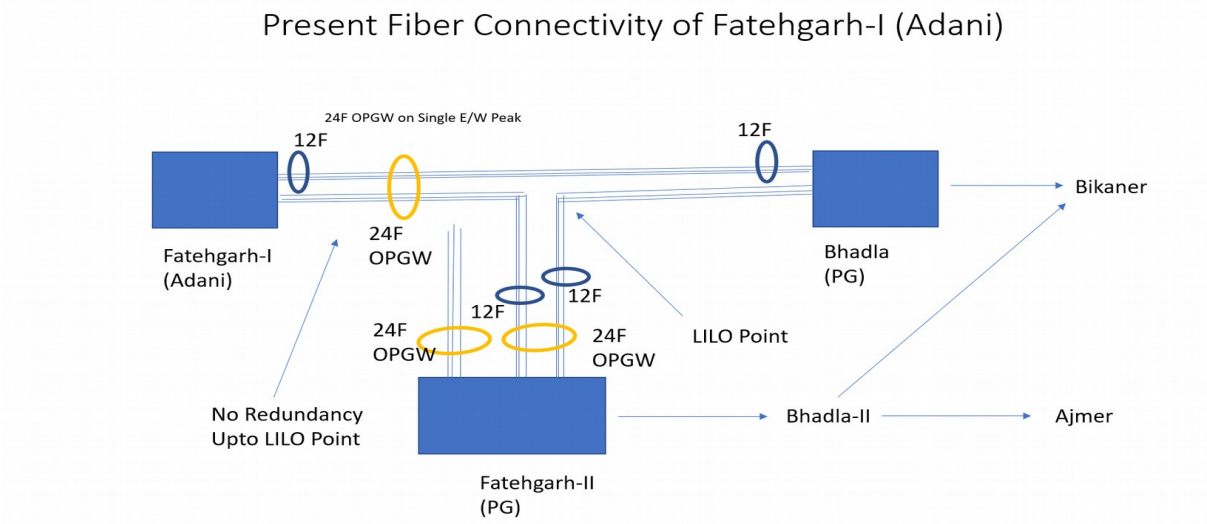


Figure-1

A.15.3. It was proposed that 6.5kms 24F OPGW may be installed on the second peak of 400kV Fatehgarh I - Fatehgarh-II line by replacing the earthwire with OPGW in live line condition upto LILO point of Fatehgarh-II (PG) shown in figure-2 below:

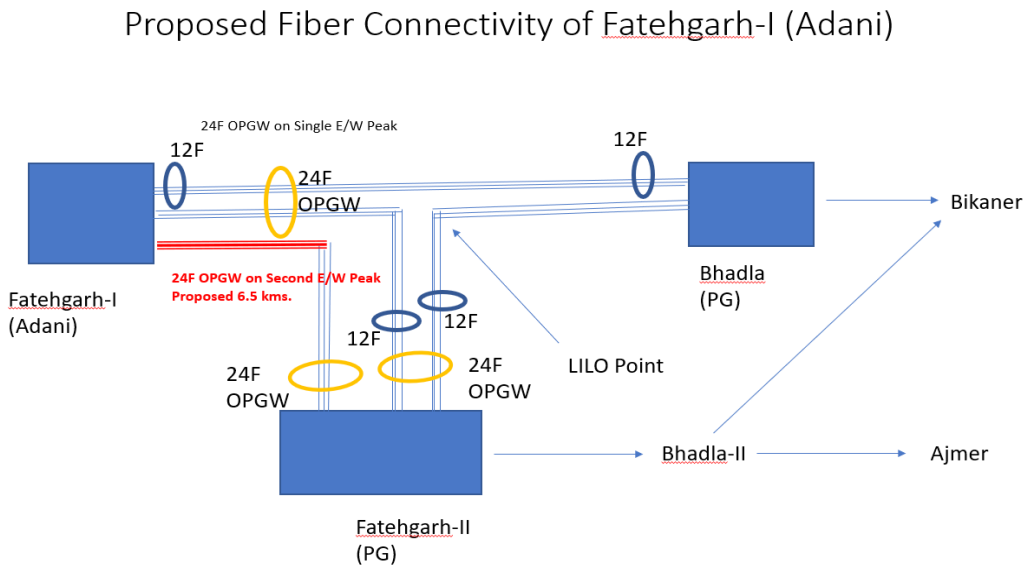


Figure-2

A.15.4. This shall provide redundant communication for Fatehgarh-I (Adani) station up to Fatehgarh-II (PG). Additional FOTE are not required for this configuration as existing FOTE shall be used. Further as Fatehgarh-II (PG) & Bhadla (PG) are connected with other ISTS wideband nodes and thus provides two redundant paths.

A.15.5. CTUIL representative informed that the scheme has already been deliberated in the 22nd & 23rd TeST meeting of NRPC held on 24.05.2023 & 21.09.2023 respectively.

A.15.6. Adani Transmission Limited on RTM mode will implement the work within time frame of 18 months from the date of allocation and the estimated cost of the project is Rs. 32.5 Lakhs (approx.) (excluding taxes and duties).

Decision of the Forum:

Forum approved the above proposal for supply and installation of OPGW on 400kV Fatehgarh I (Adani) - Fatehgarh-II (PG) line under RTM in line with decision taken in the 23rd TeST meeting held on 21.09.2023.

A.16 Supply and Installation of 12 nos. FOTE and additional ethernet (125 nos.) cards for existing FOTE in view of resource disjoint and critical locations (agenda by CTUIL)

A.16.1 EE (P), NRPC apprised that CEA Manual of Communication Planning states that communication resources like FOTE and Media should be resource disjoint. Inputs

for such locations where additional FOTE and ethernet cards for existing FOTE are required, have been provided by POWERGRID for NR. Details of the locations are given at **Annexure-IX.**

A.16.2 This agenda was also discussed in the 2nd & 4th CPM of Northern Region & the 23rd TeST meeting held on 21.09.2023.

A.16.3 CTUIL representative informed that POWERGRID on RTM mode will implement the work within time frame of 12 months from the date of allocation and the estimated cost of the project is Rs. 5.2 Crore (approx.) (excluding taxes and duties).

A.16.4 Accordingly, CTUIL proposed for the supply and Installation of 12 nos. FOTE and additional ethernet cards as per information from POWERGRID.

A.16.5 POWERGRID representative stated that earlier 8 cards were required but now 12 cards are required for redundancy. In view of above, to cover all locations, 125 cards are needed.

Decision of the Forum:

Forum approved the supply and installation of 12 nos. FOTE and additional ethernet (125 nos.) cards for existing FOTE.

A.17 Supply and Installation of 11 nos. FOTE Equipment at Backup SLDCs in NR & Backup NRLDC (agenda by CTUIL)

A.17.1 CTUIL apprised that Grid-India vide letter dated 18.07.2023 requested for planning communication system for upcoming Backup NRLDC at Guwahati and ICCP communication from Main & Backup SLDCs to Backup NRLDC.

A.17.2 CTUIL representative highlighted that as per the new architecture proposed by Grid-India, backup NRLDC is proposed at NER – Guwahati and backup SLDCs in the region. Further, Main and backup SLDC shall report to main and backup RLDC respectively. This agenda was discussed in the 4th CPM of Northern Region and the 23rd TeST meeting. Based on the discussion in 4th CPM of NR and inputs received from POWERGRID & STUs, locations are finalized where additional FOTE are required. Locations along with FOTE requirement are given at **Annexure-X**.

A.17.3 POWERGRID on RTM mode will implement the work in time frame of 12 months from the date of allocation and the estimated cost of the project is Rs. 3.3 Crore (approx.) (excluding taxes and duties).

A.17.4 CTUIL representative conveyed that the agenda has already been deliberated and agreed by all members in the 23rd TeST meeting held on 21.09.2023.

A.17.5 POWERGRID representative raised the concern regarding time frame of the project as back up control centers are not ready for some locations.

A.17.6 CTUIL representative informed that tendering of SCADA is anticipated to be done by October end and after ten months hardware delivery is supposed to be started. Accordingly, SLDC may get the control centers ready within this period. He opined to go with this time frame.

Decision of the Forum:

Forum approved the proposal of CTU for Supply and Installation of 11 nos. FOTE Equipment at Backup SLDCs in NR & Backup NRLDC.

A.18 Hosting of physical TCC & NRPC meeting (agenda by NRPC Secretariat)

A.18.1 EE (P), NRPC conveyed that a roster for hosting of meetings, was agreed in the 40thTCC/43rdNRPC meetings held on 29th/30thOctober, 2018. The roster is as below:

1.Member IPP	9. Punjab	17. Member Trader/PTC
2.NPCIL	10.Member IPP	18. Delhi
3.J&K	11. Rajasthan	19.Member IPP
4.THDC	12. POWERGRID	20. BBMB
5.Member IPP	13. UT of Chandigarh	21. Uttarakhand
6. Haryana	14.Member IPP	22. HP
7. SJVN	15. NHPC	
8. NTPC	16. UP	

Roster for Members IPP is as followed:

1.Adani Power	6.LPGCL
2.APCPL	7.NPL
3.CLP	8.PPGCL
4.JSW Power	9.RPSCL
5.LAPL	10.TSPCL

A.18.2 MS, NRPC commented that physical meeting of NRPC will be conducted quarterly as per previous decision. He further proposed that along with NRPC meeting, Technical Coordination Committee meeting (TCC) may also be held quarterly one day before of scheduled NRPC meeting.

A.18.3 He also conveyed that utilities need some time to prepare for hosting the meeting. Accordingly, based on previous meetings conducted by utilities, it is proposed to make a meeting plan upto FY 2024-25 that needs to include all utilities viz. PSUs,

STUs, Private Sectors, IPPs etc. so that concerned utility may plan in advance for conduction of meeting.

A.18.4 EE (P), NRPC presented the proposed meeting plan upto FY 2024-25. The same is attached as **Annexure-XI**.

Decision of the Forum:

Forum approved the proposed meeting plan and decided that NHPC will be hosting the upcoming 70th NRPC/48th TCC meeting in November 2023. It was also agreed to conduct TCC meetings quarterly one day before of scheduled NRPC meeting.

A.19 Implementation of CERC (Connectivity and General Network Access to the inter-state transmission system) Regulations, 2022 w.e.f. 01.10.2023 - Exclusion of GNA corresponding to drawl of partner States from BBMB generating Stations thereof (agenda by HVPN)

A.19.1 HVPN representative apprised that Central Electricity Regulatory Commission notified Connectivity and General Network Access to the Inter-State Transmission System Regulations, 2022 vide its notification dated 07.06.2022 and 1st amendment was notified on 1st April, 2023. The regulation stipulates that deemed GNA quantum for each State shall be worked out based on the actual drawl of the State during the period of FY 2018-19 to FY 2020-21.

A.19.2 He informed that vide principal regulations dated 07.06.2022 GNA for the State of Haryana has been worked out as 5418 MW excluding the GNA for Adani Power Ltd but the drawl of Haryana from BBMB Generating Stations and IGSTPS, JHAJJAR have been included.

A.19.3 Accordingly, vide comments dated 25.02.2022 on draft CERC GNA Regulations 2021 and subsequent letters addressed to CERC dated 05.07.2022 and 04.08.2022, Haryana submitted its objections regarding inclusion of drawl from BBMB generating stations and IGSTPS, JHAJJAR in its deemed GNA quantum. However, the objections of Haryana were not considered by the CERC while notifying principle GNA regulations on dated 07.06.2022.

A.19.4 HVPN representative further stated that now, CERC vide 1st Amendment to the GNA regulations dated 01st April 2023 added the new regulation 18.3 along with methodology explained in Annexure-II of these regulations. Accordingly, the drawl of

Haryana from IGSTPS, JHAJJAR (275 MW) was reduced from the total GNA of Haryana stipulated in principal regulations by reducing the GNA to 5143 MW.

A.19.5 He raised the concern that the drawl of Haryana from BBMB generating stations has not been excluded by CTUIL/NLDC even after the aforementioned methodology provided in 1st Amendment of principal Regulations, whereas it is amply clear to all stakeholders especially CTUIL/PGCIL/NRLDC/NLDC that these projects along with associated transmission network are owned and operated by partner states through BBMB (formed as per provisions of section 78 to 80 of Punjab Reorganisation Act, 1966).

A.19.6 He mentioned that it is also amply clear to all stakeholders especially CTUIL/PGCIL/ NRLDC/NLDC who are involved in deciding the GNA drawl for Haryana that as per prevailing Central Electricity Regulatory Commission (Grant of Connectivity, Long-term Access and Medium-term Open Access in inter-State Transmission and related matters) Regulations, 2009 being repealed with GNA regulations, LTA/MTOA was never ever considered for apportionment of ISTS charges for Haryana corresponding to its share of power in the power projects managed through BBMB, as generating station along with associated transmission network up to state drawal points are owned by partner states.

A.19.7 Presently while apportioning PoC charges as per prevailing sharing regulations 2020, a total of 4100 MW LTA/MTOA quantum for the State of Haryana is being considered, based on the actual tie-ups/ Power Purchase Agreements (PPAs) executed by Haryana DISCOMS and is without considering around 850 MW share of Haryana in power projects being managed through BBMB.

A.19.8 He also mentioned that in the past during the period from October 2016 to March 2017, Power Grid had claimed Point of Connection (PoC) transmission charges for BBMB (Bhakra Beas Management Board) generating stations, including their associated transmission network managed by BBMB. This matter was raised through petition no. 206/MP/2019 and was recently decided by the Hon'ble CERC on 15.12.2022 in favour of Haryana and other partner states. The relevant extract of the aforementioned order is reproduced as under:

> *17. The dispute of payment of transmission charges for BBMB system is limited to the period October 2016 - March 2017, for which POC rates were notified prior to our Order dated 28.4.2017, considering LTA equivalent to allocated power from BBMB projects. Inclusion of YTC of*

*BBMB assets and share of Rajasthan, Haryana, Punjab and Himachal Pradesh from BBMB stations has already been discontinued for the computation of transmission charges from Q1 of 2017-18**. Since, we have already taken a view with respect to non-consideration of transmission system of BBMB and LTA in respect of BBMB projects under POC, we hereby direct NLDC, POSOCO to revise the PoC calculations for Quarter-3 and Quarter-4 of 2016-2017 after excluding the transmission charges towards transmission system of BBMB and LTA for BBMB projects, and submit the same to Commission within 1 month of issue of this Order, to enable issuance of revised Orders by Commission for respective quarters."***

A.19.9 Additionally, it was submitted to note that CERC had already recognized the peculiar nature of the generation and supply from BBMB and had exempted/excluded the share of BBMB power from the PoC mechanism in the following decisions:

i. Order dated 28.04.2017 passed by this Hon'ble Commission in Petition No. L-1/44/2010-CERC, while determining POC rates, -

"10. The assets of BBMB and LTA in respect of BBMB shall not be included under PoC mechanism and a view on inclusion of these assets under PoC shall be taken after determination of final tariff of these assets."

ii. Order dated 09.01.2019 in Petition 16/TT/2019:

*"38. We have examined the matter in detail. The transmission charges of the ISTS and the intra-State transmission system carrying inter-Sate power were included in the PoC based on the tariff determined by the Commission and State Commissions in case of intra-State transmission system. In these cases, the tariff of the transmission system is determined based on the capital cost and after taking into account all elements of tariff. However, in case of BBMB on account of non-availability of the capital cost of the transmission system and taking into account that the participating States have made investment in the transmission system of BBMB, the Commission has confined its tariff determination to O&M Expenses only**. Including this tariff in the POC will result in distortion of the tariff of the participating States as they would be charged in proportion to their allocation of power at the PoC rate of the region. Accordingly, the Commission has decided to exclude the*

tariff (only O&M Expenses) of the transmission system of BBMB out of the purview of the PoC computation.

39. RUVNL and HPPCL which have filed the affidavit on behalf of the DISCOMS of Rajasthan and Haryana have contended that they have paid the transmission charges of the transmission lines used by the participating States since October 2016, for which they were not liable and ***hence, the excess payment collected from them through PoC charges should be returned to them. The said issue shall be dealt with separately on a petition for the same."***

A.19.10 In view of the above, HVPN requested the members of NRPC to deliberate and consider the following:

i. To direct CTU/NLDC to exclude the drawl of Haryana from generating stations and its associated transmission network owned and operated by partner states through BBMB from its GNA quantum.

ii. If there are any procedural challenges in implementing the request stated above CTU/NLDC and other stakeholders responsible in implementation of GNA regulation w.e.f 01.10.2023 may be requested to take up the matter with CERC for removal of such challenges and consequential hardship to Haryana.

A.19.11 GM, NRLDC highlighted that the same issue was discussed in last Commercial Sub-Committee meeting. Wherein, it was deliberated that BBMB transmission system is being used by its beneficiaries and it is also being charged in GNA. So, double charging should not be there. He opined that HVPN may file petition in honourable CERC in this matter for exemption.

A.19.12 CTU intimated that Punjab has already filed a petition in Hon'ble CERC.

Decision of the Forum:

Forum conveyed HVPN to approach the honourable CERC in the above deliberated matter.

A.20 Updating NR Operating Procedure document (agenda by NRLDC)

A.20.1 NRLDC representative apprised that regulation 5.1(f) of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010, stipulates that a set of detailed internal operating procedure for each regional grid shall be developed and maintained by respective Regional Load Despatch Centres, in consultation with the regional constituents. In compliance with the above regulations, document viz. "Operating Procedures for Northern Region" was prepared by the Northern Regional Load Despatch Centre in July 2023 in consultation with the regional constituents of the Northern Region after discussion in 207 & 208th OCC meetings.

A.20.2 As discussed in 67th NRPC meeting, Central Electricity Regulatory Commission (CERC) has notified the Indian Electricity Grid Code (IEGC) Regulations, 2023. Regulation 28(4) of these regulation mention that:

"Detailed Operating Procedures for each regional grid shall be developed, maintained and updated by respective RLDCs in consultation with NLDC, concerned RPC and regional entities and shall be kept posted on the respective RLDC's website"

A.20.3 In the meeting, NRLDC representative mentioned that NRLDC has prepared the draft operating procedure considering various changes mentioned in the new Indian Electricity Grid Code which has been notified to be effective from 01.10.2023. The procedure was also shared with NR constituents vide email dated 21.09.2023 and is also available @ NRLDC website on following link:

https://nrldc.in/download/draft-operating-procedure-for-northern-region-2022-23-iegc-2023/?wpdmdl=12902

A.20.4 NRLDC representative also presented in brief major changes done in the document w.r.t. the IEGC 2023. The presentation made by NRLDC is attached as **Annexure-XII**.

A.20.5 EE (O), NRPC stated that views of NRPC has already been sent to NRLDC for consideration in operating procedure.

A.20.6 EE (P), NRPC suggested to add permissible time limit for issuing PTW (Permit to Work) for Sub-station of various voltage level such as 765/400/220 kV in operating procedure so that uniform practice is followed by all utilities. NRLDC representative stated that PTW may not be made part of operating procedure; it may be dealt separately.

A.20.7 UPSLDC mentioned that permission for load shedding of 100 MW is not practicable as UP is a large state and such small shedding is common in UP. Rajasthan SLDC also raised the same issue. They also mentioned that at time of morning and evening peaks, large variations come in very short time.

A.20.8 NRLDC representative clarified that variation for morning and evening peak is acceptable.

A.20.9 EE (P), NRPC stated that Hon'ble Commission circulates draft of IEGC so that all stakeholders can express their concern. States could have expressed such concern to the commission.

A.20.10 MS, NRPC stated that such issues may be deliberated in details at OCC forum.

Decision of the Forum:

Forum approved the updated Operating Procedure document subject to any comments from utilities till next OCC meeting. All members were asked to provide their inputs/comments to NRLDC at the earliest.

A.21 Reactive Energy Accounting requirements as per IEGC, 2023 (agenda by NRLDC)

A.21.1 NRLDC representative presented the methodologies proposed for the implementation of the Reactive Energy Account (REA) in accordance with IEGC 2023 along with the regulatory provisions for Reactive Energy Accounting (RE-Accounting) as per IEGC, 2010 and IEGC, 2023.

A.21.2 NRLDC apprised the forum about significant differences between old and new IEGC 2023 with respect to Reactive Energy accounting as below:

SN	As per IEGC, 2010	As per IEGC, 2023
1	Applicable to All Regional Entities except Generating Stations	All Regional Entities including Generating Stations
2	Base Rate: 10 Paise/ kVArh from effective date Escalation Rate: 0.5 Paise/ kVArh/ per Year [Ref: Regulation-6.6 (2)]	Base Rate: 5 Paise/ kVArh from effective date Escalation Rate: 0.5 Paise/ kVArh/ per Year [Ref: Clause 1 (b) of Annexure-4]
3	Provision of Bilateral Settlement for state-owned lines (Natural ISTS Lines) [Mechanism as per Annexure-2]	No such Provision
4	Provision of Pro-rata Settlement (in case of 'Receivables to Pool' is less than 'Payments from Pool') [Clause-14 of Annexure I]	No such Provision

- Unlike IEGC, 2010, there is no provision for pro-rata settlement in case of "Receivables to Pool" is less than "Payments from Pool" in IEGC 2023.

- In this regard, NRLDC expressed concern regarding the possible deficit in the Pool Account arising on account of "Receivables to Pool" being less than "Payments from Pool". Thus, NRLDC requested the forum to devise suitable methodology in case of deficit or surplus.

- NRLDC proposed that for the first few weeks, existing practice can be followed and based on actual scenario/case, RE-Accounting may be reviewed. In case of new proposal at NRPC forum resorting to pro-rata settlement, the same can be reported to Hon'ble Commission.

A.21.3 NRLDC representative briefed the following Reactive power calculation methodology for NR entities:

1. **For drawee entities (States, Railways, NFL, Nepal):** In case of drawee entity, NRLDC informed that all the interface points used for calculation of active drawl will also be used for reactive power interchange calculation. It is based on existing practice except as per IEGC 2023, it now includes Natural ISTS lines (between two states). States own line emanating directly from an ISGS shall also be considered for REA.
2. **For all the regional entity generating stations including Nuclear stations**: VAr drawal/return shall be accounted considering all the outgoing feeders with that generating station
    - De-pooling for Stages within Generating Station (if applicable) shall be carried out on the basis of Installed Capacity of various Stages.
    - RE/ Floating Solar located in the premises of a Generating Station, and feeding through the Common ICT in the Generation Switchyard, VAr drawal/return of the same shall not be accounted separately as the same will be considered in the Var interchange of the principal generating station.
3. **For RE Generating Station:** RE Generating Station (s) directly connected to ISTS Pooling Station(PS) - VAr drawal/return at ISTS Metering Point, end of line connecting REGS and ISTS PS shall be accounted. Detailed methodology for segregation of reactive charges for Multiple RE Generating Station (of Installed Capacity > 50 MW) connected to ISTS Pooling Station

through Intermediate Pooling Station (PS) is provided in **Annexure-XIII**. This methodology was proposed by SRPC and has been agreed pan Grid-India. SRPC has also approved this methodology.

4. **For HVDC drawal points:** HVDC drawal points will not be considered for RE-Accounting, as their drawl is as per MoP allocation, and they are part of ISTS system.
5. Reactive Energy Accounting (REA) would be done irrespective of Generating Unit's Operating Status.
6. Active energy accounting of Nuclear stations/other generating stations where GT and ST were considered, the same shall be shifted from GT and STs combination to outgoing feeder in line with CEA Metering regulation 2006 and amendments thereof.
7. Reactive accounting for the period before COD (i.e. during infirm injection) shall also be considered for REA.

8. **Treatment of Active Power Consumption for providing Reactive Power Support (Night mode operation/Condenser mode) as per IEGC 2023:**

   In line with IEGC, 2023, NRLDC presented a preliminary process for treatment of active power consumption during night mode of operation by a generator. Same is provided in **Annexure-XIV**. NRLDC stated that further deliberation and a robust approach is needed for the accurate treatment of active power consumption of generators during reactive power support in night mode operation/ synchronous condenser mode and the same may be discussed in further meetings.

9. Procedure for Reactive energy charge calculation:

Following was proposed by NRLDC:

i. NRLDC will furnish the verified processed SEM data and the calculation formula of each Regional Entity as per mutually agreed format to NRPC.

ii. NRPC Secretariat would issue the weekly Reactive Energy Account based on the data furnished by NRLDC.

iii. These finalized Methodologies & Procedures will be followed for the account preparation of the week starting from 02.10.2023 (Monday) [i.e., from the Week: 02.10.2023 – 08.10.2023].

A.21.4 MS, NRPC expressed concern that this is an important implementation of IEGC 2023 and since it is table agenda, NRLDC may share the presentation to all stakeholders and further directed the stakeholders to provide the feedback within a week.

Decision of the Forum:

NRLDC was requested to share the presentation to all stakeholders and stakeholders were requested to provide the feedback within a week.

A.22 Charging/ Trial run operation of STATCOM-I at Fatehgarh-2 Sub-station without VSC-2 branch (Agenda by POWERGRID)

A.22.1 POWERGRID representative apprised that the STATCOM station-I (2x ±150 MVAR VSC, 125MVAR MSR, 2x125MVAr MSC) has been installed at Fatehgarh-2 Sub-station. As per advisory received from NRLDC, heat run tests of VSC-1 with MSR, MSC-1 and MSC-2 have been successfully completed. The details of post-charging tests carried out on VSC-1 with MSR, MSC-1 & MSC-2 are attached as **Annexure-XV**.

A.22.2 He further mentioned that due to technical glitch experienced in VSC-2, heat run of VSC-2 could not be completed. The matter has been referred to OEM i.e., Siemens, Germany and is being investigated. As mentioned in email dated 21.09.2023 from SIEMENS, the suspected CT need to be sent to OEM works at Switzerland for root cause analysis. Repair/ rectification is expected to take considerable time.

A.22.3 M/s SIEMENS (STATCOM OEM) has already given clearance for charging of STATCOM station-1 without VSC-2.

A.22.4 GM, NRLDC stated that as per FTC procedure, it is necessary to do trial run after all concerned blocks/units are available. Accordingly, NRLDC is not in condition to issue trial run or charging. He requested POWERGRID to provide user defined model of this STATCOM to do analysis.

A.22.5 POWERGRID representative informed that reason of failure of the suspected CT shall be known after root cause analysis by 07.10.2023 as per M/s Siemens.

A.22.6 In view of the requirement of dynamic compensation in the western Rajasthan area, POWERGRID requested to allow charging/ trial run of STATCOM station-1 at Fatehgarh-2 without VSC-2.

Decision of the Forum:

Forum directed POWERGRID to complete all parts of STATCOM-I at Fatehgarh-2 Sub-station before having trial run or charging.

A.23 Capacity building programme for Northern Regional constituents to be funded through PSDF (agenda by NRPC Secretariat)

A.23.1. EE (P), NRPC apprised that a capacity building programme for Northern Region Constituents was under discussion at NRPC forum for studying the power exchange of Nordic countries, role of TSO (Transmission System Operator), Renewable Energy in power trading, EV integration with grid etc.

A.23.2. The program proposal was discussed in 44th TCC & 47th NRPC Meetings (held on 10th and 11th December, 2019), wherein, POWERGRID presented the draft for capacity building programme to be executed in Nordic countries for 3 batches of 20 officials (one from each constituents). The earlier estimated cost was approximately 10 crores for the programme.

A.23.3. However, due to COVID pandemic, programme could not take place till the date. Other RPCs have already executed this capacity building program. CAG audit has also noticed this pending capacity program.

A.23.4. He mentioned that POWEGRID has been asked to submit revised expenditure of the program. Accordingly, DPR for PSDF funding shall be prepared.

A.23.5. MS, NRPC emphasized that capacity building is need of hour and required to be done for each utility. This will benefits all the constituents in Northern Region.

Decision of the Forum:

POWERGRID was requested to submit revised expenditure to NRPC Secretariat.

Meeting ended with vote of thanks to the Chair.

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List of addressee (via mail)

NRPC Members for FY 2023-24

S. No.	NRPC Member	Category	Nominated/ Notified/Delegated Member	E-mail
1	Member (GO&D), CEA	Member (Grid Operation & Distribution), Central Electricity Authority (CEA)	Member (GO&D), CEA	member.god@cea.nic.in
2	Member (PS), CEA	Nodal Agency appointed by the Government of India for coordinating cross-border power transactions	Member (PS), CEA	memberpscea@nic.in
3	CTUIL	Central Transmission Utility	Chief Operating Officer	pcgarg@powergrid.in
4	PGCIL	Central Government owned Transmission Company	Director (Operations)	tyagir@powergrid.in
5	NLDC	National Load Despatch Centre	Executive Director	scsaxena@grid-india.in
6	NRLDC	Northern Regional Load Despatch Centre	Executive Director	rk.porwal@grid-india.in
7	NTPC	Central Generating Company	Director (Finance)	jaikumar@ntpc.co.in
8	BBMB		Chairman	cman@bbmb.nic.in
9	THDC		ED (PSP&APP)	lpjoshi@thdc.co.in
10	SJVN		CMD	sectt.cmd@sjvn.nic.in
11	NHPC		Director (Technical)	ykchaubey@nhpc.nic.in
12	NPCIL		Director (Finance)	df@npcil.co.in
13	Delhi SLDC	State Load Despatch Centre	General Manager	gmsldc@delhisldc.org
14	Haryana SLDC		Chief Engineer (SO&C)	cesocomm@hvpn.org.in
15	Rajasthan SLDC		Chief Engineer (LD)	ce.ld@rvpn.co.in
16	Uttar Pradesh SLDC		Director	directorsldc@upsldc.org
17	Uttarakhand SLDC		Chief Engineer	anupam_singh@ptcul.org
18	Punjab SLDC		Chief Engineer	ce-sldc@punjabsldc.org
19	Himachal Pradesh SLDC		Chief Engineer	cehpsldc@gmail.com
20	DTL	State Transmission Utility	CMD	cmd@dtl.gov.in
21	HVPNL		Managing Director	md@hvpn.org.in
22	RRVPNL		CMD	cmd.rvpn@rvpn.co.in
23	UPPTCL		Managing Director	md@upptcl.org
24	PTCUL		Managing Director	md@ptcul.org
25	PSTCL		CMD	cmd@pstcl.org
26	HPPTCL		Managing Director	md.tcl@hpmail.in
27	IPGCL	State Generating Company	Managing Director	md.ipgpp@nic.in
28	HPGCL		Managing Director	md@hpgcl.org.in
29	RRVUNL		CMD	cmd@rrvun.com
30	UPRVUNL		Managing Director	md@uprvunl.org
31	UJVNL		Managing Director	md@ujvnl.com
32	HPPCL		Managing Director	md@hppcl.in
33	PSPCL	State Generating Company & State owned Distribution Company	CMD	cmd-pspcl@pspcl.in
34	DHBVN	State owned Distribution Company (alphabetical rotaional basis/nominated by state govt.)	Director (Projects)	directorprojects@dhbvn.org.in
35	Jaipur Vidyut Vitran Nigam Ltd.		Managing Director	md@jvvnl.org
36	Madhyanchal Vidyut Vitaran Nigam Ltd.		Managing Director	mdmvvnl@gmail.com
37	UPCL		Managing Director	md@upcl.org
38	HPSEB		Managing Director	md@hpseb.in
39	Prayagraj Power Generation Co. Ltd.	IPP having more than 1000 MW installed capacity	Head (Commercial & Regulatory)	sanjay.bhargava@tatapower.com
40	Aravali Power Company Pvt. Ltd		CEO	SRBODANKI@NTPC.CO.IN
41	CLP Jhajjar Power Ltd.,		CEO	rajneesh.setia@apraava.com
42	Talwandi Sabo Power Ltd.		COO	Vibhav.Agarwal@vedanta.co.in
43	Nabha Power Limited		CEO	sk.narang@larsentoubro.com
44	Lanco Anpara Power Ltd		President	sudheer.kothapalli@lancogroup.com
45	Rosa Power Supply Company Ltd		Station Director	Hirday.tomar@relianceada.com
46	Lalitpur Power Generation Company Ltd		Managing Director	vksbankoti@bajajenergy.com
47	MEJA Urja Nigam Ltd.		CEO	hopmeja@ntpc.co.in
48	Adani Power Rajasthan Limited		COO, Thermal, O&M	jayadeb.nanda@adani.com
49	JSW Energy Ltd. (KWHEP)		Head Regulatory & Power Sales	jyotiprakash.panda@jsw.in
50	RENEW POWER	IPP having less than 1000 MW installed capacity (alphabetical rotaional basis)	CEO	sumant@renew.com

51	UT of J&K	From each of the Union Territories in the region, a representative nominated by the administration of the Union Territory concerned out of the entities engaged in generation/ transmission/ distribution of electricity in the Union Territory.	Chief Engineer, JKPTCL	sojpdd@gmail.com
52	UT of Ladakh		Chief Engineer, LPDD	cepdladakh@gmail.com
53	UT of Chandigarh		Executive Engineer, EWEDC	elop2-chd@nic.in
54	BYPL	Private Distribution Company in region (alphabetical rotaional basis)	CEO	Amarjeet.Sheoran@relianceada.com
55	Bikaner Khetri Transmission Limited	Private transmission licensee (nominated by cetral govt.)	Vice-President	nihar.raj@adani.com
56	Adani Enterprises	Electricity Trader (nominated by central govt.)	Head Power Sales & Trading	anshul.garg@adani.com
57	Ajmer Vidyut Vitran Nigam Ltd.	Special Invitee	Managing Director	md.avvnl@rajasthan.gov.in
Special Invitees:				
RE Holding companies in NR with installed capacity of more than 1000 MW (provsional members as decided in 59th NRPC meeting)				

Special Invitees:

1. Shri. Chowna Mein, Hon'ble Dy. Chief Minister and I/C Power, Govt. of Arunachal Pradesh, Block No.2, 5th Floor, A.P. Civil Secretariat, Itangar-791111. [Email: chowna.mein@gov.in]Tel -03602212671
2. Shri Ginko Lingi, Chairman, TCC, NERPC & Chief Engineer (P), TPMZ , Department of Power, Govt. of Arunachal Pradesh, Vidyut Bhawan, zero Point, Itanagar-791111. [Email: ginko.lingi@gmail.com] Tel -9612153184
3. Shri K Vijayanand, Chairperson, SRPC, Chairman & Managing Director , Transmission Corporation of Andhra Pradesh Limited, Vidyut Soudha, Gunadala, Eluru Rd, Vijayawada, Andhra Pradesh 520004. [Email: cmd.aptransco@aptrandco.in ; vjanand@nic.in] Tel -08662429201
4. Shri AKV Bhaskar, Chairperson TCC, SRPC, Director (Trasmission & Grid Management), Transmission Corporation of Andhra Pradesh Limited, Vidyut Soudha, Gunadala,Eluru Rd, Vijayawada, Andhra Pradesh 520004. [Email: kannanvenkatabhaskar.angulabharanam@aptransco.co.in] Tel -.08662429209
5. Sri Nikunja Bihari Dhal, IAS, Chairman, ERPC, Additional Chief Secretary to Govt., Department of Energy, Govt. of Odisha, Bhubaneswar. [Email-chairman@gridco.co.in] Tel -06742540098
6. Shri Trilochan Panda, Managing Director, GRIDCO, Chairperson TCC, ERPC, GRIDCO Limited, Regd. Office: Janpath, Bhubaneswar – 751022. Tel -06742540877 [Email- md@gridco.co.in]
7. Shri Sanjay Dubey, Chairman, WRPC & Principal Secretary(Energy), GoMP, VB-2, Vallabh Bhawan Annex, Mantralay, Bhopal: 462 001 (M.P.), Email: psenergyn@gmail.com, Tel. 0755-2708031
8. Shri Raghuraj Rajendran, Chairman-TCC, WRPC & Managing Director MPPMCL, Block No-15, Shakti Bhawan, Vidyut Nagar, Rampur, Jabalpur-482008. [Email-mdofmppmcl@gmail.com]
9. Smt. Rishika Saran, Member Secretary, NPC, Sewa Bhawan, R. K. Puram, New Delhi-66 [Email-cenpc-cea@gov.in]
10. Shri Deepak Kumar, Member Secretary, WRPC, Plot No- F-3, MIDC Area, Marol, Opp. SEEPZ, Central Road, Andheri (East), Mumbai-40093.[email: ms-wrpc@nic.in] Tel - 02228221636
11. Shri Asit Singh, Member Secretary, SRPC, No.29, Race Course Cross Road, Bengaluru-560009. [Email: mssrpc-ka@nic.in] Tel -08022287205/9449047107
12. Shri N.S. Mondal, Member Secretary, ERPC,14,Golf Club Road, ERPC Building, Tollygunje,Kolkata-700033. [Email: mserpc-power@nic.in]- Tel 03324239651/9958389967
13. Shri K B Jagtap, Member Secretary, NERPC, NERPC Complex, Dong Parmaw, Lapalang, Shillong-793006. [Email: ms-nerpc@gov.in] Tel -03642534077/ 8652776033
14. Shri Chandra Prakash, Chief Engineer, GM Division, CEA, Sewa Bhawan, R. K. Puram, New Delhi-66 [Email: cp_cea@nic.in]

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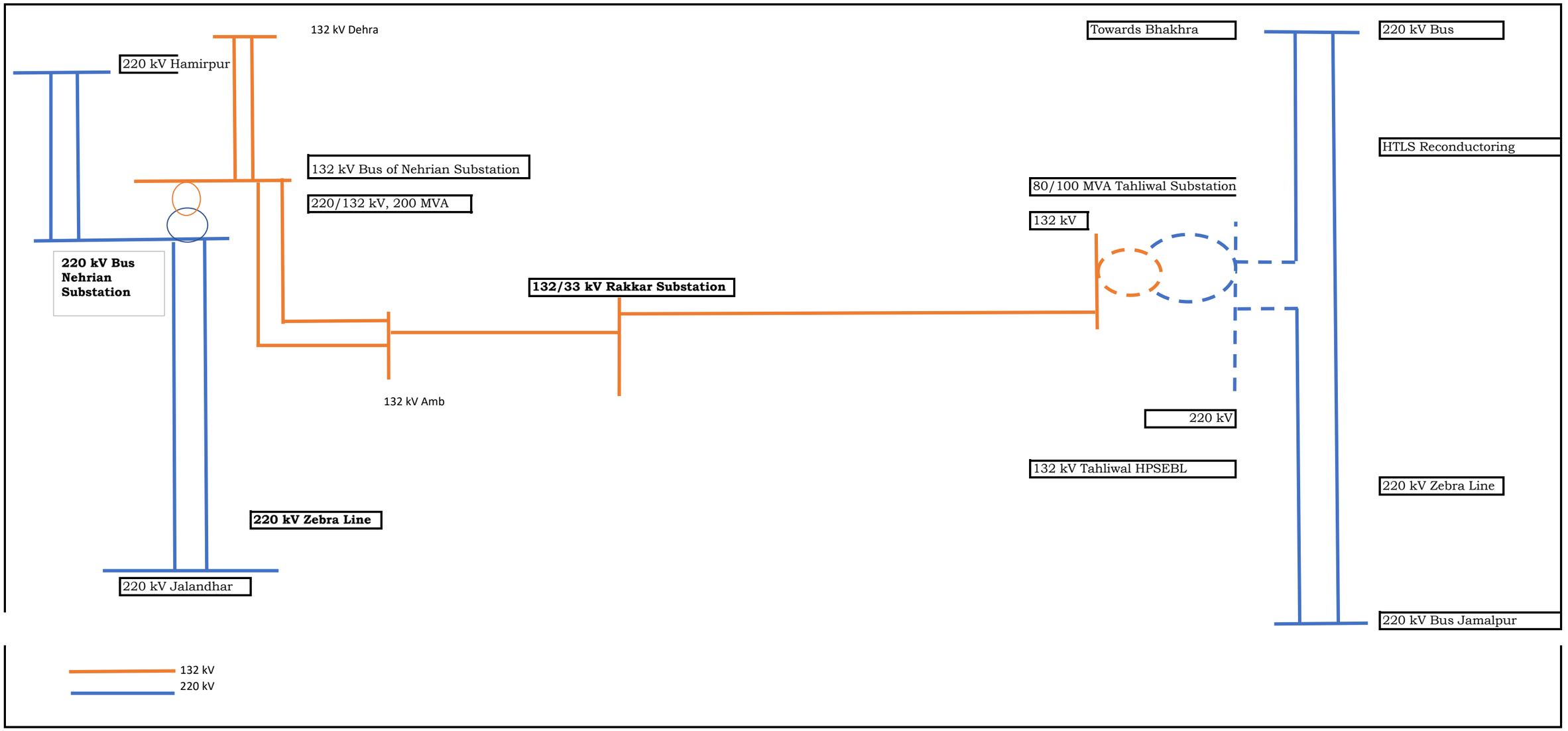
Annexure-I


132 kV Dehra
Towards Bhakhra
220 kV Bus
220 kV Hamirpur
HTLS Reconductoring
132 kV Bus of Nehrian Substation
80/100 MVA Tahliwal Substation
220/132 kV, 200 MVA
132 kV
220 kV Bus Nehrian Substation
132/33 kV Rakkar Substation
132 kV Amb
220 kV
132 kV Tahliwal HPSEBL
220 kV Zebra Line
220 kV Zebra Line
220 kV Jalandhar
220 kV Bus Jamalpur
132 kV
220 kV

List of generating stations in NR having pendancy

STATION ID	STATION NAME	CAP	STN_TYPE_ID	SECTOR_TYPE	REGION_NM	ST_NM	SH_NM	FUEL_NM
100137	ANPARA C TPS	1200	THERMAL	IPP SECTOR	Northern	Uttar Pradesh	LAPPL	COAL
100030	ANPARA TPS	2630	THERMAL	STATE SECTOR	Northern	Uttar Pradesh	UPRVUNL	COAL
100663	ANTA CCPP	419.33	THERMAL	CENTRAL SECTOR	Northern	Rajasthan	NTPC Ltd.	NATURAL GAS
100664	AURAIYA CCPP	663.36	THERMAL	CENTRAL SECTOR	Northern	Uttar Pradesh	NTPC Ltd.	NATURAL GAS
100313	BARSINGSAR LIGNITE	250	THERMAL	CENTRAL SECTOR	Northern	Rajasthan	NLC	LIGNITE
100778	BETA CCPP	0	THERMAL	IPP SECTOR	Northern	Uttarakhand	BIPL	NATURAL GAS
100726	DADRI CCPP	829.78	THERMAL	CENTRAL SECTOR	Northern	Uttar Pradesh	NTPC Ltd.	NATURAL GAS
100152	DADRI (NCTPP)	1820	THERMAL	CENTRAL SECTOR	Northern	Uttar Pradesh	NTPC Ltd.	COAL
100669	DAE (RAJASTHAN)	100	NUCL	CENTRAL	Northern	Rajasthan	DAE	NUCLEAR

			EAR	SECTOR				
100727	FARIDABAD CCPP	431.59	THERMAL	CENTRAL SECTOR	Northern	Haryana	NTPC Ltd.	NATURAL GAS
100843	GHATAMPUR TPP	0	THERMAL	CENTRAL SECTOR	Northern	Uttar Pradesh	NUPPL	COAL
100156	HARDUAGANJ TPS	1265	THERMAL	STATE SECTOR	Northern	Uttar Pradesh	UPRVUNL	COAL
100842	JAWAHARPUR STPP	0	THERMAL	STATE SECTOR	Northern	Uttar Pradesh	UPRVUNL	COAL
100797	MEJA STPP	1320	THERMAL	CENTRAL SECTOR	Northern	Uttar Pradesh	MUNPL	COAL
100841	OBRA-C STPP	0	THERMAL	STATE SECTOR	Northern	Uttar Pradesh	UPRVUNL	COAL
100148	OBRA TPS	1000	THERMAL	STATE SECTOR	Northern	Uttar Pradesh	UPRVUNL	COAL
100711	PAMPORE GPS (Liq.)	175	THERMAL	STATE SECTOR	Northern	Jammu and Kashmir	JKSPDC	HIGH SPEED DIESEL
100850	PANKI TPS EXT	0	THERMAL	STATE SECTOR	Northern	Uttar Pradesh	UPRVUNL	COAL

List of generating stations in NR having pendancy

100317	PARICHHA TPS	1140	THERMAL	STATE SECTOR	Northern	Uttar Pradesh	UPRVUNL	COAL
100616	PRAYAGRAJ TPP	1980	THERMAL	IPP SECTOR	Northern	Uttar Pradesh	PPGCL (Jaypee)	COAL
100422	RIHAND STPS	3000	THERMAL	CENTRAL SECTOR	Northern	Uttar Pradesh	NTPC Ltd.	COAL
100423	SINGRAULI STPS	2000	THERMAL	CENTRAL SECTOR	Northern	Uttar Pradesh	NTPC Ltd.	COAL
100440	TANDA TPS	1760	THERMAL	CENTRAL SECTOR	Northern	Uttar Pradesh	NTPC Ltd.	COAL
100441	UNCHAHAR TPS	1550	THERMAL	CENTRAL SECTOR	Northern	Uttar Pradesh	NTPC Ltd.	COAL

Annexure-III

फोन Phone -26511211
फेक्स Fax : 26865206
ई मेल e- mail: ms-nrpc@nic.in
वेबसाईट Website : ww.nrpc.gov.in

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

सं. उक्षेविस/ वाणिज्यिक/ 209/ आर पी सी (39 वीं)/2017/8010 - 8098 दिनाँक : 14 जुलाई, 2017
No. NRPC/ Comml/ 209/ RPC (39th)/2017/ Dated: 14th July, 2017

सेवा में,
To,

उत्तरी क्षेत्रीय विद्युत समिति तथा तकनीकी समंवय उप-समिति के सदस्य
(संलग्न सूची के अनुसार)

Members of Northern Regional Power Committee and TCC
(As per list attached)

विषय: उत्तरी क्षेत्रीय विद्युत समिति की 39 वीं तथा तकनीकी समंवय उप-समिति की 35 वीं बैठक का कार्यवृत्त।

Subject: 39th meeting of Northern Regional Power Committee and 35th meeting of TCC – Minutes.

महोदय,
Sir,

उत्तरी क्षेत्रीय विद्युत समिति की 39 वीं बैठक दिनांक 02 मई, 2017 को तथा तकनीकी समंवय उप-समिति की 35 वीं बैठक दिनांक 01 मई, 2017 को चायल (शिमला), हिमाचल प्रदेश में आयोजित की गयी थी। इन बैठकों के कार्यवृत उत्तर क्षेत्रीय विद्युत समिति की वेबसाइट पर उपलब्ध है।

The 39th meeting of Northern Regional Power Committee was held on 02nd May, 2017 and 35th meeting of TCC was held on 01st May, 2017 at Chail (Shimla), Himachal Pradesh. The minutes of the meetings are available on Northern Regional Power Committee website.

भवदीय/Yours faithfully,

(एम.ए.के.पी. सिंह)
(M.A.K.P. Singh)
सदस्य सचिव
Member Secretary

15	Chittorgarh(PG)	RAJASTHAN	125
16	Suratgarh(PG)	RAJASTHAN	125
17	Parichha	UP	125
18	Allahabad(PG)	UP	125
19	Mainpuri	UP	125
20	Unnao	UP	125
21	Gonda	UP	125
22	Meerut(PG)	UP	125
23	Kashipur	UTTRAKHAND	125
24	Srinagar	UTTRAKHAND	125

B.5.3 He informed that the progress on action taken in the matter was being deliberated in monthly OCC meetings. States were requested to submit the action plan for installation of the approved reactors. However, none of the states has submitted the action plan.

B.5.4 Member Secretary, NRPC stated that the matter was discussed in 134th OCC meeting held on 24th April, 2017, wherein, Rajasthan informed that they have carried out study for requirement of reactors and there was difference in Reactor requirement as per their study and that carried out by POWERGRID. OCC suggested that Rajasthan should approach CEA and POWERGRID. Rajasthan had informed in the OCC meeting that they have written to POWERGRID for clarification on the issue. It was also noted that requirement for Delhi was also to be reviewed.

B.5.5 OCC recommended that the report by POWERGRID and study by Rajasthan may be referred to Standing Committee on Power System Planning. After approval in standing committee the proposal may again be put up before TCC and NRPC.

B.5.6 TCC agreed with the recommendation of OCC to refer the report of the POWERGRID as well as study by Rajasthan to Standing Committee on Power System Planning of NR.

B.5.7 TCC opined that to avoid error in studies by different utilities there should be a common database for the system studies.

NRPC Deliberations

B.5.8 NRPC approved the proposal of TCC for referring the studies to standing committee on Power System Planning of NR and the decision therein would be put up before TCC and NRPC for concurrence.

B.6 Reliable Communication Scheme under Central Sector for Northern Region

TCC Deliberation

B.6.1 POWERGRID representative informed that as desired by Ministry of Power, DPR for OPGW based Reliable Communication scheme for substations of 132 KV and above was prepared by POWERGRID for all the regions. Further, as per directives of Ministry of Power, State Sector of the Scheme was to be taken up by respective states for their portion and Central Sector portion was to be implemented by POWERGRID. Accordingly, Fiber Optic connectivity along with Communication Equipment and associated items was required to be established from different stations under Central Sector scheme for data and voice communication to NRLDC for efficient grid management, as per details given below in Table - 4:

Table 4

Sl. No.	Name of Stations	Link Name	Approx. Line Length (km)
1	Baspa HEP (JP)	1. 400kV D/C Baspa HEP –KarchamWangtoo	18
2	Karcham Wangtoo	1. 400kV D/C Karcham Wangtoo - Kala Amb (Excluding LILO portion)	100
3	Kala Amb	2. 400kV D/C Kala Amb -Abdullapur (Excluding LILO portion)	100
4	Shongtong HEP (HPCL)	1. 400kV D/C Shongtong HEP -Wangtoo Pooling Station	50
		2. 400kV D/C Karcham Wangtoo-Wangtoo Pooling Station (LILO portion)	25
		3. 400kV D/C Wangtoo Pooling Station - Abdullapur (LILO portion)	25
5	Kashang HEP (HPCL)	1. 220kV D/C Kashang HEP -Jhangi Pooling Station.	75
		2. 400kV S/C Shongtong-Jhangi (LILO Portion)	80
		3. 400kV S/C Jhangi- Wangtoo (LILO portion)	
6	Ratle HEP (GVKHEPL)	1. 400kV S/C Dulhasti- Ratle HEP (LILO Portion)	65

Sl. No.	Name of Stations	Link Name	Approx. Line Length (km)
		2.400kV S/C Ratle HEP-Kishenpur (LILO Portion)	65
7	Kotlibehl HEP (NHPC)	1. 220kV D/C Kotlibehl HEP-Rishikesh	100
8	Allain Duhagan HEP (ADHEPL)	1. 220kV D/C ADHEPL-Nalagarh	150
9	Chhaur PS (Malana II Everest Power Private Ltd)	1. 220 KV D/C ADHEP- Chhaur Pooling Station (LILO portion)	50
		2. 220 KV D/C Chhaur Pooling Station - Nallagarh (LILO portion)	50
10	Budhil HEP (Greenko)	1. 220kV Budhil HEP - Chamera -III	50
11	Tapovan Vishnugarh HEP (NTPC)	1. 400kV TapovanVishnugarh - Pipalkotti 2. 400kV PipalKotti- Muzzafarnagar	250
12	Sorang HEP (HSPL)	1. 400kV D/C KarchamWangtoo- Sorang HEP	250
		2. 400kV D/C Sorang HEP-Abdullapur	
13	Jhajjar TPS (NDPL)	1. 400kV D/C Jhajjar(TPS) - Mundaka	66
		2. 400kv D/C Mundaka-Bawana	20
		3. 400kV D/C Bawana-Dipalpur	26
14	Sawra-Kuddu HEP (HPCL)	1. Sawara Kuddu-Gumma (HEP)	20
		2.400kV D/C Abdullapur - Gumma HEP (LILO portion)	30
		3.400kV D/C Gumma - NathpaJhakari (LILO portion)	30

Sl. No.	Name of Stations	Link Name	Approx. Line Length (km)
15	RAPP VII & VIII NPS (NPCIL) Kota	1. 400kV S/C RAPP VII & VIII NPS –Kota (LILO portion)	50
		2. 400kV S/C Kota- Jaipur(South) (LILO portion)	50
16	Baglihar HEP	1. 400kV D/C Baghlihar-Kishenpur	150
17	Vishnuprayag HEP	1. 400kV S/C Vishnuprayag (HEP) –Srinagar HEP	109
18	Srinagar HEP	2. 400kV S/C Srinagar HEP-Muzaffarnagar	189
19	Parbati II HEP	400kV S/C Parbati II (HEP) - Parbati III	20
20	Parbati III HEP	400kV S/C Parbati III (HEP) - Parbati Pooling	20
21	Rosa TPS (RSPCL) Reliance	Rosa - Bareily	116
22	Parbati Pooling	400kV S/C Parbati Pooling (Banala) - Koldam	80
23	Meja TPS	400kV D/C Meja-Allahabad	30
		Total Length (in Km.):	**2509**

B.6.2 He further informed that Connectivity along with Communication Equipment and associated items was also required by establishing following OPGW links of Central Sector to provide redundancy in the system for connectivity with NRLDC as per details given in Table -5 :

Table 5

Sl.No.	Node	Name of Link	Line Length (Km.)
1	Fatehpur 765	400kV Fatehpur - Mainpuri	260
2	Auraiya (NTPC)	400kV Auraiya-Agra	166

3	Kanpur 765	765kV Kanpur 765 - Varanasi 765	320
4	Aligarh 765 kV	765kV Orai - Aligarh 765	300
5	Tanakpur 220kV	220kV Tanakpur-Bareily	106
6	Rosa TPS	400kV Rosa TPS - Lucknow 400kV	170
7	Lucknow New 765kV	765kV Lucknow New- Bareily New	255
8	RAPP B	RAPP B - Chittorgarh	129
9	Chamera-I	400kV Chamera I - Jallandhar	162
10	Rae bareilly 400kV	220kV Raebareilly - Lucknow	1
11	Rihand STPS	400kV Rihand-Allahabad	279
12	Bairasiul	220kV Bairasiul-Jassore	150
13	Moga-Kishenpur Link	765kV S/C Moga-Kishenpur	275
14	Vishnuprayag	400kV S/C Vishnuprayag - Muzaffarnagar	280
15	Karcham Wangtoo HEP (JP)	400kV D/C Karcham Wangtoo – Naptha Jhakari	17
16	Amargarh	400kV Uri –Amargarh (Excluding LILO)	95
		400kV Amargarh - Wagoora (Excluding LILO)	
		Total=	**2965**

B.6.3 He stated that considering above, POWERGRID has worked out 5474 kms. OPGW based Communication Scheme. The estimated cost of the scheme was ₹137 Crs., which was proposed for implementation on cost plus basis. Tariff for the investment made was to be shared by all constituents as per CERC notification. He proposed that the scheme would become part of existing Commercial Agreement signed for ULDC Project.

B.6.4 It was deliberated that state portion was being implemented through 30% funding from PSDF. It was noted that only few states e.g. UP and Rajasthan had put up proposal for PSDF funding. TCC advised other States also to put

up schemes of OPGW for state portion for PSDF funding. On a request for increase in PSDF funding, NPC representative informed that enhancement of funding from existing 30% was under consideration.

B.6.5 Representative of Himachal Pradesh expressed concern over delay in implementation of earlier scheme by POWERGRID. He requested TCC to fix a definite timeline for implementation of the proposed scheme. Replying to a query, POWERGRID representative informed that scheme would be completed in 30 months after issuance of NIT.

B.6.6 TCC recommended the proposal by POWERGRID for installation of 5474 kms. of OPGW based communication scheme, at an estimated cost of 137 Crs. for the approval of NRPC and advised POWERGRID to implement the scheme within 30 months.

NRPC Deliberations

B.6.7 NRPC approved the proposal by POWERGRID for installation of 5474 kms. of OPGW based communication scheme, at an estimated cost of 137 Crs. with the time line of 24 months from placing the Letter of Award. It was also decided that the award would be placed by Nov, 2017.

B.6.8 Regarding the State portion, it was noted that UP and Rajasthan had already submitted DPRs and Punjab was in process of submitting the DPR. It was also noted that there was no need for additional OPGW in Himachal Pradesh and Delhi. Haryana representative stated that it would submit DPR for additional communication system, if funding is increased up to 90% from PSDF. J&K representative informed that for OPGW scheme, the proposal would be submitted for PSDF funding.

B.7 Downstream network by State Utilities from ISTS Stations

TCC Deliberation

B.7.1 POWERGRID representative informed that the following sub-stations (new and augmentation), as given in Table-6, were planned under various transmission schemes and the same were implemented /under implementation:

Table- 6

Sl.	Name of Substation	MVA Capacity	Expected Schedule	Remarks
Down Stream network by State utilities from ISTS Station being ready shortly				
1	400/220kV Parbati Pooling Station	2x315	April 2017	Downstream system for 6 Nos 220 kV bays to be matched. State (Himachal Pradesh) Line (18 Kms) work

सत्यमेव जयते

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

सं. उक्षेविस/ वाणिज्यिक/ 209/ आर पी सी (40 वीं)/2018/ 455-543 दिनाँक : 11 जनवरी, 2018
No. NRPC/ Comml/ 209/ RPC (40th)/2018/ Dated: 11th January, 2018

सेवा में / To,

उ.क्षे.वि.स. के सभी सदस्य
Members of NRPC/TCC

विषय: उत्तरी क्षेत्रीय विद्युत समिति की 40 वीं तथा तकनीकी समंवय उप-समिति की 37 वीं बैठक का कार्यवृत्त ।

Subject: 40th meeting of Northern Regional Power Committee and 37th meeting of TCC – Minutes.

महोदय / Sir,

उत्तरी क्षेत्रीय विद्युत समिति की 40 वीं बैठक दिनांक 28 अक्तूबर, 2017 को तथा तकनीकी समंवय उप-समिति की 37 वीं बैठक दिनांक 27 अक्तूबर, 2017 को श्रीनगर, जम्मू-कश्मीर में आयोजित की गयी थी । इन बैठकों के कार्यवृत की एक प्रति आपकी सूचना व आवश्यक कार्यवाही हेतु इस पत्र के साथ संलग्न है।

The 40th meeting of Northern Regional Power Committee was held on 28th October, 2017 and 37th meeting of TCC was held on 27th October, 2017 at Srinagar, Jammu & Kashmir. A copy of the minutes of the meetings is enclosed herewith for favour of information and necessary action.

भवदीय/Yours faithfully,

11/1/18

(एम.ए.के.पी. सिंह)
(M.A.K.P. Singh)
सदस्य सचिव
Member Secretary

18-ए, शहीद जीत सिंह मार्ग, कटवारिया सराय, नई दिल्ली- 110016 फोन:011-26513265 फेक्स: 011-26865206 ई-मेल: ms -nrpc@nic.in वेबसाईट: www.nrpc.gov.in
18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016 Phone: 011-26513265 Fax: 011-26865206 e- mail: ms-nrpc@nic.in Website: www.nrpc.gov.in

a) TCR of capacity 500 MVAr at Kurukshetra 400 kV bus.

b) Bus Reactors at 30 Nos. 220 kV sub-stations and 18 Nos 400 kV level sub-stations subject to the availability of space (Annexure II to the Agenda note)**.** It was also agreed that these reactors shall be provided by the owner of the substations.

B.3.3 Member Secretary, NRPC briefed that the TCR of 500 MVAr at 400 kV Kurukshetra bus had been approved by the standing Committee in view of the prevailing high voltage conditions at Kurukshetra which leads to curtailing power transfer capability through Champa- Kurukshetra HVDC.

B.3.4 NRPC requested POWERGRID to commission TCR of capacity 500 MVAr at Kurukshetra 400 kV bus at the earliest as apart from providing voltage relief it would also help in stabilization of Champa –Kurukshetra HVDC.

B.3.5 NRPC advised all the utilities to commission the reactors as given in Annexure II to the Agenda note at the earliest and to submit the detailed action plan with the timeline in the next OCC meeting. NRPC further pointed that these reactors are essential for maintaining the voltage level of the grid and needs to be commissioned within 26 months.

B.3.6 POWERGRID informed that the reactors proposed at the ISTS stations would be done under Tariff Based Competitive Bidding (TBCB) and the timeline for the same cannot be provided. However, POWERGRID assured of commissioning the TCR at Kurukshetra at the earliest.

B.4 Reliable Communication Scheme under Central Sector for NR.

TCC Deliberations

B.4.1 Member Secretary, NRPC informed the Committee that 39th NRPC had approved, implementation of following Communication Schemes:

1) Reliable Communication Scheme under Central Sector for Northern Region comprising 5474 Km of OPGW along with communication equipments and associated items at an estimated cost of Rs. 137 Cr.

2) Replacement of OPGW along with communication equipments installed under ULDC phase-I at an estimated cost of Rs. 59 Crs as a part of Reliable Communication Scheme under Central Sector for Northern Region.

B.4.2 He further mentioned that, based on NRPC approval POWERGRID has prepared the Detailed Project Report. As per DPR, quantities along with cost of the project are as under:

a) Reliable Communication Scheme under Central Sector for Northern Region consisting of 5428 Km of OPGW along with communication equipments and associated items at a cost of Rs. 177 Cr.

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

B.4.3 POWERGRID submitted that the Implementation of "Reliable Communication Scheme under Central Sector for Northern Region" consisting of 7248 Km (5428 Km + 1820 Km) of OPGW along with communication equipment and associated items was planned at a total cost of Rs. 237 Cr (Rs. 177 Crs + Rs. 60 Crs). Implementation schedule for this project would be 28 months from the date of Investment Approval.

B.4.4 POWERGRID informed that the actual cost would be discovered only after bidding process and implementation of the project. Tariff for the investment made is to be shared by all constituents as per CERC notification. The scheme would become part of existing Commercial Agreement signed for ULDC Project.

B.4.5 On a query regarding increase in cost, in spite of reduction in quantity, POWERGRID representative informed that the increase in price was due to following factors:

i) Increase in basic cost on account of revised Schedule of rates at the price level of June, 2017, while earlier it was based on Feb, 2017 price level.

ii) Inclusion of IDC, IEDC

B.4.6 He added that the present Cost estimate of Rupees 177 Cr. comprises of: Basic Cost- Rs. 146.5 Cr., IEDC- Rs.15.5.Cr, IDC- Rs.10 Cr. and Contingency- Rs.5 Cr.

It was also informed that DPR had been approved and NIT process would be completed in Nov, 2017. The time line for completion is 28 months from the date of investment approval say 1st Dec., 2017.

B.4.7 TCC noted the information. Member Secretary, NRPC informed that for State portion, UP, Rajasthan, Punjab and Uttarakhand had submitted proposal for Communication schemes for PSDF funding. He informed that latest status of PSDF funding of these schemes was enclosed at Annexure-III of the agenda.

B.4.8 Member Secretary, NRPC apprised the Committee that decision of increasing the PSDF funding from 30% to 50%. Haryana representative informed that the scheme for their State would be submitted for PSDF funding shortly.

B.4.9 TCC advised all the States to submit their proposal for PSDF funding and implement the schemes in a time bound manner.

NRPC Deliberations

B.4.10 NRPC noted the deliberations held in TCC regarding reliable communication scheme under central sector in Northern Region and advised POWERGRID to take action as decided in the TCC meeting.

File No.CEA-GO-17-11(17)/3/2023-NRPC

I/28888/2023

सत्यमेव जयते

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

विषय: **Minutes of the meeting for discussion on the RVPN's request for allotment of 500 MVA ICT available as regional spare at PGCIL's 400 kV GSS Jaipur South to RVPN's 400 kV GSS Jodhpur (Surpura)-reg.**

Kindly find attached minutes of the meeting held on **07.07.2023** for discussion on the RVPN's request for allotment of 500 MVA ICT available as regional spare at PGCIL's 400 kV GSS Jaipur South to RVPN's 400 kV GSS Jodhpur (Surpura).

Signed by Santosh Kumar
Date: 12-07-2023 16:54:50
Reason: Approved

(संतोष कुमार)
अधीक्षण अभियंता (प्रचालन)

SDGM(Ams) Sh Rajeev
for record P/.
12/7/23

18-ए, शहीद जीत सिंह मार्ग, कटवरिया सराय, नई दिल्ली दूरभाष:011-26513265 ई-मेल: seo-nrpc@nic.in वेबसाईट: www.nrpc.gov.in
18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016 Phone: 011-26513265 e-mail: seo-nrpc@nic.in Website: www.nrpc.gov.in

Minutes of the meeting held on 07.07.2023 for discussion on the RVPN's request for allotment of 500 MVA ICT available as regional spare at PGCIL's 400 kV GSS Jaipur South to RVPN's 400 kV GSS Jodhpur (Surpura)

MS, NRPC welcomed all the participants.

1. MS, NRPC informed that a letter (**attached at Annexure-I**) has been received from RVPN for allotment of 500 MVA ICT available as regional spare at PGCIL's 400 kV GSS Jaipur South to RVPN's 400 kV GSS Jodhpur (Surpura). He further informed that earlier RVPN's request for allotment of 500 MVA, 400/220 kV ICT available as regional spare at PGCIL's 400kV GSS Jaipur (South) to RVPN for utilization at RVPN's 400 kV GSS Chittorgarh, was discussed in the 208th OCC meeting held on 20.06.2023. RVPN has informed that they do not require regional spare for 400 kV GSS Chittorgarh as they are able to meet out the requirement on their own.
2. RVPN informed that recently, 315 MVA ICT at 400 kV GSS Jodhpur (Surpura) has failed and problems are being faced in supply and load management. Therefore, they have requested for allotment of 500 MVA ICT available as regional spare at PGCIL's 400 kV GSS Jaipur South to RVPN's 400 kV GSS Jodhpur (Surpura) so that existing supply crisis may be resolved.
3. NRLDC informed that currently there are 2x315 MVA ICT's at 400 kV GSS Jodhpur. As per previous years loading pattern, combined loading of more than 500 MW is observed on these ICT's during the period of September to March. Therefore, these ICT's are N-1 non-compliant. Accordingly, SPS has also been implemented for these ICT's. Further, if any 500 MVA ICT fails in Rajasthan it may lead to curtailment of RE generation. He asked Powergrid to share the availability of spare ICT's.
4. Powergrid informed that only one 500 MVA regional spare is available for Rajasthan. Further, since 315 MVA ICT has failed it would be better to replace it with 315 MVA ICT.
5. SE NRPC enquired about the availability of 315 MVA ICTS, as regional spare.
6. Powergrid informed that regional spare 315 MVA ICT is available at Bhiwadi S/s but ICT-1 and ICT-2 at Bhiwadi S/s are running at high DGA therefore spare ICT is required at Bhiwadi S/s for contingency. Regional spares are also available at Mandola S/s and Gorakhpur S/s.

7. CTU informed that one 315 MVA ICT was also to be shifted from Ludhiana S/s to Bhinmal S/s. However, it is linked with the commission of Bhinmal S/s. CTU suggested that states should also have spares to meet emergency conditions. Further, CTU requested RVPN to conform timeline by which they will be able to return the ICT to replenish the regional spare.
8. SE, NRPC suggested that since Mandola is closer to Jodhpur, ICT available at Mandola S/s may be allotted to RVPN.
9. RVPN stated that they will have to check whether it is feasible to install ICT available at Mandola S/s in their 400 kV GSS Jodhpur. Further, one 500 MVA ICT failed at Bhadla S/s is to be repaired in the next 3-4 months. They would be able to return the ICT after repair of this ICT.
10. MS, NRPC stated that as only one 500 MVA ICT is available as regional spare for Rajasthan, it is not advisable to allot it to RVPN as it may cause problems in evacuation of RE generation in case any other 500 MVA ICT fails in RE pocket. He suggested RVPN to physically check Mandola ICT and submit report immediately. He stated that another round of discussion may be held after the submission of report by RVPN.

Deliberations on 10.07.2023

11. RVPN informed that during physical inspection it was found that transportation of 315 ICT from Mandola S/s towards main highway for Jodhpur is not possible due to ongoing construction work for Ring road flyover outside Mandola sub-station due to which proper clearance is not available till the temporary structures are removed from under construction flyover. As per progress seen at flyover site, the obstruction may not be clear for transportation for at least 3 months. Therefore shifting of transformer from logistics point of view seems not feasible immediately as per requirement at Jodhpur. Report submitted by RVPN is attached as **Annexure-II**.
12. SE, NRPC suggested that in view of the issue of transportation of ICT from Mandola S/s, 315 MVA spare ICT available at Ludhiana S/s may be allotted to RVPN. He also requested Powergrid to share the likely date for commissioning of ICT at Bhinmal S/s.
13. Powergrid informed that ICT at Bhinmal S/s is likely to be commissioned by November 2023.

14. RVPN informed that they will not be able to return the ICT before December, 2023.
15. MS, NRPC suggested that 315 MVA ICT available at Ludhiana S/s may be allotted to RVPN for 400 kV GSS Jodhpur (Surpura). He suggested RVPN to give their best efforts to get the 500 MVA ICT of Bhadla S/s repaired at the earliest and return the 315 MVA ICT to Powergrid by October, 2023 for commissioning at Bhinmal S/s. Further, if required another meeting may be held in August 2023 for discussion on this matter.

Decision taken during the Meeting

I. 315 MVA ICT available at Ludhiana S/s to be allotted to RVPN for 400 kV GSS Jodhpur (Surpura).
II. RVPN to give their best efforts to get the 500 MVA ICT of Bhadla S/s repaired at the earliest and return the 315 MVA ICT to Powergrid by October, 2023 for commissioning at Bhinmal S/s.
III. If required another meeting may be held in August 2023 for discussion on this matter.

Meeting ended with vote of thanks to the Chair.

*****

Annexure-I

आशुतोष ए.टी. पेडणेकर, भा.प्र.से.
Ashutosh A.T. Pednekar, I.A.S.

अध्यक्ष एवं प्रबन्ध निदेशक
Chairman & Managing Director
राजस्थान राज्य विद्युत प्रसारण निगम लि., जयपुर
Rajasthan Rajya Vidyut Prasaran Nigam Ltd., Jaipur

The Chairman (NRPC),
18-A, Shaheed Jeet Singh Marg,
Katwaria Sarai,
New Delhi-110016.

Sub: Regarding allotment of 500 MVA, 400/220 kV ICT available as regional spare at PGCIL's 400 kV GSS Jaipur (South) to RVPN for utilization at RVPN's 400 kV GSS, Jodhpur (Surpura).

Ref: Letter No. D.96 dated 23.05.2023 written to Member Secretary (NRPC).

Vide the above referred letter, RVPN had requested the allotment of 500 MVA, 400/220 kV ICT available as regional spare at PGCIL's 400 kV GSS Jaipur (South) for utilization at 400 kV GSS, Chittorgarh due to extreme difficulty being faced in load catering in the area, which was discussed as an agenda in 208th OCC meeting on 20.06.2023. Since, RVPN was able to meet out the above requirement on its own; PGCIL's 500 MVA regional spare was not required.

Recently, 315 MVA transformer at 400 kV GSS, Jodhpur (Surpura) has also failed and problems are being faced in supply & load management. Since, Jodhpur area is agriculturally & industrially very important and is a crucial link for RE evacuation, it becomes vital to replace the new ICT to resume the normal supply operations in that area at the earliest.

In this context, you are requested to kindly arrange to allot the 500 MVA ICT lying at PGCIL's 400 kV Jaipur (South) as regional spare to RVPN's 400 kV GSS, Jodhpur (Surpura) so that the existing supply crisis may be resolved.

(Ashutosh A.T. Pednekar)
Chairman & Managing Director

Copy forwarded to the following for information:-

1. The Member Secretary (NRPC), 18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi110016
2. The Chief Engineer (PP&D), RVPN, Jaipur.

Chairman & Managing Director

Signature valid
Digitally signed by Ashutosh A.T. Pednekar
Designation : Chairman And Managing Director
Date: 2023.07.06 10:20:08 IST
Reason: Approved

#105,1st Floor, Vidyut Bhawan, Janpath, Jaipur-302005, Tel : 0141-2740118 (O), E-mail : cmd.rvpn@rvpn.co.in

Annexure-II

RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM LTD.,

(Corporate Identity Number (CIN): L40109RJ2000SGC016485)

OFFICE OF THE EXEUCTIVE ENGINEER (T&C),RVPNL, JODHPUR

No.RVPN/XEN(T&C)/Jodhpur/Tech./D 361. Dt 10-7-2023

The Chief Engineer (PPD),
Raj. Rajya Vidyut Prasaran Nigam Ltd.,
Jaipur.

Sub : Feasibility assessment Report on Shifting of 400/220kV, 315 MVA Power Transformer from 400kV GSS, PGCIL Mandola (U.P.) to 400kV GSS, RVPN, Jodhpur.

Ref : Your office order Rajkaj Ref. No.4233756 dt. 7.7.2023.

Undersigned visited vide above nomination at 400kV GSS PGCIL Mandola (UP) on dt. 8.7.2023 for Inspection/ accessing feasibility of 400/220kV, 315MVA BHEL Auto Transformer at Mandola Sub-station, findings are as below:-

i. The transformer do not have any number plate for detailing. However enquiry from BHEL revealed that it is manufactured in 1996 and repaired in 2020 by them.

ii. In this transformer provision for cooling system is available on both side, so the transformer may be utilized after some modification in structure of mounting of RVT at 400kV GSS, Jodhpur.

iii. The transportation of above 400/220kV, 315MVA transformer from PGCIL Sub-station Mandola towards Main Highway for Jodhpur is not possible due to construction work is going-on for Ring Road Flyover outside Mandola Sub-station due to which proper clearance is not available till the temporary structures are removed from the under construction Flyover. As per progress seen at Flyover site with PGCIL representative, the obstruction may not be clear for transportation for at least 3 months.

iv. No any latest test report of transformer is made available by PGCIL to adjudge the current condition of transformer. The last factory test report of March' 20 is however obtained from BHEL directly.

The Photos are enclosed for ready reference.

In view of above, the shifting of transformer from logistic point of view seems not feasible immediately as per requirement at Jodhpur.

Encl: As above.

10-7-2023

(K.L. Gajraj)
Executive Engineer (T&C),
R.V.P.N.L.,Jodhpur
Camp: Jaipur.

Sandeep Yadav {संदीप यादव}

From: Rajeev Kumar {राजीव कुमार}
Sent: 07 August 2023 13:02
To: Sandeep Yadav {संदीप यादव}
Subject: Fwd: POWERGRID AGENDA OCC -208; Regarding Outage for reconductoring work of 400KV Kankroli-Jodhpur Line
Attachments: Monthly Progress Reports PGCIL OH 01.pdf; Apar_request_letter_Shutdown.pdf; L2 _OH01_Apar_Reconductoring_Bypassing.pdf; 09th_NCT_MoM.pdf; SD-REQUEST 208th OCC Jun -2023-765KV_ HVDC_ 400kv - BELOW Format 01.06.23.xlsx; Request_Approval_of_Shutdown-16062023.pdf

Get Outlook for iOS

From: rtamc.nr1 <rtamc.nr1@powergrid.in>
Sent: Friday, June 16, 2023 5:46:07 PM
To: Santosh Kumar <seo-nrpc@nic.in>; Vipul Kumar <vipul.cea@gov.in>; nrldcoutage@grid-india.in <nrldcoutage@grid-india.in>
Cc: NARESH BHANDARI <ms-nrpc@nic.in>; alok.kumar@grid-india.in <alok.kumar@grid-india.in>; mahavir@grid-india.in <mahavir@grid-india.in>; bikaskjha@grid-india.in <bikaskjha@grid-india.in>; somara.lakra@grid-india.in <somara.lakra@grid-india.in>; Vishal Roy {विशाल रॉय} <vishal.roy@powergrid.in>; Omprakash Meena {ओमप्रकाश मीणा} <omprakash@powergrid.in>; A K Behera {ए.के. बेहरा} <akbehera@powergrid.in>; Ravindra Nath Gupta {आर.एन. गुप्ता} <ravindrangupta@powergrid.in>; Rajeev Kumar {राजीव कुमार} <Rajivkumar@powergrid.in>; Atanu Bagchi {अटानू बागची} <atanubagchi@powergrid.in>; rk.porwal@grid-india.in <rk.porwal@grid-india.in>; Gyaneshwar Prasad Payasi {जी.पी. पयासी} <gppayasi@powergrid.in>; A K Mishra {ए.के. मिश्रा} <akmishra2@powergrid.in>; Kumar Gautam {कुमार गौतम} <kumar.gautam@powergrid.in>
Subject: Fw: POWERGRID AGENDA OCC -208; Regarding Outage for reconductoring work of 400KV Kankroli-Jodhpur Line

Respected Sir,

Please include in OCC 208 agenda for outage for reconductoring work of 400KV Kankroli-Jodhpur line as per attachments.

सादर धन्यवाद,
पाली-प्रभारी
आर. टी. ए. एम. सी. उत्तरी क्षेत्र-1
मानेसर, गुरुग्राम - हरियाणा।
Hotline: 20112153 & 20110041
मो.: 9650493332, 8860093391, 9717772649 & 9205599593
फोन: 0124-2863303, 0124-2863326 & 0124-2863368
VoIP (NTAMC): 6019951, 6019952 & 6019953

Kindly Note : RTAMC -NR1 email ID changed from 'rtamc.nr1@powergrid.co.in' to 'rtamc.nr1@powergrid.in'.

It is requested to send email to 'rtamc.nr1@powergrid.in' for future communication.

From: rtamc.nr1 <rtamc.nr1@powergrid.in>
Sent: Friday, June 9, 2023 3:59 PM
To: nrldcoutage@grid-india.in <nrldcoutage@grid-india.in>; Santosh Kumar <seo-nrpc@nic.in>
Cc: nrldcoutage@grid-india.in <nrldcoutage@grid-india.in>; bikaskjha@grid-india.in <bikaskjha@grid-india.in>; alok.kumar@grid-india.in <alok.kumar@grid-india.in>; mahavir@grid-india.in <mahavir@grid-india.in>; somara.lakra@grid-india.in <somara.lakra@grid-india.in>; Vishal Roy {विशाल रॉय} <vishal.roy@powergrid.in>; Sumit Gaur {सुमित गौड़} <sumitgaur@powergrid.in>; Atanu Bagchi {अटानू बागची} <atanubagchi@powergrid.in>; Rakesh Kumar Agrawal {राकेश कुमार अग्रवाल} <rkagrawal83@powergrid.in>; Kumar Gautam {कुमार गौतम} <kumar.gautam@powergrid.in>; Vipul Kumar <vipul.cea@gov.in>; Omkishor <omkishor.sahu@gov.in>; bikaskjha@grid-india.in <bikaskjha@grid-india.in>; NARESH BHANDARI <ms-nrpc@nic.in>; Sukumar Mishra {सुकुमार मिश्रा} <sukumarmishra@powergrid.in>; Rajeev Kumar {राजीव कुमार} <Rajivkumar@powergrid.in>; A K Behera {ए.के. बेहरा} <akbehera@powergrid.in>; Ravindra Nath Gupta {आर.एन. गुप्ता} <ravindrangupta@powergrid.in>; Gyaneshwar Prasad Payasi {जी.पी. पयासी} <gppayasi@powergrid.in>; se.ldrvpnl@rvpn.co.in <SE.LDRVPNL@RVPN.CO.IN>; ldshutdown@rvpn.co.in <LDSHUTDOWN@RVPN.CO.IN>; ldshutdown@gmail.com <ldshutdown@gmail.com>
Subject: Fw: Regarding Outage for reconductoring work of 400KV Kankroli-Jodhpur Line

Dear Sir,

In reference to trailing mail and attachments, It is again requested to kindly issue Shutdown approval of 400 KV Kankroli-Jodhpur Line for **15 days starting from 12-06-2023, 08:00 AM to 26-06-2023, 19:00 PM on continuous basis** for reconductoring work.

The reconductoring work is awarded on M/s APAR industries limited. The party has submitted the shutdown request letter mentioning that they are ready to start the reconductoring work.

All necessary documents have been attached.

सादर धन्यवाद,
पाली-प्रभारी
आर. टी. ए. एम. सी. उत्तरी क्षेत्र-1
मानेसर, गुरुग्राम - हरियाणा।
Hotline: 20112153 & 20110041
मो.: 9650493332, 8860093391, 9717772649 & 9205599593
फोन: 0124-2863303, 0124-2863326 & 0124-2863368
VoIP (NTAMC): 6019951, 6019952 & 6019953

Kindly Note : RTAMC -NR1 email ID changed from 'rtamc.nr1@powergrid.co.in' to 'rtamc.nr1@powergrid.in'.
It is requested to send email to 'rtamc.nr1@powergrid.in' for future communication.

From: rtamc.nr1 <rtamc.nr1@powergrid.in>
Sent: Thursday, June 8, 2023 5:31 PM
To: nrldcoutage@grid-india.in <nrldcoutage@grid-india.in>; bikaskjha@grid-india.in <bikaskjha@grid-india.in>; Santosh Kumar <seo-nrpc@nic.in>
Cc: alok.kumar@grid-india.in <alok.kumar@grid-india.in>; mahavir@grid-india.in <mahavir@grid-india.in>; somara.lakra@grid-india.in <somara.lakra@grid-india.in>; Vishal Roy {विशाल रॉय} <vishal.roy@powergrid.in>; Sumit Gaur {सुमित गौड़} <sumitgaur@powergrid.in>; Atanu Bagchi {अटानू बागची} <atanubagchi@powergrid.in>; Rakesh Kumar Agrawal {राकेश कुमार अग्रवाल} <rkagrawal83@powergrid.in>; Kumar Gautam {कुमार गौतम} <kumar.gautam@powergrid.in>; Vipul Kumar <vipul.cea@gov.in>; Omkishor <omkishor.sahu@gov.in>
Subject: Regarding Outage for reconductoring work of 400KV Kankroli-Jodhpur Line

Dear Sir,

In reference to trailing mail and attachments, kindly issue shutdown approval of 400 KV Kankroli-Jodhpur Line **for 15 days starting from 12-06-2023,08:00 AM to 26-06-2023,19:00 PM on continuous basis** for reconductoring work.

The reconductoring work is awarded on M/s APAR industries limited. The party has submitted the shutdown request letter mentioning that they are ready to start the reconductoring work.

All necessary documents has been attached.

सादर धन्यवाद,
पाली-प्रभारी
आर. टी. ए. एम. सी. उत्तरी क्षेत्र-1
मानेसर, गुरुग्राम - हरियाणा।
Hotline: 20112153 & 20110041
मो.: 9650493332, 8860093391, 9717772649 & 9205599593
फोन: 0124-2863303, 0124-2863326 & 0124-2863368
VoIP (NTAMC): 6019951, 6019952 & 6019953

Kindly Note : RTAMC -NR1 email ID changed from 'rtamc.nr1@powergrid.co.in' to 'rtamc.nr1@powergrid.in'.
It is requested to send email to 'rtamc.nr1@powergrid.in' for future communication.

From: Bhagwan Sahay Meena {भगवान सहाय मीना} <b.meena@powergrid.in>
Sent: Thursday, June 8, 2023 2:37 PM
To: rtamc.nr1 <rtamc.nr1@powergrid.in>
Cc: Sukumar Mishra {सुकुमार मिश्रा} <sukumarmishra@powergrid.in>; Ravindra Nath Gupta {आर.एन. गुप्ता} <ravindrangupta@powergrid.in>; Umesh Chandra Chaudhary {यू.सी. चौधरी} <ucchaudhary@powergrid.in>; Vishal Roy {विशाल रॉय} <vishal.roy@powergrid.in>; Atanu Bagchi {अटानू बागची} <atanubagchi@powergrid.in>; Ramkrapal Meena {रामकृपाल मीना} <ramkrapalmeena@powergrid.in>
Subject: Re: Regarding Outage for reconductoring work of 400KV Kankroli-Jodhpur Line

Dear Sir,

This has reference to trailing mail regarding outage of 400 KV Kankroli-Jodhpur Line for reconductoring work.
The reconductoring work is awarded on M/s APAR industries limited. The party has submitted the shutdown request letter mentioning that they are ready to start the reconductoring work.
You are therefore requested to arrange for **continues shutdown of Kankroli-Jodhpur line for 15 days starting from 12-06-2023,08:00 AM to 26-06-2023,19:00 PM**. Further requirement of line shutdown shall be proposed 7 days prior to required time schedule.

Regards,
BS Meena,
Dy. Manager, Kankroli

Annexure-A

List of shutdown required for commissioning of ICT-3 at Kurukshetra Substation

S.N.	NAME OF THE ELEMENT	Owner	Daily/ Continuous	DURATION				Reason
				FROM		TO		
				DATE	TIME	DATE	TIME	
2	400kV Bus-3	POWERGRID	Continuous	01.10.2023	07:00	03.10.2023	20:00	For Erection of interface module for connection of ICT-3 tie bay with existing Bus-3. After erection, internal conductor link will be removed and corona shield applied on both ends to isolate existing & new GIS. Internal conductor will be connected after HV test.
4	400kV Bus-3	POWERGRID	Daily	04.10.2023	07:00	05.10.2023	20:00	For HV Test of GIS Extension bay of Bus-3
1	400kV Bus-4	POWERGRID	Continuous	06.10.2023	07:00	08.10.2023	20:00	For Erection of interface module for connection of ICT-3 main bay with existing Bus-4. After erection, internal conductor link will be removed and corona shield applied on both ends to isolate existing & new GIS. Internal conductor will be connected after HV test.
3	400kV Bus-4	POWERGRID	Daily	9.10.2023	07:00	10.10.2023	20:00	For HV Test of GIS Extension bay of Bus-4
8	220kV Bus-1	POWERGRID	Daily	11.10.2023	07:00	11.10.2023	20:00	For HV TEST OF 220 KV BUS-1 GIS EXTENSION
9	220kV Bus-2	POWERGRID	Daily	12.10.2023	07:00	12.10.2023	20:00	For HV TEST OF 220 KV BUS-2 GIS EXTENSION
5	400kV Bus-4	POWERGRID	Continuous	13.10.2023	07:00	14.10.2023	20:00	For connection of internal conductor of new ICT-3 GIS bay with Existing GIS Bus-4 after HV test and busbar relay testing
6	400kV Bus-3	POWERGRID	Continuous	15.10.2023	07:00	16.10.2023	20:00	For connection of internal conductor of new ICT-3 GIS bay with Existing GIS Bus-3 after HV test and busbar relay testing.
7	400kV Kurukshetra-Jind-2 line	POWERGRID	Daily	16.10.2023	07:00	16.10.2023	20:00	For current injection point for Bus-3 for Busbar Relay Testing after HV test of ICT-3 bays.
10	220kV Bus-1	POWERGRID	Continuous	17.10.2023	07:00	18.10.2023	20:00	For connection of internal conductor of new ICT-3 GIS bay with Existing GIS Bus-1 and Busbar Relay Testing
12	220kV Bus-2	POWERGRID	Continuous	19.10.2023	07:00	20.10.2023	20:00	For connection of internal conductor of new ICT-3 GIS bay with Existing GIS Bus-2 & Busbar Relay Testing

Annexure-VII
Annexure-32/B

सत्यमेव जयते

भारत सरकार/Government of India
विद्युत मंत्रालय/Ministry of Power
केंद्रीय विद्युत प्राधिकरण/Central Electricity Authority

राष्ट्रीय विद्युत समिति प्रभाग/National Power Committee Division

सं.: 3/NRCE/NPC/CEA/2018/ ९५१ - ९५८ दिनांक:20.09.2018

To

1. Member Secretary, NRPC, 18-A, SJSS Marg, Katwaria Sarai, New Delhi-110016
2. Member Secretary, WRPC, MIDC Area Marol, Andheri(East), Mumbai - 400093
3. Member Secretary, SRPC, No. 29, Race Course Cross Road, Bengaluru - 560009
4. Member Secretary, ERPC, 14, Golf Club Road, Tolly Gunge, Kolkata-700033
5. Member Secretary, NERPC, Dong Parmaw, Lapalang Shillong-793006

विषय: Ambient temperature adjusted TTC –Reg.

संदर्भ: NLDC letter No. NLDC/SO/NPC/TempadjustedTTC/222 dated 31.08.2018

Sir,

In line with the decisions in the meetings of Sub-Group of NRCE for finalizing the methodology for computation of TTC/ATC/TRM, PGCIL vide letter dated 18.04.2018 has submitted the details of current rating of terminal equipment for high capacity 400kV lines owned by POWERGRID.

In response to the NPC Division letter dated 17.08.2018, seeking status report regarding compliance/implementation of ambient temperature adjusted TTC for all the transmission corridors of the country, POSOCO vide letter dated 31.08.2018 (copy enclosed) has informed that the terminal equipment rating of both ends for the lines were available only for 99 Nos. of 400 kV lines, out of 183 lines as per the data submitted by PGCIL. Therefore, we are again taking up with PGCIL to send the complete information.

POSOCO has further requested that terminal equipment ratings of the STU and other transmission licensees would also be required for full implementing of temperature adjusted TTC.

It is, therefore, requested that the terminal equipment ratings of STUs' and other transmission licensees' transmission lines in your region, may please be compiled and furnished to POSOCO with a copy to NPC Division, CEA on priority basis.

Encl.: As Above.

20/9/2018

(प्रदीप जिंदल/Pardeep Jindal)
मुख्य अभियन्ता / Chief Engineer

Copy to:

ED, NLDC, New Delhi- With request that while calculating the TTC for Short Term Transactions the terminal equipment rating as available may please be considered.

Copy for kind information to:

Member (GO&D), CEA, New Delhi

पावर सिस्टम ऑपरेशन कॉर्पोरेशन लिमिटेड
(भारत सरकार का उद्यम)
POWER SYSTEM OPERATION CORPORATION LIMITED
(A Govt. of India Enterprise)

पंजीकृत एवं केन्द्रीय कार्यालय : प्रथम तल, बी-9, कुतुब इंस्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली-110016
Registered & Corporate Office : Ist Floor, B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi -110016
CIN : U40105DL2009GOI188682, Website : www.posoco.in, E-mail : posococc@posoco.in,Tel.: 011- 41035696, Fax : 011- 26536901

Ref: NLDC/SO/NPC/TempadjustedTTC/222

Date: 31st August 2018

Annexure-32/A

To
The Chief Engineer,
National Power Committee (NPC),
NRPC Building, 18-A,
Shaheed Jeet Singh Marg, Katwaria Sarai,
New Delhi – 110016

Sub: Review of Ambient temperature adjusted TTC

Ref:

1. **NPC letter 3/NRCE/NPC/CEA/2017/827-834 dtd. 17.08.2018**
2. **PGCIL letter no. C/CTU/N/01/NRCE dtd. 18.04.2018**

Sir,

I. This is in reference to the above communication from NPC. In the meetings of sub-group of NRCE, it was decided to finalise the methodology for computation of TTC/ATC/TRM, taking into account variations in thermal capability of lines with respect to variations of ambient temperature.

II. Examining the details furnished by POWERGRID vide letter dtd. 18.04.2018, it was observed that details of terminal equipment ratings of both ends for the line were available for 99 nos. of 400 kV lines, out of total 183 lines. Regionwise summary is given at ***Annexure-I***. Details of lines for which terminal equipment ratings of both ends are available is given at ***Annexure-II***.

III. For conducting studies in PSSE for assessment of inter control-area transfer capability, POSOCO considers thermal ratings of lines as specified in CEA's Manual on Transmission Planning Criteria 2013. These ratings are considering ambient temperature of 45^0 C.

IV. Amongst the lines in Annexure-II, 20 nos. of lines had terminal equipment rated higher than the thermal ratings considered by POSOCO in studies. The list of lines are indicated as per ***Annexure – III***. Consequently there is scope for considering temperature adjusted thermal ratings in these lines. POSOCO is in the process of populating the temperature adjusted thermal rating for these lines in the PSSE study cases. It is also to mention that most of the lines were not found to be in the path of inter-regional transfer.

V. NPC may take up with POWERGRID, STUs and other transmission licensees to furnish terminal equipment ratings at all transmission lines at 400 kV and above to ensure that there is no gap in security assessment.

Thanking you,

Yours faithfully,

(S.R.Narasimhan) 31/8/2018
Executive Director, NLDC

Copy To: Executive Director, WRLDC / ERLDC / NERLDC / NRLDC / SRLDC

Annexure - I

Summary of details of terminal equipment ratings of 400 kV lines furnished by POWERGRID

Region	No. of lines for which data furnished	No. of lines with terminal equipment ratings of both ends	No. of lines requiring review
NR	65	31	8
WR	32	14	4
SR	38	26	2
ER	34	16	4
NER	2	2	0
Inter-regional	12	10	2
Total	**183**	**99**	**20**

Annexure - II

400 kV transmission lines with information of terminal equipment ratings at both ends

Name of the Transmission Line	Length in Ckt KM	Voltage Level in kV	Type of Conductor	Configura t ion	Temp Deg C	End-1Rating (MVA)	End-2 Rating (MVA)	Line rating (MVA)	Line rating as per CEA Tx Planning Criteria (MVA)
Ballabhgarh-M. Bagh	60.68	400	Bersimis	Quad	75	1385.6	2078.4	1385.6	2029
Lucknow(Old)-Lucknow(New)-I	2.862	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Lucknow(Old)-Lucknow(New)-II	2.862	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Sikar-Agra-1	386	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Sikar-Agra-2	386	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Bareilly (New) - Bareilly (Old) I	1.7	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Bareilly (New) - Bareilly (Old) I	1.7	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Roorkee-Saharanpur-I	36.535	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Roorkee-Saharanpur-II	36.535	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Varanasi-Sarnath I	107.577	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
Varanasi-Sarnath II	107.577	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
Kanpur-Kanpur GIS I	21.233	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Kanpur-Kanpur GIS II	21.233	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Hissar-Kaithal I	113.12	400	ACSR	Tripple	75	1385.6	1385.6	1385.6	1270
Hissar-Kaithal I	113.12	400	ACSR	Tripple	75	1385.6	1385.6	1385.6	1270
Kaithal- Patiala I	126	400	ACSR	Tripple	75	1385.6	1385.6	1385.6	1270
Kaithal- Patiala II	126	400	ACSR	Tripple	75	1385.6	1385.6	1385.6	1270
Nalagarh- Patiala I	93.78	400	ACSR	Tripple	75	1385.6	1385.6	1385.6	1270
Nalagarh- Patiala II	93.78	400	ACSR	Tripple	75	1385.6	1385.6	1385.6	1270
Bahadurgah- Sonepat I	53.4	400	ACSR	Tripple	75	1385.6	1385.6	1385.6	1270
Bahadurgah- Sonepat II	53.4	400	ACSR	Tripple	75	1385.6	1385.6	1385.6	1270
Baghpat-Kaithal-2	153.672	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Baghpat-Kaithal-2	153.672	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Merrut-Baghpat-1	70.976	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Merrut-Baghpat-2	70.976	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Abdullapur-Kurukshetra- I	51.65	400	ACSR	Tripple	85	1385.6	1385.6	1385.6	1623
Kurukshetra- Sonepat I	124.66	400	ACSR	Tripple		2078.4	1385.6	1385.6	1623
Abdullapur-Kurukshetra- II	51.65	400	ACSR	Tripple	85	1385.6	1385.6	1385.6	1623
Kurukshetra- Sonepat I	124.66	400	ACSR	Tripple		2078.4	1385.6	1385.6	1623
Abdullapur-Panchkula- I	63	400	ACSR	Tripple	85	1385.6	1385.6	1385.6	1623
Abdullapur-Panchkula- II	63	400	ACSR	Tripple	85	1385.6	1385.6	1385.6	1623
Nalagarh-Parbati PS	47.264	400	ACSR Moose	Quad	85	1385.6	2182.32	1385.6	2211
400kV Kurukshetra- Jalandhar	267	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Gooty - Raichur-I (PG)	128.7	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Raichur (PG) - Raichur-I	22.219	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Gooty - Raichur-II (PG)	128.7	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Raichur (PG) - Raichur-II	22.219	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Nellore - Nellore PS I	3.65	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Nellore - Nellore PS II	3.65	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Nellore PS - SEPL	3.83	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Nellore PS - MEPL	3.85	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Neylore PS - Gooty I	289.004	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Neylore PS - Gooty Ii	289.004	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Neylore PS - TPCIL I	32.488	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Neylore PS - TPCIL II	32.73	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Kurnool - Nannoor (Kurnool) I	9.881	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Kurnool - Nannoor (Kurnool) II	9.881	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Nellore - Tiruvellum-I	172.964	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Nellore - Tiruvellum-II	172.964	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
Nellore PS - NCC I	33.58	400	ACSR Moose	Quad		2078.4	2078.4	2078.4	2211
Nellore PS - NCC II	33.58	400	ACSR Moose	Quad		2078.4	2078.4	2078.4	2211
Thirunelveli - Kudankulam I	72.489	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
Tuticorin PS - Madurai I	94.924	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
Tuticorin PS - Madurai II	94.924	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211

S. No.	Name of the Transmission Line	Length in Ckt KM	Voltage Level in kV	Type of Conductor	Configura t ion	Temp Deg C	End-1Rating (MVA)	End-2 Rating (MVA)	Line rating (MVA)	Line rating as per CEA Tx Planning Criteria (MVA)
94	Kochi - Trichur I	78.197	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
95	Kochi - Trichur II	78.197	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
97	Tiruvelam - Chitoor II	21.022	400	ACSR Moose	Quad	85	2182.32	1385.6	1385.6	2211
100	Jeypore - Gazuwaka-I	220	400	AAAC	Twin	75	1385.6	1385.6	1385.6	874
101	Jeypore - Gazuwaka-II	220	400	AAAC	Twin	75	1385.6	1385.6	1385.6	874
106	Narendra - Kudgi I	176.13	400	Zebra	Quad	85	2078.4	2182.32	2078.4	1948
107	Narendra - Kudgi II	176.13	400	Zebra	Quad	85	2078.4	2182.32	2078.4	1948
108	Aurangabad(PG) - Aurangabad I	52.563	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
109	Aurangabad(PG) - Aurangabad II	52.563	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
110	Wardha - Parli I	336.939	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
111	Wardha - Parli II	336.939	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
120	Jabalpur - Itarsi-I	232	400	ACKC	Twin	75	1385.6	1385.6	1385.6	874
121	Jabalpur - Itarsi-II	232	400	ACKC	Twin	75	1385.6	1385.6	1385.6	874
122	Seoni - Khandwa-I	351.729	400	AAAC	Quad	75	2182.32	2182.32	2182.32	1680
123	Seoni - Khandwa-II	351.729	400	AAAC	Quad	75	2182.32	2182.32	2182.32	1680
128	Indore - Indore II (MP)	49.73	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
129	Indore - Indore I (MP)	49.73	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
132	Jabalpur PS - Jabalpur I	15.456	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
133	Jabalpur PS - Jabalpur II	15.456	400	ACSR Moose	Quad	85	2182.32	2182.32	2182.32	2211
134	Pirana - Vadodara I	131.549	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
136	Pirana - Vadodara II	131.549	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
142	Ballia-Biharshariff I	241.79	400	ACSR	Quad	85	2078.4	2078.4	2078.4	2211
143	Ballia-Biharshariff II	241.79	400	ACSR	Quad	85	2078.4	1385.6	1385.6	2211
144	Patna-Ballia I	195.323	400	ACSR	Quad	85	2078.4	2078.4	2078.4	2211
145	Patna-Ballia II	195.323	400	ACSR	Quad	85	2078.4	2078.4	2078.4	2211
148	Patna-Ballia III	185	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
149	Patna-Ballia IV	185	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
150	Biharshariff - Sasaram III (now purnea-I)	324.185	400	ACSR Moose	Quad	85	1385.6	1385.6	1385.6	2211
151	Biharshariff - Sasaram IV(now purnea-II)	324.185	400	ACSR Moose	Quad	85	1385.6	1385.6	1385.6	2211
158	Ranchi (New) - Ranchi I	78.617	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
159	Ranchi (New) - Ranchi II	78.617	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
160	Ranchi (New) - Ranchi III	78.542	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
161	Ranchi (New) - Ranchi IV	78.542	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
162	Patna-Kishanganj I	346.72	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
163	Patna-Kishanganj II	346.72	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
166	New Ranchi - Chandwa I	68	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
168	New Ranchi - Chandwa II	68	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
172	New Purnea - New Siliguri I	168	400	HTLS	Twin	75	2078.4	2078.4	2078.4	1748
173	New Purnea - New Siliguri II	168	400	HTLS	Twin	75	2078.4	2078.4	2078.4	1748
174	Newpurnea - Kishanganj-I (LILO portion)		400	ACSR Moose	Quad		1385.6	2078.4	1385.6	2211
176	Newpurnea - Kishanganj-II (LILO portion)		400	ACSR Moose	Quad		1385.6	2078.4	1385.6	2211
78	Durgapur-Maithon I	70.77	400	ACSR	Twin	85	1385.6	1385.6	1385.6	1106
79	Durgapur-Maithon II	70.77	400	ACSR	Twin	85	1385.6	1385.6	1385.6	1106
82	Balipara- Bongaingaon III	309	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211
83	Balipara- Bongaingaon IV	309	400	ACSR Moose	Quad	85	2078.4	2078.4	2078.4	2211

Note : Sl.Nos. in this document are as per Annexure to letter received from POWERGRID on 18.04.18

Annexure - III

400 kV Transmission lines with need for review considering variation in ambient temperature

Sl.No.	Line	Thermal rating as per limitations on terminal equipment	Thermal rating as per CEA's Manual on Tx Planning criteria (45^0C ambient temperature)
1	400 kV Hissar - Kaithal I	1386	1270
2	400 kV Hissar - Kaithal II	1386	1270
3	400 kV Kaithal - Patiala I	1386	1270
4	400 kV Kaithal - Patiala II	1386	1270
5	400 kV Nalagarh - Patiala I	1386	1270
6	400 kV Nalagarh - Patiala II	1386	1270
7	400 kV Bahadurgarh - Sonepat I	1386	1270
8	400 kV Bahadurgarh - Sonepat II	1386	1270
9	400 kV Jeypore - Gazuwaka I	1386	874
10	400 kV Jeypore - Gazuwaka II	1386	874
11	400 kV Narendra - Kudugi I	2078	1948
12	400 kV Narendra - Kudugi II	2078	1948
13	400 kV Jabalpur - Itarsi I	1386	874
14	400 kV Jabalpur - Itarsi II	1386	874
15	400 kV Seoni - Khandwa I	2182	1680
16	400 kV Seoni - Khandwa II	2182	1680
17	400 kV New Purnea - New Siliguri I	2078	1748
18	400 kV New Purnea - New Siliguri II	2078	1748
19	400 kV Durgapur-Maithon I	1386	1106
20	400 kV Durgapur-Maithon II	1386	1106

Annexure-VIII

TERMINAL EQUIPMENT DETAILS FOR HIGH CAPACITY 400kV LINES

S. No.		Name of the Transmission Line	Length in Ckt KM	Voltage Level in kV	Type of Conductor	Configuration	Temp Deg C	One End (Current Rating)	One and half Breaker scheme			DMT Scheme	Double main Scheme	Remote End (Current Rating)	One and half Breaker scheme			DMT Scheme	Double main Scheme
									Line Bay Equipments	Main bay equipments	Tie bay equipments	All equipments	All equipments		Line Bay Equipments	Main bay equipments	Tie bay equipments	All equipments	All equipments
1	NR-I	B'Garh-Navada (Upto LILO point)	12.55	400	Bersimis	Quad	75	Isolators	3150	3150	2000			Isolators					
								CT		3000	3000			CT					
								Breakers		3150	3150			Breakers					
								Wave Traps	3150	-	-			Wave Traps					
2	NR-I	Dadri-M. Bagh	54.36	400	Bersimis	Quad	75	Isolators						Isolators					4000
								CT						CT					3000
								Breakers						Breakers					4000
								Wave Traps						Wave Traps					3150
3	NR-I	Ballabhgarh-M. Bagh	60.68	400	Bersimis	Quad	75	Isolators	2000	2000	2000			Isolators					4000
								CT		2000	2000			CT					3000
								Breakers		3150	3150			Breakers					4000
								Wave Traps	3150	-	-			Wave Traps					3150
4	NR-I	Mandola-Dadri-1	46.3	400	Bersimis	Quad	75	Isolators	3150	2000	2000			Isolators					
								CT		2000	2000			CT					
								Breakers		3150	3150			Breakers					
								Wave Traps	2000					Wave Traps					
5	NR-I	Mandola-Dadri-2	46.3	400	Bersimis	Quad	75	Isolators	3150	2000	2000			Isolators					
								CT		2000	2000			CT					
								Breakers		3150	3150			Breakers					
								Wave Traps	2000					Wave Traps					
6	NR-III	Lucknow(Old)-Lucknow(New)-I	2.862	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150A	3150A	3150A		
								Current Transformers	NA	3000	3000			Current Transformers	NA	3000A	3000A		
								Breakers		3150	3150			Breakers	NA	3150A	3150A		
								Wave Traps	3150	NA	NA			Wave Traps	3150A	NA	NA		
7	NR-III	Lucknow(Old)-Lucknow(New)-II	2.862	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150A	3150A	3150A		
								Current Transformers	NA	3000	3000			Current Transformers	NA	3000A	3000A		
								Breakers		3150	3150			Breakers	NA	3150A	3150A		
								Wave Traps	3150	NA	NA			Wave Traps	3150A	NA	NA		
8	NR-I	Gurgaon-Manesar-1	16.9	400	ACSR Moose	Quad	85	Isolators					3150	Isolators					3150
								CT					3000	CT					3000
								Breakers					3150	Breakers					3150
								Wave Traps					3150	Wave Traps					3150
9	NR-I	Gurgaon-Manesar-2	16.9	400	ACSR Moose	Quad	85	Isolators					3150	Isolators					3150
								CT					3000	CT					3000
								Breakers					3150	Breakers					3150
								Wave Traps					3150	Wave Traps					3150
10	NR-I	Jhatikara-Bamnauli-1	6.106	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators					
								CT		3000	3000			CT					
								Breakers		3150	3150			Breakers					
								Wave Traps	3150	-	-			Wave Traps					
11	NR-I	Jhatikara-Bamnauli-2	6.106	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators					
								CT		3000	3000			CT					
								Breakers		3150	3150			Breakers					
								Wave Traps	3150	-	-			Wave Traps					
12	NR-I	Jhatikara-Mundka-1	6.782	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators					
								CT		3000	3000			CT					
								Breakers		3150	3150			Breakers					
								Wave Traps	3150	-	-			Wave Traps					
13	NR-I	Jhatikara-Mundka-2	6.782	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators					
								CT		3000	3000			CT					
								Breakers		3150	3150			Breakers					
								Wave Traps	3150	-	-			Wave Traps					
14	NR-I/ NR-3	Sikar-Agra-1	386	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT		3000	3000			CT		3000	3000		
								Breakers		3150	3150			Breakers		3150	3150		
								Wave Traps	3150	-	-			Wave Traps	3150	-	-		
15	NR-I/ NR-3	Sikar-Agra-2	386	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT		3000	3000			CT		3000	3000		
								Breakers		3150	3150			Breakers		3150	3150		
								Wave Traps	3150	-	-			Wave Traps	3150	-	-		
16	NR-I	Bassi-Jaipur(RVPNL) I	47.3	400	ACSR Moose	Quad	85	Isolators	3150	3000	3150			Isolators					
								CT		3150	3000			CT					
								Breakers		3150	3150			Breakers					
								Wave Traps	3150					Wave Traps					
17	NR-I	Bassi-Jaipur(RVPNL) I	47.3	400	ACSR Moose	Quad	85	Isolators	3150	3000	3150			Isolators					
								CT		3150	3000			CT					
								Breakers		3150	3150			Breakers					
								Wave Traps	3150					Wave Traps					

18	NR-3	Bareilly (New) - Bareilly (Old) I	1.7	400	ACSR Moose	Quad	85	Isolators	3150A	3150A	3150A			Isolators	3150A	3150A	3150A		
								CT	NA	3000A	3000A			CT	NA	3000A	3000A		
								Breakers	NA	3150A	3150A			Breakers	NA	3150A	3150A		
								Wave Traps	3150A	NA	NA			Wave Traps	3150A	NA	NA		
19	NR-3	Bareilly (New) - Bareilly (Old) I	1.7	400	ACSR Moose	Quad	85	Isolators	3150A	3150A	3150A			Isolators	3150A	3150A	3150A		
								CT	NA	3000A	3000A			CT	NA	3000A	3000A		
								Breakers	NA	3150A	3150A			Breakers	NA	3150A	3150A		
								Wave Traps	3150A	NA	NA			Wave Traps	3150A	NA	NA		
20	NR-3/NR-I	Bareily Kashipur-I	101.23	400	ACSR Moose	Quad	85	Isolators	3150 A	3150 A	3150 A			Isolators					
								CT		3000 A	3000 A			CT					
								Breakers		3150 A	3150 A			Breakers					
								Wave Traps	3150 A					Wave Traps					
21	NR-3/NR-I	Bareily Kashipur-II	101.23	400	ACSR Moose	Quad	85	Isolators	3150 A	3150 A	3150 A			Isolators					
								CT		3000 A	3000 A			CT					
								Breakers		3150 A	3150 A			Breakers					
								Wave Traps	3150 A					Wave Traps					
22	NR-3/WR-II	Rihand III - Vindhyachal PS I	30.702	400	ACSR Moose	Quad	85	Isolators						Isolators	3150A	3150A	3150A		
								CT						CT	NA	3000A	3000A		
								Breakers						Breakers	NA	3150A	3150A		
								Wave Traps						Wave Traps	3150A	NA	NA		
23	NR-3/WR-II	Rihand III - Vindhyachal PS II	31.159	400	ACSR Moose	Quad	85	Isolators						Isolators	3150A	3150A	3150A		
								CT						CT	NA	3000A	3000A		
								Breakers						Breakers	NA	3150A	3150A		
								Wave Traps						Wave Traps	3150A	NA	NA		
24	NR-I	Roorkee-Kashipur-1	150.832	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators					
								CT		3000	3000			CT					
								Breakers		3150	3150			Breakers					
								Wave Traps	3150	-	-			Wave Traps					
25	NR-I	Roorkee-Kashipur-2	150.832	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators					
								CT		3000	3000			CT					
								Breakers		3150	3150			Breakers					
								Wave Traps	3150	-	-			Wave Traps					
26	NR-I	Roorkee-Saharanpur-I	36.535	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT		3000	3000			CT		3000	3000		
								Breakers		3150	3150			Breakers		3150	3150		
								Wave Traps	3150	-	-			Wave Traps	3150	-	-		
27	NR-I	Roorkee-Saharanpur-II	36.535	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT		3000	3000			CT		3000	3000		
								Breakers		3150	3150			Breakers		3150	3150		
								Wave Traps	3150	-	-			Wave Traps	3150	-	-		
28	NR-3/ER-I	Varanasi-Sarnath I	107.577	400	ACSR Moose	Quad	85	Isolators	NA	3150A	3150A			Isolators	NA	3150A	3150A		
								CT	NA	3150A	3150A			CT	NA	3150A	3150A		
								Breakers	NA	3150A	3150A			Breakers	NA	3150A	3150A		
								Wave Traps	3150A	NA	NA			Wave Traps	3150A	NA	NA		
29	NR-3/ER-I	Varanasi-Sarnath II	107.577	400	ACSR Moose	Quad	85	Isolators	NA	3150A	3150A			Isolators	NA	3150A	3150A		
								CT	NA	3150A	3150A			CT	NA	3150A	3150A		
								Breakers	NA	3150A	3150A			Breakers	NA	3150A	3150A		
								Wave Traps	3150A	NA	NA			Wave Traps	3150A	NA	NA		
30	NR-3	Kanpur-Kanpur GIS I	21.233	400	ACSR Moose	Quad	85	Isolators	3150A	3150A	3150A			Isolators					3150
								CT	NA	3000A	3000A			CT					3000
								Breakers	NA	3150A	3150A			Breakers					3150
								Wave Traps	3150A	NA	NA			Wave Traps					3150
31	NR-3	Kanpur-Kanpur GIS II	21.233	400	ACSR Moose	Quad	85	Isolators	3150A	3150A	3150A			Isolators					3150
								CT	NA	3000A	3000A			CT					3000
								Breakers	NA	3150A	3150A			Breakers					3150
								Wave Traps	3150A	NA	NA			Wave Traps					3150
32	NR-1/NR-II	Abdullapur-Bawana-I	166.64	400	ACSR Snowbird	Tripple	75	Isolators	2000	2000	2000			Isolators					
								CT	N.A	2000	2000			CT					
								Breakers	N.A	2000	3150			Breakers					
								Wave Traps	2000	--	--			Wave Traps					
33	NR-II	Abdullapur - Depalpur (upto LILO point)	140.547	400	ACSR Snowbird	Tripple	75	Isolators	2000	2000	2000			Isolators					
								CT	N.A	2000	2000			CT					
								Breakers	N.A	2000	2000			Breakers					
								Wave Traps	2000	--	--			Wave Traps					
34	NR-1	Depalpur - Bawana (upto LILO point)	26.095	400	ACSR Snowbird	Tripple	75	Isolators	3000	3000	3000			Isolators					
								CT	N.A	3000	3000			CT					
								Breakers	N.A	3150	3150			Breakers					
								Wave Traps	0	--	--			Wave Traps					
35	NR-1	Hissar-Kaithal I	113.12	400	ACSR Snowbird	Tripple	75	Isolators	2000	2000	2000			Isolators	2000	2000	2000		
								CT		2000	2000			CT		2000	2000		
								Breakers		2000	3150			Breakers		2000	2000		
								Wave Traps	2000					Wave Traps	2000				
36	NR-1	Hissar-Kaithal I	113.12	400	ACSR Snowbird	Tripple	75	Isolators	2000	2000	2000			Isolators	2000	2000	2000		
								CT		2000	2000			CT		2000	2000		
								Breakers		2000	3150			Breakers		2000	2000		
								Wave Traps	2000					Wave Traps	2000				

37	NR-1/NR-II	Kaithal- Patiala I	126	400	ACSR Snowbird	Tripple	75	Isolators	3150A	3150A	3150A			Isolators	3150A	3150A	3150A		
								CT	N.A	3000A	3000A			CT	N.A	3000A	3000A		
								Breakers	N.A	3150A	3150A			Breakers	N.A	3150A	3150A		
								Wave Traps	2000A	N.A	N.A			Wave Traps	2000A	N.A	N.A		
38	NR-1/NR-II	Kaithal- Patiala II	126	400	ACSR Snowbird	Tripple	75	Isolators	3150A	3150A	3150A			Isolators	3150A	3150A	3150A		
								CT	N.A	3000A	3000A			CT	N.A	3000A	3000A		
								Breakers	N.A	3150A	3150A			Breakers	N.A	3150A	3150A		
								Wave Traps	2000A	N.A	N.A			Wave Traps	2000A	N.A	N.A		
39	NR-II	Nalagarh- Patiala I	93.78	400	ACSR Snowbird	Tripple	75	Isolators	2000	2000	2000			Isolators	2000	2000	2000		
								CT	N.A	2000	2000			CT	N.A	2000	2000		
								Breakers	N.A	2000	2000			Breakers	3150A	3150A	3150A		
								Wave Traps	2000					Wave Traps	2000				
40	NR-II	Nalagarh- Patiala II	93.78	400	ACSR Snowbird	Tripple	75	Isolators	2000	2000	2000			Isolators	2000	2000	2000		
								CT	N.A	2000	2000			CT	N.A	2000	2000		
								Breakers	N.A	2000	2000			Breakers	3150A	3150A	3150A		
								Wave Traps	2000	N.A	N.A			Wave Traps	2000	N.A	N.A		
41	NR-II	Nalagarh- Rampur I	126.481	400	ACSR Snowbird	Tripple	75	Isolators	2000	2000	2000			Isolators					
								CT	N.A	2000	2000			CT					
								Breakers	N.A	2000	2000			Breakers					
								Wave Traps	2000					Wave Traps					
42	NR-II	Nalagarh- Rampur II	126.481	400	ACSR Snowbird	Tripple	75	Isolators	2000	2000	2000			Isolators					
								CT	N.A	2000	2000			CT					
								Breakers	N.A	2000	2000			Breakers					
								Wave Traps	2000					Wave Traps					
43	NR-I/NR-II	Bahadurgah- Sonepat I	53.4	400	ACSR Snowbird	Tripple	75	Isolators	3150A	3150A	3150A			Isolators	2000	2000	2000		
								CT		2000	2000			CT		2000	2000		
								Breakers		3150A	3150A			Breakers		2000	2000		
								Wave Traps						Wave Traps	2000				
44	NR-I/NR-II	Bahadurgah- Sonepat II	53.4	400	ACSR Snowbird	Tripple	75	Isolators	3150A	3150A	3150A			Isolators	2000	2000	2000		
								CT		2000	2000			CT		2000	2000		
								Breakers		3150A	3150A			Breakers		2000	2000		
								Wave Traps						Wave Traps	2000				
45	NR-I	Baghpat-Kaithal-2	153.672	400	ACSR Moose	Quad	85	Isolators	3150A	3150A	3150A			Isolators	3150A	3150A	3150A		
								CT	N.A	3000A	3000A			CT	N.A	3000A	3000A		
								Breakers	N.A	3150A	3150A			Breakers	N.A	3150A	3150A		
								Wave Traps	3150A	N.A	N.A			Wave Traps	3150A	N.A	N.A		
46	NR-I	Baghpat-Kaithal-2	153.672	400	ACSR Moose	Quad	85	Isolators	3150A	3150A	3150A			Isolators	3150A	3150A	3150A		
								CT	N.A	3000A	3000A			CT	N.A	3000A	3000A		
								Breakers	N.A	3150A	3150A			Breakers	N.A	3150A	3150A		
								Wave Traps	3150A	N.A	N.A			Wave Traps	3150A	N.A	N.A		
47	NR-I	Merrut-Baghpat-1	70.976	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators					3150
								CT		3000	3000			CT					3000
								Breakers		3150	3150			Breakers					3150
								Wave Traps	3150	-	-			Wave Traps					3150
48	NR-I	Merrut-Baghpat-2	70.976	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators					3150
								CT		3000	3000			CT					3000
								Breakers		3150	3150			Breakers					3150
								Wave Traps	3150	-	-			Wave Traps					3150
49	NR-II	Abdullapur-Kurukshetra- I	51.65	400	ACSR Snowbird	Tripple	85	Isolators	2000	3150	3150			Isolators	2000	3150	3150		
								CT	N.A	3000	3000			CT	N.A	3000	3000		
								Breakers	N.A	3150	3150			Breakers	N.A	3150	3150		
								Wave Traps	2000	N.A	N.A			Wave Traps	3150	N.A	N.A		
50	NR-II	Kurukshetra- Sonepat I	124.66	400	ACSR Snowbird	Tripple		Isolators	3150A	3150A	3150A			Isolators	2000	2000	2000		
								CT	NA	3000A	3000A			CT		2000	2000		
								Breakers	NA	3150A	3150A			Breakers		2000	2000		
								Wave Traps	3150A	NA	NA			Wave Traps	2000				
51	NR-II	Abdullapur-Kurukshetra- II	51.65	400	ACSR Snowbird	Tripple	85	Isolators	2000	3150	3150			Isolators	2000	3150	3150		
								CT	N.A	3000	3000			CT	N.A	3000	3000		
								Breakers	N.A	3150	3150			Breakers	N.A	3150	3150		
								Wave Traps	2000	N.A	N.A			Wave Traps	3150	N.A	N.A		
52	NR-II	Kurukshetra- Sonepat I	124.66	400	ACSR Snowbird	Tripple		Isolators	3150A	3150A	3150A			Isolators	2000	2000	2000		
								CT	NA	3000A	3000A			CT		2000	2000		
								Breakers	NA	3150A	3150A			Breakers		2000	2000		
								Wave Traps	3150A	NA	NA			Wave Traps	2000				
53	NR-II	Abdullapur-Panchkula- I	63	400	ACSR Snowbird	Tripple	85	Isolators	2000	2000	2000			Isolators	2000	2000	2000		
								CT	N.A	2000	2000			CT	N.A	2000	2000		
								Breakers	N.A	2000	2000			Breakers	N.A	2000	2000		
								Wave Traps	2000	N.A	N.A			Wave Traps	2000	N.A	N.A		
54	NR-II	Abdullapur-Panchkula- II	63	400	ACSR Snowbird	Tripple	85	Isolators	2000	2000	2000			Isolators	2000	2000	2000		
								CT	N.A	2000	2000			CT	N.A	2000	2000		
								Breakers	N.A	2000	2000			Breakers	N.A	2000	2000		
								Wave Traps	2000	N.A	N.A			Wave Traps	2000	N.A	N.A		
55	NR-II	Panchkula-Naptha Jhakri I	165	400	ACSR Snowbird	Tripple	85	Isolators	2000	2000	2000			Isolators					
								CT	N.A	2000	2000			CT					
								Breakers	N.A	2000	2000			Breakers					
								Wave Traps	2000	N.A	N.A			Wave Traps					

56	NR-II	Panchkula-Naptha Jhakri II	165	400	ACSR Snowbird	Tripple	85	Isolators	2000	2000	2000			Isolators					
								CT	N.A	2000	2000			CT					
								Breakers	N.A	2000	2000			Breakers					
								Wave Traps	2000	2000	2000			Wave Traps					
57	NR-II	Nalagarh-Parbati PS	47.264	400	ACSR Moose	Quad	85	Isolators	3150	3150	2000			Isolators					3150
								CT	N.A	3000	2000			CT					3150
								Breakers		3150	2000			Breakers					3150
								Wave Traps	3150					Wave Traps					3150
58	NR-II	Nalagarh-Koldam II	46.381	400	ACSR Moose	Quad	85	Isolators	3150	3150	2000			Isolators					
								CT	N.A	3000	2000			CT					
								Breakers		3150	2000			Breakers					
								Wave Traps	3150					Wave Traps					
59	NR-II	Parbati III-Parbati PS(LILO portion)	3.184	400	ACSR Moose	Quad	85	Isolators						Isolators					3000 A
								CT						CT					420kV, 3000A
								Breakers						Breakers					420kV, 3150A
								Wave Traps						Wave Traps					400kV, 3150A
60	NR-II	Nalagarh-Parbati PS(LILO portion)	0.845	400	ACSR Moose	Quad	85	Isolators						Isolators					3000 A
								CT						CT					420kV, 3000A
								Breakers						Breakers					420kV, 3150A
								Wave Traps						Wave Traps					400kV, 3150A
61	NR-II	Parbati III-Parbati PS(LILO portion)	3.114	400	ACSR Moose	Quad	85	Isolators						Isolators					3000 A
								CT						CT					420kV, 3000A
								Breakers						Breakers					420kV, 3150A
								Wave Traps						Wave Traps					400kV, 3150A
62	NR-II	Parbati PS-Koldam I(LILO portion)	0.884	400	ACSR Moose	Quad	85	Isolators					3000 A	Isolators					
								CT					420kV, 3000A	CT					
								Breakers					420kV, 3150A	Breakers					
								Wave Traps					400kV, 3150A	Wave Traps					
63	NR-II	Parbati II-Parbati PS(LILO portion)	0.886	400	ACSR Moose	Quad	85	Isolators						Isolators					3000 A
								CT						CT					420kV, 3000A
								Breakers						Breakers					420kV, 3150A
								Wave Traps						Wave Traps					400kV, 3150A
64	NR-II	Parbati PS-Koldam II(LILO portion)	0.886	400	ACSR Moose	Quad	85	Isolators					3000 A	Isolators					
								CT					420kV, 3000A	CT					
								Breakers					420kV, 3150A	Breakers					
								Wave Traps					400kV, 3150A	Wave Traps					
65	NR-II	400kV Kurukshetra- Jalandhar	267	400	ACSR Moose	Quad	85	Isolators	3150A	3150A	3150A			Isolators	3150A	3150A	3150A		
								CT	NA	3000A	3000A			CT	NA	3000A	3000A		
								Breakers	NA	3150A	3150A			Breakers	NA	3150A	3150A		
								Wave Traps	3150A	NA	NA			Wave Traps	3150A	NA	NA		
66	NR-II	400kV Kurukshetra- Nakodar	234	400	ACSR Moose	Quad	85	Isolators	3150A	3150A	3150A			Isolators					
								CT	NA	3000A	3000A			CT					
								Breakers	NA	3150A	3150A			Breakers					
								Wave Traps	3150A	NA	NA			Wave Traps					
67	NR-II	400kV Jalandhar- Nakodar	42	400	ACSR Moose	Quad	85	Isolators	3150A	3150A	3150A			Isolators					
								CT	NA	3000A	3000A			CT					
								Breakers	NA	3150A	3150A			Breakers					
								Wave Traps	3150A	NA	NA			Wave Traps					
68	SR-I	Gooty - Raichur-I (PG)	128.7	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT	NA	3000	3000			CT	NA	3000	3000		
								Breakers	NA	3150	3150			Breakers	NA	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		
69	SR-I	Raichur (PG) - Raichur-I	22.219	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT	NA	3000	3000			CT	NA	3000	3000		
								Breakers	NA	3150	3150			Breakers	NA	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		

70	SR-I	Gooty - Raichur-II (PG)	128.7	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT	NA	3000	3000			CT	NA	3000	3000		
								Breakers	NA	3150	3150			Breakers	NA	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		
71	SR-I	Raichur (PG) - Raichur-II	22.219	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT	NA	3000	3000			CT	NA	3000	3000		
								Breakers	NA	3150	3150			Breakers	NA	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		
72	SR-I	Nellore - Nellore PS I	3.65	400	ACSR Moose	Quad	85	Isolators	3000A	3000	3000			Isolators	3000A	3000	3000		
								CT	NA	3150	3150			CT	NA	3150	3150		
								Breakers	NA	3150	3150			Breakers	NA	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		
73	SR-I	Nellore - Nellore PS II	3.65	400	ACSR Moose	Quad	85	Isolators	3000A	3000	3000			Isolators	3000A	3000	3000		
								CT	NA	3150	3150			CT	NA	3150	3150		
								Breakers	NA	3150	3150			Breakers	NA	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		
74	SR-I	Nellore PS - SEPL	3.83	400	ACSR Moose	Quad	85	Isolators	3000A	3000	3000			Isolators	3000A	3000	3000		
								CT	NA	3150	3150			CT	NA	3150	3150		
								Breakers	NA	3150	3150			Breakers	NA	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		
75	SR-I	Nellore PS - MEPL	3.85	400	ACSR Moose	Quad	85	Isolators	3000A	3000	3000			Isolators	3000A	3000	3000		
								CT	NA	3150	3150			CT	NA	3150	3150		
								Breakers	NA	3150	3150			Breakers	NA	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		
76	SR-I	Neylore PS - Gooty I	289.004	400	ACSR Moose	Quad	85	Isolators	3000A	3000	3000			Isolators	3000A	3000	3000		
								CT	NA	3150	3150			CT	NA	3150	3150		
								Breakers	NA	3150	3150			Breakers	NA	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		
77	SR-I	Neylore PS - Gooty Ii	289.004	400	ACSR Moose	Quad	85	Isolators	3000A	3000	3000			Isolators	3000A	3000	3000		
								CT	NA	3150	3150			CT	NA	3150	3150		
								Breakers	NA	3150	3150			Breakers	NA	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		
78	SR-I	Neylore PS - TPCIL I	32.488	400	ACSR Moose	Quad	85	Isolators	3000A	3000	3000			Isolators	3000A	3000	3000		
								CT	NA	3150	3150			CT	NA	3150	3150		
								Breakers	NA	3150	3150			Breakers	NA	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		
79	SR-I	Neylore PS - TPCIL II	32.73	400	ACSR Moose	Quad	85	Isolators	3000A	3000	3000			Isolators	3000A	3000	3000		
								CT	NA	3150	3150			CT	NA	3150	3150		
								Breakers	NA	3150	3150			Breakers	NA	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		
80	SR-I	Kurnool - Nannoor (Kurnool) I	9.881	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT	NA	3000	3000			CT	NA	3000	3000		
								Breakers	NA	3150	3150			Breakers	NA	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		
81	SR-I	Kurnool - Nannoor (Kurnool) II	9.881	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT	NA	3000	3000			CT	NA	3000	3000		
								Breakers	NA	3150	3150			Breakers	NA	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		
82	SR-I	Nellore - Tiruvellum-I	172.964	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT	NA	3000	3000			CT	NA	3000	3000		
								Breakers	NA	3150	3150			Breakers	NA	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		
83	SR-I	Nellore - Tiruvellum-II	172.964	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT	NA	3000	3000			CT	NA	3000	3000		
								Breakers	NA	3150	3150			Breakers	NA	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		
84	SR-I	Nellore PS - NCC I	33.58	400	ACSR Moose	Quad		Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT	NA	3000	3000			CT	NA	3000	3000		
								Breakers	NA	3150	3150			Breakers	NA	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		
85	SR-I	Nellore PS - NCC II	33.58	400	ACSR Moose	Quad		Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT	NA	3000	3000			CT	NA	3000	3000		
								Breakers	NA	3150	3150			Breakers	NA	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		
86	SR-II	Thirunelveli - Kudankulam I	72.489	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT	NA	3150	3150			CT					
								Breakers	NA	3150	3150			Breakers					
								Wave Traps	3150	NA	NA			Wave Traps					
87	SR-II	Thirunelveli - Kudankulam II	72.489	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators					
								CT	NA	3150	3150			CT					
								Breakers	NA	3150	3150			Breakers					
								Wave Traps	3150	NA	NA			Wave Traps					
88	SR-II	Thirunelveli - Kudankulam III	79.534	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators					
								CT	NA	3150	3150			CT					
								Breakers	NA	3150	3150			Breakers					
								Wave Traps	3150	NA	NA			Wave Traps					

89	SR-II	Thirunelveli - Kudankulam IV	79.534	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators						
								CT	NA	3150	3150			CT						
								Breakers	NA	3150	3150			Breakers						
								Wave Traps	3150	NA	NA			Wave Traps						
90	SR-II	Tuticorin PS - Madurai I	94.924	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150			
								CT	NA	3150	3150			CT	NA	3150	3150			
								Breakers	NA	3150	3150			Breakers	NA	3150	3150			
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA			
91	SR-II	Coastal Energen - Tuticorin PS	36.003	400	ACSR Moose	Quad	85	Isolators						Isolators	3150	3150	3150			
								CT						CT	NA	3150	3150			
								Breakers						Breakers	NA	3150	3150			
								Wave Traps						Wave Traps	3150	NA	NA			
92	SR-II	Tuticorin TPS - Tuticorin PS	61.586	400	ACSR Moose	Quad	85	Isolators						Isolators	3150	3150	3150			
								CT						CT	NA	3150	3150			
								Breakers						Breakers	NA	3150	3150			
								Wave Traps						Wave Traps	3150	NA	NA			
93	SR-II	Tuticorin PS - Madurai II	94.924	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150			
								CT	NA	3150	3150			CT	NA	3150	3150			
								Breakers	NA	3150	3150			Breakers	NA	3150	3150			
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA			
94	SR-II	Kochi - Trichur I	78.197	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150			
								CT	NA	3150	3150			CT	NA	3150	3150			
								Breakers	NA	3150	3150			Breakers	NA	3150	3150			
								Wave Traps	4000	NA	NA			Wave Traps	3150	NA	NA			
95	SR-II	Kochi - Trichur II	78.197	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150			
								CT	NA	3150	3150			CT	NA	3150	3150			
								Breakers	NA	3150	3150			Breakers	NA	3150	3150			
								Wave Traps	4000	NA	NA			Wave Traps	3150	NA	NA			
96	SR-II	Tiruvelam - Chitoor I	21.022	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators						
								CT	NA	3150	3150			CT						
								Breakers	NA	3150	3150			Breakers						
								Wave Traps	3150	NA	NA			Wave Traps						
97	SR-II	Tiruvelam - Chitoor II	21.022	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators						
								CT	NA	3150	3150			CT						
								Breakers	NA	3150	3150			Breakers						
								Wave Traps	3150	NA	NA			Wave Traps	2000	NA	NA			
98	SR-I	Ramagundam - Malakaram (upto LILO point)	166.212	400	AAAC	Twin	75	Isolators						Isolators						
								CT						CT						
								Breakers						Breakers						
								Wave Traps						Wave Traps						
99	SR-I	Malakaram - Hyderabad-II (upto LILO point)	27.87	400	AAAC	Twin	75	Isolators						Isolators	2000	2000	2000			
								CT						CT		2000	2000			
								Breakers						Breakers		2000	2000			
								Wave Traps						Wave Traps	2000	2000	2000			
100	Odisha/SR-I	Jeypore - Gazuwaka-I	220	400	AAAC	Twin	75	Isolators	2000	2000	2000			Isolators	2000	2000	2000			
								CT		2000	2000			CT		2000	2000			
								Breakers		2000	3150			Breakers		2000	2000			
								Wave Traps	2000					Wave Traps	2000					
101	Odisha/SR-I	Jeypore - Gazuwaka-II	220	400	AAAC	Twin	75	Isolators	2000	2000	2000			Isolators	2000	2000	2000			
								CT		2000	2000			CT		2000	2000			
								Breakers		2000	2000			Breakers		2000	2000			
								Wave Traps	2000					Wave Traps	2000					
102	SR-II	Kolar - Hoody-I	51.067	400	Bersimis	Quad	75	Isolators						Isolators				3150		
								CT						CT				3150		
								Breakers						Breakers				3150		
								Wave Traps						Wave Traps				3150		
103	SR-II	Kolar - Hoody-II	51.067	400	Bersimis	Quad	75	Isolators						Isolators				3150		
								CT						CT				3150		
								Breakers						Breakers				3150		
								Wave Traps						Wave Traps				3150		
104	SR-II	Kaiga - Narendra-I	107.662	400	AAAC	Twin	75	Isolators						Isolators	2000	2000	2000			
								CT						CT	NA	2000	2000			
								Breakers						Breakers	NA	2000	2000			
								Wave Traps						Wave Traps	2000	NA	NA			
105	SR-II	Kaiga - Narendra-II	107.662	400	AAAC	Twin	75	Isolators						Isolators	2000	2000	2000			
								CT						CT	NA	2000	2000			
								Breakers						Breakers	NA	2000	2000			
								Wave Traps						Wave Traps	2000	NA	NA			
106	SR-II	Narendra - Kudgi I	176.13	400	Zebra	Quad	85	Isolators	3150A	3150A	3150A			Isolators	3150	3150	3150			
								CT	NA	3000A	3000A			CT	NA	3150	3150			
								Breakers	NA	3000A	3000A			Breakers	NA	3150	3150			
								Wave Traps	3150A	NA	NA			Wave Traps	3150	NA	NA			
107	SR-II	Narendra - Kudgi II	176.13	400	Zebra	Quad	85	Isolators	3150A	3150A	3150A			Isolators	3150	3150	3150			
								CT	NA	3000A	3000A			CT	NA	3150	3150			
								Breakers	NA	3000A	3000A			Breakers	NA	3150	3150			
								Wave Traps	3150A	NA	NA			Wave Traps	3150	NA	NA			

108	WR-I	Aurangabad(PG) - Aurangabad I	52.563	400	ACSR Moose	Quad	85	Isolators	3000	3000	3000			Isolators				3000	
								CT	NA	3000	3000			CT				3000	
								Breakers	NA	3150	3150			Breakers				3150	
								Wave Traps	3150	NA	NA			Wave Traps				3150	
109	WR-I	Aurangabad(PG) - Aurangabad II	52.563	400	ACSR Moose	Quad	85	Isolators	3000	3000	3000			Isolators				3000	
								CT	NA	3000	3000			CT				3000	
								Breakers	NA	3150	3150			Breakers				3150	
								Wave Traps	3150	NA	NA			Wave Traps				3150	
110	WR-I	Wardha - Parli I	336.939	400	ACSR Moose	Quad	85	Isolators	3150 A	3150 A	3150 A			Isolators	3150 A	3150 A	3150 A		
								CT	NA	3000 A	3000 A			CT	NA	3000 A	3000 A		
								Breakers	NA	3150 A	3150 A			Breakers	NA	3150 A	3150 A		
								Wave Traps	3000 A	NA	NA			Wave Traps	3000 A	NA	NA		
111	WR-I	Wardha - Parli II	336.939	400	ACSR Moose	Quad	85	Isolators	3150 A	3150 A	3150 A			Isolators	3150 A	3150 A	3150 A		
								CT	NA	3000 A	3000 A			CT	NA	3000 A	3000 A		
								Breakers	NA	3150 A	3150 A			Breakers	NA	3150 A	3150 A		
								Wave Traps	3000 A	NA	NA			Wave Traps	3000 A	NA	NA		
112	WR-I	Mauda - Wardha I	123.841	400	ACSR Moose	Quad	85	Isolators	3150 A	3150 A	3150 A			Isolators					
								CT	NA	3000 A	3000 A			CT					
								Breakers	NA	3150 A	3150 A			Breakers					
								Wave Traps	3000 A	NA	NA			Wave Traps					
113	WR-I	Mauda - Wardha II	123.841	400	ACSR Moose	Quad	85	Isolators	3150 A	3150 A	3150 A			Isolators					
								CT	NA	3000 A	3000 A			CT					
								Breakers	NA	3150 A	3150 A			Breakers					
								Wave Traps	3000 A	NA	NA			Wave Traps					
114	WR-I	Wardha - Raipur I	370.565	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators					
								CT	3000	3000	3000			CT					
								Breakers	-	3150	3150 (2000 not as indicated by AM)			Breakers					
								Wave Traps	3000	-	-			Wave Traps					
115	WR-I	Wardha - Raipur II	370.565	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators					
								CT	3000	3000	3000			CT					
								Breakers	-	3150	3150			Breakers					
								Wave Traps	3000	-	-			Wave Traps					
116	WR-I	Solapur - Solapur I	11.2	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators					
								CT	NA	3150	3150			CT					
								Breakers	3150	3150	3150			Breakers					
								Wave Traps	3150	NA	NA			Wave Traps					
117	WR-I	Solapur - Solapur II	11.2	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators					
								CT	NA	3150	3150			CT					
								Breakers	3150	3150	3150			Breakers					
								Wave Traps	3150	NA	NA			Wave Traps					
118	WR-II	Vindhyachal - Jabalpur-I	360	400	ACKC	Twin	75	Isolators						Isolators	2000A	2000A	2000A		
								CT						CT	-	2000A	2000A		
								Breakers						Breakers	-	2000A	2000A		
								Wave Traps						Wave Traps	2000A	-	-		
119	WR-II	Vindhyachal - Jabalpur-II	360	400	ACKC	Twin	75	Isolators						Isolators	2000A	2000A	2000A		
								CT						CT	-	2000A	2000A		
								Breakers						Breakers	-	2000A	2000A		
								Wave Traps						Wave Traps	2000A	-	-		
120	WR-II	Jabalpur - Itarsi-I	232	400	ACKC	Twin	75	Isolators	2000A	2000A	2000A			Isolators	2000A	2000A	2000A		
								CT	-	2000A	2000A			CT	-	2000A	2000A		
								Breakers	-	2000A	2000A			Breakers	-	2000A	2000A		
								Wave Traps	2000A	-	-			Wave Traps	2000A	-	-		
121	WR-II	Jabalpur - Itarsi-II	232	400	ACKC	Twin	75	Isolators	2000A	2000A	2000A			Isolators	2000A	2000A	2000A		
								CT	-	2000A	2000A			CT	-	2000A	2000A		
								Breakers	-	2000A	2000A			Breakers	-	2000A	2000A		
								Wave Traps	2000A	-	-			Wave Traps	2000A	-	-		
122	WR-I / WR-II	Seoni - Khandwa-I	351.729	400	AAAC	Quad	75	Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT	NA	3150	3150			CT	NA	3150	3150		
								Breakers	3150	3150	3150			Breakers	3150	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		
123	WR-I / WR-II	Seoni - Khandwa-II	351.729	400	AAAC	Quad	75	Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT	NA	3150	3150			CT	NA	3150	3150		
								Breakers	3150	3150	3150			Breakers	3150	3150	3150		
								Wave Traps	3150	NA	NA			Wave Traps	3150	NA	NA		
124	WR-II	Mundra - Bhachau I	99.468	400	ACSR Snowbird	Tripple	85	Isolators						Isolators	3150	3150	3150		
								CT						CT	NA	3000	3000		
								Breakers						Breakers	3150	3150	3150		
								Wave Traps						Wave Traps	3150	NA	NA		
125	WR-II	Mundra - Bhachau II	99.468	400	ACSR Snowbird	Tripple	85	Isolators						Isolators	3150	3150	3150		
								CT						CT	NA	3000	3000		
								Breakers						Breakers	3150	3150	3150		
								Wave Traps						Wave Traps	3150	NA	NA		

126	WR-II	Bachau - Ranchodpura I	282.856	400	ACSR Snowbird	Quad	85	Isolators	3150	3150	3150			Isolators					
								CT	NA	3000	3000			CT					
								Breakers	3150	3150	3150			Breakers					
								Wave Traps	3150	NA	NA			Wave Traps					
127	WR-II	Bachau - Ranchodpura II	282.856	400	ACSR Snowbird	Triplle	85	Isolators	3150	3150	3150			Isolators					
								CT	NA	3000	3000			CT					
								Breakers	3150	3150	3150			Breakers					
								Wave Traps	3150	NA	NA			Wave Traps					
128	WR-II	Indore - Indore II (MP)	49.73	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators				3150	
								CT	NA	3600	3600			CT				3600	
								Breakers	NA	3150	3150			Breakers				3150	
								Wave Traps	3150	NA	NA			Wave Traps				3150	
129	WR-II	Indore - Indore I (MP)	49.73	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators				3150	
								CT	NA	3600	3600			CT				3600	
								Breakers	NA	3150	3150			Breakers				3150	
								Wave Traps	3150	NA	NA			Wave Traps				3150	
130	WR-II	Vindhyachal IV - Vindhyachal PS I	28.55	400	ACSR Moose	Quad	85	Isolators	3150A	3150A	3150A			Isolators					
								CT	NA	3000A	3000A			CT					
								Breakers	NA	3150A	3150A			Breakers					
								Wave Traps	3150A	NA	NA			Wave Traps					
131	WR-II	Vindhyachal IV - Vindhyachal PS II	28.55	400	ACSR Moose	Quad	85	Isolators	3150A	3150A	3150A			Isolators					
								CT	NA	3000A	3000A			CT					
								Breakers	NA	3150A	3150A			Breakers					
								Wave Traps	3150A	NA	NA			Wave Traps					
132	WR-II	Jabalpur PS - Jabalpur I	15.456	400	ACSR Moose	Quad	85	Isolators	3150 Amp	3150 Amp	3150 Amp			Isolators	3150 Amp	3150 Amp	3150 Amp		
								CT		3150 Amp	3150 Amp			CT		3150 Amp	3150 Amp		
								Breakers		3150 Amp	3150 Amp			Breakers		3150 Amp	3150 Amp		
								Wave Traps	3150 Amp					Wave Traps	3150 Amp				
133	WR-II	Jabalpur PS - Jabalpur II	15.456	400	ACSR Moose	Quad	85	Isolators	3150 Amp	3150 Amp	3150 Amp			Isolators	3150 Amp	3150 Amp	3150 Amp		
								CT		3150 Amp	3150 Amp			CT		3150 Amp	3150 Amp		
								Breakers		3150 Amp	3150 Amp			Breakers		3150 Amp	3150 Amp		
								Wave Traps	3150 Amp					Wave Traps	3150 Amp				
134	WR-II	Pirana - Vadodara I	131.549	400	ACSR Moose	Quad	85	Isolators	3150A	3150A	3150A			Isolators					3150
								CT	NA	3000A	3000A			CT					3000
								Breakers	NA	3150A	3150A			Breakers					4000
135	WR-II	Asoj - Vadodara I	11.99	400	ACSR Moose	Quad	85	Isolators						Isolators					3150
								CT						CT					3000
								Breakers						Breakers					4000
136	WR-II	Pirana - Vadodara II	131.549	400	ACSR Moose	Quad	85	Isolators	3150A	3150A	3150A			Isolators					3150
								CT	NA	3000A	3000A			CT					3000
								Breakers	NA	3150A	3150A			Breakers					4000
								Wave Traps	3150A	NA	NA			Wave Traps					3150
137	WR-II	Asoj - Vadodara II	11.99	400	ACSR Moose	Quad	85	Isolators						Isolators					3150
								CT						CT					3000
								Breakers						Breakers					4000
								Wave Traps						Wave Traps					3150
138	WR-II	Jabalpur PS - Annupur I	246.409	400	ACSR Snowbird	Tripple	85	Isolators	3150 Amp	3150 Amp	3150 Amp			Isolators					
								CT		3150 Amp	3150 Amp			CT					
								Breakers		3150 Amp	3150 Amp			Breakers					
								Wave Traps	3150 Amp					Wave Traps					
139	WR-II	Jabalpur PS - Annupur II	246.409	400	ACSR Snowbird	Tripple	85	Isolators	3150 Amp	3150 Amp	3150 Amp			Isolators					
								CT		3150 Amp	3150 Amp			CT					
								Breakers		3150 Amp	3150 Amp			Breakers					
								Wave Traps	3150 Amp					Wave Traps					
140	ER-I	Barh - Patna-I	93.113	400	ACSR Moose	Quad	85	Isolators						Isolators	3150A	3150A	3150A		
								CT						CT		3000A	3000A		
								Breakers						Breakers		3150A	3150A		
								Wave Traps						Wave Traps	3150A				
141	ER-I	Barh - Patna-II	93.113	400	ACSR Moose	Quad	85	Isolators						Isolators	3150A	3150A	3150A		
								CT						CT		3000A	3000A		
								Breakers						Breakers		3150A	3150A		
								Wave Traps						Wave Traps	3150A				
142	ER-I/NR-III	Ballia-Biharshariff I	241.79	400	ACSR	Quad	85	Isolators	3150A	3150A	3150A			Isolators	3150	3150	3150		
								CT		3000A	3000A			CT	3000	3000	3000		
								Breakers		3150A	3150A			Breakers		3150	3150		
								Wave Traps	3150A					Wave Traps	3150				
143	ER-I/NR-III	Ballia-Biharshariff II	241.79	400	ACSR	Quad	85	Isolators	3150A	3150A	3150A			Isolators	3150	3150	2000		
								CT		3000A	3000A			CT	3000	3000	3000		
								Breakers		3150A	3150A			Breakers		3150	2000		
								Wave Traps	3150A					Wave Traps	3150				
144	ER-I/NR-III	Patna-Ballia I	195.323	400	ACSR	Quad	85	Isolators	3150A	3150A	3150A			Isolators	3150A	3150A	3150A		
								CT		3000A	3000A			CT		3000A	3000A		
								Breakers		3150A	3150A			Breakers		3150A	3150A		
								Wave Traps	3150A					Wave Traps	3150A				

145	ER-I/NR-III	Patna-Ballia II	195.323	400	ACSR	Quad	85	Isolators	3150A	3150A	3150A			Isolators	3150A	3150A	3150A		
								CT		3000A	3000A			CT		3000A	3000A		
								Breakers		3150A	3150A			Breakers		3150A	3150A		
								Wave Traps	3150A					Wave Traps	3150A				
146	ER-I	Barh-Patna-III	68.651	400	ACSR Moose	Quad	85	Isolators						Isolators	3150A	3150A	3150A		
								CT						CT		3000A	3000A		
								Breakers						Breakers		3150A	3150A		
								Wave Traps						Wave Traps	3150A				
147	ER-I	Barh-Patna-IV	68.651	400	ACSR Moose	Quad	85	Isolators						Isolators	3150A	3150A	3150A		
								CT						CT		3000A	3000A		
								Breakers						Breakers		3150A	3150A		
								Wave Traps						Wave Traps	3150A				
148	ER-I/NR-III	Patna-Ballia III	185	400	ACSR Moose	Quad	85	Isolators	3150A	3150A	3150A			Isolators	3150A	3150A	3150A		
								CT		3000A	3000A			CT		3000A	3000A		
								Breakers		3150A	3150A			Breakers		3150A	3150A		
								Wave Traps	3150A					Wave Traps	3150A				
149	ER-I/NR-III	Patna-Ballia IV	185	400	ACSR Moose	Quad	85	Isolators	3150A	3150A	3150A			Isolators	3150A	3150A	3150A		
								CT		3000A	3000A			CT		3000A	3000A		
								Breakers		3150A	3150A			Breakers		3150A	3150A		
								Wave Traps	3150A					Wave Traps	3150A				
150	ER-I	Biharshariff - Sasaram III (now purnea-I)	324.185	400	ACSR Moose	Quad	85	Isolators	3150	2000	2000			Isolators	3150	3150	3150		
								CT	3000	3000	3000			CT		3000	3000		
								Breakers		2000	2000			Breakers		3150	3150		
								Wave Traps	3000					Wave Traps	2000				
151	ER-I	Biharshariff - Sasaram IV(now purnea-II)	324.185	400	ACSR Moose	Quad	85	Isolators	3000	2000	3000			Isolators	3150	3150	3150		
								CT	3000	3000	3000			CT		3000	3000		
								Breakers		3000	3000			Breakers		3150	3150		
								Wave Traps	3000					Wave Traps	2000				
152	ER-I	Nabinagar - Sasaram I	81.65	400	ACSR Lapwing	Twin	85	Isolators						Isolators	3150	3150	3150		
								CT						CT		3000	3000		
								Breakers						Breakers		3150	3150		
								Wave Traps						Wave Traps	2000				
153	ER-I	Nabinagar - Sasaram II	81.65	400	ACSR Lapwing	Twin	85	Isolators						Isolators	3150	3150	3150		
								CT						CT		3000	3000		
								Breakers						Breakers		3150	3150		
								Wave Traps						Wave Traps	2000				
154	ER-I/ER-II	Koderma-Gaya I	125.512	400	ACSR Moose	Quad	85	Isolators						Isolators	3150	3150	3150		
								CT						CT		3000	3000		
								Breakers						Breakers		3150	3150		
								Wave Traps						Wave Traps	3150				
155	ER-I/ER-II	Koderma-Gaya II	125.512	400	ACSR Moose	Quad	85	Isolators						Isolators	3150	3150	3150		
								CT						CT		3000	3000		
								Breakers						Breakers		3150	3150		
								Wave Traps						Wave Traps	3150				
156	ER-I/ER-II	Gaya - Maithon I	274.943	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators					
								CT		3000	3000			CT					
								Breakers		3150	3150			Breakers					
								Wave Traps	3150					Wave Traps					
157	ER-I/ER-II	Gaya - Maithon II	274.943	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators					
								CT		3000	3000			CT					
								Breakers		3150	3150			Breakers					
								Wave Traps	3150					Wave Traps					
158	ER-I	Ranchi (New) - Ranchi I	78.617	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT		3000	3000			CT		3000	3000		
								Breakers		3150	3150			Breakers		3150	3150		
								Wave Traps	3150					Wave Traps	3150				
159	ER-I	Ranchi (New) - Ranchi II	78.617	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT		3000	3000			CT		3000	3000		
								Breakers		3150	3150			Breakers		3150	3150		
								Wave Traps	3150					Wave Traps	3150				
160	ER-I	Ranchi (New) - Ranchi III	78.542	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT		3000	3000			CT		3000	3000		
								Breakers		3150	3150			Breakers		3150	3150		
								Wave Traps	3150					Wave Traps	3150				
161	ER-I	Ranchi (New) - Ranchi IV	78.542	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators	3150	3150	3150		
								CT		3000	3000			CT		3000	3000		
								Breakers		3150	3150			Breakers		3150	3150		
								Wave Traps	3150					Wave Traps	3150				
162	ER-I	Patna-Kishanganj I	346.72	400	ACSR Moose	Quad	85	Isolators	3150A	3150A	3150A			Isolators					4000 A
								CT		3000A	3000A			CT					3000 A
								Breakers		3150A	3150A			Breakers					4000 A
								Wave Traps	3150A					Wave Traps					3150 A

163	ER-I	Patna-Kishanganj II	346.72	400	ACSR Moose	Quad	85	Isolators	3150A	3150A	3150A			Isolators					4000 A
								CT		3000A	3000A			CT					3000 A
								Breakers		3150A	3150A			Breakers					4000 A
								Wave Traps	3150A					Wave Traps					3150 A
164	ER-I/NR-III	Barh II - Gorakhpur I	349.177	400	ACSR Moose	Quad	85	Isolators						Isolators	3150A	3150A	3150A		
								CT						CT		3000A	3000A		
								Breakers						Breakers		3150A	3150A		
								Wave Traps						Wave Traps	3150A				
165	ER-I/NR-III	Barh II - Gorakhpur II	349.177	400	ACSR Moose	Quad	85	Isolators						Isolators	3150A	3150A	3150A		
								CT						CT		3000A	3000A		
								Breakers						Breakers		3150A	3150A		
								Wave Traps						Wave Traps	3150A				
166	ER-I	New Ranchi - Chandwa I	68	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators					3150
								CT		3000	3000			CT					3000
								Breakers		3150	3150			Breakers					3150
								Wave Traps	3150					Wave Traps					3150
167	ER-I	Chandwa- Gaya I	117	400	ACSR Moose	Quad	85	Isolators					3150	Isolators	3150	3150	3150		
								CT					3000	CT		3000	3000		
								Breakers					3150	Breakers		3150	3150		
								Wave Traps					3150	Wave Traps	3150				
168	ER-I	New Ranchi - Chandwa II	68	400	ACSR Moose	Quad	85	Isolators	3150	3150	3150			Isolators					3150
								CT		3000	3000			CT					3000
								Breakers		3150	3150			Breakers					3150
								Wave Traps	3150					Wave Traps					3150
169	ER-I	Chandwa- Gaya II	117	400	ACSR Moose	Quad	85	Isolators					3150	Isolators	3150	3150	3150		
								CT					3000	CT		3000	3000		
								Breakers					3150	Breakers		3150	3150		
								Wave Traps					3150	Wave Traps	3150				
170	ER-I/ER-II	Farakka-Malda-I	40	400	HTLS	Twin	75	Isolators						Isolators		3000	3000		
								CT						CT		3000	3000		
								Breakers						Breakers		3000	3000		
								Wave Traps						Wave Traps		3000	3000		
171	ER-I/ER-II	Farakka-Malda-II	40	400	HTLS	Twin	75	Isolators						Isolators		3000	3000		
								CT						CT		3000	3000		
								Breakers						Breakers		3000	3000		
								Wave Traps						Wave Traps		3000	3000		
172	ER-I/ER-II	New Purnea - New Siliguri I	168	400	HTLS	Twin	75	Isolators	3150A	3150A	3150A			Isolators	3150A	3150A	3150A		
								CT		3000A	3000A			CT		3000A	3000A		
								Breakers		3150A	3150A			Breakers		3150A	3150A		
								Wave Traps	3150A					Wave Traps	3150A				
173	ER-I/ER-II	New Purnea - New Siliguri II	168	400	HTLS	Twin	75	Isolators	3150A	3150A	3150A			Isolators	3150A	3150A	3150A		
								CT		3000A	3000A			CT		3000A	3000A		
								Breakers		3150A	3150A			Breakers		3150A	3150A		
								Wave Traps	3150A					Wave Traps	3150A				
174	ER-I	Newpurnea - Kishanganj-I (LILO portion)		400	ACSR Moose	Quad		Isolators	3150 A	3150 A	3150 A			Isolators					4000 A
								CT		2000 A	2000A			CT					3000 A
								Breakers		3150 A	3150 A			Breakers					4000 A
								Wave Traps	3150 A					Wave Traps					3150 A
175	ER-I	Kishanganj-New Siliguri (LILO portion)		400	ACSR Moose	Quad		Isolators					4000 A	Isolators	3150A	3150A	3150A		
								CT					3000 A	CT		3000A	3000A		
								Breakers					4000 A	Breakers		3150A	3150A		
								Wave Traps					3150 A	Wave Traps	3150A				
176	ER-I	Newpurnea - Kishanganj-II (LILO portion)		400	ACSR Moose	Quad		Isolators	3150 A	3150 A	3150 A			Isolators					4000 A
								CT		2000A	2000 A			CT					3000 A
								Breakers		3150 A	3150 A			Breakers					4000 A
								Wave Traps	3150 A					Wave Traps					3150 A
177	ER-I/ER-II	Kishanganj-New Siliguri II (LILO portion)		400	ACSR Moose	Quad		Isolators					4000 A	Isolators	3150A	3150A	3150A		
								CT					3000 A	CT		3000A	3000A		
								Breakers					4000 A	Breakers		3150A	3150A		
								Wave Traps					3150 A	Wave Traps	3150A				
178	ER-II	Durgapur-Maithon I	70.77	400	ACSR Lapwing	Twin	85	Isolators	2000	2000	2000			Isolators	2000	2000	2000		
								CT		2000	2000			CT		2000	2000		
								Breakers		3150	3150			Breakers		3150	3150		
								Wave Traps	2000	2000	2000			Wave Traps	2000	2000	2000		
179	ER-II	Durgapur-Maithon II	70.77	400	ACSR Lapwing	Twin	85	Isolators	2000	2000	2000			Isolators	2000	2000	2000		
								CT		2000	2000			CT		2000	2000		
								Breakers		3150	3150			Breakers		3150	3150		
								Wave Traps	2000	2000	2000			Wave Traps	2000	2000	2000		
180	ER-II	Baharampur-Sagardighi I	26.297	400	HTLS	Twin	85	Isolators	3150A	3150A	3150A			Isolators					
								CT	NA	3000A	3000A			CT					
								Breakers	NA	3150A	3150A			Breakers					
								Wave Traps	3150A	NA	NA			Wave Traps					
181	ER-II	Baharampur-Sagardighi II	26.297	400	HTLS	Twin	85	Isolators	3150A	3150A	3150A			Isolators					
								CT	NA	3000A	3000A			CT					
								Breakers	NA	3150A	3150A			Breakers					
								Wave Traps	3150A	NA	NA			Wave Traps					

182	NER	Balipara- Bongaingaon III	309	400	ACSR Moose	Quad	85	Isolators	3150A	3150A	3150A			Isolators	3150A	3150A	3150A		
								CT	NA	3000A	3000A			CT	NA	3000A	3000A		
								Breakers	NA	3150A	3150A			Breakers	NA	3150A	3150A		
								Wave Traps	3000A	NA	NA			Wave Traps	3000A	NA	NA		
183	NER	Balipara- Bongaingaon IV	309	400	ACSR Moose	Quad	85	Isolators	3150A	3150A	3150A			Isolators	3150A	3150A	3150A		
								CT	NA	3000A	3000A			CT	NA	3000A	3000A		
								Breakers	NA	3150A	3150A			Breakers	NA	3150A	3150A		
								Wave Traps	3000A	NA	NA			Wave Traps	3000A	NA	NA		

The information regarding terminal equipment ratings of 400 KV Lines

Sr. No	Name of Line	Voltage (KV)	Tower Configuration (S/C or D/C)	Line Length (Km)	Type of Conductor	Conductor Configuration	End 1 and End 2 Rating
1	Talwandi Sabo-Dhuri	400 KV	Double Circuit	88	Moose	Twin	CB - 2000A,40 KA CT - 2000A, 40 KA CVT- 4400 pF Isolator-2000A,40KA Line Trap-2000A, 0.5 mH, 40 KA
2	Talwandi Sabo- Muktsar			100.3			
3	Talwandi Sabo- Nakodar			155			
4	LILO of Talwandi Sabo-Nakodar at Moga			11.347			
5	Muktsar- Makhu			95			
6	Makhu- Balachak			64			
7	Rajpura TPS- Nakodar			137			
8	Rajpura TPS- Rajpura			9			
9	Rajpura-Dhuri			84			
10	Nakodar-Makhu			52.72			

S.No.	Name of Line	Circuit ID	Tower Configuration(S/C or D/C)	Line Length (in km)	Type of conductor	O&M by	Agency at		Thermal Capability of Breaker and Isolators	Thermal Capability of Other SwitchGears such as CT,PT, etc.	Thermal Capability of Line
							End-I	End-II			
4. 400kV HVAC Transmission Line											
G. HVPNL											
1	CLP Jhajjar -Dhanonda	1	D/C	20	Twin Moose	KT Jhajjar	CLP Jhajjar	HVPNL	2000A @ 50 DEG C	2500A@50 DEG C	728A @ 40 DEG AMBIENT TEMPERATURE
2	CLP Jhajjar -Dhanonda	2	D/C	20	Twin Moose	KT Jhajjar	CLP Jhajjar	HVPNL	2000A @ 50 DEG C	2500A@50 DEG C	728A @ 40 DEG AMBIENT TEMPERATURE
3	CLP Jhajjar- Kabulpur	1	D/C	35	Quad Moose	KT Jhajjar	CLP Jhajjar	HVPNL	3150 A @ 50 deg C	3000 A @ 50 deg C	714 A @ 50 deg C ambient temp
4	CLP Jhajjar- Kabulpur	2	D/C	35	Quad Moose	KT Jhajjar	CLP Jhajjar	HVPNL	3150 A @ 50 deg C	3000 A @ 50 deg C	714 A @ 50 deg C ambient temp
5	Deepalpur-Kabulpur	1	D/C	64	Quad Moose	KT Jhajjar	KT Jhajjar	KT Jhajjar	3150 A @ 50 deg C	3000 A @ 50 deg C	714 A @ 50 deg C ambient temp
6	Deepalpur-Kabulpur	2	D/C	64	Quad Moose	KT Jhajjar	KT Jhajjar	KT Jhajjar	3150 A @ 50 deg C	3000 A @ 50 deg C	714 A @ 50 deg C ambient temp
7	Dhanoda-Daultabad	1	D/C	73	Quad Moose	HVPNL	HVPNL	HVPNL	2000A @ 50 DEG C	2500A@50 DEG C	728A @ 40 DEG C AMBIENT TEMP
8	Dhanoda-Daultabad	2	D/C	73	Quad Moose	HVPNL	HVPNL	HVPNL	2000A @ 50 DEG C	2500A@50 DEG C	728 A @ 40 Deg C AMB. TEMP.
9	Gurgaon-Daultabad	1	D/C	24	Quad Moose	HVPNL	POWERGRID	HVPNL	3150 A @ 50 deg C	2000 A @ 50 deg C	714A each conductor@ 50 deg C ambient temp
10	Gurgaon-Daultabad	2	D/C	24	Quad Moose	HVPNL	POWERGRID	HVPNL	3150 A @ 50 deg C	2000 A @ 50 deg C	714A each conductor@ 50 deg C ambient temp
11	Jhajjar-Daulatabad	1	D/C	64	Twin Moose	HVPNL	APCPL	HVPNL	3150 A @ 50 deg C	2000 A @ 50 deg C	714A each conductor@ 50 deg C ambient temp
12	Jhajjar-Daulatabad	2	D/C	64	Twin Moose	HVPNL	APCPL	HVPNL	3150 A @ 50 deg C	2000 A @ 50 deg C	714A each conductor@ 50 deg C ambient temp
13	Khedar-Fathehabad	1	D/C	40	Twin Moose	HVPNL	HPGCL	POWERGRID	3150 A @ 50 deg C	3000 A @ 50 deg C	714 A @ 50 deg C ambient temp
14	Khedar-Kirori	1	D/C	6	Twin Moose	HVPNL	HPGCL	HVPNL	3150 A @ 50 deg C	3000 A @ 50 deg C	714 A @ 50 deg C ambient temp
15	Khedar-Kirori	2	D/C	6	Twin Moose	HVPNL	HPGCL	HVPNL	3150 A @ 50 deg C	3000 A @ 50 deg C	714 A @ 50 deg C ambient temp
16	Jind Kirori 1	1	D/C	50	Twin Moose	HVPNL	PGCIL	HVPNL	3150 A @ 50 deg C	3000 A @ 50 deg C	714 A @ 50 deg C ambient temp
17	Jind Kirori 2	2	D/C	50	Twin Moose	HVPNL	PGCIL	HVPNL	3150 A @ 50 deg C	3000 A @ 50 deg C	714 A @ 50 deg C ambient temp
18	Khedar-Nuhiawali	1	D/C	114	Twin Moose	HVPNL	HPGCL	HVPNL	2000 A @ 45 deg C	2000A @ 45 deg C	1670A @ 45deg C Ambiant temp.
19	Nuhiawali-Fathehabad	1	D/C	78	Twin Moose	HVPNL	HVPNL	POWERGRID	2000 A @ 45 deg C	2000A @ 45 deg C	1670A @ 45deg C Ambiant temp.

Additional Equipment for resource disjoint and critical Locations in Northern Region

Sr No.	Name	Directions at critical nodes	Available Equipment	Required equipment
1	Mandola	4	1	1
2	DTL Bawana	4	1	1
3	Muradnagar	4	1	1
4	SLDC, RRVPNL (Jaipur)	2	1	1
5	SLDC, HVPNL (Panipat)	5	1	1
6	SLDC, BBMB (Chandigarh)	3	1	1
7	SLDC, DTL (New Delhi)	2	1	1
8	SLDC, HPSEBL (Shimla)	1	1	1
9	SLDC J&K PDD (Jammu)	1	1	1
10	SLDC Lucknow (UPPTCL)	2	1	1
11	SLDC PSTCL (Patiala)	2	1	1
12	SLDC PTCUL (Dehradun)	1	1	1

Annexure-X

Locations for FOTE requirement

Sr No.	Name	Backup CC location	FOTE
1	Backup NRLDC	Guwahati	2
2	SLDC, RRVPNL (Jaipur)	Sub-LDC Bhilwara	1
3	SLDC, HVPNL (Panipat)	HW, Shakti Bhawan Panchkula	1
4	SLDC, BBMB (Chandigarh)	SLDC, Patiala, Punjab	0
5	SLDC, DTL (New Delhi)	400kV Bamnauli (ALDC Bldg)	2
6	SLDC, HPSEBL (Shimla)	Sub-LDC Hamirpur	1
7	SLDC J&K PDD (Jammu)	Backup SLDC Srinagar	2
8	SLDC Lucknow (UPPTCL)	SLDC Modipuram (UPPTCL)	1
9	SLDC PSTCL (Patiala)	SLDC, BBMB (Chandigarh)	0
10	SLDC PTCUL (Dehradun)	Kashipur	1
		Total	11

Meeting Plan for FY 2023-24

S.N.	Month	Meeting	Host	Mode
1	Apr-2023	65th NRPC	SJVN	Physical
2	May-2023	66th NRPC	NRPC Secretariat	VC
3	June-2023	67th NRPC	NRPC Secretariat	VC
4	Jul-2023	-	-	-
5	Aug-2023	68th NRPC	NTPC	Physical
6	Sep-2023	69th NRPC	NRPC Secretariat	VC
7	Oct-2023	70th NRPC	NRPC Secretariat	VC
8	Nov-2023	71st NRPC & 48th TCC	NHPC	Physical
9	Dec-2023	72nd NRPC	NRPC Secretariat	VC
10	Jan-2024	73rd NRPC	NRPC Secretariat	VC
11	Feb-2024	74th NRPC & 49th TCC	Combined by CLP Jhajjar & Lanco Anpara Power Ltd	Physical
12	Mar-2024	75th NRPC	NRPC Secretariat	VC

Meeting Plan for FY 2024-25

S.N.	Month	Meeting	Host	Mode
1	Apr-2024	76th NRPC	NRPC Secretariat	VC
2	May-2024	77th NRPC & 50th TCC	UPPTCL	Physical
3	June-2024	78th NRPC	NRPC Secretariat	VC
4	Jul-2024	79th NRPC	NRPC Secretariat	VC
5	Aug-2024	80th NRPC & 51st TCC	Member Trader	Physical
6	Sep-2024	81st NRPC	NRPC Secretariat	VC
7	Oct-2024	82nd NRPC	NRPC Secretariat	VC
8	Nov-2024	83rd NRPC & 52nd TCC	DTL	Physical
9	Dec-2024	84th NRPC	NRPC Secretariat	VC
10	Jan-2025	85th NRPC	NRPC Secretariat	VC
11	Feb-2025	86th NRPC & 53rd TCC	Adani Power Ltd	Physical
12	Mar-2025	87th NRPC	NRPC Secretariat	VC

CHANGES IN OPERATING PROCEDURE FOR NR REGION AS PER NEW IEGC-2023

NRLDC System Operation Department

1. All references to sections has been changes as per new IEGC-2023.
2. New element connectivity chapter is completely changed as per new IEGC code.
   - All formats and forms are attached as Annexures in the document.
   - Data to be submitted for Interconnection studies 6 months prior to the expected date of commission for studies purposes
   - 10 days prior to date of commissioning intimation to be given to RLDC
   - Within 3 working days RLDC should acknowledge the receipt of request and ask for clarifications
   - Request for testing 7 days before the date
   - Within 3 working days RLDC shall give provisional approval for testing
3. Planned Outages
   - Planned Outages in D-5 basis via NRPC procedure is added.
   - Hotline Maintenance is added to operating Procedure. Annexure has the format of declaration to be submitted.

4. Change in timeline of execution of operating code from half hour to 60 minutes.
5. Frequency control
   - Wordings changed for 100MW change from intimation to permission as per IEGC.
   - RGMO is changed to FGMO.
   - Availability of TRAS should be assessed on a daily basis.
   - Messages issued by NRLDC: Formats and Logics have been changed.

Violation Type and Category			Duration for issuance of Message
Frequency Violation	(49.85 <= f < 49.90) or (50.05 < f <= 50.10)	Alert	Message will be issued if violation continues for at least 15 minutes
	(49.70 <= f < 49.85) or (50.10 < f <= 50.25)	Emergency	Message will be issued if violation continues for at least 5 minutes
	(f < 49.70 or f > 50.25)	Extreme Emergency	Message will be issued if violation continues for at least 5 minutes
Voltage Violation	(380 kV <= V < 385 kV) or (415 kV < V <= 420kV) / (725kV <= V < 735kV) or (795kV < V <= 805kV)	Alert	Message will be issued if violation continues for at least 15 minutes
	(370 kV <= V < 380 kV) or (420 kV < V <= 430 kV) / (707kV <= V < 725kV) or (805kV <= V < 825kV)	Emergency	Message will be issued if violation continues for at least 5 minutes
	(V < 370 kV or V > 430 kV) or (V< 707kV or V > 825kV)	Extreme Emergency	Message will be issued if violation continues for at least 5 minutes
Loading Violation	current loading of lines/ICT is more than SIL and less than its thermal limit	Alert	Message will be issued if violation continues for at least 15 minutes
	current loading of lines/ICT is more than thermal limit and less than limit of LTS/SPS	Emergency	Message will be issued if violation continues for at least 5 minutes
	current loading of lines/ICT is more than thermal limit and LTS/SPS scheme operated	Extreme Emergency	Immediately after LTS/SPS scheme operated

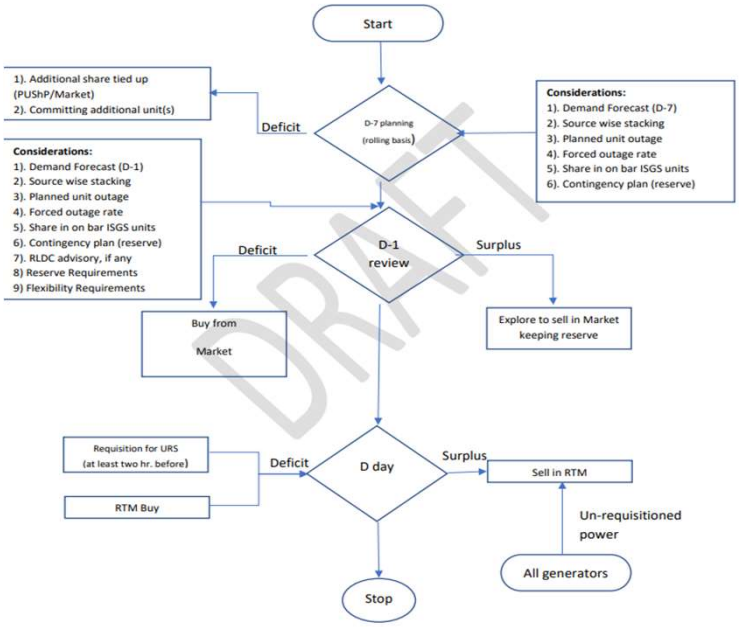
6. Voltage control
   - 230kV rms row voltage rating is added in the table.
   - New STATCOMs commissioned in Solar pooling stations (Bhadla-2, Bikaner-2, Fatehgarh-2) were added to procedure
7. Congestion Management
   - Timelines for restoration actions to bring system parameters to normal levels has been reduced to one hour.
   - ATC/TTC timelines and responsibilities have been added as defined in IEGC.
   - NLDC procedure for ATC/TTC assessment is added as Annexure.
   - STOA applications are redefined as T-GNA

Purpose	Sl No	Action of Stakeholder	Submission Responsibility	Submission to	Data/Information Submission Time line
1. Revision 0 TTC/ATC Declaration for Month 'M'	1(a)	Submission of node wise Load and generation data along with envisaged scenarios for assessment of transfer capability	SLDC	RLDC	10th Day of 'M-12' month
		Assessment of TTC/ATC of the intra-state system and sharing of updated network simulation models			
	1(b)	Declaration of TTC/ATC of the intra-state system in consultation with RLDC			26th Day of 'M-12' month
	1 (c)	Updating state and regional load & generation & modelling of inter-state & intra-state elements in the regional system base case	RLDCs	NLDC	26th Day of 'M-12' month
	1 (d)	Assessment and declaration of TTC/ATC for the intra-regional and interstate system & sharing of network simulation models			
	1 (e)	Update the All-India network model with inputs from RLDCs/SNA	NLDC	RLDCs	28th Day of 'M-12' month
	1(f)	Assessment and declaration of inter-regional and cross-border TTC/ATC on the website			
2. Interconnection Studies for elements to be integrated in the month 'M'	2(a)	Submission of node-wise load and generation data & sharing of network simulation models for intra-state elements coming in the next six months	SLDC	RLDC	8th Day of 'M-6' month
	2(b)	Sharing of inter-connection study results			21st Day of 'M-6' month

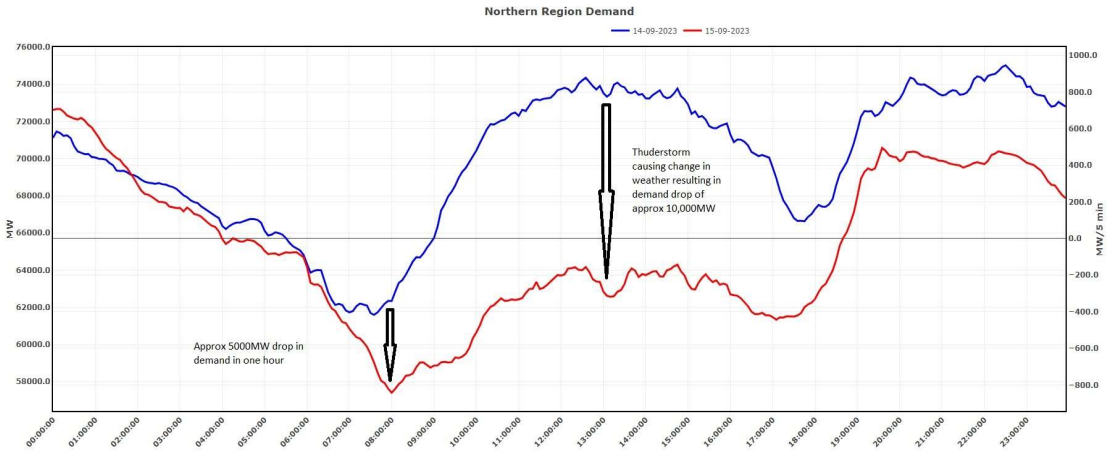
Purpose	Sl No	Action of Stakeholder	Submission Responsibility	Submission to	Data/Information Submission Time line
	2(c)	Updating state and regional load & generation & modelling of inter-state & intra-state elements coming in the next six months in the regional system base case	RLDCs	NLDC	13th Day of 'M-6' month
	2(d)	Sharing of inter-connection study results			26th Day of 'M-6' month
	2(e)	Update the All-India network model for interconnection studies	NLDC	RLDCs	15th Day of 'M-6' month
	2(f)	Completion of inter-connection study for elements coming in the next six months			Last Day of 'M-6' month
3. Month Ahead TTC/ATC Declaration & Base case for Operational Studies for Month 'M'	3(a)	Submission of node wise Load and generation data along with envisaged scenarios for assessment of transfer capability	SLDC	RLDC	8th Day of 'M-1' month
		Assessment of TTC/ATC of the intra-state system and sharing of updated network simulation models			
	3(b)	Declaration of TTC/ATC of the intra-state system in consultation with RLDC	SLDC	RLDC	22nd Day of 'M-1' month
	3(c)	Updating state and regional load & generation and modelling of inter-state & intra-state elements in the regional system base case	RLDCs	NLDC	22nd Day of 'M-1' month
	3(d)	Assessment and declaration of TTC/ATC for the intra-regional and interstate system & sharing of network simulation models			
	3(e)	Update the All-India network model with inputs from RLDCs/SNA	NLDC	RLDCs	24th Day of 'M-1' month
	3(f)	Assessment and declaration of inter-regional and cross-border TTC/ATC on the website			

8. Demand estimation
   - Demand Estimation and generation adequacy studies have been made responsibility of SLDCs as per IEGC.
   - Flowchart of week ahead basis actions to be taken is shared.
   - Formats of demand estimation are shared as annexure.
   - Automatic demand management and controls for demand management with SLDC have been made compulsory for SLDCs.

Flow chart for reviewing load generation balance



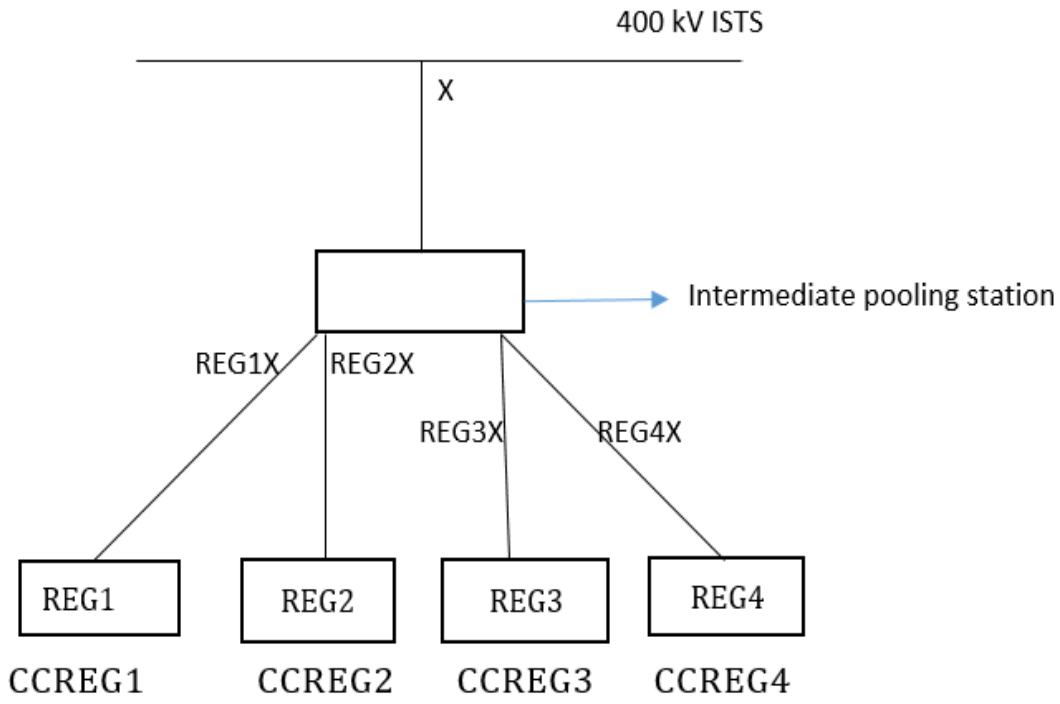
8. NR load crash plot due to Thunderstorm plot is added



8. Scheduling
   - BBMB scheduling will be done by NRLDC in coordination with BBMB.
   - Long term and Medium term contracts have been merged as GNA contracts
   - RLDC ensure schedule<100% of installed capacity
   - Timelines for GNA schedule submission has been changed
   - Reserve Unit Shutdown procedure has been mentioned in IEGC (SCUC process)
   - Short term contracts have been merged as T-GNA contracts
   - Ramp rates for various fuel type plants have been specified
     - Coal or lignite fired plants:1 %
     - Gas power plants :3%
     - Hydro power plants: 10%
   - Scheduling from alternate source of power by generating station in various cases
     - Unit Shut Down(USD) in terms of clause (1) of Regulation 47 of IEGC 2023
     - forced outage of unit(s)
     - A generating station other than a Renewable Energy Generation Station (REGS) may substitute its planned generation with power generated from REGS sources

13. Periodic Testing
    - As per new IEGC periodic testing of generators are proposed.Tests to be done are defined.
    - Synchronous Generators: Real and reactive power, Model Validation and verification test for the complete Generator and Excitation System model including PSS, Model Validation and verification of Turbine/Governor and Load Control or Active Power/ Frequency Control Functions, Testing of Governor performance and Automatic Generation Control.
    - Non-synchronous Generators: Real and reactive power, PPC function test, Frequency response, Active power set point
    - NLDC procedure for testing is attached as Annexure.
14. Reporting to RLDC
    - Written Flash report shall be submitted to RLDC by constituents within 8 hours of the event.
    - Black start capabilities should be tested and reports should be submitted to RLDC as per timelines specified in IEGC

Multiple RE Generating Station (of Installed Capacity > 50 MW) connected to ISTS Pooling Station through Intermediate Pooling Station (PS) – Reactive Accounting shall be done at ISTS Metering Point end of the line connecting Intermediate PS to ISTS PS. De-pooling of Reactive Charges shall be done as given below:



Incomer-X			
Name of Generator	**Commissioned Capacity limited to Connectivity quantum**	**MVAR_H**	**MVAR_L**
Reactive Energy measured at ISTS Metering Point end of the connecting line between Intermediate PS and ISTS PS		X	Y
Reactive Energy measured at Incomers of RPPD			
REG-1	CCREG1	REG1X	REG1Y
REG-2	CCREG2	REG2X	REG2Y
REG-3	CCREG3	REG3X	REG3Y
REG-4	CCREG4	REG4X	REG4Y
SUM	CCTotal	REGX	REGY

Name of the Generator	**Connected Capacity**	**MVAR_H**	**MVAR_L**
REG-1	CC-REG1	REG1X+ (X-REGX)*CCREG1/CCTotal	REG1Y+ (Y-REGY)*CCREG1/CCTotal
REG-2	CC-REG2	REG2X+ (X-REGX)*CCREG2/CCTotal	REG2Y+ (Y-REGY)*CCREG2/CCTotal
REG-3	CC-REG3	REG3X+ (X-REGX)*CCREG3/CCTotal	REG3Y+ (Y-REGY)*CCREG3/CCTotal
REG-4	CC-REG4	REG4X+ (X-REGX)*CCREG4/CCTotal	REG4Y+ (Y-REGY)*CCREG4/CCTotal

Here REG1, REG2, REG3 and REG 4 are 4 RE generators connected at an intermediate pooling station.

X= Net reactive interchange at ISTS point (in case of High Voltage)
Y= Net reactive interchange at ISTS point (in case of Low Voltage)
REG1X = Net reactive interchange of generator 1 at intermediate pooling station
CCREG1 = Commissioned Capacity limited to Connectivity quantum of generator 1

Treatment of Active Power Consumption for providing Reactive Power Support (Night mode operation/Condenser mode)

Methodology Proposed

- A suitable methodology for determining Active Power Consumption for providing Reactive Power Support during synchronous condenser/ night mode taking into account the following shall be formulated:
  - During the Time-blocks corresponding to *synchronous condenser/ night-mode of operation, the concerned machine/ unit will be drawing active power to support (i) own auxiliary consumption, and (ii) providing reactive power support*
  - *Active status (in-service) of the machine (s)/ unit(s)*
  - *Learnings from the Pilot project or otherwise of the relation between reactive power support vs active power consumption*
- Once determined, the active power consumption by an SPD/ QCA for providing reactive power support in a time-block shall be deducted from the Actuals recorded by corresponding SEMs. This determined active power consumption may be reviewed annually.
- NRLDC will provide the block-wise data of standard active power consumption by an SPD/QCA and the time duration of reactive power support/night mode operation to NRPC on weekly basis.
- NRPC Secretariat would issue the Weekly DSM Account based on data furnished and reactive power support duration details provided by NRLDC.

Detailed report on Post energisation activities for FATEHGARH-II STATCOM Station-1

S.No	Test Name	Work	Reactive Power Injection at 400kV HV Bus	NRLDC Code	Date	Test Timing start	Date	Test Timing End	Work done
1	**VSC-1 blocking mode**	Initial energisation of VSC branch by closing VSC circuit breaker Initial and passive charge of DC capacitors (2H).	Qsvc (rated) = ± 0 MVAr	3094	17-Aug-23	22:21	17-Aug-23	22:31	**COMPLETED** with Bypass Resistor switch open. **(FQM mode)**
2	**VSC 1 active DC capacitor charging**	Active charging to nominal DC capacitor voltage by CCS/MMS (3H).	Qsvc (rated) = ± 0 MVAr	3094	17-Aug-23	22:52	17-Aug-23	23:52	**COMPLETED** with closing of Bypass Resistor switch and switching of IGBT modules. **(FQM mode)**
3	**VSC 1 current mode**	Initial current mode (The VSC current is ramped up and down to Ivsc = ±360A (1h each))	Qsvc (rated) = ± 36 MVAr	3100	18-Aug-23	0:41	18-Aug-23	2:48	**COMPLETED (FQM mode)** By injecting +360Amps (+36MVAr) for 01 hour and -360Amps (-36MVAr) for 01 hour. Ramping rate: 5MVAr/sec
4	**VSC 1 Current mode**	Initial current mode (The VSC current is ramped up and down to Ivsc= ± 1450A (20min Each))	Qsvc (rated) = ± 150MVAr	3100	18-Aug-23	3:32	18-Aug-23	4:22	**COMPLETED (FQM mode)** By Injecting +1450Amps (+150MVAr) for 20mins and - 1450Amps (-150MVAr) for 20mins. Ramping rate: 5MVAr/sec.
5	**MSR**	Initial current mode of MSR (4H).	Q (rated)= -125 MVAr (Reactive)	3523	19-Aug-23	20:41	19-Aug-23	23:44	**COMPLETED (FQM mode)** MSR switched ON by keeping VSC-1 in FQM mode with Qsvc (rated)= -70MVAr. Fine Tuning completed.
6	**MSC-1**	Initial current mode of MSC- 1 (4H).	Q (rated) = +125 MVAr (Capacitive)	2286	13-Sep-23	22:39	14-Sep-23	1:39	**COMPLETED (FQM mode)** MSC-1 switched ON by keeping VSC-1 in FQM mode with Qsvc (rated) = 50MVAr. Fine Tuning completed.
7	**MSC-2**	Initial current mode of MSC- 2 (4H).	Q (rated) = +125 MVAr (Capacitive)	2535	15-Sep-23	0:10	15-Sep-23	3:10	**COMPLETED (FQM mode)** MSC-2 switched ON by keeping VSC-1 in FQM mode with Qsvc (rated) = 50MVAr. Fine Tuning completed.
8	**SVC fixed Q ramp**	Fixed reactive power mode (FQM) for SVC (2H).	Qsvc = ± 150 MVAr	2708	15-Sep-23	20:23	15-Sep-23	20:38	**COMPLETED (FQM mode)** By Injecting +1450Amps capacitive (+150MVAr) for 60sec and -1450Amps reactive (-150MVAr) for 60 sec in both VSC-1. Ramping rate: 5MVAr/sec.
9	**SVC ON sequence VSC-1**	Initial VSC-1 ON sequence in fixed reactive power mode (FQM) (1H).	FQM up to ± 150MVAr Ramp Rate 5 MVAr/sec	2708	15-Sep-23	20:41	15-Sep-23	20:38	**COMPLETED (FQM mode)** After initialisation of ON sequence, controller matched reference value (+/-150MVAr) and ramped up to +/-150MVAr automatically.
10	**SVC OFF sequence VSC-1**	VSC-1 OFF sequence starting at capacitive or inductive operating point (1H).	FQM up to ± 150MVAr Ramp Rate 5 MVAr/sec	2708	15-Sep-23	20:41	15-Sep-23	20:38	**COMPLETED (FQM mode)** After initialisation of OFF sequence, SVC output is ramped down to ZERO.
11	**SVC Closed Loop Control**	Verify response time of SVC controller after changeover from FQM to VCM mode	Maximum capacitive power injection: + 300MVAr Maximum inductive power injection: - 300MVAr Depending upon Vref	2708	15-Sep-23	21:18	15-Sep-23	21:33	**COMPLETED (changeover from FQM to VCM mode)** Vref = 400kV kept for 20mins.
12	**SVC Closed Loop Control voltage reference ramp**	Ramp in voltage control mode (SVC in service and voltage control mode is enabled.) (2H)	Maximum capacitive power injection: + 300MVAr Maximum inductive power injection: - 300MVAr	2708	16-Sep-23	22:06	16-Sep-23	4:10	**COMPLETED (VCM mode)** by changing Vref from 400kV to 408kV and then to 392kV
13	**SVC negative phase sequence control**	Switching on of NPS controller in VCM mode.	Deadband is set to 0.3% and measured NPS is 0.4% (If there is presence of NPS then controller will change its output accordingly)	2708	16-Sep-23	0:27	16-Sep-23	0:28	**COMPLETED (VCM mode)** Due to presence of high negative sequence in 400kV Grid, NPS DB was set to 0.4%, accordingly change in output of controller was observed.
14	**SVC Closed Loop Control**	Verify response time of SVC controller for step changes in Vref for different slopes.	Maximum capacitive power injection: + 300MVAr Maximum inductive power injection: - 300MVAr Depending upon Vref	2708	15-Sep-23	23:21	15-Sep-23	23:36	**COMPLETED (VCM mode)** by changing Vref 1% from software and checked the reponse of the controller at different slopes.
15	**Heat run and auxiliary load determination**	The SVC is operated in manual control mode. VSC runs at maximum current to check all yard and cable connections.	Qsvc = -275MVAr	2856	16-Sep-23	17:10	17-Sep-23	5:17	**COMPLETED (FQM mode)** MSR and VSC-1 switched ON by keeping VSC-1 in FQM mode with Qsvc = -275 MVAr for 12 hours.
16	**Heat run and auxiliary load determination**	The SVC is operated in manual control mode. VSC runs at maximum current to check all yard and cable connections.	Qsvc = +400MVAr	3119	18-Sep-23	10:43	18-Sep-23	10:43	**COMPLETED (FQM mode)** MSC-1, MSC-2 and VSC-1 switched ON by keeping VSC-1 in FQM mode with Qsvc = +400 MVAr for 12 hours.