सत्यमेव जयते

भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

केन्द्रीय विद्युत प्राधिकरण

Central Electricity Authority

विद्युत प्रणाली योजना एवं मूल्यांकन-I प्रभाग

Power System Planning & Appraisal-I Division

क• सं : 26/10/2017/ वि प्र. यो. & प. मू -I/ 1194-1208 दिनांक: 25.10.2017

1. सदस्य (विद्युत प्रणाली), केन्द्रीय विद्युत प्राधिकरण, सेवा भवन, आर के पुरम, नई दिल्ली–110066
2. सदस्य सचिव, पश्चिमी क्षेत्रीय विद्युत समिति, एम. आई. डी. सी क्षेत्र, मेरोल, अंधेरी पूर्व, मुम्बई–400094 फैक्स सं. 022–28370193
3. निदेशक (परियोजना), पावरग्रिड कॉरपोरेशन ऑफ इंडिया लि•, सौदामिनी, प्लाट सं• 2, सैक्टर–29, गुडगॉव–122001 फैक्स सं. 0124–2571760
4. अध्यक्ष एवं प्रबन्ध निदेशक, एम.पी.पी.टी.सी.एल. शक्ति भवन, रामपुर, जबलपुर–482008 फैक्स सं. 0761–2664141
5. प्रबन्ध निदेशकए छत्तीसगढ़ रा. वि. बोर्ड, दानगनिया, रायपुर (छत्तीसगढ) –492013 फैक्स सं. 0771–2574246
6. प्रबन्ध निदेशक, जी.ई.ट्रां.नि.लि, सरदार पटेल विद्युत भवन, रेस कोर्स, बड़ोदा–390007 फैक्स सं. 0265–2338164
7. निदेशक (प्रचालन), महाट्रांसको, प्रकाशगड, प्लॉट संख्या–जी 9, बांद्रा–पूर्व, मुम्बई–400051 फैक्स 022–26390383/26595258
8. मुख्य अभियंता (पारेषण), न्यूक्लीयर पावर कॉरपोरेशन ऑफ इंडिया लि, 9एस30, वीएस भवन, अणुशक्ति नगर, मुम्बई–400094 फैक्स सं. 022–25993570
9. कार्यपालक निदेशक (अभियांत्रिकी), नेशनल थर्मल पावर कॉरपोरेशन लि, इंजीनियरिंग ऑफिस कॉम्पलैक्स, ए–8, सैक्टर–24, नोएडा–201301 फैक्स सं. 0124–2410201
10. मुख्य अभियंता, विद्युत विभाग, गोवा सरकार, पणजीफैक्स सं. 0832–2222354
11. कार्यपालक इंजीनियर (परियोजनाएं), दादरा एवं नागर हवेली संघ शासित क्षेत्र,, विद्युत विभाग, सिलवासा, फोन न• 0260–2642338
12. कार्यपालक इंजीनियर, विद्युत विभाग, दमन एवं दीव संघशासित क्षेत्र प्रशासन, मोती दमन, पिन–396220 फोन न• 0260–2250889, 2254745
13. कार्यपालक निदेशक, (विशेष आमंत्रित), डब्लू आर एल डी सी, प्लॉट संख्या–एफ 3, एम आई डी सी एरिया, मरोल, अंधेरी पूर्व, मुम्बई–400093, फैक्स संख्या–022–28235434
14. कार्यपालक निदेशक, एनएलडीसी बी–9, कुतुब इन्स्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली–110016 फैक्स 011–26852747
15. निदेशकए पारेशनए विद्युत मंत्रलयए श्रम शक्ति भवनए रफी मार्गए नई दिल्ली

विषय :– पश्चिमी क्षेत्र विद्युत प्रणाली योजना की स्थाई समिति की 42 वीं बैठक की **कार्यसूची** ।

महोदय / महोदया ,

पश्चिमी क्षेत्र के विद्युत प्रणाली योजना स्थायी समिति की 42 वीं बैठक की कार्यसूची केंद्रीय विद्युत प्राधिकरण की वेबसाइट www.cea.nic.in के लिंक http://www.cea.nic.in/compsplanning.html (i.e. Home page-Wings-Power Systems-PSP&PA-I - Standing Committee on Power System Planning-Western Region) पर उपलब्ध हैं । यह बैठक दिनांक 17.11.2017 को सुबह 10:30 बजे से (प क्षे वि स), अंधेरी (पू) मुम्बई में आयोजित की जायेगी । कृपया उपरोक्त बैठक में भाग लें ।

धन्यवाद

भवदीय

रवीन्द्र गुप्ता 25/10/17

(रवींद्र गुप्ता)

मुख्य अभियंता

संलग्न : उपरोक्त

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Power System Planning & Appraisal-I Division

No. 26/10/2017/PSP&PA-I/ 1194 – 1208 **Date: 25.10.2017**

1. The Member (PS), Central Electricity Authority, Sewa Bhawan, R. K. Puram, New Delhi-110066
2. The Member Secretary, Western Regional Power Committee, MIDC Area, Marol, Andheri East, Mumbai Fax 022 28370193
3. The Director (Projects), GCIL, Saudamini, Plot No. 2, Sector-29, Gurgaon-122001 Fax 0124-2571760/2571932
4. Chairman and Managing Director, MPPTCL, Shakti Bhawan, Rampur, Jabalpur-482008 Fax 0761 2664141
5. The Managing Director, CSPTCL, Dangania, Raipur (CG)-492013*Fax 0771 2574246/ 4066566*
6. The Managing Director, GETCO, Sardar Patel Vidyut Bhawan, Race Course, Baroda-390007 Fax 0265-2338164
7. Director (Operation), MAHATRANSCO, 'Prakashgad', Plot No.G-9, Bandra-East, Mumbai-400051 Fax 022-26390383/26595258
8. Chief Engineer (Trans), NPCIL, 9S30, VS Bhavan, Anushakti Nagar, Mumbai-400094 Fax 022-25993570
9. The Executive Director (Engg.), NTPC Ltd., Engg. Office Complex, A-8, Sector-24, NOIDA 201301 *Fax 0120-2410201/2410211*
10. The Chief Engineer, Electricity Department, The Government of Goa, Panaji Fax 0832 2222354
11. Executive Engineer (Projects) UT of Dadra & Nagar Haveli, Department of Electricity , Silvassa *Ph. 0260-2642338/2230771*
12. Executive Engineer, Administration of Daman & Diu (U.T.), Department of Electricity, Moti Daman-396220 *Ph. 0260-2250889, 2254745*
13. GM, WRLDC, Plot no F-3, MIDC Area, Marol, Andheri(East) Mumbai-400093 Fax no 022-28235434
14. CEO, POSOCO, B-9, Qutab Institutinal Area, Katwaria Sarai, New Delhi-110016 Fax 011-26852747
15. Director (Trans), MoP, Shram Shakti Bhawan, Rafi Marg, New Delhi

Sub: Agenda notes of 42nd meeting of the Standing Committee on Power System Planning of Western Region

Sir / Madam,

The agenda notes of 42nd Meeting of Standing Committee on Power System Planning of Western Region is available on CEA website (www.cea.nic.in at the following link: http://www.cea.nic.in/compsplanning.html i.e. Home page-Wings-Power Systems-PSP&PA-I - Standing Committee on Power System Planning-Western Region). The above meeting would held at 10:30 Hrs on 17.11.2017 at WRPC, F – 3, MIDC Area, Andheri (E), Mumbai.Kindly make it conveni--enient to attend the same.

Yours' faithfully,

रवीन्द्र गुप्ता

(Ravinder Gupta)
Chief Engineer

Enclosures: as above

Agenda notes for the 42nd Meeting of Standing Committee on Power System Planning in Western Region

1. Confirmation of the minutes of 41st meeting of the Standing Committee on Power System Planning in Western Region (SCPSPWR) held on 21.12.2016 at NRPC, Katwaria Sarai, New Delhi

1.1. The minutes of the 41st meeting of SCPSPWR were issued vide CEA letter No. 26/10/2017/PSP&PA-I/ 92 – 106 dated 16.02.2017.

1.2. No comments from any of the constituents have been received on the same. The Committee may confirm the minutes of 41st meeting of SCPSPWR.

2. Reviewing the Progress of Earlier Agreed Transmission Schemes

2.1. The status of implementation of transmission projects under tariff based competitive bidding in Western Region are enclosed at Annexure – 2.1. The status of transmission schemes under implementation by POWERGRID in Western Region is enclosed at Annexure – 2.2.

2.2. **Members may deliberate.**

3. Early commissioning of TBCB schemes of M/s Adani Transmission Ltd.

3.1. Adani Transmission Ltd. vide its letter no. ATL/CEA/17-18/03062017 dated 03.06.2017 requested for advancement of transmission schemes 'Additional System Strengthening for Sipat STPS', 'Additional System Strengthening Scheme for Chhattisgarh IPPs – Part B' and 'System Strengthening for IPPs in Chhattisgarh & Other Generation Projects in Western Region' being under implementation through TBCB (Tariff Based Competitive Bidding) process by M/s STL, M/s RRWTL and M/s CWRTL (owned by M/s Adani Transmission Ltd.) respectively.

3.2. MoP vide their order no. 15/1/2013-Trans dated 15.07.2015 has issued the policy for incentivizing early commissioning of transmission projects. Subsequently, MoP vide its OM No. 15/1/2013-Trans dated 05.10.2016 constituted a committee to ensure smooth operationalization of the Policy for early commissioning of Transmission Projects.

3.3. Accordingly, on the request of M/s STL, RRWTL and CWRTL, a meeting was held on 16.06.2017 in CEA, New Delhi, under the chairmanship of Member (PS), CEA. The request received from M/s STL, RRWTL and CWRTL for the early commissioning did not qualify under the MoP policy for the early commissioning, as the request was not made well in advance (i.e. less than 24 months prior to the intended early SCOD). However, there is a provision in the Transmission Service Agreement (TSA) between TSP and LTTCs which provides that COD shall not be date prior to the scheduled COD mentioned in the TSA unless mutually agreed by all parties. In view of this, the proposals received from M/s STL, RRWTL and CWRTL were discussed scheme / element wise and the following was agreed:

i) The elementwise details of the three schemes along with their scheduled COD as per TSA, TSP's proposed early commissioning COD and the mutually agreed date for early commissioning is enclosed at Annexure – 3.1.

ii) The TSP and the implementing agency of the upstream and downstream network would make best effort to achieve the mutually agreed date of early commissioning as given in Annexure – 3.1. The parties involved would coordinate with each other to ensure that there is no mismatch. In case of any anticipated mismatch, the respective transmission elements are to be completed by revised mutually agreed date or by SCOD, whichever is earlier.

iii) There will be no financial implication either on the TSP or on the implementing agencies of the upstream and downstream network, in case of mismatch in achieving the early commissioning date.

3.4. **Members may kindly note.**

4. Provision of Bus Reactors at High Voltage Nodes in Western Region – by POWERGRID

4.1. In 41st meeting of SCPSPWR, PGCIL had proposed 5 no. of bus reactors in Western Region i.e. Mapusa (400 kV – 125 MVAR), Solapur (765 kV – 240 MVAR), Kolhapur GIS (400 kV – 125 MVAR), Rajgarh (400 kV – 125 MVAR) and Aurangabad (765 kV – 240 MVAR) based on the studies carried out for 2018–19 timeframe (off peak) conditions for controlling overvoltage. In the meeting MSETCL had informed that they had planned reactive power compensation at various nodes in their system including Solapur. It was agreed that the reactive power compensation proposal of PGCIL need to be reviewed considering the reactors already proposed by MSETCL and any other utility of Western Region. CEA requested all utilities to furnish the list of reactive compensations proposed in Western Region.

4.2. In line with the decision of 41st meeting of Standing Committee on Power System Planning, a meeting was held on 13.01.2017, wherein MSETCL intimated that it has planned 11 nos. bus reactors each of 125 MVAR at following 400 kV S/s of MSETCL and these are expected to be commissioned by 2021-22, namely, (i) Karad (ii) Kolhapur (iii) Solapur (iv) Nanded (v) Akola-II (vi) Bhusawal – II (Deep Nagar) (vii) Koradi–II (viii) Chandrapur–II (ix) Khaparkheda (x) Lonikhand-II (xi) Dhule. In addition, 25 MVAR bus reactor at Dhule (220 kV) in GEC-I, and 125 MVAR at Balsane (400kV) in GEC II was also proposed. MSETCL is also providing 125 MVAR bus reactors at Kudus and Alkud 400 kV sub-stations. During the meeting, it was decided that the revised system studies would be carried out for assessing balance reactors requirement in WR by PGCIL, after considering reactors proposed by MSETCL.

4.3. MSETCL has further informed that among 11 nos. shunt reactors planned, the work of procurement, installation and commissioning of 3 nos. reactors at Kolhapur, Karad and Solapur is under progress and remaining 08 Nos. of 1 x 125 MVAR Shunt Bus Reactors submitted for 90% funding from PSDF are as below.

Phase –-I: 1) Nanded, 2) Akola-II, 3) Koradi-II, 4) Bhusawal-II,

Phase –II: 5) Khaparkheda, 6) Chandrapur-II, 7) Lonikand-II, 8) Dhule

4.4. MSETCL has requested approval of the SCPSPWR for the above 8 nos. bus reactors for getting funding under PSDF.

4.5. Subsequently, a joint meeting amongst CEA, CTU and MSETCL was held on 7-8 Sep.17 at CEA, New Delhi, wherein the reactive compensation requirement in WR was studied after considering all the bus reactors proposed by MSETCL for 2021-22 time-frame (in off-peak scenario). After considering MSETCL reactive compensation proposal, following is the list of high voltage nodes in WR, where voltages remain on the higher side. Therefore, additional reactive compensation is required at these nodes.

Sl. No.	Name of the Substation	Existing Bus Reactor(s) (MVAr)	Proposed Bus Reactor (MVAr)	% times (avg) voltage beyond 420kV / 800kV as per operational feedback report (Apr-Jun'17)	Voltage in 2021-22 time frame (Off peak)	
					Without proposed reactor	With proposed reactor
1	Khandwa 400 kV	2x125	125	8	418	414
2	Solapur 765 kV	240	240	20	795	787
3	Rajgarh 400 kV	125	125	27	421	416
4	Wardha 765 kV	240+330	330	3	799	791
5	Aurangabad 765 kV	2x240	240	1	803	795

4.6. Further, high voltage issues at Raipur Pool (Durg) 765kV bus were discussed in 497th OCC meeting of WR. In July 17, maximum voltage observed at Raipur PS was 808kV and for 16.3% of time the voltage remained above 800kV. Matter was recently deliberated in the 498th OCC meeting of WR held on 22.08.2017 and it was decided to refer the matter in SCM. In the off-peak file for 2021-22 time-frame, the voltage at Raipur PS 765kV bus is obtained as 788kV without any proposed reactors and 785kV with reactors proposed in the table above and without any additional reactor at Raipur PS. Since voltage obtained at Raipur Pool (Durg) 765/400kV substation is below 790kV in the 2021-22 time frame (off-peak), no additional reactor needs to be planned at the Pooling Station.

4.7. Further, looking into the high voltages at various nodes identified above (close to 420kV and 800kV respectively), following bus reactors are proposed at ISTS nodes in Western Region:

Sl. No.	Name of the Substation	Proposed Bus Reactor (MVAr)
1	Khandwa 400kV	**125**
2	Solapur 765kV	**240**
3	Rajgarh 400kV	**125**
4	Wardha 765kV	**330**
6	Aurangabad 765kV	**240**

4.8. **Members may deliberate.**

5. Second 400 kV D/C transmission line for BALCO Complex – M/s BALCO

5.1. In the 40th meeting of SCPSPWR held on 01.06.2016, M/s BALCO had raised the issue of single point of connectivity of BALCO with the ISTS system (through BALCO-Dharamjaygarh 400 kV D/C dedicated line) and for redundancy had requested for second 400 kV interconnection with ISTS. M/s BALCO had also requested that the existing interim connectivity arrangement (LILO of 2nd ckt of Korba-Birsinghpur 400kV D/c line at BALCO switchyard), instead of dismantling, may be retained permanently for power evacuation as a redundant transmission line, in case of any exigency condition. The issue was discussed and committee was of the opinion that the interim LILO connectivity cannot be put in parallel to the dedicated line, but instead of dismantling it, the LILO portion can be disconnected from the main line and kept in charged condition with a suitable bypass arrangement, which could be used in exigencies as per the instructions of the Grid Operator. M/s BALCO was requested to submit the bypassing scheme so that the same could be examined by CEA, CTU and POSOCO.

5.2. In the 41st meeting of SCPSPWR held on 21.12.2016, M/s BALCO has proposed segregation of connectivity of 2010 MW into connectivity for IPP (600 MW) and CPP (1410 MW). It had requested for separate connectivity for the CPP for (i) Grid security for BALCO complex, (ii) to fulfill RPO obligation for Aluminium smelter plant, (iii) to fulfill Power Sale commitment and (iv) import of power in case of shutdown of multiple CPP units. In the meeting, members observed that BALCO has modified its connectivity two times and again and it has now made a proposal for the revision of its connectivity and segregation of the connectivity of 2010 MW into connectivity of 1410 MW for CPP and 600 MW for IPP. In the meeting, members opined that the proposal needs a close examination. Accordingly, it was decided that a separate meeting shall be convened by CEA with CTU, WRLDC and BALCO to further deliberate on the issue as per the regulations of CERC.

5.3. In line with the decision of the 41st meeting of SCPSPWR, a meeting was held on 10.03.2017 in CEA, where in, the following was agreed:

(i) Existing Connectivity with ISTS through BALCO – Dharamjaygarh 400 kV D/C line, provided for injection of power from both CPP and IPP units of BALCO, is adequate. The existing regulations do not have provision for separate connectivity for CPP and IPP units connected with ISTS system at a single point. Further, BALCO is not eligible

to apply for additional connectivity for the same generation capacity for which connectivity has already been granted. In case, if BALCO still desires separate connectivity for CPP and IPP units connected with ISTS system at a single point, M/s BALCO may approach CERC for necessary direction in this regard.

(ii) M/s BALCO is resorting to frequent change of status of its units from IPP to CPP and / or vice versa. M/s BALCO may therefore clearly identify the IPP units & CPP units and submit necessary documents to CEA, CTU and POSOCO in this regard.

5.4. This is for kind information of the members.

6. LILO of SSP – Dhule 400 kV D/C at Shivaji Nagar (Balsane) 400 kV S/s – proposal by MSETCL

6.1. MSETCL has submitted a proposal under GEC–II Part B for funding under GEC (Green Energy Corridor - 40 % KfW loan, 40 % NCEF grant and 20 % State Govt. equity) which, interalia, includes establishment of 400/220 kV pooling station at Balsane (Shivajinagar) by LILO of one ckt. of Sardar Sarovar–Dhule 400 kV D/C line at Balsane. This substation has been proposed by MSETCL for evacuation of power from large quantum of existing and proposed RE generation projects in Sakri, Shivaji Nagar and Dondaicha area. The scope of works of 400 kV Pooling S/s. is as follows:

a) 400/220 kV Pooling Sub-Station at Balsane (2021-22)
b) 2 x 500 MVA, 400/220 kV ICTs with GIS bays.
c) LILO of one ckt. of 400 kV Dhule–Sardar Sarovar D/C line at Balsane 400 kV Pooling S/s.
d) 220 kV D/C line from 400 kV Pooling S/s. to 220 kV Shivajinagar S/s.
e) LILO of 220 kV Dhule – Dondaicha S/C line partially on M/C towers at 400 kV Pooling S/s.
f) 1 x 125 MVAr Bus Reactor at 400 kV Pooling S/s.

6.2. In a joint meeting held on 7-8 Sep.17 at CEA, New Delhi amongst CEA, CTU and MSETCL the scheme was discussed, wherein, few alternatives of the 400 kV interconnections of the proposed 400 kV Balsane pooling station were studied. In all the alternatives, the power flow was towards Dhule (from Balsane). The following alternatives in addition to LILO of one circuit of Sardar Sarovar–Dhule 400 kV D/C line were studied:

Alternative 1	(i) LILO of both ckts of SSP – Dhule 400 kV D/C at Balsane
Alternative 2	(i) Balsane – Dhule 400 kV D/C line
Alternative 3	(i) Dhule – Nashik 400 kV D/C line (ii) LILO of both ckts of Dhule – Nashik 400 kV D/C line at Balsane.
Alternative 4	(i) LILO of one ckt of SSP – Dhule 400 kV D/C at Balsane. (ii) Balsane – Nashik 400 kV D/C line

6.3. The proposal made by MSETCL also involves 220 kV interconnections of Balsane 400/220 kV pooling station with the existing system, therefore with the increase in injection of RE power overloading of some of 220 kV lines were observed.

6.4. MSETCL was suggested to consider Alternative 4 so that Balsane 400/220 kV could be directly connected to Nashik (load centre) through 400 kV D/C line. The implementation could be taken up by MSETCL in phases with increasing RE injection in the area. Also with this alternative, Nashik would get interconnected at 400 kV, which at present is radial. It may be noted that for providing 400 kV interconnection to Nashik, LILO of Navsari – Navi Mumbai 400 kV D/C at Nasik (to be implemented by MSETCL) was agreed in the 28th meeting of SCPSPWR held on 06.12.2008, which was dropped in 41st meeting of SCPSPWR.

6.5. MSETCL may present the final scheme and members may deliberate.

7. Additional feed to Goa: interconnection of Xeldam and Xeldam (New) S/s

7.1. The following transmission scheme for providing additional feed to Goa was discussed in 39th meeting of SCPSPWR held on 30.11.2015 and agreed in the 40th meeting of SCPSPWR held on 01.06.2016 at NRPC, New Delhi:

i) Establishment of 2x500 MVA, 400/220 kV new substation at Xeldam. The interconnection between the existing 220 kV Xeldam i.e. Xeldam (GED) substation and the proposed 400/220 kV new Xeldam substation could be through bus extension or through 220 kV interconnecting lines, as the case may be.

ii) LILO of one circuit of Narendra (existing) – Narendra (new) 400 kV D/C quad line at Xeldam.

iii) Xeldam (New)-Mapusa S/s 400 kV D/C (Quad) line to take care of any N-1-1 contingency involving outage of any one 400 kV infeed to Goa.

7.2. The above scheme is being implemented through TBCB route. To finalize the 220 kV interconnection arrangement between new Xeldam S/s i.e. Xeldam (TBCB) and Xeldam (GED), a meeting was held on 25.04.2017 at Goa among representatives of GED, PFCCL, CTU and CEA. The minutes of the meeting enclosed as Annexure – 7.1. In the meeting, the following interconnection was agreed:

Under TBCB scope

a) Xeldem (TBCB) – Xeldem (GED) 220 kV D/C line with HTLS conductor equivalent to twin moose conductor

(220 kV line / interconnection is under TBCB Scope, 2 nos. 220 kV line bays at Xeldem (GED) to be constructed by GED)

Under GED scope

b) New Xeldem (400 kV) – Verna (GED) 220 kV D/c line: 220 kV line and 2 nos. 220 kV line bays at Verna (GED)

c) LILO of 2nd circuit of Ambewadi – Ponda 220 kV D/C line at Xeldem (New) 400 kV S/s.

7.3. Subsequently, M/s GED has requested for implementation of Xedam (New) – Mapusa 400 kV D/C line, which is under scope of TBCB, on multi-circuit towers instead of double circuit towers, so the same could be utilized for establishment of their Xeldam – Mapusa 220 kV D/C line (via Kadamba & Verna) and the overall RoW requirements would be reduced.

7.4. To discuss the issue raised by GED, a meeting was held in CEA on 14.06.2017, wherein it was observed that the three alternative routes for the proposed for Xeldem (new)-Mapusa 400 kV D/C line marked in the survey report submitted by BPC were not passing through the proposed route of 220 kV Mapusa-Kadamba-Verna-Xeldem D/C line of the GED. Further, Xeldem (new)–Mapusa 400 kV D/C line is an ISTS line, which is to be implemented through TBCB route and the 220 kV D/C line from Mapusa–Kadamba–Verna–Xeldem D/C line is an intra state line of GED. Therefore, it was decided that both 400 kV and 220 kV circuits cannot be implemented on same multi-circuit towers, and they are to be implemented independently. The minutes of the meeting is enclosed as Annexure – 7.2.

7.5. Members may note**.**

8. Progress of dedicated transmission lines of IPPs which are connected through interim arrangement – Extension of Essar Power (Mahan) interim connectivity:

8.1. The cases of connectivity on interim LILO in Western Region (including M/s EPMPL case) were discussed in the 40th & 41st meeting of SCPSPWR held on 01.06.2016 & 21.12.2016 respectively, to finalize the replacement of interim LILOs of generation developer by their dedicated transmission lines as per direction of the CERC. In the 41st meeting of SCPSPWR, M/s EPTCL was requested to expedite the implementation of Mahan STPS–Bilaspur Pooling Station 400 kV D/C line before monsoon as against their completion target of December 2017. In line with direction given by CERC vide order no. 30/MP/2014 dated 28.06.2016, the matter was referred to WRPC forum for further deliberation.

8.2. WRPC in their 33rd meeting held on 31.01.2017 & 01.02.2017 has agreed to the TCC recommendation that M/s EPMPL should complete the line by 30.06.2017 and CTU to discuss such issues in WRPC forum. CTU vide their later dated 15.06.2017 has written to WRLDC to initiate action for disconnection of interim arrangement of M/s EPMPL by 30.06.2017.

8.3. Subsequently, M/s EPMPL vide their later dated 13.06.2017 has requested CEA for extension of LILO arrangement for evacuation of power from their generation plant up to January 2018. A meeting was held under the Chairmanship of Member (Power System), CEA on 28.06.2017 at CEA, New Delhi to discuss the extension of LILO arrangement for evacuation of power of M/s EPMPL Power Project (2x600 MW) at Mahan in Madhya Pradesh. Minutes of the meeting enclosed as Annexure – 8.1. In the meeting, following was decided:

i) The transmission system for evacuation of power from M/s EPMPL generation plant at Mahan is now an ISTS system being implemented by M/s EPTCL (ISTS Transmission Licensee) and not a dedicated transmission system of generation developer. As such LILO of Vindhyachal–Korba STPP 400 kV S/C would not be an interim arrangement. This change would be brought to the notice of constituents in the next meeting of SCPSPWR.

ii) The system studies indicate that the LILO of Vindhyachal–Korba STPP 400 kV S/C line at Mahan STPS would also be essential to take care of contingency of outage of one ckt of Mahan SPTS–Bilaspur Pooling Station 400 kV D/C line for reliable evacuation of power from 2x600 MW units of Mahan TPS.

iii) M/s EPTCL has agreed to complete the remaining works of Mahan STPS–Bilaspur Pooling Station 400 kV D/C line by December 2017.

8.4. **Members may deliberate.**

9. Connectivity of Railways' TSS with ISTS Network

9.1. In 41st meeting of Standing Committee on Power System Planning of Western Region held on 21.12.2016, Railways requested for availability of 220 kV bays at various substations for its Delhi – Bharuch route. PGCIL confirmed the availability of 2 no. of 220 kV AIS bays at Rajgarh, Dehgam, Pirana, Kota & Bassi substations and 2 no. of GIS bays at Vadodara. It was decided in the meeting that Railways shall submit the location of TSS, maximum load, interconnection etc., and to assess the availability of transformation capacity Railways was requested to apply for LTA.

9.2. South East Central Railways, Bilaspur vide its letter no. ELECT/SECR/227/NTPC/1876 dated 24.05.2017 (enclosed as Annexure – 9.1) intimated that PGCIL has granted connectivity to 220/132 kV Bhilai GSS (Grid Sub Station) of Railways (which in feeds to various TSS – Traction Substations) through Raipur (Kumhari – PGCIL). In order to provide an alternative source of feeding to these TSS, it has requested for another connectivity to its Raigarh GSS through 400/220 kV Raigarh (PG) S/s.

9.3. Subsequently, South East Central Railways, Bilaspur vide its letter no. ELECT/SECR/227/NTPC/2727 dated 26.07.2017 (enclosed as Annexure – 9.2) requested for additional ISTS connectivity for Bhatapara GSS through 400/220 kV Bhatapara S/s for reliability and to address voltage drop during feed extension.

9.4. Railways may furnish the information regarding the locations of its various TSS / GSS along the Delhi–Bharuch route, maximum load at each of these, its interconnection etc., and maximum load of Bhilai GSS.

9.5. **Members may deliberate.**

10. Transmission System for Solar Power Parks in Madhya Pradesh

10.1. In the 40th meeting of SCPSPWR, the following transmission system strengthening scheme was agreed by the members:

Inter State Transmission system strengthening in Chhatarpur area in Madhya Pradesh

(i) Establishment of 2x500 MVA, 400/220 kV substation at Bijawar*

(ii) LILO of Satna – Bina 400kV (1st) D/c line at Bijawar. (There are four 400kV circuits between Satna and Bina, out of which one is proposed to be LILOed at Sagar (MPPTCL) Substation. This LILO is on one D/c out of the above three remaining 400kV circuits between Satna and Bina).

(iii) 1x125 MVAr, 420 kV Bus Reactor at Bijawar pooling station.

(iv) 4 nos. 220kV line bays for termination of LILO of both ckts of Tikamgarh-Chatarpur 220 kV D/c line at Bijawar.

(v) Space for 4 nos. of 220kV line bays for solar park interconnections

*SPPD shall provide land contiguous to Chhatarpur solar park for establishment of 400/220kV Bijawar substation.

Intra State Transmission system strengthening in Chhatarpur area in Madhya Pradesh

(i) Stringing of 2nd circuit of Tikamgarh – Chhatarpur 220kV S/c on D/c line.

(ii) LILO of both circuits of Tikamgarh-Chhatarpur 220 kV D/c line at Bijawar 400/220 kV substation (60 km)

10.2. The following transmission system was agreed by the members for solar parks in Madhya Pradesh, which has been planned in advance in view of the short gestation periods of solar park, based on the information made available by MNRE, MPPTCL and Govt. of Madhya Pradesh:

S. No.	Solar Park	Capacity (MW)	Proposed Transmission System
1	Suwasara Distt. Mandsaur	250	**Intra-State Scheme** **MPPTCL scope** (already under implementation by MPPTCL under Green Energy Corridor Phase-I)**:** (i) 400/220kV Sitamau (Mandsaur) substation (ii) Mandsaur-Nagda 400kV D/c line (100kM) **SPPD scope:** **Interim Arrangement** (Required due to mismatch in the Implementation schedule of 400/220kV Sitamau S/s (2018-19) and Suwasara Solar park (Mar. 2017)) (i) 220kV D/c line from Solar Park Pooling station to crossing point of Bhanpura-Badod 220kV line – 13 km **Connectivity System** (i) Extension of 220kV D/c line from crossing point of Bhanpura-Badod 220kV line up to Sitamau (Mandsaur) – 37 km (ii) Associated 220kV line bays

2	Neemuch Solar Park Comprises of three solar parks: (i) Rampura Solar Park (150 MW) (ii) Singoli Solar Park (200 MW) (iii) Jeeran Solar Park (150 MW).	500	**<u>Intra-State Scheme</u>** **MPPTCL scope:** Already under implementation by MPPTCL under Green Energy Corridor Phase-I (i) 400/220kV Sitamau (Mandsaur) substation (ii) Mandsaur-Nagda 400kV D/c line (100kM) (iii) 220 kV Ratangarh Pooling station Additional system (may be reviewed by MPPTCL) (iv) Establishment of 1x500 MVA (3rd), 400/220 kV transformer at Sitamau (Mandsaur) **Connectivity System - SPPD Scope** (i) Rampura SP – Sitamau (Mandsaur) 220 kV D/c line - 60 km (ii) Jeeran SP - Sitamau (Mandsaur) 220 kV D/C line - 60 km (iii) Singoli SP – Ratangarh 220 kV D/C line – 30 km
3	**Agar** (250 MW), **Rajgarh** (250 MW) and **Shajapur** (Moman Badodiya 250 MW) solar parks **Agar** comprises of two solar parks: (i) Agar Solar Park (125 MW) (ii) Susner Solar Park (125 MW) **Rajgarh** comprises of two solar parks: (i) Jeerapur Solar Park (125 MW)	750	**<u>Inter-state transmission system</u>** **TBCB/ POWERGRID scope:** (i) Establishment of 2x500 MVA, 400/220 kV Pooling station at/near Jeerapur (ii) LILO of both circuits of RAPP –Shujalpur 400 kV D/c at Jeerapur Pooling station (iii) 1x125 MVAr, 420 kV Bus Reactor at Jeerapur Pooling station (iv) 220kV line bays (10 nos) for solar park interconnections **MPPTCL scope**: (i) Shujalpur (PG)-Shujalpur (MP) 2nd 220 kV D/C line or another 220kV outlet from Shujalpur (PG) towards Ashta /other load center **Connectivity System – SPPD scope** (i) Agar SP – Jeerapur Pooling station 220 kV D/c – 35 km (ii) Susner SP – Jeerapur Pooling station 220 kV D/c – 20 km

	(ii) Khilchipur Solar Park (125 MW)		(iii) Jeerapur SP – Jeerapur Pooling station 220 kV D/c (iv) Khilchipur SP– Jeerapur Pooling station 220 kV D/c – 20 km (v) Moman Badodiya SP – Jeerapur Pooling station 220 kV D/c – 45 km
4	Chattarpur Solar park As informed by MoP/MNRE the capacity of the solar park is 250 MW. However, as per the information given by Madhya Pradesh the solar park has potential for 500 MW capacity. Therefore, for evacuation purpose 500 MW capacity has been considered.	500	**Intra State Transmission system strengthening in Chhatarpur area in Madhya Pradesh** (i) 2nd circuit stringing of 220kV Tikamgarh – Chhatarpur line. (ii) LILO of Tikamgarh - Chhatarpur 220 kV D/c line (both circuits) at Bijawar PS (60 km) **Connectivity System – SPPD Scope** (i) Solar park to Bijawar 400/220 kV substation 220 kV lines along with the 220 kV bays.
5	Morena	250	**Intra-State Scheme** **Connectivity System – SPPD Scope** **Alternative I** (i) 220kV Morena SP - Morena S/s (MPPTCL) D/c line – 22 km **Alternative II** (i) 220kV Morena SP – Morena 400/220 substation (ISTS) D/c line – 35 km (ii) Two nos. of 220 kV bays at Morena 400/220 substation (ISTS

10.3. A meeting was held in CEA on 28.08.2017 to review the status of the transmission scheme "Connectivity System for Lanco Vidarbha Thermal Power Pvt. Ltd. (LVTPPL) and Inter

State Transmission system strengthening in Chhatarpur area in Madhya Pradesh", which is to be implemented through TBCB but its bidding process is yet to start. M/s Rewa Ultra Mega Solar Ltd. (RUMSL), the Solar Power Project Developer (SPPD) for development of solar parks in Madhya Pradesh, vide their letter dated 26.08.2017 have stated that RUMSL is unable to develop solar park at Chhatarpur and does not require associated substation in that area, but CEA may take decision on development of proposed ISTS substation at Chhatarpur. In the meeting, CEA had stated that establishment of Bijawar 400/220 kV substation has been agreed as system strengthening scheme for the purpose of evacuation of power from Chhatarpur Solar Park and also to cater the present and future power drawl requirements in Chhatarpur area. The 220 kV outlets for Bijawar are to be implemented by MPPTCL as intra-state system strengthening scheme. Therefore, the scheme can still be implemented as transmission system strengthening scheme.

10.4. CEA vide its letter dated 30.08.2017 has requested MPPTCL to intimate the implementation time frame of the intra-state strengthening scheme in Chhatarpur area (220 kV outlets from proposed Bijawar 400/220 kV substation) also furnish the inputs regarding the tentative location(s) of the proposed 400/220 kV substation in Chhatarpur area.

10.5. RUMS intimated that it is planning to set up 500 MW solar park in the Neemuch district Madhya Pradesh. Considering the inputs of RUMS, in the 40th Meeting of SCPSPWR held on 01.06.2017, the evacuation system for Neemuch Solar park i.e. three different locations i.e. Rampura SP (150 MW), Singoli Solar Park (200 MW) and Jeeran Solar Park (150 MW) was planned and agreed as given above. RUMS vide its letter dated 02.06.2017 has intimated that it has identified suitable land (total of 1120 Hectares) in the vicinity of Singoli to establish entire 500 MW at Singoli itself (instead of 150 MW at Rampura, 200 MW at Singoli and 150 MW at Jeeran) and the solar parks at Jeeran & Rampura would not be developed.

10.6. RUMS has requested for grant of connectivity to Neemuch Solar Park in ISTS by LILO of Chittorgarh–Nagda at Neemuch Solar Park and to establish a 400 kV or above Substation adjacent to Neemuch solar park.

10.7. Members may deliberate**.**

11. Additional ISTS feed to Navi Mumbai 400/220 kV substation of POWERGRID

11.1. In the 41st meeting of Standing Committee on Power System Planning in WR held on 21.12.2017 and subsequent meeting held on 13.01.2017, following transmission system was agreed for providing ISTS feed to Navi Mumbai 400/220 kV S/s subject to implementation feasibility of 220 kV outlets from Navi Mumbai S/s.

i. Padghe (PG)–Kharghar 400 kV D/c quad line to be terminated into one ckt. of Kharghar–Ghatkopar 400 kV D/c line (thus forming Padghe (PG)-Kharghar 400 kV S/c quad line and Padghe (PG)-Ghatkopar 400 kV S/c quad line)

ii. LILO of Padghe (PG) – Ghatkopar 400 kV S/c line at Navi Mumbai (PG)

iii. LILO of Taloja–Kalwa 220 kV S/c line at Navi Mumbai (PG)

iv. LILO of Apta–Kalwa 220 kV S/c line at Navi Mumbai (PG)

11.2. In line with the decision of 41st meeting of SCPSPWR held on 21.12.2017, a joint site visit was carried out on 07.04.2017 by CEA, CTU & MSETCL, for ascertaining the

implementation feasibility of 220 kV outlets from Navi Mumbai 400/220 kV S/s. During the site visit, it was noted that the distance of LILO point of Taloja – Kalwa 220kV S/c section from Navi Mumbai S/s (as mentioned at sl. no. iii) is about 7 km. The implementation of this 7 km LILO length shall not be practically possible due to severe ROW issues in this area. Accordingly, it was decided that LILO of Apta–Taloja / Kalwa 220 kV D/c line shall be carried out at Navi Mumbai instead of earlier mentioned LILO of Apta – Kalwa & Taloja – Kalwa 220 kV lines.

11.3. In view of the above, the modified transmission system for providing ISTS feed to Navi Mumbai (to be implemented through TBCB route) is as below.

Transmission System for providing ISTS feed to Navi Mumbai:

- Padghe (PG)–Kharghar 400 kV D/c quad line to be terminated into one ckt. of Kharghar–Ghatkopar 400 kV D/c line (thus forming Padghe (PG) - Kharghar 400 kV S/c quad line, Padghe (PG) - Ghatkopar 400 kV S/c quad line)
- LILO of Padghe (PG) – Ghatkopar 400kV S/c line at Navi Mumbai (PG)
- LILO of Apta–Taloja and Apta-Kalwa section of the Apta-Taloja/Kalwa 220 kV D/c line at Navi Mumbai (PG)

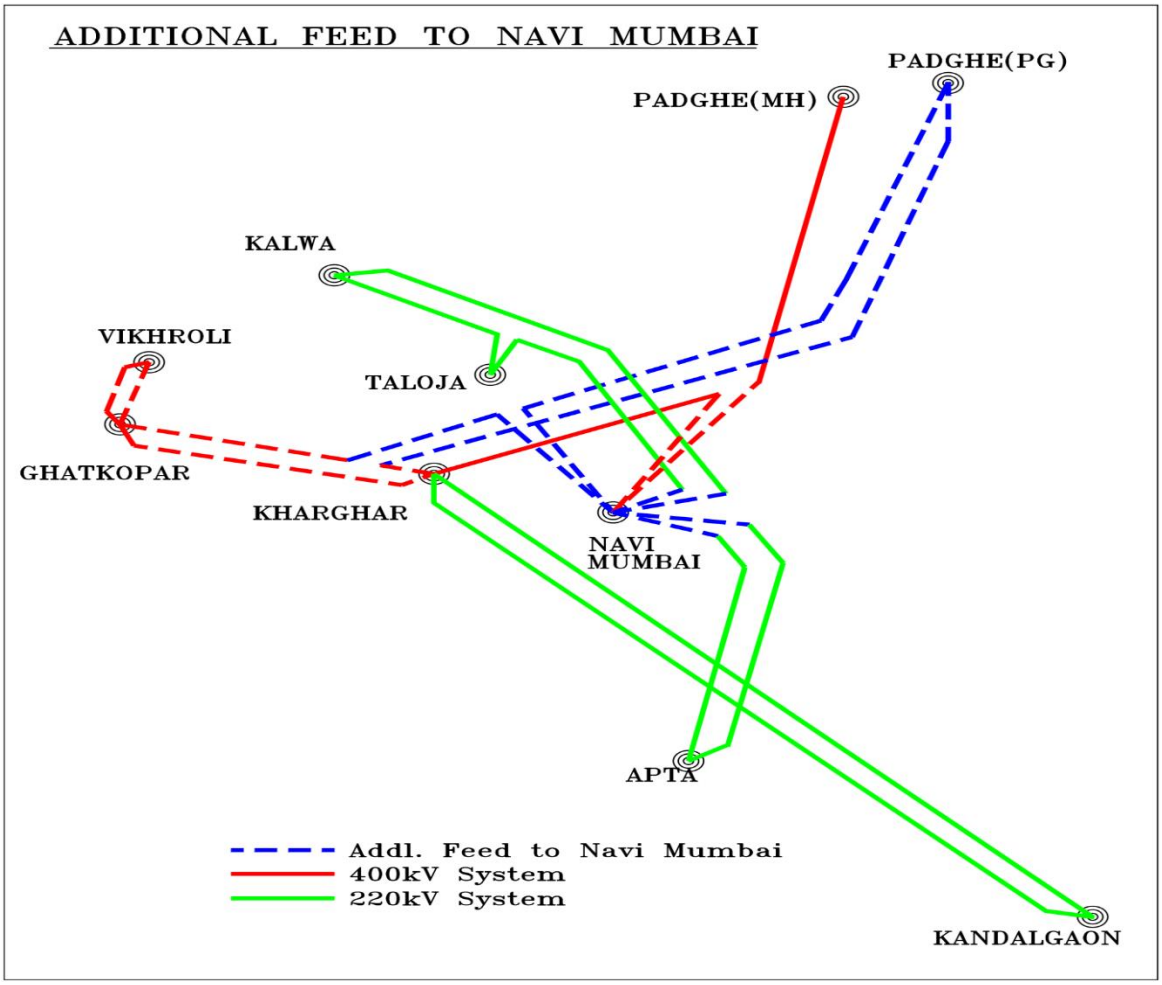


Figure-1: Schematic Diagram of Transmission System around Mumbai area

11.4. During the joint visit, it was also decided that to ensure that power flows are well balanced on all the 220 kV outlets from Navi Mumbai substation, MSETCL shall carry out reconfiguration of the Kharghar – Kandalgaon 220 kV D/c line and Apta – Taloja / Kalwa 220 kV D/c at the crossing point. One of the feasible option is shown in the figure below:

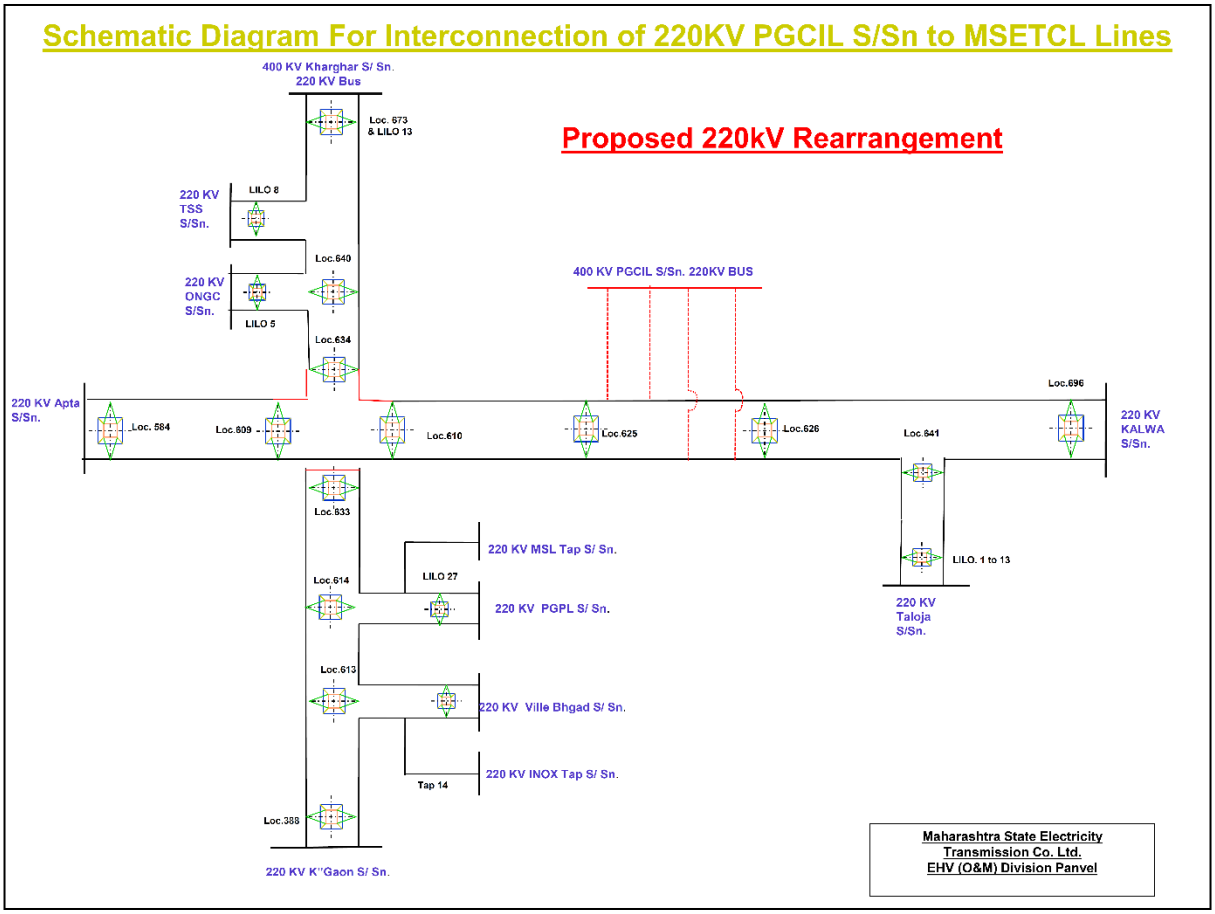


Figure-2: LILO of Apta – Kalwa 220kV D/c line at Navi Mumbai S/s of POWERGRID with Interconnection of Khargar – Khandalgaon 220kV D/c line with one circuit of Apta – Kalwa 220kV D/c line along-with bunching of the other section of Khargar – Khandalgaon 220kV D/c line near location 633

11.5. MSETCL vide their letter MSETCL/CO/STU/9849 dated 07.09.2017 requested minor modifications in above proposed system. MSETCL proposed that Padghe(PG)–Kharghar 400 kV D/C line should be terminated at 400 kV Kharghar (MSETCL) S/s instead of terminating it to one circuit of Kharghar–Vikhroli 400 kV D/C line, as the conductor of Padghe(PG) – Kharghar 400 kV D/C line is quad moose while conductor of Kharghar – Vikhroli 400 kV D/C line is twin moose.

11.6. Kharghar–Vikhroli corridor is important and main feeding source to Vikhroli S/s. This corridor is having severe RoW issues, so CEA is in view to implement Kharghar – Vikhroli corridor with quad moose conductor / with high ampacity conductor equivalent to quad moose. Also by terminating the Padghe–Kharghar 400 kV D/C line to one circuit of Kharghar-Vikhroli 400 kV D/C, Kharghar S/s and Ghatkopar S/s through Navi Mumbai S/s would be directly connected to strong ISTS source Padghe (PG).

11.7. MSETCL vide letter dated 07.09.2017 also proposed the LILO of 400 kV Talegaon (PG) – Kalwa line at Vikhroli S/s to have an alternate source to import power from Maharashtra grid. The LILO of Talegaon (PG) – Kalwa 400 kV line at Vikhroli only redistribute the power and increases the interconnections which further increases the fault level at different sub-stations.

11.8. Members may deliberate and concur the Navi Mumbai ISTS feed proposal.

12. Interim arrangement of Koradi II–Wardha 400 kV D/C quad line and power evacuation beyond Warora.

12.1. In the 41st meeting of SCPSPWR, following measures to control fault level at Wardha were agreed:

(i) At present Koradi II-Wardha 400 kV D/C is terminated into one ckt of Warora–Wardha 400 kV D/C line as an interim arrangement (forming Koradi-II – Wardha 400 kV S/C line, Koradi-II–Warora 400 kV S/C line and Warora–Wardha 400 kV S/C line). Removal of the interim arrangement through bypassing of Koradi II-Wardha 400 kV D/C line and Wardha (PG)–Warora 400 kV line at Wardha (forming Koradi II–Warora 400 kV D/C line) would be done after commissioning of Koradi II–Koradi III 400 kV D/C quad line. One ckt of Koradi II – Koradi III 400 kV D/C quad line commissioned in Dec'2016 & another circuit commissioned in Feb, 2017.

(ii) For evacuation of power from Koradi-II / Tiroda generation projects, system strengthening was required beyond Warora 400 (MSETCL) substation. MSETCL would finalise the transmission system strengthening beyond Warora and the same would be intimated in the next SCM of WR.

12.2. MSETCL may intimate the restoration status of the interim arrangement and MSETCL may present the transmission system strengthening beyond Warora.

12.3. Members may deliberate**.**

13. High fault level at 400 kV Korba STPS (NTPC)

13.1. In the 40th meeting of SCPSPWR held on 01.06.2016, high fault level at 400 kV Korba STPS (3 x 200 + 4 x 500) of NTPC was discussed and the following scheme was agreed to control high fault current at Korba STPS:

(i) Korba STPS - Korba West 400 kV S/C line to be normally kept open.

(ii) Korba STPS- Sipat STPS 400 kV S/C line and Sipat STPS – Raipur 400 kV S/C line to be rearranged as Korba STPS- Raipur 400 kV S/C line (bypassing Sipat STPS – bypassing arrangement at Sipat STPS is available).

13.2. CSPTCL vide its letter no. 02 – 12 / SE (C & RA) / 1016 dated 02.09.2016 intimated that the above arrangement (i.e. Korba STPS-Korba West 400 kV S/C line in normally open conditions) would cause overloading of the 400 kV & 220 kV lines emanating from Korba (West) power plant under n–1–1 contingency condition and requested to review the proposal. In view of this, in 41st meeting of SCPSPWR, it was decided to have a joint meeting among CEA, CTU, WRPC, WRLDC & CSPTCL.

13.3. In line with the decision of the 41st meeting of SCPSPWR, a meeting was held on 22.09.2017 at CEA, New Delhi with participation from CTU, CSPTCL, WRLDC and NTPC. Minutes of the meeting enclosed as Annexure – 13.1. In the meeting, it was agreed to carryout studies for 2021-22 time frame for three different alternatives as give below:

Alternative 1 (A1): Korba (NTPC) – Korba (W) 400 kV S/C open + Korba(NTPC) - Sipat STPS 400 kV S/C line and Sipat STPS – Raipur 400 kV S/C line bypassed at Sipat so as to form Korba STPS- Raipur 400 kV S/C line, as proposed in 41st meeting of SCPSPWR

Alternative 2(A2): Reconfiguration of Korba (West) – Korba (NTPC) 400 kV line and Korba (NTPC) - Sipat 400 kV S/C line as Korba (W) – Sipat 400 kV S/C line through bypassing at Korba (NTPC).

Alternative 3(A3): Reconfiguration of Korba(W)-Korba(NTPC) 400 kV line and Korba(NTPC)- Essar Mahan 400 kV line as Korba(W)-Essar Mahan 400 kV line through bypassing at Korba(NTPC)

13.4. As per the study results, it is seen that the fault level is in within limits for both A1 & A2. In alternative A1, one 400 kV interconnections (Korba (NTPC) – Korba (W) 400 kV S/C line) would not be available from both Korba(W) and Korba (NTPC) 400 kV bus. But in alternative A2, two no. of 400 kV interconnections (Korba (NTPC) – Korba (W) 400 kV S/C line and Korba(NTPC) - Sipat STPS 400 kV S/C line) would not be available for evacuation of power from Korba (NTPC) 400 kV bus.

13.5. The study suggests the following alternative to control high fault current at Korba STPS (3x200 MW + 4x500 MW) of NTPC:

i. Korba STPS - Korba West 400 kV S/C line to be normally kept open. CSPTCL to take Korba (W) to Korba (NTPC) 400 kV S/C line into service in case of planned shutdown of any of 400 kV lines emanating from Korba(W). This line would be normally idle charged from one end say Korba (NTPC).

ii. Korba STPS- Sipat STPS 400 kV S/C line and Sipat STPS – Raipur 400 kV S/C line to be rearranged as Korba STPS- Raipur 400 kV S/C line bypassing at Sipat STPS. (bypassing arrangement at Sipat STPS already exists).

13.6. Members agreed with the above proposal. However, CSPTCL stated that they would convey their opinion on the proposal after consultation with their SLDC. CSPTCL may communicate their views on the proposal.

13.7. Members may deliberate.

14. Reviewing the intra state transmission system and 220 kV interconnection with Vapi – II DNH

14.1. The following interstate transmission system, based on the joint system studies among CEA, CTU and GETCO was proposed in the 41st meeting of SCPSPWR to cater the demand of DNH and Daman & Diu (no space available for putting additional transformers at existing Vapi 400/220 kV) and provide 220 feed to south Gujarat substation.

i) Establishment of 2 x 500 MVA, 400/220 kV S/s near Vapi / Ambheti (Vapi – II)
ii) LILO of KAPP – Vapi 400 kV D/c line at Vapi – II
iii) 1 x 125 MVAr bus reactor at Vapi – II Substation

220 kV connectivity from Vapi – II is given below:

(a) For Gujarat (GETCO)

- Vapi-II – Atul (GETCO) 220kV D/c line
- LILO of Chikhli (Ambetha) – Vapi (GETCO) 220 kV S/c line at Vapi-II

(b) For Dadra and Nagar Haveli (DNHPDCL)

- Vapi-II – Sayali (DNH) 220 kV D/c line (high capacity)
- Vapi-II – New Kharadpada (DNH) 220 kV D/c line (high capacity)

14.2. In the 41st meeting of SCPSPWR held on 21.12.2016, it was observed that Vapi–Khadoli 220 kV D/C line and Vapi – Kharadpapda 220 kV D/C line were lightly loaded and there is a space constraint at Sayali and severe RoW problems in implementation of these lines. Therefore, it was agreed to review the intrastate network of DNH & its interconnection with Vapi II separately.

14.3. Accordingly, a meeting was held among CEA, CTU & PGCIL on 01.06.2017 and 02.06.2017 at Silavassa, DNH (Minutes of the Meeting are enclosed as Annexure – 14.1). In the meeting, interconnection from the Vapi-II & intra state constraints in the DNH network (based on the comprehensive system study report in the 2021-22 time frame submitted by POWERGRID), was discussed and after the detailed deliberations, the following system was agreed:

I. 220 kV connectivity from 400/220 kV, 2x500 MVA Vapi–II substation to DNH (Transmission System under ISTS)

   a. Vapi-II–Sayali 220kV D/C line (From Vapi-II to LILO point of one circuit of Vapi(PG)–Khadoli 220kV D/C line at Sayali substation with ampacity equivalent to twin zebra conductor).

   b. Interconnection with LILO section (of LILO of one circuit of Vapi(PG) –Khadoli 220kV D/C line at Sayali substation) so as to form Vapi-II–Sayali 220 kV D/C line and Vapi-Khadoli 220 kV D/C line. The LILO section is with zebra conductor.

II. Intra State system strengthening in DNH transmission network

220 kV system

a. Kala – Khadoli 220 kV (2nd) D/C line.
b. Establishment of 220 kV switching station at Bhilosa (GIS) with provision of 8 nos. of 220 kV bays (4 nos. equipped line bays and 4 nos. future bays). (Out of the 4 equipped line bays, 2 nos. line bays are for LILO of one ckt. of Vapi- Kharadpada 220 kV D/C line at Bhilosa and 2 nos. line bays are for Bhilosa industries)
c. LILO of one ckt. of Vapi-Kharadpada 220 kV D/C line at Bhilosa.
d. Establishment of Vagchipa 220/66 kV, 2x160 MVA substation by LILO of both ckts of Vapi – Khadoli 220 kV D/C line. (already under implementation).

e. Conversion of Sayali 220 kV switching station to 2x100 MVA, 220/66 kV substation.
f. Conductor replacement of the LILO section (of LILO of one circuit of Vapi(PG) – Khadoli 220kV D/C line at Sayali substation) with ampacity equivalent to twin zebra conductor depending on the loading of the lines in future, if required.

66 kV system

g. Establishment of three 66kV circuits between Vaghchipa & Dadra
h. Establishment of three 66kV circuits between Vaghchipa & Amli
i. 66 kV Vaghchipa – Silli D/C line
j. Establishment of Sayali new 66/11 kV substation with LILO of Sayali 220/66 kV-Rakholi 66 kV D/Cline at Sayali new and LILO of Masat – Khadoli 66kV S/C line at Sayali New 66/11kV S/s.
k. Amli- Silvassa Town 66 kV D/C line.
l. Shifting of about 20MVA bulk load from Amli to Silli

14.4. Accordingly, the scheme for establishment of new 400/220 kV substation in Vapi/Ambethi area and its associated transmission lines as system strengthening scheme in WR is as given below:

Establishment of new 400/220 kV substation in Vapi/Ambethi area and its associated transmission lines (under ISTS):

i) Establishment of 2 x 500 MVA, 400/220 kV S/s near Vapi / Ambheti (Vapi – II)
ii) LILO of both circuits of KAPP – Vapi 400 kV D/c line at Vapi – II
iii) 1 x 125 MVAr bus reactor at Vapi – II Substation
iv) Vapi-II – Sayali D/C 220kV line
- From Vapi-II to LILO point of one circuit of Vapi(PG) –Khadoli 220kV D/C line at Sayali substation with ampacity equivalent to twin zebra conductor.
- Interconnection with LILO section (of LILO of one circuit of Vapi(PG) –Khadoli 220kV D/C line at Sayali substation) so as to form Vapi-II – Sayali 220 kV D/C line and Vapi- Khadoli 220 kV D/C line. The LILO section is with zebra conductor.

220 kV outlets to be implemented by GETCO in matching time frame of the above scheme is given below:

a) Vapi-II–Atul (GETCO) 220kV D/c line
b) LILO of Chikhli (Ambetha)–Vapi (GETCO) 220 kV S/c line at Vapi-II

14.5. POWERGRID has suggested that DNHPDCL may implement reconductoring of the LILO section (of LILO of one circuit of Vapi(PG)–Khadoli 220kV D/C line at Sayali substation) with high capacity conductor with ampacity equivalent to twin zebra conductor in matching time-frame of the ISTS line i.e., Vapi-II – Sayali D/C 220kV line

14.6. The intrastate system of DNH also includes establishment of 220 kV switching station at Bhilosa (GIS) with LILO of one ckt. of Vapi – Kharadpada 220 kV D/C line at Bhilosa. The scheme has already been discussed and agreed in the meeting held among CEA, CTU & PGCIL from 01.06.2017 to 02.06.2017 at Silavassa. The scheme involves LILO of an

interstate line, therefore the scheme, as given below, has been put for approval of WR constituents:

a. Establishment of 220 kV switching station at Bhilosa (GIS) with provision of 8 nos. of 220 kV bays (4 nos. equipped line bays and 4 nos. future bays). (Out of the 4 equipped line bays, 2 nos. line bays are for LILO of one ckt. of Vapi- Kharadpada 220 kV D/C line at Bhilosa and 2 nos. line bays are for Bhilosa industries)

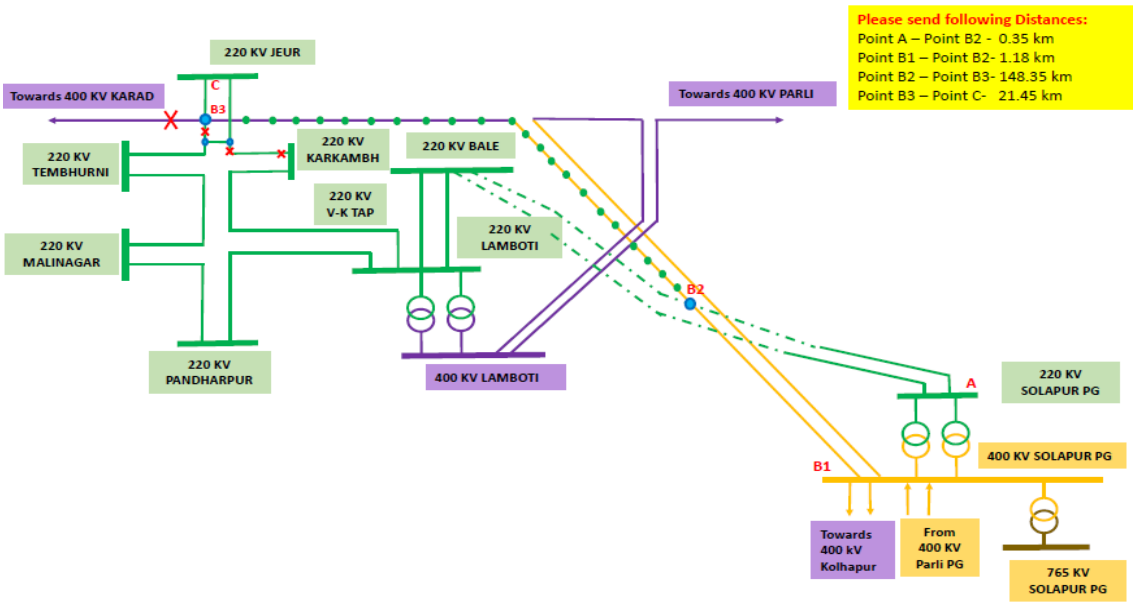
b. LILO of one ckt. of Vapi- Kharadpada 220 kV D/C line at Bhilosa.

14.7. CEA has conveyed in principle approval of the scheme to DNH.

14.8. Member may concur the same.

15. Charging of 400 kV Solapur PG – Karad line on 220 kV level for resolving low voltage problems in Solapur District

15.1. MSETCL vide its letter no. MSETCL/CO/STU/2818 dated 18.03.2017 has sent the proposal of charging a part of the existing 400 kV Solapur (PG) – Karad S/C line at 220 kV level using one circuit of under construction Solapur (PG)-Bale 220 kV D/C line as an interim arrangement to CEA. The proposal was to resolve low voltage problems in Solapur District during agriculture peak load. Parli–Karad 400 kV S/C line is LILOed at 400 kV Lamboti S/s (i.e. Solapur - MSETCL). Subsequently, under WRTS–II, LILO of 400 kV Lamboti – Karad S/C line at Solapur (PG) was implemented by M/s Reliance Power Transmission Limited (RPTL). The schematic of the proposal is as given below:



Schematic diagram in the vicinity of Lamboti

15.2. The 220 kV substations at Pandharpur, Malinagar, Jeur, Tembhurni and Karkambh of Solapur district are presently fed from 400/220 kV Lamboti S/s through radially connected 220 kV Lamboti–Karkambh–Jeur (189 km) line and 220 kV Lamboti–Pandarpur–Malinagar–Tembhurni–Jeur (166 km) line. However, during the peak agriculture load (6

AM to 12 Noon), power flow through these lines is beyond their SIL limit thus, the low voltage is observed at all above substations along with 400 kV Lamboti S/s i.e. up to 370 kV. In order to address this low voltage problem, 220 kV Solapur (PG) – Bale D/C was planned and the same is under implementation (expected to be commissioned by September 2017). Further a 400/220 kV, 2x500 MVA S/s at Tembhurni / Karjat is also planned in 2021–22 time frame to mitigate the low voltage problem.

15.3. The above interim arrangement has been discussed in 493rd OCC meeting held on 10th March, 2017 at Vindhyachal, wherein, it was deliberated that any reconfiguration of the network would require approval of CEA / CTU and the Reliance Power Transmission Ltd.

15.4. To discuss the proposal of MSETCL, a meeting was held on 12.04.2017 at CEA, New Delhi among CEA, CTU, POSOCO, MSETCL and RPTL. Minutes are enclosed as Annexure – 15.1. In the meeting the following was agreed:

i) The proposal of MSETCL as shown in the block diagram above was agreed as an interim arrangement to mitigate the low voltage problem faced in Solapur district.

ii) The interim arrangement shall be disconnected by Dec, 2017 or after the completion of Solapur (PG) – Bale 220 kV D/C line, whichever is earlier.

iii) The above proposal is agreed in principle and the proposal would be put up in forthcoming meeting of the Standing Committee on Power System Planning of Western Region for ratification.

iv) All the expenditure for implementation of the interim arrangement and its restoration shall be borne by M/s MSETCL.

v) MSETCL shall expedite the implementation of 400/220 kV Tembhurni / Karjat sub-station along with upstream and downstream network.

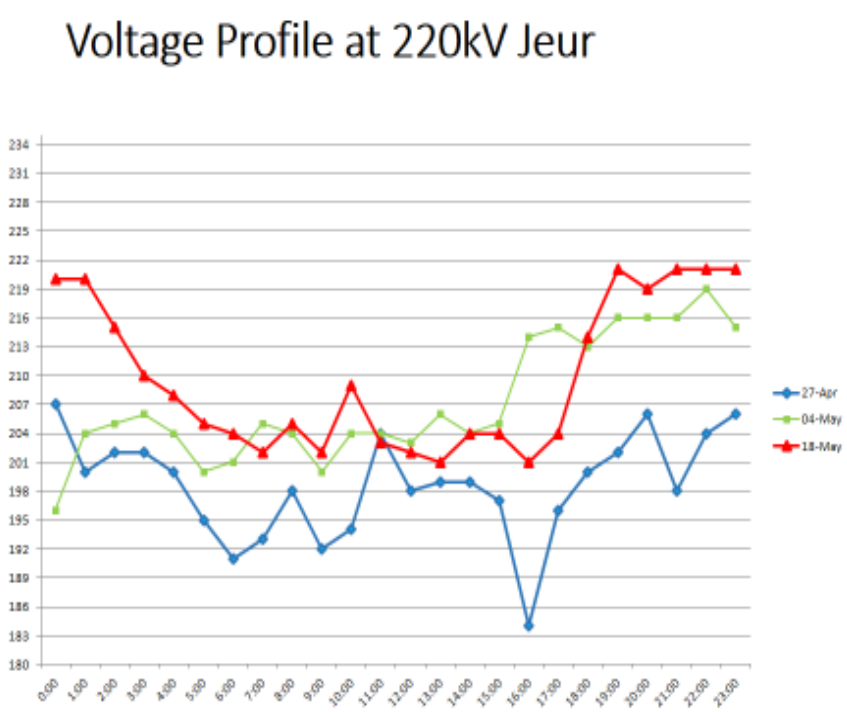
vi) MSETCL shall implement Under Voltage Load Shedding (UVLS) relays at all its S/s at the earliest and provide adequate reactive compensation at 33 kV and below voltage level in Solapur district at the earliest.

vii) MSETCL shall explore interconnection between Solapur (PG) – Lamboti (MSETCL) by using LILO portions of Parli - Karad 400 kV line at Solapur (PG) and Lamboti.

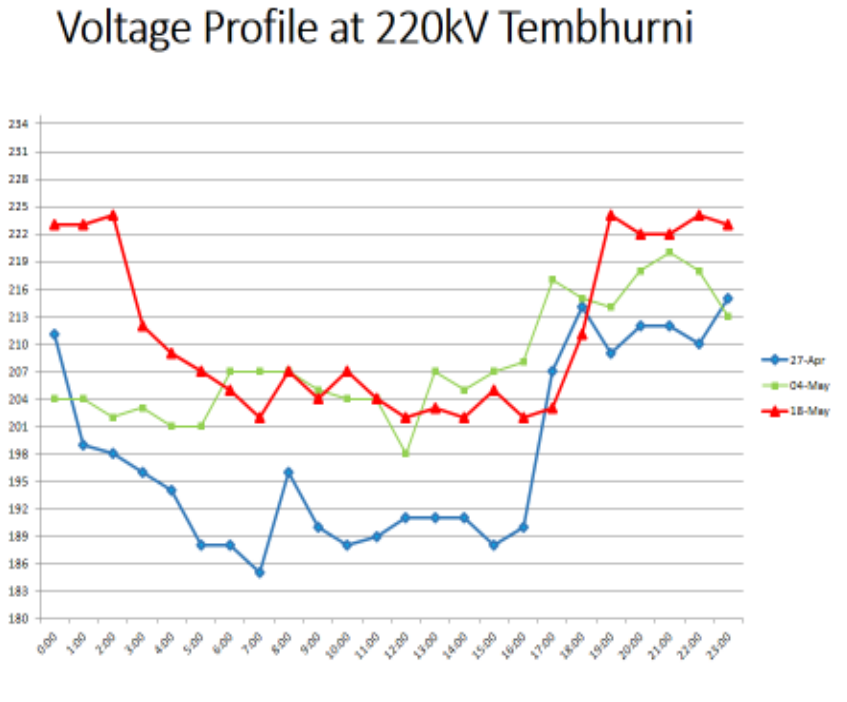
viii) The idle section of Solapur (PG) – Karad 400kV S/c line along with the line bays at Solapur (PG) end shall be deemed 100% available subjected to regulatory norms.

15.5. MSETCL vide their letter dated 07.09.2017 has informed that the interim arrangement was implemented by MSETCL on 03.05.3017. The improvement in voltage profile after implementation of the scheme is given below:

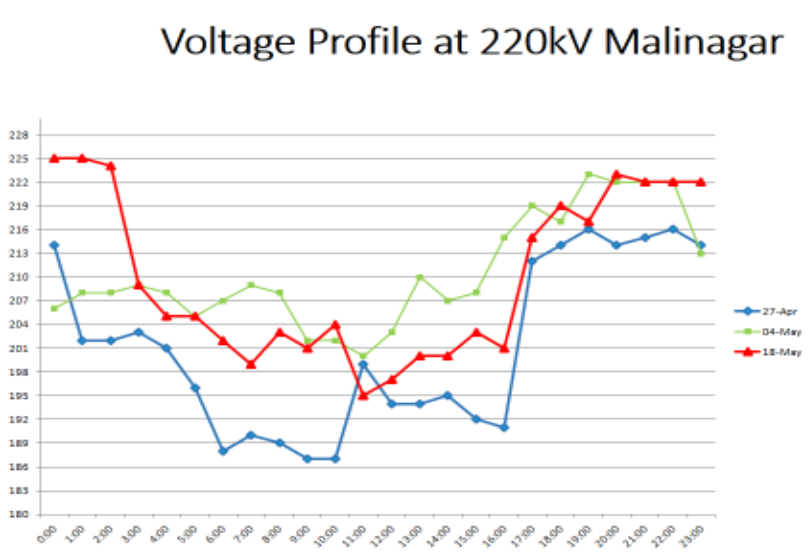
Time	27-Apr	04-May	18-May	Diff
0:00	207	196	220	13
1:00	200	204	220	20
2:00	202	205	215	13
3:00	202	206	210	8
4:00	200	204	208	8
5:00	195	200	205	10
6:00	191	201	204	13
7:00	193	205	202	9
8:00	198	204	205	7
9:00	192	200	202	10
10:00	194	204	209	15
11:00	204	204	203	-1
12:00	198	203	202	4
13:00	199	206	201	2
14:00	199	204	204	5
15:00	197	205	204	7
16:00	184	214	201	17
17:00	196	215	204	8
18:00	200	213	214	14
19:00	202	216	221	19
20:00	206	216	219	13
21:00	198	216	221	23
22:00	204	219	221	17
23:00	206	215	221	15
Average rise in voltage				**11.2**



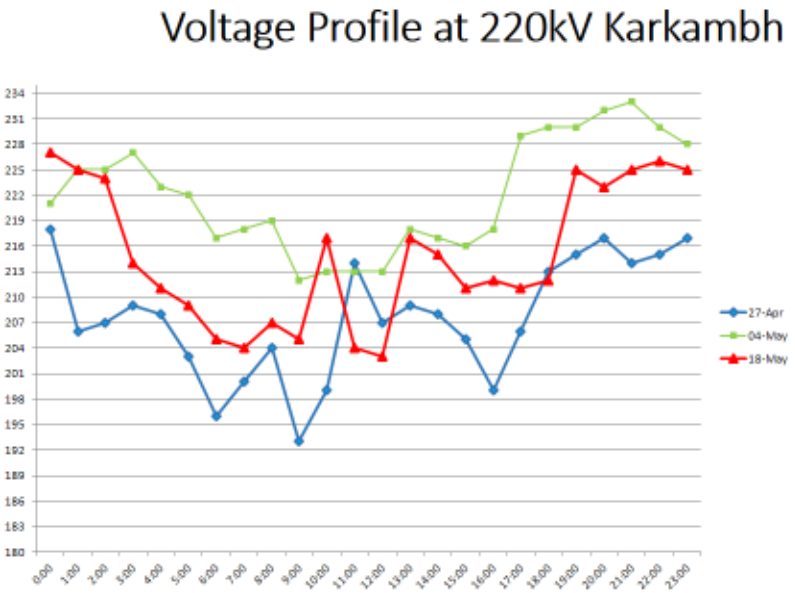
Time	27-Apr	04-May	18-May	Diff
0:00	211	204	223	12
1:00	199	204	223	24
2:00	198	202	224	26
3:00	196	203	212	16
4:00	194	201	209	15
5:00	188	201	207	19
6:00	188	207	205	17
7:00	185	207	202	17
8:00	196	207	207	11
9:00	190	205	204	14
10:00	188	204	207	19
11:00	189	204	204	15
12:00	191	198	202	11
13:00	191	207	203	12
14:00	191	205	202	11
15:00	188	207	205	17
16:00	190	208	202	12
17:00	207	217	203	-4
18:00	214	215	211	-3
19:00	209	214	224	15
20:00	212	218	222	10
21:00	212	220	222	10
22:00	210	218	224	14
23:00	215	213	223	8
Average rise in voltage				**13.3**



Time	27-Apr	04-May	18-May	Diff
0:00	214	206	225	11
1:00	202	208	225	23
2:00	202	208	224	22
3:00	203	209	209	6
4:00	201	208	205	4
5:00	196	205	205	9
6:00	188	207	202	14
7:00	190	209	199	9
8:00	189	208	203	14
9:00	187	202	201	14
10:00	187	202	204	17
11:00	199	200	195	-4
12:00	194	203	197	3
13:00	194	210	200	6
14:00	195	207	200	5
15:00	192	208	203	11
16:00	191	215	201	10
17:00	212	219	215	3
18:00	214	217	219	5
19:00	216	223	217	1
20:00	214	222	223	9
21:00	215	222	222	7
22:00	216	222	222	6
23:00	214	213	222	8
Average rise in voltage				8.9



Time	27-Apr	04-May	18-May	Diff
0:00	218	221	227	9
1:00	206	225	225	19
2:00	207	225	224	17
3:00	209	227	214	5
4:00	208	223	211	3
5:00	203	222	209	6
6:00	196	217	205	9
7:00	200	218	204	4
8:00	204	219	207	3
9:00	193	212	205	12
10:00	199	213	217	18
11:00	214	213	204	-10
12:00	207	213	203	-4
13:00	209	218	217	8
14:00	208	217	215	7
15:00	205	216	211	6
16:00	199	218	212	13
17:00	206	229	211	5
18:00	213	230	212	-1
19:00	215	230	225	10
20:00	217	232	223	6
21:00	214	233	225	11
22:00	215	230	226	11
23:00	217	228	225	8
Average rise in voltage				7.3



15.6. The implementation of the interim arrangement has resulted in following benefits:

i) Voltage profile of Pandharpur, Jeur Grid increased from 7 to 14 kV

ii) Low voltage & hunting problem resolved. Now, Minimum voltage always above 198kV

iii) System Stability improved

iv) Additional Source from power grid

v) ICT loading of lamboti reduced

vi) Over Loading of Lamboti – Pandharpur & Lamboti – Karkamb/Khanapur has reduced.

vii) Utilization of ICT capacity at PGCIL

15.7. In view of above, MSETCL has requested to approve the above proposal for charging of 400 kV Solapur PG – Karad line on 220 kV Level as an interim arrangement till commissioning of proposed 400/220 kV Karjat S/s.

15.8. MSETCL may furnish the following details:

i) Status of Solapur (PG) – Bale 220 kV D/C line.

ii) Status of the implementation of 400/220 kV Tembhurni / Karjat sub-station along with upstream and downstream network. Details of the 400 kV interconnections and 220 kV interconnections may be provided.

iii) Status of Under Voltage Load Shedding (UVLS) relays at all its S/s at the earliest and provide adequate reactive compensation at 33 kV and below voltage level in Solapur district at the earliest.

iv) Feasibility of interconnection between Solapur (PG) – Lamboti (MSETCL) by using LILO portions of Parli-Karad 400 kV line at Solapur (PG) and Lamboti.

15.9. Members may concur the interim arrangement approved in the meeting held on 12.04.2017 at CEA, New Delhi till Dec, 2017 or after the completion of Solapur (PG) – Bale 220 kV D/C line, whichever is earlier.

15.10. Members may deliberate on the proposal of MSETCL for charging of 400 kV Solapur PG – Karad line on 220 kV Level as an interim arrangement till commissioning of proposed 400/220 kV Karjat S/s.

16. Progress of downstream network whose terminating bays are under construction by POWERGRID

16.1. The 5.4. Proviso (iii) of Indian Electricity Grid Code (IEGC) (Fourth Amendment) Regulations, 2016, of CERC dated 06.04.2016 is as follows:

"Where the transmission system executed by a transmission licensee is required to be connected to the transmission system executed by any other transmission licensee and both transmission systems are executed in a manner other than through tariff based competitive bidding, the transmission licensee shall endeavor to match the commissioning of its transmission system with the transmission system of the other licensee as far as practicable and shall ensure the same through an appropriate Implementation Agreement."

16.2. The purpose of the above provision of signing of Implementation Agreement (IA) between the parties involved is that both the upstream and downstream network may be completed in the matching timeframe to avoid any situation of transmission system remaining unutilized.

16.3. In WR there are many instances where 400/220 kV substation along with the associated 220 kV bays have already been commissioned as ISTS assets, but the 220 kV line bays are still unutilized due to delay in completion of the associated 220 kV lines. Presently, many 400/220 kV substation are under implementation and in order optimize the asset utilization, it is required that downstream 220 kV networks is also implemented in the matching

timeframe. In view of this, STUs are requested to furnish/ update the status of execution of downstream network indicated in the table below:

Status of unutilised 220kV line bays at Existing Substations in WR

Sl	ISTS Substation	Voltage ratio in use	Status of Bays		220kV Lines for unutilized bays	Status of 220kV lines as per 41st meeting dated 21.12.2016
			Total	Unutilized		
1	Raipur (PG)	3x315MVA, 400/220 kV	6	2 no bays ready since 01.07.2011 (WRSS-6)	Raipur (PG) – Doma 220 kV D/c	Completion by January 2017
2	Mapusa (PG)	3x315MVA, 400/220kV	4	2 nos Bays ready since : 01.11.2013	Mapusa – Cuncolin 220 kV D/c	No participation
3	Pirana	2x315MVA, 400/220kV	4	2 nos Bays ready since 19.03.15 (WRSS-6)	Pirana – Barjadi 220 kV D/c	Tender floated , completion by June 2018
4	Boisar	2x315 +500MVA, 400/220kV	6	1 no Bay ready since 30.05.15	Boisar – Borivali 220 kV line S/c	Completion by June 2017
5	Magarwada	2x315MVA, 400/220kV	4	2 nos Bays ready since 03/11/14	Magarwada – Ringanwada 220 kV D/c	No participation
6	Wardha	2x315MVA, 400/220kV	6	2 nos Bays ready since 01.02.2011	Wardha- Yavatmal 220 kV D/C line	June 2017
				2 nos Bays ready since 01.01.2012	Wardha – Bhugaon 220 kV S/c	Commissioned in August 2016
					Wardha – Pusad220kV S/c	Commissioned in August 2016
7	Solapur	2x315 +1x500MVA, 400/220kV	6	2 nos Bays ready since 01.04.2011	Solapur – Bhale (MS) 220kV D/c	September 2017
				2 nos Bays ready since 02.11.2015	Solapur – Narangwadi 220 kV D/c line	Narangwadi 220 kV substation planned in 2019-20 time frame.
8	Damoh	1 x 500 MVA 400/220 kV	6	2 no. of bays ready since Nov – 2016	LILO of 2nd 220kV circuit of Damoh (MPPTCL) - Sagar 220kV line at Damoh (PGCIL) 400kV S/s. (1Km)	Targeted to be completed by May 2017

Status of Under Construction 220 kV line bays at New Substations / Substation Extensions in WR

S. No.	ISTS Substation	Proposed Bays	Comm. Schedule	220kV Lines emanating from Substation	Status of 220kV lines as per 41st WR SCM dtd 21.12.2016	Remarks
1	Betul GIS 2x315 MVA, 400/220 kV	4	Commissioned	(i) Betul (PG) - Betul D/C 220 kV line (3 Km)	targeted to complete by March 2017	
				ii) LILO of Sarni - Pandhurna 220kV line at Betul GIS(PGCIL) 400 kV S/s (41 Km).	targeted to complete by Jan 2018	
2	Morena (TBCB) 2 x 315, 400/220 kV	4	May'18 (Chhattisgarh & WR SS)	i) LILO of one circuit of Malanpur – Mehgaon 220kV line at Morena (TBCB) 400kV S/s (8Km from Loc. No.12). ii) Morena(TBCB)400 - Sabalgarh 220kV DCDS line (92Km) with LILO of one circuit of Morena(TBCB)400 - Sabalgarh 220kV line at Morena 220kV S/s of MPPTCL (0.5Km)	targeted to complete by March 2018	
3	Navi Mumbai 2 x 315, 400/220 kV	4	Bays ready since Mar'14 (WRSS-V)	STU line	Planned	Severe RoW issues are involved
4	Indore (PG) 2x500 MVA, 400/220 kV	6	Jul'18 (WRSS-14)	LILO of both circuit of Indore-II (Jaitpura) - Ujjain 220 kV line at Indore (PGCIL) 765 kV S/s. (2X4Km)	Targeted to complete by March 2018	
				(ii) Remaining 2 Nos. feeders from Indore(PGCIL) 765kV S/s shall be intimated at later stage		
5	Itarsi (PG) 1x500 MVA, 400/220 kV	2	Jul'18 (WRSS-14)	LILO of 2nd 220kV circuit of Itarsi (MPPTCL) - Hoshangabad 220 kV line	In line with scheduled	

				at Itarsi (PGCIL) 400kV S/s (Existing)	date of ICT i.e. July 2018	
6	Parli (PG) 2x500 MVA, 400/220 kV	4	Jun/Jul'18 (WRSS-16)	LILO of Parli - Harngul 220 kV S/c	Dec, 2018	
				LILO of Osmanabad (MS) - Parli 220 kV S/c	Dec, 2018	
7	Mapusa (PG) 3X315 MVA, 400/220	2	Jun/Jul'18 (WRSS-16)	Mapusa - Tuem 220 kV D/c	UC	
8	Satna (PG) 1x500 MVA, 400/220 kV	2	Jun/Jul'18 (WRSS-16)	LILO of one circuit of Satna (MPPTCL) - Chhatarpur 220 kV line at Satna (PGCIL) 400 kV S/s (3Km)	Targeted to complete by March- 2018	
9	Vadodara GIS 2 x 500 MVA, 400/220 kV	4	March – 2017	220 kV Venkatpura-Vadodara D/C Line 220 KV Jambua – Vadodara D/C Line	Dec, 2017 Dec, 2018	
10	Bijawar (TBCB) 2 x 500 MVA, 400/220 kV	4	RfQ stage	LILO of Tikamgarh – Chhattarpur 220kV D/c line at Bijawar	To be awarded	
11	Navsari 2x315MVA + 1x500MVA, 400/220kV	2	May'18	Navsari – Bhestan 220kV D/c line	Scheduled COD : May'18	DGENTPL has confirmed that they are not taking up implementation of the scheme
12	Rewa PS 3x500 MVA, 400/220kV	6	Oct'17	Rewa UMSPP – Rewa PS 220kV 3xD/c line	UC by Rewa UMSPP	Matching with Generation Project
13	Khandwa 1x500 MVA, 400/220kV	2	Sep'19	Khandwa – Chamera 220kV D/c line	UC	

STU to make all effort to maintain the time schedule indicated.

16.4. **Members may deliberate this.**

17. Requirement of Transformer Augmentation in Western Region – Agenda by POWERGRID

17.1. Several 400/220 kV ICTs in WR are getting critically loaded in current time frame. In case of tripping of one ICT in that S/s, the situation becomes critical as the parallel ICT gets overloaded. Studies have been carried out and the list of transformers with high anticipated loadings in 2021-22 time frame (peak file) and which violate N-1 criteria is given below:

REGION / TRANSFORMER			EXISTING /PLANNED TRANSFORMERS (MVA)	CURRENT TIME FRAME		2021-22 TIME FRAME	
				PEAK LOADING (MW)	AVERAGE LOADING (MW)	PEAK LOADING (MW)	N-1 Outage loading (MW)
WR-II	JABALPUR	400/220kV	2x315	2x285	2x169	2x284	1x399 (315MVA outage)
WR-II	ITARSI	400/220kV	1x315 + 1x500*	1x274	1x217	1x224+1x355	1x306 (500 MVA outage)
WR-II	GWALIOR	400/220kV	3x315	3x257	3x187	3x228	2x294 (315 MVA outage)
WR-II	MAGARWADA	400/220kV	2x315	2x139	2x88	2x201	1x358 (315MVA outage) with Magarwada 220kV (D&D) bus split & 1x317 (315MVA outage) without the split arrangement
*Additional 500MVA ICT under implementation (under WRSS-14 scheme by POWERGRID)							

17.2. In view of the above, following is proposed:

- Augmentation of 400/220 kV transformation capacity at Jabalpur(PG) S/s by 500 MVA
- Replacement of 315 MVA, 400/220kV transformer at Itarsi (PG) S/s by 500 MVA ICT and shifting the 315 MVA ICT thus freed to Gwalior as 4th 400/220 kV ICT
- Augmentation of 400/220 kV transformation capacity at Magarwada (PG) S/s by 500 MVA

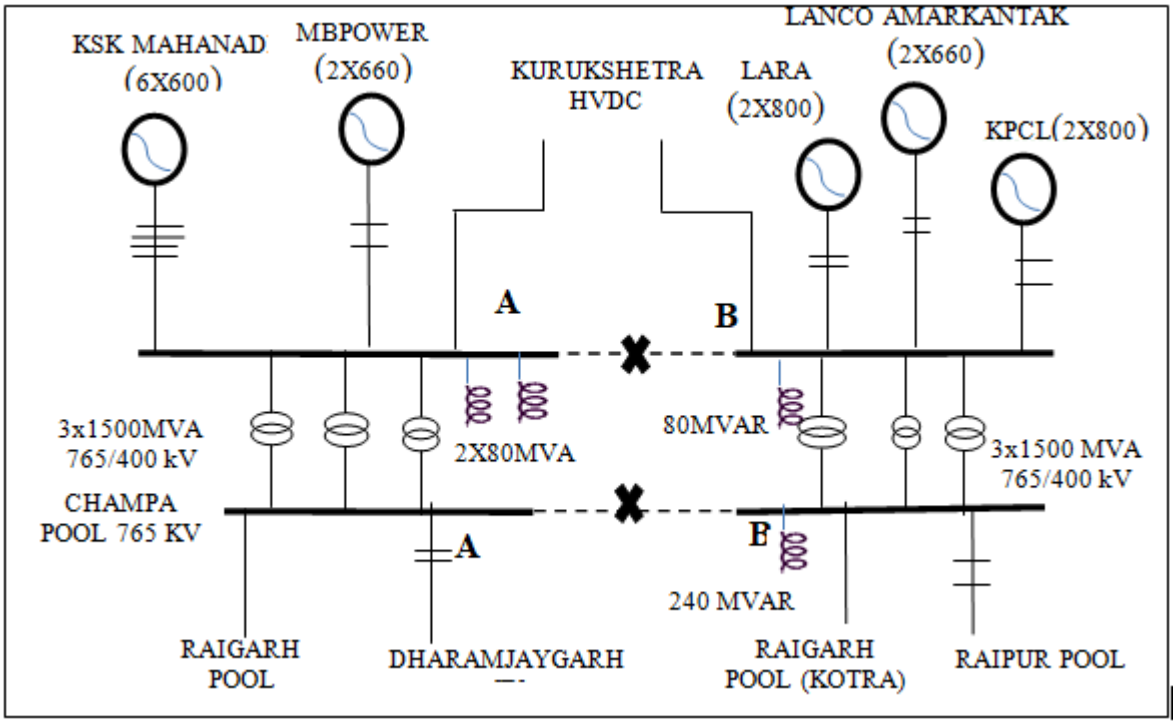
17.3. Subsequently, MPPTCL vide its letter no. 04 – 02 /n – 171 / 2601 dated 16.10.2017 intimated that the existing 2 x 315 MVA ICTs at Jabalpur (PG) are feeding Jabalpur, Panagar and Narsinghpur 220 kV S/s. The max loading on these ICTs observed in April – 2017 as 287.16 MW and generally the loading on these ICTs is around 200 MVA on each throughout the year. It is also mentioned that under n – 1 contingency of above transformers, it is very difficult to manage the loads of Jabalpur & Narsinghpur. Therefore, it is proposed to install additional 1 x 500 MVA or 1 x 315 MVA ICT at Jabalpur (PG) S/s.

17.4. **Members may deliberate.**

18. Provision of Bus Reactor at Champa Pool 400 kV Split bus Section – A – Agenda by POWERGRID

18.1. During the 39th meeting of SCPSPWR held on 30.11.2015, the following split bus arrangement was agreed at Champa P.S.

i. Champa Pooling Station after BUS Splitting:



Champa Pool Voltage Level(in kV)	Description		BUS Section A	BUS Section B
400	Generation (in MW)	Available	4920	4520
	BUS Reactor (in MVAR)	Available	2x80	1x80
	765/400 kV ICT(in MVA)	Available	3x1500	3x1500
765	BUS Reactor (in MVAR)	Available	-	240
		Proposed	240	-

18.2. Under the proposed splitting arrangement, 2x80MVAr bus reactor under Section A of Champa 400 kV bus was inadvertently mentioned as "available" whereas only space for 2x80 MVAr Bus Reactors is available at Section A of Champa 400 kV bus. With the above agreed splitting arrangement, the existing one 80 MVAr Bus Reactor at Champa Pooling Station would be on Section B of 400 kV bus (mentioned under Bus Section B in the table above). Hence, no bus reactor would be available at split section A of Champa 400kV bus post the under-implementation splitting arrangement.

18.3. Accordingly, it is proposed to install a 420 kV, 1x125 MVAr bus reactor at Champa Split section A for voltage control purpose as the Split Section A shall be operating as an independent substation after splitting.

18.4. **Members may deliberate.**

19. Transmission System associated with DGEN TPS (4x300MW) under implementation by DGEN Transmission Co. Ltd.

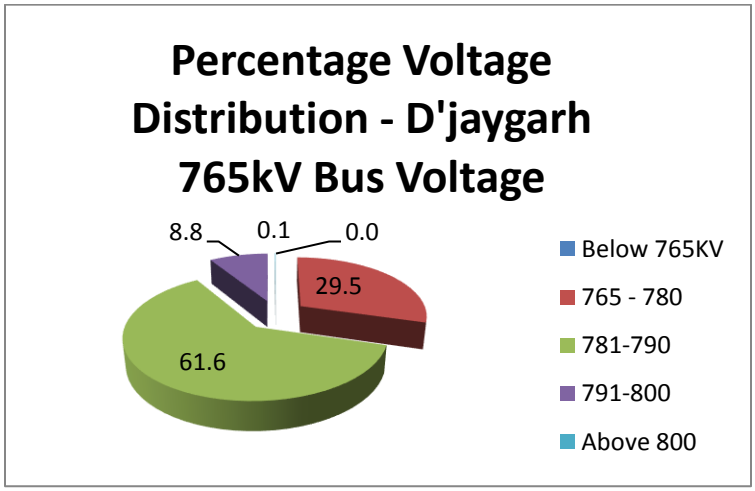
19.1. DGEN-Vadodara 400 kV D/C line and Navsari – Bhestan 220 kV D/C line has been awarded to DGEN Transmission Company Ltd (DGENTCL) through tariff based competitive bidding route for evacuation of power from DGEN TPS (3x400 MW) with commissioning schedule of May 2018. The zero date of the project is 17.03.2015 and M/S DGENTCL has not yet taken up the implementation of the scheme as per the execution plan submitted by them.

19.2. In a meeting held at CEA on 26.04.2017, it was decided that Torrent Energy Ltd shall initiate action as per relevant clause of TSA as M/s DGENTCL has confirmed that they are not taking up the implementation of the project. Further, CEA shall inform the status of project to CERC in due course. In the same meeting, representative from Torrent Energy Ltd. informed that all three units of 1200 MW DGEN gas based power project at Dahej near Bharuch in South Gujarat have been commissioned along with dedicated connectivity line (DGEN- Navsari 400 kV D/C line. They are not able to run the power plant at full load due to unavailability of gas. In case of gas availability and absence of DGEN-Vadodara 400 kV D/C line, there may be constraint in evacuation of power from DGEN plant.

19.3. In view of the above, future course of action regarding transmission system associated with DGEN TPS (4x300MW) may be deliberated upon by the constituents.

20. Charging of 2x330 MVAR Line Reactors of Dharamjaygarh – Jharsuguda 765kV 2nd D/c line as Bus Reactor at 765/400 kV Dharamjaygarh Substation

20.1. 765 kV Bus voltage of Dharamjaygarh Substation remains high for most of the time and to control overvoltage problem in spite of all the reactors remaining in service either as Bus reactor or line reactor, opening of 765 kV lines is required. During the months of May'17 to Jul'17, the maximum & minimum voltages observed at Dharamjaygarh 765kV bus were 802kV and 765kV respectively and voltages remained in the range of 781kV to 800kV for more than 70% of the time. The voltage profile at Dharamjaygarh substation is as given below:



20.2. The bays associated with 765kV Jharsuguda-Dharamjaygarh Ckt 3 & 4 along with 2x330 MVAR line reactors are ready for charging at Dharamjaygarh substation, whereas the construction of the line is in progress and is expected to be completed by March 18.

20.3. In view of above, POWERGRID has proposed to charge the 2x330 MVAR Line Reactors as bus reactors (utilizing Jharsuguda Ckt # 3 & 4 bays) till such time the 765 kV Jharsuguda-Dharamjaygarh Ckt 3 & 4 is completed. System studies indicate a voltage sensitivity of about 2.5kV per 330MVAr reactor switching. Accordingly, the reactors may be utilized based on requirement of system condition to control High Voltage encountered at Dharamjaygarh substation.

20.4. **Members may deliberate.**

21. Interconnection of MSETCL lines with PGCIL lines or S/s

21.1. MSETCL vide its letter no. MSETCL/CO/STU/5607 dated 29.05.2017 (copy enclosed as annexure – 21.1) intimated that in its five year plan (from 2017–18 to 2021–22), it has proposed to interconnect some of its existing or upcoming new lines / substations with PGCIL network and requested to take up the same in the meeting of SCPSPWR.

21.2. The list of elements of MSETCL are as follows:

S. No.	Transmission Elements	PGCIL S/s	Target Year
1	LILO of 400 kV Talegaon (PG) – Kalwa at Vikhroli	Talegaon	2021 – 22
2	Wardha (PG) – Yavatmal 220 kV D/C	Wardha	2017 - 18
3	Solapur (PG) – Bale 220 kV D/C	Solapur	2016 – 17
4	Conversion of existing 220 kV S/C Urse – Chinchwad line to M/C for portion between Chinchwad S/s to prop 220 kV Talegaon PGCIL line LILO point (Loc no. 50)	Talegaon	2016 – 17
5	LILO of one Ckt. of 400 kV Tarapur – Padghe D/C at Kudus (Padghe II)	Padghe / Kudus	2017 – 18
6	LILO of one Ckt. of Aurangabad (PG) – Shendra D/C at Phulambri	Aurangabad	2019 – 20
7	LILO of 220 kV Parli – Harangul S/C at Parli (PG)	Parli	2018 – 19
8	LILO of Parli – Osmanabad S/C at Parli (PG)	Parli	2018 – 19
9	LILO of 2nd Ckt of South Solapur – Kolhapur D/C at Alkud 400 kV S/s	Solapur	2016 – 17
10	LILO of both ckts of Parli (PG) – Pune (PG) 400 kV D/C at Lonikhand II	Pune	2017 – 18
11	LILO of one ckt. Of 220 kV Borivali – Boisar (M) M/C line at Boisar (PG) and 220 kV Nalasopara at Boisar PG Idle line	Boisar	2016 – 17
12	LILO of both ckts of Dhule – SSP 400 kV D/C at Balsane PS	Dhule / SSP	2019 – 20

21.3. **Members may deliberate.**

22. Declaration of 132 kV Nepanagar (Madhya Pradesh) – Dharni (Maharashtra) line as ISTS line – proposal by MSETCL

22.1. MSETCL vide its letter no. MSETCL/CO/STU/9849 dated 07.09.2017 intimated that 132 kV Nepanagar (Madhya Pradesh)–Dharni (Maharashtra) line (approx. 60 km) has been charged on 09.02.2017 in radial mode and power was flowing towards Maharashtra successfully through this line since 16.02.2017. As it is interconnected between two states, it is requested to declare this line as an ISTS line (Inter State Transmission System).

22.2. **Members may deliberate.**

23. Advancement in schedule of 2 no. of 220 kV line bays at Khandwa (PG) 400/220 kV S/s associated with 1 x 500 MVA, 400/220 kV, 3rd ICT

23.1. MPPTCL vide its letter no. 04-02/N-171/2223 dated 29.08.2017 intimated that 1 x 500 MVA, 400/220 kV 3rd ICT at Khandwa was agreed in 39th meeting of SCPSPWR held on 30.11.2015 and 2 no. of 220 kV line bays were agreed the 41st meeting of SCPSPWR held on 21.12.2016.

23.2. In this regards, MPPTCL intimated that the downstream network associated with above ICT is 220 kV Chhenera – Khandwa (PG) D/C line and the same has been already awarded and expected to get completed by Dec, 2018. However, the target for completion of 500 MVA, 400/220 kV 3rd ICT at Khandwa along with 2 no. of 220 kV bays is September, 2019. In view of this, it is requested to implement the ICT in matching time frame of its downstream i.e. Dec, 2018.

23.3. **Members may deliberate.**

24. Provision of 400/220 kV, 2x500 MVA ICT at Kakrapar Nuclear Power Station – proposal by GETCO

24.1. GETCO vide its letter no. STU/511/13 dated 04.09.2017 has intimated that installed capacity of KAPP is 2x220 MW (Unit–1 & 2) and work is under progress for Units 3 & 4 (2 x 700 MW). The Associated Transmission System (ATS) for KAPP is as follows:

(i) KAPP – Navsari 400 kV D/C

(ii) KAPP – Vapi (PG) 400 kV D/C

(iii) KAPP – Vav 220 kV D/C

(iv) KAPP – Vapi 220 kV D/C

(v) KAPP – Haldarwa 220 kV D/C

24.2. Presently, the 400 kV switchyard and 220 kV switchyard at KAPP are operating in isolated mode. GETCO has informed that during low / no generation at KAPP, the power is flowing from Haldarwa to Vav & Vapi through 220 kV Haldarwa–KAPP D/C and KAPP–Vav 220 kV D/C & KAPP–Vapi 220 kV D/C, thus some of the 220 kV lines in this area getting over loaded.

24.3. In view of this, GETCO has proposed for 2 x 500 MVA, 400/220 kV ICT at KAPP.

24.4. **Members may deliberate.**

25. Installation of 2 x 50MVA, 220/33kV transformer with 10 Nos. 33kV feeder bays at 220kV Jabalpur substation

25.1. Jabalpur 400/220 kV sub-station of POWERGRID presently has 2x315 MVA, 400/220 kV ICTs and the 220kV & 132kV works including 220kV bus and 220kV side ICT bays located in the same premises are owned by MPPTCL. NTPC (then owner of Jabalpur 400kV sub-station) vide letter dated 22-05-1987 had allowed MPPTCL (then MPEB) to carry out 220/132kV extension works at its Jabalpur sub-station subject to inter-alia the following conditions:

- MPEB will not provide any 132/33 kV extension at Jabalpur 400kV sub-station
- MPEB shall not construct any staff quarter in the space given by NTPC
- The ownership of the land allotted to MPEB for 220/132kV extension rests with NTPC

25.2. Now, MPPTCL vide letter dated 10.04.2017 has requested POWERGRID to provide consent towards the installation of 2x50MVA, 220/33kV transformer along with 10 nos. 33 kV outgoing feeders (to be implemented by MPPTCL) to cater to future load growth of Jabalpur & surrounding area. The existing 33kV auxiliary supply to Jabalpur substation is from a 16km long 33kV line from 220/132/33kV MPPTCL substation, which is not reliable. Hence, the proposed 220/33kV ICTs shall also help to provide reliable auxiliary supply to Jabalpur (PG) substation.

25.3. Considering the planned augmentations, a further increase in the loading of Jabalpur ICTs is expected in future. Therefore, to feed the additional load requirement of MPPTCL with reliability and n-1 security may require augmentation of transformation capacity at 400/220kV Jabalpur substation.

25.4. **Members may deliberate.**

26. Retention of LILO of 400kV Khandwa- Rajgarh at Khangone – Agenda by NTPC

26.1. NTPC has intimated that one double circuit line has been approved for many of recently approved NTPC projects namely Darlipalli, Khargone, Rihand III. Under planned shutdown of any one line, as per operational practice Auto reclose of second line is blocked. This has resulted in station blackout and damage to LP turbine diaphragm due to loss of cooling water (Mouda). It takes minimum 6-8 hours to replace the diaphragm, subject to availability of spares if required to be replaced for multiple units. Even if Single Phase Auto Reclose is kept enabled, during dead time, generators will be subjected to very high Negative sequence current (Rotor heating) and torsional stress.

26.2. The approved transmission system meets transmission planning criteria, above facts may also be taken into consideration at planning stage. NTPC has proposed the following:

a) Provision of at least two D/C lines preferably to two different substation may be considered for new projects as immediate transmission system.

b) For Khargone TPS, the LILO of 400kV Khandwa-Rajgarh at Khangone may be allowed to be retained.

26.3. The following transmission system associated with Khargone TPP has been agreed and the same is under implementation through tariff based competitive bidding route:

1. Connectivity system for Khargone STPP

(i) LILO of one ckt of Rajgarh-Khandwa 400kV D/C line at Khargone TPP (The LILO shall be used for startup power and commissioning activities requirement. After commissioning of balance transmission system, the LILO would be bypassed at Khargone generation switchyard and may be utilized only under contingency condition)

(ii) Khargone TPP Switchyard – Khandwa pool 400 kV D/C (Quad) line

2. System strengthening in WR in time frame of Khargone TPP

(i) Khandwa Pool – Indore 765kV D/C line

(ii) Khandwa Pool – Dhule 765 kV D/C line

(iii) Establishment of 765/400kV, 2x1500MVA pooling station at Khandwa pool

26.4. As per the approved scheme the LILO shall be used for startup power and commissioning activities requirement. After commissioning of balance transmission system, the LILO would be bypassed at Khargone generation switchyard and may be utilized only under contingency condition. Now NTPC has requested to retain the LILO on continuous basis for evacuation of power.

26.5. **Members may deliberate.**

Annexure - 2.1

Status of TBCB Transmission Projects - Western Region

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
1	System Strengthening in NR for import of power from North Karanpura and other projects outside NR and System Strengthening in WR for import of power from North Karanpura and other projects outside Western Region and also for projects within Western Region. Estimated Cost Rs. 2700 Cr	REC NKTCL (Reliance Power Transmission Company Ltd) **Milestones:** (i) SPV acquired by Reliance on 20-05-2010 (ii) Approval u/s 164 received on 12.08.2013.	(i) Sipat/Korba (Pooling) - Seoni 400 kV D/C line (ii) Lucknow - Bareilly 765 kV D/C line (iii) Bareilly - Meerut 765 kV D/C line (iv) Agra - Gurgaon(ITP) 400 kV D/C line (v) Gurgaon (ITP) - Gurgaon (PG) 400 kV D/C line (vi) Gurgaon (ITP) 400/220 kV GIS Substation	Matter was in CERC for revision of tariff and extension of date of commissioning. NKTCL filed an appeal in appellate tribunal challenging CERC order of 9.5.2013. Appellate Tribunal has given final judgment on 2.12.13 setting aside CERC order and allowing the appeal. NKTCL is initiating steps for implementing of order. The judgment of Appellate Tribunal accepts delay in clearance under section-164 as force majeure. According NKTCL have requested MoP to extend the validity of section 68 clearance vide their letter dated 14.1.2014. Beneficiaries have appealed SC. SC on 12th August has disposed of the appeal and directed ATE to decide on the appeal. **Work Yet to start.**
2	Transmission System Associated with Krishnapattnam UMPP- Synchronous interconnection between SR and WR (Part-B) Estimated Cost Rs. 440 Cr	REC RSTCL (Consortium of Patel-Simplex- BS Transcomm) **Milestones:** (i) LoI placed on 16.12.2010 (ii) SPV acquired on 07.01.2011 (iii) Trans. license received on 24.08.2011 (iv) Approval u/s 164 received on 29.08.2011 Tariff adoption on 12.8.2011	(i) Raichur - Sholapur 765 kV S/C line-1 (208 ckm)	**Commissioned in 06/2014**
3	System strengthening common for WR and NR Estimated Cost Rs. 1720 Cr	PFC Jabalpur Transmission Company Limited (Sterlite Grid) **Milestones:** (i) LOI placed on 31.01.2011 (ii) Special Purpose Vehicle acquired on 31.03.2011 (iii) Scheduled Completion Date is 31.03.2014. (iv) Transmission License granted on 12.10.2011. (v) Tariff adoption approval on 28.10.2011	(i) Dhramjaygarh - Jabalpur 765 kV D/C (ii) Jabalpur - Bina 765 kV S/C line	**Line commissioned in 09/2015** **Line commissioned in 06/2015**

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		(vi) Clearance under Section 164 : received on 12.07.13		
4	System strengthening for WR Estimated Cost Rs. 2900 Cr	PFC BDTCL(Sterlite Grid) **Milestones:** (i) LoI placed on 19.1.2011 (ii) SPV acquired on 31.3.2011 (iii) Trans. license received on 12.10.2011 (iv) Approval u/s 164 received on 29.01.2013 (v) Tariff adoption on 28.10.2011 (vi) Original COD : Mar2014	(i) Jabalpur-Bhopal 765 kV S/C line (ii) Bhopal-Indore 765 kV S/C line (iii) 2x1500 MVA 765/400 kV substation at Bhopal (iv) Bhopal-Bhopal (MPPTCL) 400 kV D/c quad line. (v) Aurangabad-Dhule 765 kV S/C line (vi) Dhule-Vadodara 765 kV S/C line (vii) 2x1500 MVA, 765/400 kV substation at Dhule (viii) Dhule - Dhule(Msetcl)400 kV D/C Line	**Line commissioned in 06/2015** **Line commissioned in 10/2014** **Commissioned in 07/2014** **Line Commissioned in 07/2014** **Line commissioned in 10/2014** **Line commissioned in 10/2015** **Commissioned in 11/2014** **Line Commissioned in 11/2014**
5	Transmission System associated with DGEN TPS (1200 MW) of Torrent Power Ltd. Estimated Cost Rs. 275 Cr	PFC M/s Instalaciones Inabensa, S.A. Spain **Milestones:** (i) LoI issued on 19.05.2014 (ii) Approval under section 68 on 30.01.2014. (iii) Approval under Sec 164 of EA,2003 on 24.04.2016	(i) DGEN TPS – Vadodara 400 kV D/C, Twin Moose line. (ii) Navsari – Bhestan 220 kV D/C line	Project authority had not started construction activity as per execution plan. Matter was taken up with the project authority and notice served in August/Sept 2016 but project authority did not respond. Member(PS), CEA took a meeting on 26.04.2017 to review the progress of Tr. project wherein project authority informed to close the project due to financial constraints in parent company. CEA vide letter dated 14.06.2017 informed CERC to take appropriate action. **Completion Target : May 2018**
6	Transmission System associated with Gadarwara STPS (2x800 MW) of NTPC (Part-A)	REC Powergrid Warora Transmisson Limited (A subsidiary of PGCIL) **Milestones:** (i) LoI issued on 11.03.2015 (ii) Approval under section 68 on 26.11.2014 (iii) Approval under Sec 164 of EA,2003 on 24.04.2017	(i) Gadarwara STPS - Jabalpur Pool 765kV D/C line (ii) Gadarwara STPS - Warora P.S. (New) 765 kV D/C line (iii) LILO of both Ckts. Of Wardha-Parli 400 kV D/C at Warora P.S. (2xD/C) (iv) Warora 765/400 kV Pooling Station (2x1500 MVA).	**Completion Target: November, 2017**
7	Transmission System associated with Gadarwara STPS (2x800 MW) of NTPC (Part-B).	REC Powergrid Parli Transmisson Limited (A subsidiary of PGCIL) **Milestones:**	(i) Warora P.S.- Parli (New) 765 kV D/C line (ii) Parli (New) - Solapur 765 kV D/c line (iii) Parli (New) - Parli (PG) 400 kV D/C (Quad) line (iv) 765/400 kV Parli (New) Sub-station (2x1500 MVA)	**Completion Target: January, 2018**

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		(i) LoI issued on 11.03.2015 (ii) Approval under section 68 on 10.12.2014 (iii) Approval under Sec 164 of EA,2003 on 28.06.2017		
8	Transmission System Strengthening associated with Vindhyachal- V	REC Powergrid Jabalpur Transmisson Limited (A subsidiary of PGCIL) **Milestones:** (i) LoI issued on 10.02.2015 (ii) SPV has been acquired by the successful bidder on 26.02.2015 (iii) Approval u/s 164 of EA,2003 on 19.09.2016	(i) Vindhyachal P. S- Jabalpur P. S. 765 kV D/C line.	**Completion Target: June, 2018**
9	System strengthening for IPPs in Chhattisgarh and other generation projects in Western Region	PFC Chhattisgarh - WR Transmission Ltd. (A subsidiary of Adani Power Limited) **Milestones:** (i) LoI issued on 28.07.2015 (ii) SPV acquisition on 23.11.2015 (iii) Approval u/s 68 of EA,2003 on 24.04.2015 (iv) Approval u/s 164 of EA,2003 on 20.10.2016	(i) Gwalior 765/400 kV – Morena 400 kV D/C line 400 kV D/C Length- 50 km (ii) Establishment of 400/220 kV S/s at Morena, 2X315 MVA (iii) Vindhyachal-IV & V– Vindhyachal Pool 400 kV D/C (Quad) line Length-15 km (iv) Sasan UMPP – Vindhyachal Pooling station 765 kV S/C (Q) line 7 Length-8 km (v) LILO of one circuit of Aurangabad – Padghe 765 kV D/C line at Pune Length-50 km (vi) Raigarh (Kotra) – Champa (Pool) 765kV S/C (Q) line (vii) Champa (Pool) – Dharamjaygarh 765kV S/C (Q) line	**Scheduled Date of Completion: March, 2019** **Anticipated Date of Completion: May, 2018**
10	Additional System Strengthening for Sipat STPS	PFC Sipat Transmission Ltd (A subsidiary of Adani Power Limited) **Milestones:** (i) SPV acquisition on 23.11.2015 (ii) LoI issued on 28.07.2015 (iii) Approval u/s 164 of EA,2003 on 05.08.2016	(i) Sipat – Bilaspur Pooling Station765 kV S/C line Length-25 km (ii) Bilaspur PS – Rajnandgaon 765 kV D/C line Length-180 km	**Scheduled Date of Completion: March, 2019** **Anticipated Date of Completion: July, 2018**
11	Additional System Strengthening Scheme for Chhattisgarh IPPs – Part B	PFC Raipur - Rajnandgaon - Warora Transmission Ltd (A subsidiary of Adani Power Limited)	(i) Raipur (Pool) – Rajnandgaon 765 kV D/C line Length - 60 KM (ii) Rajnandgaon – New Pooling station near Warora 765 kV D/C line Length - 270 KM (iii) Establishment of new 765/400 kV substation near	**Scheduled Date of Completion: Nov, 2018** **Anticipated Date of Completion: March, 2018**

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		Milestones: (i) SPV acquisition on 23.11.2015 (ii) LoI issued on 28.07.2015 (iii) Approval u/s 164 of EA,2003 on 15.06.2016	Rajnandgaon 2x1500 MVA	
12	Additional inter-Regional AC link for import into Southern Region i.e. Warora – Warangal and Chilakaluripeta - Hyderabad - Kurnool 765 kV link	PFC Warora Kurnool Transmission Ltd (A subsidiary of Essel Infraprojects Limited) **Milestones:** (i) LoI issued on 29.02.2016 (ii) SPV acquisition on 06.07.2016 (iii) Approval u/s 164 of EA,2003 on 27.06.2017	(i) Establishment of 765/400 kV S/s at Warangal (New) with 2x1500 MVA ICTs and 2x240 MVAR bus reactors (ii) Warora Pool – Warangal (New) 765kV D/c line with 240 MVAR switchable line reactor at both ends Length - 350 KM (iii) Warangal (New) – Hyderabad 765 kV D/c line with 330 MVAR switchable line reactor at Warangal end Length- 160 KM (iv) Warangal (New) – Warangal (existing) 400 kV (quad) D/c line Length-10 KM (v) Hyderabad – Kurnool 765 kV D/c line with 240 MVAR switchable line reactor at Kurnool end Length- 170 KM (vi) Warangal (New) – Chilakaluripeta 765kV D/c line with 240 MVAR switchable line reactor at both ends Length – 250 KM (vii) Cuddapah – Hoodi 400kV (quad) D/c line with 63 MVAR switchable line reactor at both ends Length-200 KM	**Scheduled Date of Completion : Nov, 2019**
13	Common Transmission System for Phase-II Generation Projects in Odisha and Immediate Evacuation System for OPGC (1320 MW) Project in Odisha	PFC Orissa Generation Phase-II Transmission Limited (A subsidiary of Sterlite Grid Limited) **Milestones:** (i) LoI issued on 06.01.2016 (ii) SPV acquisition on 08.04.2016 (iii) Approval u/s 164 of EA,2003 on 07.03.2017	(i) OPGC (IB TPS) – Jharsuguda (Sundargarh) 400 kV D/C line with Triple Snowbird Conductor Length - 50 KM (ii) Jharsuguda (Sundargarh) – Raipur Pool 765 kV D/C line Length - 350 KM	**Scheduled Date of Completion: August, 2019**
14.	Transmission System Strengthening in WR associated with Khargone TPP (1320 MW)	REC Khargone Transmission Limited (Sterlite Grid Ltd.) **Milestones:** (i) LoI issued on 26.05.2016 (ii) SPV acquisition on 22.08.2016 (iii) Approval u/s 164 of EA,2003 on 05.07.2017	**A. Connectivity system for Khargone TPP** (i) LILO of one ckt of Rajgarh - Khandwa 400 kV D/C line at Khargone TPP (ii) Khargone TPP Switchyard – Khandwa pool 400 kV D/C (Quad) line **B. System strengthening in WR in time frame of Khargone TPP** (i) Khandwa Pool – Indore 765 kV D/C line.	**Scheduled Date of Completion: July, 2019** **Anticipated Date of Completion: Feb, 2018**

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
			(ii) Khandwa Pool – Dhule 765 kV D/C line. (iii) Establishment of 765/400 kV, 2x1500 MVA pooling station at Khandwa pool	
15.	New WR- NR 765 kV Inter-regional corridor	REC Milestones: (i) MoP vide Gazette Notification dated 28.10.2016 appointed RECTPCL as BPC (ii) Request for Qualification : 28.12.2016 (iii) Request for Proposal : 28.03.2017	(i) Vindhyanchal Pooling Station- Varanasi 765 kV D/C line	**Yet to get Awarded**
16.	A. Additional 400kV feed to Goa B. Additional System for Power Evacuation from Generation projects pooled at Raigarh (Tamnar) Pool	PFC Milestones: (i) MoP vide Gazette Notification dated 28.10.2016 appointed PFCCL as BPC (ii) Request for Qualification : 01.02.2017 (iii) Request for Proposal : 01.05.2017	**A. Additional 400kV feed to Goa** (i) LILO of one ckt. of Narendra (existing) – Narendra (New) 400 kV D/c quad line at Xeldem (ii) Xeldem – Mapusa 400 kV D/c (Q) line (iii) Establishment of 2x500MVA, 400/220kV substation at Xeldem **B. Additional System for Power Evacuation from Generation Projects pooled at Raigarh (Tamnar) Pool** (i) Dharamjaygarh Pool section B - Raigarh (Tamnar) Pool 765 kV D/c line	**Yet to get Awarded**
17.	A. Connectivity System for Lanco Vidarbha Thermal Power Ltd. (LVTPL) B. Inter State Transmission system strengthening in Chhatarpur area in Madhya Pradesh	PFC Milestones: (i) MoP vide Gazette Notification dated 28.10.2016 appointed PFCCL as BPC	**A. Connectivity System for Lanco Vidarbha Thermal Power Ltd. (LVTPL)** (i) LVTPL TPS switchyard – Warora Pool 765kV D/c line **B. Inter State Transmission system strengthening in Chhatarpur area in Madhya Pradesh** (i) LILO of both circuits of Satna – Bina 400kV (1st) D/c line at Bijawar. (ii) Establishment of 2x500MVA, 400/220kV substation at Bijawar	**Bidding process is kept in abeyance**

Annexure 2.2

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION (as on 31.08.2017)

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
1	**Western Region System Strengthening Scheme - II**	5222	20th (23.01.04)	July'06		
	Set-A: For absorbing import in eastern and central part of WR Grid (POWERGRID)	1700			Commissioned	
	Set-B: For regional strengthening in Southern Maharashtra **(100 % private)**	1050			Commissioned	
	Set-C: For regional strengthening in Gujarat **(100 % private)**	600			---	Implementation by Reliance
	a) Rajgarh – Karamsad 400kV D/c				commissioned	
	b) Limdi(Chorania) – Ranchodpura 400kV D/c				commissioned	
	c) Ranchodpura – Zerda(Kansari) 400kV D/c				commissioned	
	Set-D: For regional Strengthening in Northern Madhya Pradesh **(POWERGRID)**	1050			commissioned	
2	**Western Region System Strengthening -V**	722	25th (30.09.06)	Dec'07		Under implementation
	a) 400 kV Vapi- Kala - Kudus D/c				Dec'17	Vapi-Kala portion commissioned in Mar'14. Kudus S/s being implemente by MSETCL.
	b) LILO of 400 kV Lonikhand - Kalwa line at Navi Mumbai				Dec'17	Cable work in progress (2km.) Critical ROW issues
	c) Establishment of 400/220 kV, 2 x 315 MVA new S/s (GIS) at Navi Mumbai				Substation is ready and shall be commissioned matching with line	
	d) 220 kV Vapi- Khadoli D/c.				Commissioned	
3	**Tr. System of Mundra Ultra Mega Power Project (4000 MW)**	4824	26th (23.02.07)	Oct'08		Under implementation
	a) Mundra – Bachchau -Ranchodpura 400 kV (Triple) D/c				Commissioned	
	b) Mundra – Jetpur 400 kV (Triple) D/c				Commissioned	
	c) Mundra – Limbdi 400 kV (Triple) D/c				Commissioned	
	d) Gandhar-Navsari 400 kV D/c				Commissioned	
	e) Navsari - Boisar 400 kV D/c				Commissioned	Severe ROW & Forest issue.
	f) LILO of both circuits of Kawas-Navsari 220 kV D/c at Navsari (PG)				Commissioned	
	g) Wardha-Aurangabad 400 kV(Quad) D/c (with provision to upgrade at 1200 kV at later date)				Feb'18	Both Contracts terminated due to unsatisfactory performance. Tender awarded for both the packages.
	g) Aurangabad (PG) -Aurangabad I (Waluj) 400 kV(Quad)				Commissioned	
	Substations					
	a) 40% Fixed Series Compensation each on Wardha - Aurangabad 400 kV D/c at Wardha end				Feb'18	Commissioning matching with the line
	b) Establishment of new 400/220 kV, 2x315 MVA substation at Navsari & Bachchau				Commissioned	
	c) Establishment of new 765/400 kV, 3x1500 MVA, substation at Wardha for charging of Seoni - Wardha 2xS/c lines at 765 kV level				Commissioned	
4	**Transmission system associated with Krishnapatnam (5x800 MW) (WR Portion)- now delinked from Krishnapatnam UMPP**	1928	27th (30.07.07)			Under implementation
	a) Raichur – Solapur (PG) 765 kV S/c				Commissioned	
	b) Solapur(PG) – Pune 765 kV S/c				Commissioned	
	c) LILO of 400kV Aurangabad I (Waluj) - Pune (PG) D/c & Parli (PG) - Pune (PG) D/c lines at Pune(GIS)				Commissioned	
	d) Establishment of new 765/400 kV substations at Pune (GIS) with 2x1500 MVA transformation capacity				Commissioned	
5	**Associated transmission system of VSTPP-IV and Rihand-III**	4673	29th (10.09.09)	Mar'10		Under implementation
	a) Rihand III- Vindhyachal Pool 765 kV D/c (initially to be op. at 400kV)				Commissioned	
	b) Vindhyachal IV - Vindhyachal Pool 400kV D/c(Quad)				Commissioned	
	c) Vindhyachal Pool - Satna 765 kV 2xS/c				Commissioned	
	d) Satna -Gwalior 765 kV 2xS/c				Commissioned	
	e) Gwalior – Jaipur(South) 765 kV S/c				Commissioned	
	f) Vindhyachal Pool-Sasan 765 kV S/c				Commissioned	

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION (as on 31.08.2017)

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
	g) Vindhyachal Pool-Sasan 400 kV D/c				Commissioned	
	h) Establishment of 765/400kV, 2x1500 MVA substation at Vindhyachal Pool				Commissioned	
6	**Solapur STPP(2x660MW) transmission system**	63.32	30th (08.07.10)	Oct'13		Under implementation
	a) Solapur STPP – Solapur (PG) 400kV D/c (Quad)				Commissioned	Line completed in Apr'15
	b) Augmentation of 400/220kV ICT by 1x500MVA transformer (3rd) at Solapur (PG)				Commissioned	
7	**Solapur STPP (2x660MW) transmission system (Part-A)**	50.52	36th (29.08.13)	Mar'15		Award placed in May'15
	a) Solapur STPP – Solapur (PG) 400kV 2nd D/c (Quad)				Sep'17	Expected by end of Sep'17
8	**Transmission system for evacuation of Kakrapar Atomic Power Project unit 3 &4 (2x700 MW)**	378.71	31st (27.12.10)	Feb'14		Under Implementation
	a) Kakrapar NPP – Navsari 400kV D/c – 38 km				Commissioned	Stringing commenced from Mar'16
	b) Kakrapar NPP – Vapi 400kV D/c - 104 km				Commissioned	
9	**Transmission System associated with Mauda Stage-II (2x660 MW)**	1575.3	32nd (13.05.11)	Sep'13		Under Implementation
	a) Mauda II – Betul 400KV D/c (Quad)-210 km				Commissioned	
	b) Betul– Khandwa 400KV D/c (Quad)-180 km				Commissioned	
	c) Khandwa – Indore(PG) 400kV D/c -215 km				Commissioned	
	d) Establishment of 400/220kV 2x315MVA substation at Betul				Commissioned	
10	**Provision of 1x315MVA ICT & Spare Converter Trf for reliable auxlliary power supply at HVDC back to back station at Bhadravati**	143	33rd (21.10.11)	-	Commissioned	ICT commissioned in Mar'15. Balance work under progress.
11	**Establishment of Pooling Station at Champa and Raigarh (Near Tamnar) for IPP Generation Projects in Chhattisagrh**	2066.85	29th (10.09.09)	May'11		Under Implementation
	a) Champa Pooling Station - Raipur Pooling Station 765kV D/c				Commissioned	
	b) Raigarh Pooling Staiton (near Kotra) - Raigarh pooling (near Tamnar) 765kV D/c				Commissioned	
	c) Champa Pooling Station - Dharamjaygarh Pooling Station 765kv S/c				Commissioned	
	d)Raigarh Pooling Staiton (near Kotra) - Champa pooling 765kV S/c				Commissioned	
	e) Establishment of 765/400kV 6x1500MVA Champa Pooling Station				Commissioned	
	f)Establishment of 765/400kV 3x1500MVA Raigarh Pooling Station (near Tamnar)				Commissioned	
12	**Transmission system strengthening in Western Part of WR for IPP generation proejcts in Chhattisgarh**	2127.51	29th (10.09.09)	Nov'11		Under Implemetation
	a) Aurangabad(PG) – Boisar 400kV D/c (Quad)				Sep'17	Expected by end of Sep'17
	b) Wardha - Aurangabad (PG) 765kV D/c				Commissioned	
	c) Establishement of 765/400kv 2x1500MVA auraganbad (PG) S/s				Commissioned	
	d) Augmentation of transformation capacity at Boisar by 400/220kV, 1x500MVA				Commissioned	
13	**System strengthening in North/West part of WR for IPP Projects in Chhattisgarh**	2073.26	29th (10.09.09)	Dec'11		Under Implementation
	a) Aurangabad (PG) – Padghe(PG) 765kV D/c				Dec'17	
	b) Vadodara – Asoj 400kV D/c(Quad)				Commisisoned	
	c) Padghe – Kudus 400kV D/c (Quad)				Dec'17	
14	**System Strengthening in Raipur-Wardha Corridor for IPP projects in Chhattisgarh (DPR-6)**	1422.85	29th (10.09.09)	Jan'12		Under Implementation
	a) Raipur Pooling station - Wardha 765kV 2nd D/c				Commisisoned	
15	**WR-NR HVDC interconnector for IPP Projects in Chhattisgarh**	9569.76	29th (10.09.09)/30 th (08.07.10)	Mar'12		Under Implementation
	a) A ± 800kV, 3000Mw HVDC bipole between Champa Pooling Station-Kurukshetra (NR) (provision to upgrade to 6000MW at a latter date)				Commissioned	
	b) Kurukshetra(NR) - Jallandhar 400kV D/c(Quad) one ckt. via 400/220kV Nakodar				Commissioned	
	c) LILO of Abdullapur – Sonepat 400kV D/c(triple) at Kurukshetra				Commissioned	

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION (as on 31.08.2017)						
Sl. No.	**Description of Scheme**	**Estimated Cost (Rs. Cr)**	**Date of firming up in WR standing committee**	**Date of investment approval**	**Target date as of now**	**Remarks**
	d) Establishment of 3000MW 800KV HVDC bipole terminal each at Champa Pooling station and Kurukshetra(NR) respectively: to be upgraded to 6000MW.				Commissioned	
	e) Establishment of 400/220kV 2x500 MVA S/s at Kurukshetra (GIS) 2x500MVA				Commissioned	400kV bays ready for commissioning in Dec'15. ICT-II
16	**Inter-regional system strengthening scheme for WR and NR-Part A**	1315.9	36th (29.08.13)	Oct'13		Completed
	a) Solapur - Aurangabad 765kV D/c				Commissioned	
17	**Transmission System Associated with Lara STPS-I (2x800MW)**	400.47	17th LTA (03.01.13)	Jun'14		Under Implementation
	a) Lara STPS-I – Raigarh (Kotra) Pooling Station 400 kV D/c line – 18km				Commissioned	
	b) Lara STPS-I – Champa Pooling Station 400 kV D/c (quad) line.-112km				Commissioned	Tower erection commenced in Oct'15
18	**Transmission System Strengthening in WR-NR Transmission Corridor for IPPs in Chattisgarh**	5151.37	35th (03.01.13)	Jun'14		Under Implementation
	a) Up-gradation of + 800kV, 3000MW HVDC bipole between Champa Pooling Station – Kurukshetra (NR) to 6000MW				Pole-III: Jun'18; Pole-IV: Dec'18	Tentative
	b) Kurukshetra (NR) – Jind 400kV D/c (Quad)				Oct'17	
19	**Inter-regional system strengthening scheme for WR and NR-Part B**	6517.36		Dec'14		Under Implementation
	(a) 765KV D/C Jabalpur Pooling Station - Orai line				Mar'18	
	(b) 765KV D/C Orai - Aligarh line				Mar'18	
	(c) 400KV D/C Orai - Orai line (Q)				Mar'18	
	(d) LILO of one ckt of Satna-Gwalior 765KV 2x S/C line at Orai				Mar'18	Efforts being made to commission earlier
	(e) LILO of Agra - Meerut 765KV S/C at Aligarh				Mar'18	
	(f) LILO of Kanpur - Jhatikara 765KV S/C at Aligarh				Mar'18	
20	**Wardha - Hyderabad 765kV Links**	3662.02		Jan'15		
	(a) 765KV D/C Wardha - Hyderabad line				Commissioned	
	(b) 400KV D/C Nizamabad - Dichpali line				Commissioned	
21	**GREEN ENERGY CORRIDORS:- Inter State Transmission Scheme (ISTS) - Part B**	3705.61	36 / 37th (29.08.13/05.09.14)	Apr'15		Under Implementation
	(a) 765KV D/C Banaskanta - Chittorgarh (New) line				Apr'18	
	(b) 765KV D/C Chittorgarh (New) - Ajmer (New) line				Apr'18	
	(c) 400KV D/C Banaskanta - Sankhari line				Apr'18	
	(d) Establishment of 765/400/220kV (765/400kV - 2x1500 MVA & 400/220kV - 2x500MVA) substation at Banaskanta				Apr'18	
22	**GREEN ENERGY CORRIDORS:- Inter State Transmission Scheme (ISTS) - Part C**	2247.37	36 / 37th (29.08.13/05.09.14)	July'15		Under Implementation
	(a) 765KV D/C Bhuj Pool - Banaskanta line				July'18	
	(d) Establishment of 765/400/220kV (765/400kV - 2x1500 MVA & 400/220kV - 2x500MVA) pooling station at Bhuj				July'18	
23	**Transmission System Strengthening Associated with Vindhyachal V - Part A**		34th (09.05.12)	Feb'15		
	(a) 1x1500MVA, 765/400kV ICT at Vindhyachal Pooling Station				Commissioned	
24	**Transmission System Strengthening Associated with Vindhyachal V - Part B**		34th (09.05.12)			Under Implementation
	(a) 2 nos of 765kV Line bays alongwith 2x330MVAR Line Reactor at Vindhyachal Pooling Station				Jun'18	
	(a) 2 nos of 765kV Line bays alongwith 2x330MVAR Line Reactor at Jabalpur Pooling Station				Jun'18	
25	**STATCOMs in Western Region**		36th (29.08.13)	Mar'15		
	(a) Aurangabad				Sep'17	
	(b) Gwalior				Apr'18	
	(c) Solapur				Sep'17	
	(d) Satna				Sep'17	
26	**Western Region System Strengthening Scheme XIV**	93.96	37th (05.09.14)	Jan'16		

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION (as on 31.08.2017)						
Sl. No.	**Description of Scheme**	**Estimated Cost (Rs. Cr)**	**Date of firming up in WR standing committee**	**Date of investment approval**	**Target date as of now**	**Remarks**
	(a)2x500MVA, 400/220kV transformer alongwith six nos of 220kV bays at Indore (PG) 765/400kV Substation (b)1x500MVA, 400/220kV transformer alongwith two nos of 220kV bays at Itarsi (PG) 400/220kV S/s				July'18 Commissioned	
27	**Powergrid works associated with Part-A of Transmission system for Gadarwara STPS of NTPC** (a) 2 nos. 765 kV line bays at 765/400kV Jabalpur Pooling Station of POWERGRID {for Gadarwara STPS (NTPC) - Jabalpur PS 765 kV D/c}		36/37th (29.08.13 / 05.09.14)	Apr'16	Commissioned in May'17	
28	**Powergrid works associated with Part-B of Transmission system for Gadarwara STPS of NTPC i.e. WRSS XV** (a) 2 nos. 765 kV line bays at 765/400kV Solapur sub-station of POWERGRID {for Parli New (TBCB) - Solapur (PG) 765 kV D/c} (b) 2 nos 400kV line bays at existing 400kV Parli (PG) Switching Station of POWERGRID {for Parli New (TBCB) - Parli (PG) 400kV D/c (quad)}		36/37th (29.08.13 / 05.09.14)	Apr'16	Matching with TBCB schedule Jan'18 Feb'18	
29	**Powergrid works associated with System Strengthening for IPPs in Chhattisgarh and other generation projects in Western Region** (a) 1 no. 765 kV line bay at 765/400kV Vindhyachal Pooling Station of POWERGRID {for Sasan UMPP - Vindhyachal PS (PG) 765 kV 2nd S/c} (b) 2 no. 400 kV line bays at 765/400kV Vindhyachal Pooling Station of POWERGRID {for Vindhaychal (IV/V) STPP switchyard (NTPC) - Vindhyachal PS (PG) 400 kV 2nd D/c (quad)} (c) 2 no. 400 kV line bays at Gwalior Substation {for Gwalior - Morena 400 kV D/c (quad)} (d) 2 nos. 765 kV line bays at 765/400kV Pune (GIS) sub-station of POWERGRID {for LILO of one circuit of Aurangabad(PG) – Padghe(PG)765 kV D/c at Pune (GIS) (PG)} (e) 2 nos. 765 kV line bays at 765/400kV Champa Pooling Station of POWERGRID {1for Champa PS(PG) - Raigarh (Kotra) PS(PG) 765 kV 2nd S/c, 1 for Champa PS(PG) – Dharamjaigarh(PG) 765 kV 2nd S/c} (f) 1 no. 765 kV line bay at 765/400kV Raigarh (Kotra) Pooling Station of POWERGRID {for Champa PS(PG) - Raigarh (Kotra) PS(PG) 765 kV 2nd S/c} (g) 1 no. 765 kV line bay at 765/400kV Dharamjaigarh Pooling Station of POWERGRID {for Champa PS(PG) – Dharamjaigarh(PG)765 kV 2nd S/c}		36th (29.08.13)	Jul'16	Matching with TBCB schedule Nov'18 Jan'19 May'18 Mar'19 Nov'18 Nov'18 Nov'18	
30	**Powergrid works associated with Additional System Strengthening Scheme Chhattisagrh IPPs Part-B** (a) 2 nos. 765 kV line bay at 765/400kV Raipur Pooling Station of POWERGRID {for Raipur PS(PG) – Rajnandgaon (TBCB) 765 kV D/c}		36/37th (29.08.13 / 05.09.14)	Jul'16	Matching with TBCB schedule Nov'18	
30	**Powergrid workds associated with Additional System Strengthening for Sipat STPS** (a) 3 nos. 765 kV line bays at 765/400kV Bilaspur Pooling Station of POWERGRID (1 no. for Sipat STPS(NTPC) - Bilapur PS(PG) 3rd 765kV S/c, 2 nos. for Bilaspur PS(PG)-Rajnandgaon(TBCB) 765 kV D/c) (b) 2 nos. 240 MVAR, 765 kV switchable line reactors at 765/400kV Bilaspur PS end for Bilaspur PS(PG) - Rajnandgaon(TBCB) 765 kV D/c		36/37th (29.08.13 / 05.09.14)	Jul'16	Matching with TBCB schedule Nov'18-Mar'19 Mar'19	
31	**Transmission System Strengthening associated with Mundra UMPP- Part A** (a) LILO of both circuits of Mundra UMPP-Limbdi 400kV D/c (triple snowbird) line at Bachau	266.19	36th (29.08.13)	Jul'16	Dec'17	

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION (as on 31.08.2017)						
Sl. No.	**Description of Scheme**	**Estimated Cost (Rs. Cr)**	**Date of firming up in WR standing committee**	**Date of investment approval**	**Target date as of now**	**Remarks**
32	**Transmission System Strengthening associated with Mundra UMPP- Part B** (a) Mundra UMPP - Bhuj Pool 400kV D/c line (triple snowbird)		36/38th (29.08.13/17.07.2015)		Dec'18	
33	**Bays for Transmission System Associated with DGEN Torrent Energy Ltd (1200MW)** (a) 2nos 400kV Bays at Vadodara (GIS) (b) 2nos 220kV Bays at Navsari (GIS)		13/14th LTA (27.12.10/13.05.2011)	Jul'16	 May'18 May'18	Execution of TBCB scheme critical
34	**Western Region System Strengthening -16** (a) Installation of 2x500MVA, 400/220kV ICTs with associated bays at Parli (PG) switching station along with provision of six nos. of 220 kV bays (b) Provision of two nos. of 220kV bays at Mapusa (Colvale) 400/220 kV substation (c) Installation of 500MVA, 400/220kV (3rd) ICT with associated bays at Satna (PG) S/s with provision of two nos. 220kV line bays (d) Provision of two nos. of 400 kV bays at 765/400kV Indore(PG) substation		38th (17.07.15)	Jul'16	July'18	
35	**Western Region System Strengthening -17** 1. Provision of 1x240 MVAR switchable line reactor at Pune GIS S/s end {for Aurangabad (PG) – Pune GIS 765kV S/C line, formed after LILO of one ckt of Aurangabad (PG) – Padghe (PG) 765kV D/C line at Pune GIS}. 2. Conversion of followings Fixed Line Reactor into Switchable Line Reactors / BUS Reactor. a. Itarsi – Indore (MPPTCL) 400kV 2xS/C lines: 420kV 50 MVAR fixed line reactors at both ends of each line are to be converted into switchable line reactors. b. Bina (PG) – Shujalpur 400kV D/C line: 420kV 50 MVAR fixed line reactor at Shujalpur end is to be converted into switchable line reactor. The 420kV 63 MVAR line reactor installed at Bina (PG) end is already switchable. c. 1x63 MVAR BUS Reactor at Bhadravati S/s: 420kV 3. Installation of ICTs along with associated bays at following substations of POWERGRID: a. Khandwa 400/220kV Substation: 1x500 MVA, 400/220kV 3rd ICT. b. Boisar 400/220kV Substation: 1x500 MVA, 400/220kV 4th ICT. c. Kala 400/220kV Substation: 1x500 MVA, 400/220kV 3rd ICT. d. Dehgam 400/220kV Substation: 1x500 MVA, 400/220kV 3rd ICT.		39th (30.11.15)	Feb'17	Sep'19	
36	**Western Region System Strengthening -18** 1. Splitting of following substation along with necessary switching arrangement. a. Dharamjaygarh Pool 765kV BUS b. Raigarh Pool (Kotra) 400kV & 765kV BUS c. Champa Pool 400 kV & 765kV BUS 2. Installation of Reactors: a. 1X125 MVAR BUS Reactor at 400kV BUS Section A of Dharamjaygarh Pool. b. 1X125 MVAR BUS Reactor at 400kV BUS Section A of Raigarh Pool (Kotra). c. 1X240 MVAR BUS Reactor at 765kV BUS Section A of Raigarh Pool (Kotra). d. 1X240 MVAR BUS Reactor at 765kV BUS Section A of Champa Pool. e. 1X330 MVAR BUS Reactor at 765kV BUS Section B of Dharamjaygarh Pool.		39th (30.11.15)	Feb'17	Feb'20	
37	**PG Works associated with Transmission System for Khargone TPP**		38th & 39th (17.07.15 & 30.11.15)	Feb'17		

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION (as on 31.08.2017)

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
	1. 63 MVAr switchable line reactor along with 500Ω NGR at Rajgarh(PG) end of Khargone TPS – Rajgarh (PG) 400kV line *{formed after LILO of one circuit of Khandwa - Rajgarh 400 kV D/C line at Khargone TPS, being implemented under TBCB}* 2. 2 nos. of 765 kV line bays at 765/400kV Indore Substation of POWERGRID *{for termination of Khandwa PS – Indore 765 kV D/C line, being implemented under TBCB }* 3. 240 MVAr Switchable Line Reactors along with 700Ω NGR at Indore (765/400kV S/s) end of each circuit of Khandwa Pool – Indore 765kV D/c line (Line being implemented under TBCB)				Feb'18 July'19 July'19	
38	**POWERGRID Works associated with New WR - NR 765kV Inter-regional corridor** a. 2 nos. of 765kV Line Bays at Vindhyachal 765/400 kV Pooling Station; b. 2 nos. of 765kV Line Bays along with 765kV, 1x330 MVAr line reactor in each bay at Varanasi 765/400 kV GIS sub-station		40th (01.06.2016)		Matching with TBCB Line	
39	**POWERGRID Works associated with Additional 400kV feed to Goa** 2 nos of 400kV line bays at Mapusa s/s for termination of Xeldem – Mapusa 400kV D/c (quad) line & 1x80MVAr LR at Narendra (New) S/s for Narendra(New) - Xeldam 400kV line		40th (01.06.2016) 41st (21.12.2016)		Matching with TBCB works	
40	**POWERGRID Works associated with Additional System for Power Evacuation from Generation Projects pooled at Raigarh (Tamnar) Pool** 2 nos. of 765kV Line Bays each at Dharamjaygarh Pool and Raigarh (Tamnar) Pool		40th (01.06.2016)		Matching with TBCB works	
41	**Transmission system for Ultra Mega Solar Power Park (700MW) at Banaskantha (Radhanesda), Gujarat** 400KV D/C Banaskantha PS - Banaskantha (PG) line 765/400kV Banasktantha (PG) 2 nos line bays	118	40th (01.06.2016)	May'17	Matching with Banaskantha (Radhanesda) Solar Park (expected by Jun'19)	
42	**Supplementary Transmission system for Ultra Mega Solar Power Park (700MW) at Banaskantha (Radhanesda), Gujarat** Establishment of 2x500MVA, 400/220kV pooling station at Banaskantha (Radhanesda) [GIS] along with 1x125MVAr bus reactor 4 nos. 220kV line bays at 400/220kV at Banaskantha (Radhanesda) pooling station for Solar Park Interconnection.		41st (21.12.2016)		Matching with Transmission system for Ultra Mega Solar Power Park (700MW) at Banaskantha (Radhanesda) Gujarat	
43	**Transmission System for Ultra mega Solar Park in Rewa District, Madhya Pradesh .** Establishment of 3x500MVA, 400/220kV substation at Rewa Pooling Station LILO of Vindhyachal - Jabalpur 40kV D/c (both circuits) at Rewa Pooling Station 6 nos. 220kV line bays at Rewa Pooling Station		38th (17.07.2015)	Jan'16 / Mar'17	Matching with Rewa UMSPP (expected by Oct'17)	

Annexure - 3.1

S. No.	Elements	Developer	SCOD as per TSA	Indicated Early date of commissioning	Mutually agreed date of Early Commissioning	Remarks
1	**Sipat Transmission Ltd. (STL) - Additional System Strengthening for Sipat STPS**					
a	765 kV S/C Sipat - Bilaspur Pooling Station	STL	Nov' 18	Dec'17	June' 18	Early commissioning of this transmission line would improve the reliability of evacuation system of Sipat STPS.
i	1 no. 765 kV line bay at Sipat STPP of NTPC	STL	Nov'18	May'17		
ii	1no. of 765 kV line bay at Bilaspur PS	PGCIL	Nov'18*	June'18		
b	765 kV D/C Bilaspur Pooling Station - Rajnandgaon	STL	Mar' 19	July 18	Nov'18	The system beyond Rajnandgaon (i.e, Rajnandgaon-Warora-Parli) is under implementation by different TSPs (RRWTL, PWTL, and PPTL).
i	2 no. of Bays at Bilaspur PS	PGCIL	Mar'19*	Nov'18		
ii	2 no. of 765 kV bay at Rajnandgaon SS (Switching)	RRWTL	Nov' 18	Nov'17	Nov'18 (SCOD)	
2	**Raipur - Rajnandgaon Warora Transmission Ltd. (RRWTL) - Additional System Strengthening Scheme for Chhattisgarh IPPs – Part B**					
a	765 kV D/C Raipur Pool - Rajnandgaon	RRWTL	Nov'18	May'17	Nov'18 (SCOD)	System Strengthening Scheme for Chhattisgarh IPPs, no requirement of early commissioning. This scheme is interlinked with transmission system being implemented by M/s PWTL (Nov'17) & PPTL (January 18). The line reactors of the Rajnandgaon- Warora 765 kV D/C line at Warora substation are in the scope of M/s WKPL (Nov'19 with SCOD of reactors as Nov 18).
i	2 no. of 765 kV Bays at Raipur PS	PGCIL	Nov'18*	-		
ii	2 no. of 765 kV bays at Rajnandgaon SS (Switching)	RRWTL	Nov'18	Nov'17		
b	765 kV D/C Rajnandgaon - New Pooling Station near Warora	RRWTL	Nov'18	June'18	Nov'18 (SCOD)	
i	2 no. of 765 kV bays at Rajnandgaon SS (Switching)	RRWTL	Nov'18	Nov'17		
ii	2 no. of 765 kV bays at New Warora Pooling Station	Powergrid Warora Transmission Ltd	Nov'17	Nov'17	Nov'17 (SCOD)	
iii	2X240 MVAR line reactors at Warora end	WKTL	Nov'18	-	Nov'18 (SCOD)	
c	Establishment of new 765kV switching station near Rajnandgaon	RRWTL	Nov'18	Nov'17	Nov'18 (SCOD)	

3	**Chhattisgarh WR Transmission Limited (CWRTL) - System Strengthening for IPPs in Chhattisgarh & Other Generation Projects in Western Region**					
a	400 kV D/C Gwalior - Morena	CWRTL	May'18	Jan'18	Jan'18	This line is planned to establish an interconnection between Gwalior (PG) & Morena (MPPTCL). MPPTCL agreed to implement their 220 kV outlets from Morena 400/220 kV SS by January 2018
i	2 no. of 400 kV bays at Gwalior (PG)	PGCIL	May'18*	Jan'18		
ii	2 no. of 400 kV bays at Morena (TBCB)	CWRTL	May'18	Jan'18		
iii	4 no. of 220 kV outlets from Morena (TBCB)	MPPTCL	May'18	Jan'18		
b	400 kV D/C Vindhyachal IV & V STPP - Vindhyachal Pool	CWRTL	Jan'19	Jan'18	Jan'18	To improve reliability of power evacuation of Vindhyachal stage IV & V.
i	2 no. of 400 kV Bays at Vindhyachal STPP of NTPC	CWRTL	Jan'19	Jan'18		
ii	2 no. of Bays at Vindhyachal Pool	PGCIL	Jan'19*	Jan'18		
c	765 kV S/C Sasan UMPP - Vindhyachal Pooling Station	CWRTL	Nov'18	Dec'17	Jun'18	To improve the reliability of power evacuation of Sasan UMPP
i	1 no. of 765 kV Bay at Sasan UMPP of M/s. SPL, Reliance	CWRTL	Nov'18	Dec'17		
ii	1 no. of 765 kV Bay at Vindhyachal Pool	PGCIL	Nov'18*	Jun'18		
d	LILO of one circuit of Aurangabad - Padghe 765 kV D/C line at Pune	CWRTL	Mar'19	Jul'18	Jul'18	System strengthening line
i	2 no. of 765 kV bays at Pune	PGCIL	Mar'19*	Jul'18		
e	765 kV S/C Raigarh (Kotra) - Champa (Pool)	CWRTL	Nov'18	Mar'18	Jun'18	To improve reliability in Chattishgarh generation complex(Raigarh kotra, Raigarh Tamna, Champa)
i	1 no. of 765 kV bay at Raigarh (Kotra)	PGCIL	Nov'18*	Jun'18		
ii	1 no. of 765 kV bay at Champa (Pool)	PGCIL	Nov'18*	June'18		
f	765 kV S/C Champa (Pool) - Dharamjaigarh	CWRTL	Nov'18	Apr'18	Jun'18	To improve reliability in Chattishgarh generation complex(Raigarh kotra, Raigarh Tamna, Champa)
i	1 no. of 765 kV bay at Champa PS	PGCIL	Nov'18*	Jun'18		
ii	1 no. of 765 kV bay at Dharamjaygarh	PGCIL	Nov'18*	Jun'18		

*Bays in matching time frame of the associated line.

भारत सरकार / **Government of India**
विद्युत मंत्रालय / **Ministry of Power**
केन्द्रीय विद्युत प्राधिकरण / **Central Electricity Authority**
विद्युत प्रणाली योजना एवं परियोजना मूल्यांकन- I प्रभाग
Power System Planning & Project Appraisal -I Division
सेवा भवन, आर.के.पुरम, नई दिल्ली - **110066**
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email: pspandpa1.cea@gmail.com

[ISO 9001:2008]

सं/ No. 100/11/PFC-25/2016/PSPA-I/ 271-274 **दिनांक /Date:** 28.04.2017

सेवा में / To

1. COO (CTU), Power Grid Corporation of India Ltd., Saudamini, Plot No. 2, Sector – 29, Gurgaon – 122001,
2. Chief Engineer, Goa Electricity Department (GED), Curti Ponda, Ponda, GOA – 403401
3. CEO, PFC Consulting Limited, First Floor, Urjanidhi, 1, Barakhamba Lane, Connaught Place, New Delhi – 110001

विषय / Subject: Minutes of the meeting held on 25.04.2017 at Xeldem 220 kV sub-station of Goa Electricity Department (GED) to finalize interconnection of proposed New Xeldem 400/220 kV sub-station at 220 kV level

महोदय / महोदया ,

Please find an enclosed minutes of the meeting held on 25.04.2017 at Xeldem 220 kV sub-station of Goa Electricity Department (GED) to finalize interconnection of proposed New Xeldem 400/220 kV sub-station at 220 kV level.

भवदीय,

28/4/2017

(अवधेश कुमार यादव)
निदेशक

CC:
Member (PS), CEA

Gist of the discussions of the meeting held on 25-04-2017 at Xeldem 220 kV sub-station of Goa Electricity Department (GED) to finalize interconnection of proposed New Xeldem 400/220 kV sub-station at 220 kV level

1.0 List of participants is enclosed at Annexure-I.

2.0 A meeting was held under the chairmanship of Chief Engineer (PSPA-I), CEA on 25-04-2017 at Xeldem 220 kV sub-station of GED to discuss location of New Xeldem 400/220kV sub-station being implemented through tariff based competitive bidding (TBCB) and modalities of its interconnection with existing Xeldem 220 kV sub-station of GED.

3.0 It was informed that at the proposed New Xeldem 2x500 MVA 400/220 kV sub-station is an AIS sub-station. Keeping in view the provision for expansion by 2x500 MVA transformer, the land required for the new sub-station would be about 40 acre. Further, the switching scheme at 220 kV level at new sub-station would be double main and transfer bus scheme with bus bar rating of 3000A.

4.0 GED informed that the switching scheme at existing Xeldem sub-station is double main bus scheme and the bus bar rating is of 2000A.

5.0 As adequate land contiguous to the existing Xeldem sub-station was not available and also keeping in view the different 220 kV switching scheme at proposed New Xeldem S/S and existing Xeldem sub-station, it was decided that interconnection between the two sub-stations would be through 220 kV HTLS D/C line. The interconnection line has already been covered under the scope of TBCB. The two no. of 220 kV line bays of adequate rating required for the interconnection at Xeldem existing sub-station would be provided by GED.

6.0 The surveyor appointed by Bid Process Coordinator (BPC) i.e. PFCCL informed that they have identified 3 locations for establishment of New Xeldem sub-station, which are in the vicinity of existing 220 kV Xeldem sub-station of GED. It was decided that the surveyor would collect landowner ship details at these locations and furnish the same to GED, PFCCL, CTU and CEA. After interaction with local administration and landowners, GED will inform CEA, CTU and BPC the location, which is more suitable for establishment of the new sub-station from land acquisition and line termination point of view.

7.0 After further discussions, it was decided that following 220kV interconnections would be established for drawl of power from New Xeldem 400/220 kV sub-station:

- New Xeldem (400 kV) - Xeldem (GED) 220kV D/c line with HTLS conductor equivalent to twin moose conductor: (220 kV line under TBCB Scope, 2 nos. 220kV line bays at Xeldem (GED) to be constructed by GED)
- New Xeldem (400 kV)-Verna (GED) 220kV D/c line : 220 kV line and 2 nos. 220kV line bays at Verna (GED) to be constructed by GED
- LILO of 2nd circuit of Ambewadi-Ponda 220 kV D/C line at New Xeldem (400 kV)

Annexure-I

List of the participants of the meeting chaired by Chief Engineer (PSPA-I), CEA held on 25-04-2017 at Xeldem 220 kV sub-station of Goa Electricity Department (GED) to finalize interconnection of proposed New Xeldem 400/220 kV sub-station at 220 kV level

S. No.	**Name**	**Designation & organization**
1.	Sh. Ravinder Gupta	CE (PSPA-I), CEA, New Delhi
2.	Sh. Subir Mulchandani	CEO, PFCCL, New Delhi
3.	Sh. Yogesh Juneja	GM, PFCCL, New Delhi
4.	Sh. Ramchandra	DGM, CTU-Planning, POWERGRID, Gurgaon. 9910378128
5	Sh. Laxmikant Kolveker	CEE Goa
6.	Ms. Reshma Mathew	Suptd. Engineer Elect. Dept., Panji, Goa
7	Sh. Devadasan A	Executive Engineer Div.XII Xeldem
8	Sh. Jose E. De Melo	Executive Engineer, EHV

Annexure - 7.2

भारत सरकार / **Government of India**
विद्युत मंत्रालय / **Ministry of Power**
केन्द्रीय विद्युत प्राधिकरण / **Central Electricity Authority**
विद्युत प्रणाली योजना एवं परियोजना मूल्यांकन- I प्रभाग
Power System Planning & Project Appraisal -I Division
सेवा भवन, आर.के.पुरम, नई दिल्ली - **110066**
Sewa Bhawan, R. K. Puram, New Delhi-110066
email: pspandpa1.cea@gmail.com

[ISO 9001:2008]

सं/ No. 100/11/PFC-25/2016/PSPA-I/ 472-475 **दिनांक /Date:** 14.06.2017

सेवा में / To

1. COO (CTU), Power Grid Corporation of India Ltd., Saudamini, Plot No. 2, Sector – 29, Gurgaon – 122001,
2. Chief Engineer, Goa Electricity Department (GED), Curti Ponda, Ponda, GOA – 403401
3. CEO, PFC Consulting Limited, First Floor, Urjanidhi, 1, Barakhamba Lane, Connaught Place, New Delhi – 110001

विषय / Subject: Minutes of the meeting held on 14.06.2017 at CEA to discuss the issue raised by GED regarding the implementation of Xeldem – Mapusa 400 kV D/C line on multi circuit towers & other issues

महोदय / महोदया ,

Please find an enclosed minutes of the meeting held on 14.06.2017 at CEA to discuss the issue raised by GED regarding the implementation of Xeldem – Mapusa 400 kV D/C line on multi circuit towers & other issues.

भवदीय,

14/6/2017

(अवधेश कुमार यादव)
निदेशक

CC:
Member (PS), CEA

Minutes of the meeting held on 14.06.2017 at CEA to discuss the issue raised by GED regarding the implementation of Xeldem – Mapusa 400 kV D/C line on multi circuit towers & other issues.

1.0 A meeting was held under the Chairmanship of Chief Engineer (PSPA-I), CEA on 14.06.2017 at CEA to discuss the issue raised by GED regarding the implementation of Xeldem – Mapusa 400 kV D/C line on multi circuit towers and other issues. List of participants is enclosed at Annexure-I.

2.0 GED representative informed that they have planned Tivim-Mapusa-Xeldem 220 kV D/C line with LILO at Verna. He requested that the proposed Xeldem (new)-Mapusa 400 kV D/C line may be implemented on multi circuit towers to accommodate their 220 kV D/C line.

3.0 The survey report submitted by BPC has indicated three alternative routes for the proposed for Xeldem(new)-Mapusa 400 kV D/C line. These routes are not passing through the proposed route of 220 kV Mapusa-Kadamba-Verna-Xeldem D/C line of the GED. Further, Xeldem(new) – Mapusa 400 kV D/C line is an ISTS line, which is to be implemented through TBCB route and the 220 kV D/C line from Mapusa – Kadamba – Verna – Xeldem D/C line is an intra state line of GED. Therefore, both 400 kV and 220 kV circuits cannot be implemented on same multi-circuit towers, and they are to be implemented independently.

4.0 Regarding the option of implementing Xeldem (new) 400 kV S/s as GIS, BPC has submitted survey report, in which, it is mentioned that the enough land is available in the vicinity of existing Xeldem 220 kV S/s of GED for establishment as AIS sub-station. Also, the proposed sites indicated in the survey report are about 20 kilometers away from the seacoast. In view of the above, the 400 kV Xeldem (new) S/s may be implemented as AIS. Thus, there is no change in the scope of the works for which bidding is under process.

5.0 BPC informed that RfP for the project has already been issued on 6th June, 2017 and the project is expected to be awarded by October, 2017. Accordingly, the Xeldem (new) 400 kV S/s along with 400 kV Xeldem – Mapusa D/C line is likely to be commissioned by December 2020. GED was requested to implement the 220 kV requisite line bays at Xeldem (existing) 220 kV S/s for the termination of Xeldem(new) – Xeldem(existing) 220 kV D/C line (to be constructed under TBCB) and associated 220 kV downstream network from Xeldem (new) in the matching time frame. GED agreed for the same.

6.0 Meeting ended with thanks to the chair.

14/6/17 14/06/17 14.6.17 14.06.17 14/06/17

List of the Participants of a meeting held on 14.06.2017

S.No.	Name Shri/Smt.	Designation	Mobile No.	Email	Signature
1.	Ravinder Gupta	Chief Engineer	9968286184	ravindergupta_cea@nic.in	
2.	Awdhesh Kumar Yadav	Director	9868664087	awd.cea@gmail.com	14/6/2016
3.	Vikas Sachan	Assistant Director	7838263649	Vikas.cea@gmail.com	
4.	Kumar Ritu Raj	Coordinator / PFCCL	7042303567	rituraj.pfccl@gmail.com	
5.	N.C.Gupta	Sr. V.P/ PFCCL	9650996275	ncgupta@pfcindia.com ncgupta@pfcindia.com	
6.	Jose E.	Ex. Eng	8380015364	cee-elec.goa@nic.in	
7.	Ram Chandra	DGM/ CTU POWERGRID	9910378128	ramchandra@powergridindia.com	
8.	Pratush Singh	Sr. Eng./ CTU POWERGRID	8826094863	pratush.singh@powergridindia.com	

Annexure - 8.1

सत्यमेव जयते

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
विद्युत प्रणाली योजना एवं मूल्यांकन-I प्रभाग
Power System Planning & Appraisal- I Division

सं / No. 26/10/PSP&A - I/2017/555-558 दिनांक / Date: 04.07.2017

सेवा में / **To**

1) The Member Secretary, Western Regional Power Committee, MIDC Area, Marol, Andheri East, Mumbai Fax 022 28370193
2) COO (CTU), Saudamini, Plot No. 2, Sector – 29, Gurgaon - 122001
3) CEO, POSOCO, B-9, Qutub Institutional Area, Katwaria Sarai, New Delhi - 110 016.
4) Director, Essar Power MP Ltd., Vill: Bandhora, Post: Karsualal, Tehsil: Mada, Dist: Singrauli, Madhya Pradesh – 486 886

विषय : Essar Mahan (2 X 660 MW) LILO के सम्बंध मे हुई बैठक का कार्यवृत्त

Subject: Minutes of the meeting held on 28.06.2017 to discuss the request of M/s Essar Power MP Ltd (EPMPL) regarding extension of Loop In Loop Out (LILO) arrangement for evacuation of Power of Essar (Mahan) 2 X 600 MW – Reg.

महोदय / महोदया / Madam / Sir,

Please find enclosed minutes of the meeting held under the chairmanship of Member (PS), CEA on 28.06.2017 to discuss the request of M/s Essar Power MP Ltd (EPMPL) regarding extension of Loop In Loop Out (LILO) arrangement for evacuation of Power of Essar (Mahan) 2 X 600 MW.

भवदीय / Yours faithfully,

संलग्न / enclosures: as above

4/7/2017

(Awdhesh Kumar Yadav)
(Director, PSPA1)

सेवा भवन, आर. के. पुरम-I, नई दिल्ली-110066 टेलीफैक्स: 011-26732305. ईमेल: pspandpa1.cea@gmail.com वेबसाइट: www.cea.nic.in

Sewa Bhawan, R.K Puram-I, New Delhi-110066 Telefax: 011-26732305 Email: pspandpa1.cea@gmail.com, Website: www.cea.nic.in

Minutes of the meeting held on 28.06.2017 at CEA, New Delhi to discuss the extension of LILO arrangement for evacuation of power of M/s EPMPL (ESSAR Power MP Ltd.) Power Project (2x600 MW) at Mahan in Madhya Pradesh

1. A meeting was held under the Chairmanship of Member (Power System), CEA on 28.06.2017 at CEA, New Delhi to discuss the extension of LILO arrangement for evacuation of power of M/s EPMPL Power Project (2x600 MW) at Mahan in Madhya Pradesh. List of participants is enclosed at Annexure-I.

2. CEA stated that M/s EPMPL is establishing 1200 (2x600) MW TPS in Madhya Pradesh. First unit of 600 MW is under operation and the second unit is expected to be commissioned by July, 2017. The following transmission system for Mahan TPS was agreed in the 27th meeting of Standing Committee on Power System Planning of Western Region (SCPSPWR) / 9th meeting of WR constituents on LTOA held on 30.07.2007 to be implemented by generation developer:

   i. Mahan STPS-Sipat (Bilaspur Pooling Station) 400 kV D/C (triple moose conductor) line

   ii. Loop In Loop Out (LILO) of one circuit of existing 400 kV Vindhyachal-Korba S/C lines at Mahan STPS (This was short term arrangement meant for providing connectivity to the regional grid. The LILO to be removed and line shall be restored to the original configuration by M/s EPMPL at their cost after commissioning of item (i) and other grid elements identified for providing long term access.)

   iii. Gandhar NTPC – Hazira 400 kV D/C (twin moose) line

   iv. Hazira 400/220 kV S/s

   MoP vide its letter no. 11/4/07-PG dated 26.05.2008 granted prior approval of Government under section 68(1) of the Electricity Act, 2003 to M/s EPTCL for the transmission system mentioned at (2) above.

3. M/s ESSAR representative stated that CERC vide Licence no. 4/Transmission/CERC dated 08-04-2008 and order dated 15-09-2009 granted transmission license to M/s ESSAR Power Transmission Company Ltd. (EPTCL) on Build Own Operate Maintain (BOOM) basis for the following transmission works:

   i) Mahan STPS-Sipat (Bilaspur Pooling Station) 400 kV D/C (Quad moose conductor) line

   ii) LILO of existing 400 kV Vindhyachal-Korba S/C lines at Mahan STPS

   iii) Gandhar NTPC – Hazira 400 kV D/C (twin moose) line

   iv) 3x500 MVA 400/220 kV S/s at Hazira

   v) 2x50 MVAR line reactors at Sipat (Bilaspur) Pooling station.

vi) 2x50 MVAR line reactors at Mahan STPS

vii) 1x80 MVAR 420 kV bus reactor at Mahan TPS along with associated 400 kV bay

viii) 2 no. 400 kV line bays at Sipat (Bilaspur) Pooling station

ix) 2 no. 400 kV line bays at Gandhar NTPC

x) 4 no. 400 kV line bays at Mahan generation switchyard

4. CEA further stated that the all cases of connectivity on interim LILO in Western Region (including M/s EPMPL case) were discussed in the 40th & 41st meeting of SCPSPWR held on 01.06.2016 & 21.12.2016 respectively, to finalize the replacement of interim LILOs of generation developer by their dedicated transmission lines as per direction of the CERC. In the 41st meeting of SCPSPWR, M/s EPTCL was requested to expedite the implementation of Mahan STPS–Bilaspur Pooling Station 400 kV D/C line before monsoon as against their completion target of December 2017. In line with direction given by CERC vide order no. 30/MP/2014 dated 28.06.2016, the matter was referred to WRPC forum for further deliberation. WRPC in their 33rd meeting held on 31.01.2017 & 01.02.2017 has agreed to the TCC recommendation that M/s EPMPL should complete the line by 30.06.2017 and CTU to discuss such issues in WRPC forum. CTU vide their later dated 15.06.2017 has written to WRLDC to initiate action for disconnection of interim arrangement of M/s EPMPL by 30.06.2017. Subsequently, M/s EPMPL vide their later dated 13.06.2017 has requested CEA for extension of LILO arrangement for evacuation of power from their generation plant up to January 2018.

5. M/s ESSAR representative stated that all elements of transmission system associated with evacuation of power from Mahan STPS has been commissioned except Mahan STPS–Bilaspur Pooling Station 400 kV D/C line. He informed that the delay in completion of the line is due to delay in getting forest clearance from MoEF, severe RoW issues and issues related to project financing. As on date all the issues have been resolved and the work would be started after the Monsoon. He also informed that lenders have already sanctioned funding to the tune of Rs. 175 Crores, which includes promoters' equity of Rs. 75 Crores. As on date, the equity of Rs. 75 crores has already been deposited in Trust Retention Account (TRA).

6. With regard to progress of the line, M/s ESSAR representative informed that as on date out of 942 foundations, 938 has been completed and 909 towers has been erected and out of 337 km stringing 197 km has been completed. With all inputs required for construction of the line been tied up, the line would be completed by December 2017.

7. M/s ESSAR representative also stated that with existing LILO of Vindhyachal–Korba STPP 400 kV S/C line at Mahan STPS, no overloading or grid security issue has been observed. The LILO would also help in charging of Mahan STPS–

Bilaspur Pooling Station 400 kV D/C line. Without the LILO arrangement, Mahan generating station would be connected radially to the grid through 337 KM long line. Without LILO, outage of one circuit of Mahan STPS–Bilaspur Pooling Station 400 kV D/C line would result in massive voltage & power swings and angular instability at Mahan TPS. Therefore, it is desirable to retain the LILO arrangement even after completion of Mahan STPS–Bilaspur Pooling Station 400 kV D/C line from security and stability of Mahan TPS machines and grid as whole.

8. M/s EPMPL further informed that they have filed a petition in CERC on 14.06.2017 to allow EPMPL to use the LILO connectivity till January, 2018 and the hearing for the same was held on 20.06.2017. The RoP / order of the CERC is awaited.

9. CTU informed that system studies carried out by them also indicate the requirement of another anchoring of Mahan TPS apart from Mahan-Sipat Pooling point 400 kV D/C line. The summary of the studies carried out by CTU is given below:

a) Case-1 : Without Mahan STPS-Sipat pooling station 400 kV D/C line

i) With one unit of 600 MW in service at Mahan STPS – No instability/oscillations observed in power evacuation under n-1 condition.

ii) With both units of 600 MW in service - Rotor angle instability of Mahan STPS units as well as sustained grid oscillations are observed under outage of Mahan STPS -Vindhyachal 400 kV S/C line. With tripping of one unit through SPS (within 450 ms), the system remains stable.

b) Case-2 : With only Mahan STPS–Bilaspur Pooling Station 400 kV D/C line

i) With one unit of 600 MW in service at Mahan STPS – No instability / oscillations observed in power evacuation under n-1 condition.

ii) With both 600 MW units in service at Mahan STPS - Grid instability issues (oscillations) are observed under N-1 conditions of the line. With tripping of one unit through SPS (within 300 ms), the system remains stable.

c) Case-3 : With both lines i.e. LILO of Vindhyachal – Korba STPP 400 kV S/C line at Mahan STPS and Mahan STPS–Bilaspur Pooling Station 400 kV D/C line)

i) With one unit of 600 MW in service at Mahan STPS – No instability / oscillations observed in power evacuation under n-1 condition.

ii) With both 600 MW units in service at Mahan STPS - Power can be reliably evacuated from both units of Mahan TPS. Issue of increase in short circuit level at Vindhyachal due to both the lines needs to be studied in detail.

Thus from the above it is seen that there is requirement of LILO of Vindhyachal – Korba STPP 400 kV S/C line at Mahan STPS in addition to Mahan STPS–Bilaspur Pooling Station 400 kV D/C line for safe and reliable evacuation of power from Mahan STPS.

Similar case of instability / oscillations being observed in the case of Lalitpur Generating station in Northern Region, under the contingency of one ckt of the only 765 kV D/C line was pointed out during the deliberations.

10. CEA stated that the transmission licence given by CERC, inter alia, includes elements, which are part of generation switchyard and with the grant of transmission license to M/s EPTCL, the status of the entire evacuation system from Mahan STPS has been changed from dedicated system (to be built by generation developer) to ISTS (being implemented by TSP M/s EPTCL). Further, system studies carried out by POWERGRID also indicate there is a technical requirement of additional anchoring of Mahan TPS with grid apart from Mahan TPS-Sipat Pooling station 400 kV D/C line.

11. WRPC stated that the decision regarding the opening of the LILO of Vindhyachal–Korba STPP 400 kV S/C line at Mahan TPS has to be taken at WRPC forum and require further deliberations. The WRPC meeting is scheduled in the last week of July 2017. To the query of WRPC whether the LILO section would be a part of final EPMPL – Bilaspur Pooling Station 400 kV D/C line, it was clarified that the LILO and the D/C line are in different direction and now both are ISTS assets. LILO of Vindhyachal–Korba STPP 400 kV S/C line at Mahan TPS is already commissioned and its tariff is being paid from PoC pool.

12. After further discussion, following was decided:

    i) The transmission system for evacuation of power from M/s EPMPL generation plant at Mahan is now an ISTS system being implemented by M/s EPTCL (ISTS Transmission Licensee) and not a dedicated transmission system of generation developer. As such LILO of Vindhyachal–Korba STPP 400 kV S/C would not be an interim arrangement. This change would be brought to the notice of constituents in the next meeting of SCPSPWR.

    ii) The system studies indicate that the LILO of Vindhyachal–Korba STPP 400 kV S/C line at Mahan STPS would also be essential to take care of contingency of outage of one ckt of Mahan SPTS–Bilaspur Pooling Station 400 kV D/C line for reliable evacuation of power from 2x600 MW units of Mahan TPS.

    iii) M/s EPTCL has agreed to complete the remaining works of Mahan STPS–Bilaspur Pooling Station 400 kV D/C line by December 2017.

The meeting ended with thanks to the chair.

Annexure – I

List of Participants of a meeting held on 28.06.2017 regarding extension of interim connectivity of ESSAR Mahan MP Ltd.

S. No.	Name S/Shri/ Ku./Smt.	Designation	Mobile	E-mail
CENTRAL ELECTRICITY AUTHORITY				
1	Prakash Mhaske	Member		
2	Ravinder Gupta	CE(PSPA-I)	9968286184	ravindergupta_cea@rediffmail.com
3	Awdhesh Kumar Yadav	Director	9868664087	awd.cea@gmail.com
4	Shiva Suman	Dy. Director	9013929260	shivvasumanmedak@gmail.com
5	Vikas Sachan	Assistant Director	7838263699	vikas.cea@gmail.com
6	Nitin Deswal	Assistant Director	9717818349	nitindeswal@nic.in
POWER GRID/ CTU				
7	Ashok Pal	GM	9910378105	ashok@ powergridindia.com
8	Pratyush Singh	Sr. Engineer	8826094863	pratyush.singh@ powergridindia.com
EPMPL/ EPTCL				
9	Madam G. Gupta	M.D.	9819731319	madam.gupta@essar.com
10	S.J. Bhujade	V.P.	9909993545	sbhujade@essar.com
11	Shruti Verma		7291887303	shruti.verma@essar.com
WRPC				
12	L.K.S. Rathore	AS/Ex	9833371844	lksr_ies@nic.in

Annexure - 9.1

दक्षिण पूर्व मध्य रेलवे
SOUTH EAST CENTRAL RAILWAY

प्रधान कार्यालय/Head Quarter office
विद्युत विभाग/Electrical Department
बिलासपुर/Bilaspur
Phonr: 07752-415558, Fax-07752-414627
Email: cede@secr.railnet.gov.in

Date: 15.05.2017

No. ELECT/SECR/227/NTPC/1876

The Member (Power System)
Central Electricity Authority
Power System Planning & Apprasal Division-I
Sewa Bhawan, R. K. Puram,
New Delhi-110066.

Sub: Approval for Connectivity from Raigarh Sub-station of PGCIL (Chhattisgarh) ISTS to South East Central Railway.

Ref: (i) PGCIL letter No. C/CTU-P/W/06/SECR dated 08.03.2017. (Copy enclosed).
(ii) PGCIL letter No. C /SEF /W /06 /INT /0512 /01 dated 29.05.2012. (Copy enclosed)
(iii) Agreement between Rail Vikas Nigam Limited & PGCIL dated 22.12.16 for Pre-award and Post-award Engineering Services/Project Management Services for implementation of 220 KV & 132 KV Transmission. (Copy enclosed)

1. The work of construction of 220/132 kV Transmission line in South East Central Railway to avail direct power supply from Central Generating Agencies has been sanctioned & under execution by Rail Vikas Nigam Limited (RVNL). In this regard an agreement has been signed between RVNL and PGCIL to avail pre-award and post-award consultancy services from PGCIL for execution of above work. (Copy enclosed).
2. PGCIL vide letter No. C /SEF /W /06 /INT /0512 /01 dated 29.05.2012 has granted connectivity of SEC Railway 220/132 KV sub-station at Bhilai in Chhattisgarh to Raipur (Kumhari PGCIL) substation.
3. In view of the requirement of uninterrupted Traction Power Supply, alternate standby arrangement at Raigarh substation of POWERGRID is required. (Diagram enclosed). Railways has applied for connectivity to PGCIL. PGCIL vide letter under ref- (i) informed that application to be submitted to CEA for deliberation in the Standing Committee of Power System planning

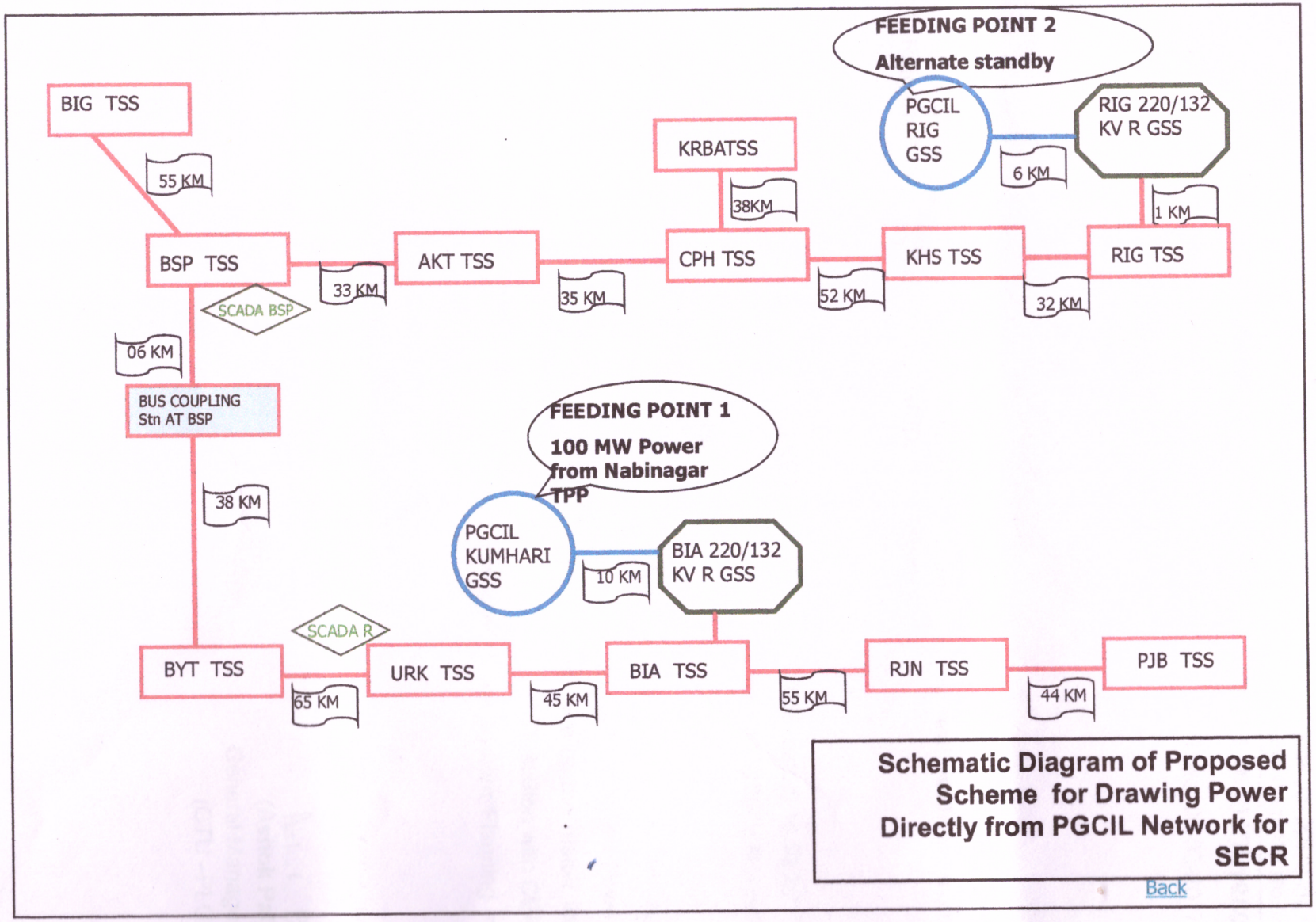
   Therefore it is requested that, kindly include the following the agenda item in ensuing Standing Committee meeting on Power System Planning of Western Region:

   (i) Connectivity of Railway's 220/132 KV Substation to 400/220 KV Raigarh ISTS station.
   (ii) Reconfirmation of connectivity of SEC Railway 220/132 KV sub-station at Bhilai in Chhattisgarh to Raipur (Kumhari PGCIL) substation.

Enclosed: As above.

(Kishore V. Madavi)
Chief Electrical Distribution Engineer
South East Central Railway, Bilaspur

Copy to: (i) Executive Director (EEM)/Railway Board Rail Bhawan, New Delhi for kind information please.
(ii) GM (Elect) /RVNL, 1st floor, August Kranti Bhawan, Bhikaji Cama Place, R.K. Puram, New Delhi-110-066 for information please.
(iii) C.O.O (CTU-Planning) Power Grid Corporation of India Ltd. Saudamini Plot No. 2, Sector-29 Near IFFCO Chowk, Gurgaon-122-011. Haryana, for information please.


FEEDING POINT 2
Alternate standby
PGCIL RIG GSS
RIG 220/132 KV R GSS
6 KM
1 KM
BIG TSS
55 KM
KRBATSS
38KM
BSP TSS
33 KM
AKT TSS
35 KM
CPH TSS
52 KM
KHS TSS
32 KM
RIG TSS
SCADA BSP
06 KM
BUS COUPLING Stn AT BSP
FEEDING POINT 1
100 MW Power from Nabinagar TPP
PGCIL KUMHARI GSS
10 KM
BIA 220/132 KV R GSS
38 KM
SCADA R
BYT TSS
65 KM
URK TSS
45 KM
BIA TSS
55 KM
RJN TSS
44 KM
PJB TSS
Schematic Diagram of Proposed Scheme for Drawing Power Directly from PGCIL Network for SECR
Back

Annexure - 9.2

दक्षिण पूर्व मध्य रेलवे
SOUTH EAST CENTRAL RAILWAY

प्रधान कार्यालय/Head Quarter office
विद्युत विभाग/Electrical Department
बिलासपुर/Bilaspur
Phonr: 07752-415558, Fax-07752-414627
Email: cede@secr.railnet.gov.in

Date: 26.07.2017

No. ELECT/SECR/227/NTPC/2727

The Member (Power System)
Central Electricity Authority
Power System Planning & Appraisal Division-I
Sewa Bhawan, R. K. Puram,
New Delhi-110066.

Sub: Construction of 220 KV and 132 KV Transmission system in SEC Railway- Submission of proposal for ISTS connectivity at Raigarh & Bhatapara Sub-station of PGCIL (Chhattisgarh) to Standing Committee meeting of CEA of Western Region.

Ref (i) SEC Railway letter No. ELECT/SECR/227/NTPC/1876 dated 15.05.2017 (copy enclosed).
(ii) DGM/BDD PGCIL letter No. C;BDD:RVNL:Kumhari-Raigarh dated 24.05.2017.
(iii) PGCIL letter No. C/CTU-P/W/06/SECR dated 08.03.2017.
(iv) PGCIL letter No. C /SEF /W /06 /INT /0512 /01 dated 29.05.2012.

1. PGCIL vide letter No. C /SEF /W /06 /INT /0512 /01 dated 29.05.2012 has granted connectivity of SEC Railway 220/132 KV sub-station at Bhilai in Chhattisgarh to Raipur (Kumhari PGCIL) substation.
2. In view of the requirement of reliable Traction Power Supply, SEC Railways vide letter under ref (i) has requested for additional connectivity at Raigarh PGCIL (Chhattisgarh) ISTS. For reliability of proposed network and voltage drop issue during feed extension one more connectivity at intermediate location viz Bhatapara PGCIL sub-station between Kumhari & Raigarh is required. The Single line diagram of the proposed Transmission line in SEC Railway with 3 GSS is enclosed as Annexure-A.
3. PGCIL vide letter under ref- (iii) informed that application to be submitted to CEA for deliberation in the Standing Committee of Power System planning of Western Region.

Therefore it is requested that, kindly include the following agenda item in ensuing Standing Committee meeting on Power System Planning of Western Region:

(i) Connectivity to Railway's 220/132 KV Substation at Raigarh with 400/220 KV Raigarh Grid Sub-station & connectivity to Railway's 220/132 KV Substation Bhatapara with 400/220 KV Bhatapara Grid Sub-station.

(ii) Reconfirmation of connectivity of SEC Railway 220/132 KV sub-station at Bhilai in Chhattisgarh to Raipur (Kumhari PGCIL) substation.

C/o Member (Power System) Dy. No. : 1563 Date :

Enclosed: As above.

26072017

(Kishore V. Madavi)
Chief Electrical Distribution Engineer
South East Central Railway, Bilaspur

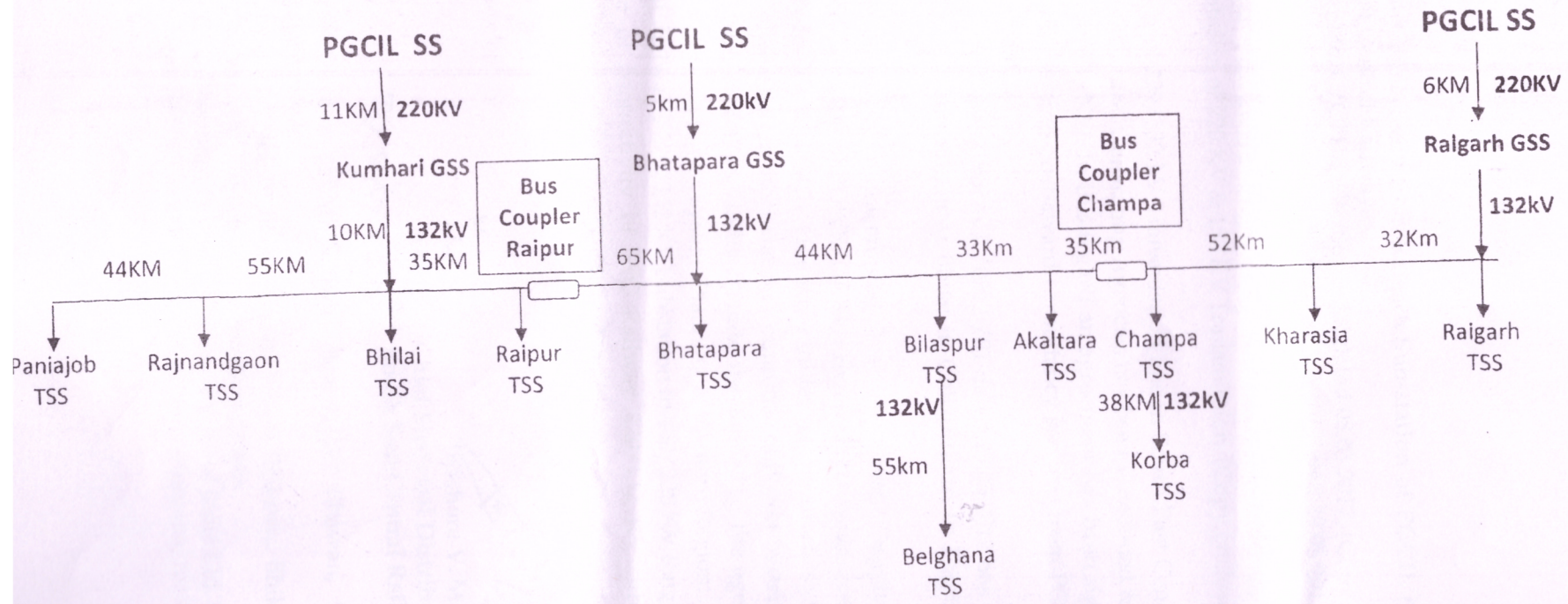
Copy to: (i) Executive Director (EEM)/Railway Board Rail Bhawan, New Delhi for kind information please.
(ii) GM (Elect) /RVNL, 1st floor, August Kranti Bhawan, Bhikaji Cama Place, R.K. Puram, New Delhi-110-066 for information please.
(iii) C.O.O (CTU-Planning) Power Grid Corporation of India Ltd. Saudamini Plot No. 2, Sector-29 Near IFFCO Chowk, Gurgaon-122-011. Haryana, for information please.
(iv) DGM/B.D.D. Power Grid Corporation of India Ltd. Saudamini Plot No. 2, Sector-29 Near IFFCO Chowk, Gurgaon-122-011. Haryana,

copy already sent to PSPA(I).

CE (PSPA-I)

considered for CEA agenda

Single Line Diagram of Proposed Transmission Line in SEC Railway-Revised



Approx Load on every TSS – 10 MVA

ANNEXURE-

सत्यमेव जयते

भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

केन्द्रीय विद्युत प्राधिकरण

Central Electricity Authority

विद्युत प्रणाली योजना एवं मूल्यांकन-I प्रभाग

Power System Planning & Appraisal-I Division

संख्या / No. 26/10/PSP & A – I/2017/ 1105 - 1110 दिनांक / Date: 28.09.2017

सेवा में / To

1. The Member Secretary, Western Regional Power Committee, MIDC Area, Marol, Andheri East, Mumbai - Fax 022 28370193
2. COO (CTU), Power Grid Corporation of India Ltd., Saudamini, Plot No. 2, Sector – 29, Gurgaon – 122001
3. GM, WRLDC, Plot no F-3, MIDC Area, Marol, Andheri(East) Mumbai – 400093 Fax: 022-28235434
4. The Managing Director, CSPTCL, Dangania, Raipur (CG)-492013Fax 0771 2574246/ 4066566
5. The Executive Director (Engg.), NTPC Ltd., Engg. Office Complex, A-8, Sector-24, NOIDA 201301 Fax 0120-2410201/2410211

विषय : कोरबा एसटीपीएस (एनटीपीसी) में high fault level को नियंत्रित करने के उपायों पर हुयी बैठक का कार्यवृत्त - सम्बंधित

Subject: Minutes of meeting held on 22.09.2017 to discuss measures to control high fault level at Korba STPS (NTPC) - Regarding.

महोदय / महोदया / Sir / Madam,

Please find enclosed minutes of the meeting held on 22.09.2017 at CEA, New Delhi to discuss measures to control high fault level at Korba (NTPC).

भवदीय / Yours' faithfully,

28/9

(अवधेश कुमार यादव / Awdhesh Kr. Yadav)
निदेशक / Director

प्रतिलिपि / CC: सदस्य (वि प्र) / Member (PS), के वि प्रा CEA

सेवा भवन, आर. के. पुरम-I, नई दिल्ली-110066 टेलीफैक्स: 011-26102045 ईमेल: pspandpa1.cea@gmail.com वेबसाइट: www.cea.nic.in
Sewa Bhawan, R.K Puram-I, New Delhi-110066 Telefax: 011-26102045 email: pspandpa1.cea@gmail.com Website: www.cea.nic.in

Minutes of a meeting held on 22.09.l2017 to discuss measures to control high fault level at Korba (NTPC)

The list of participants is enclosed as Annexure – I.

1. CE (PSPA-1), CEA welcomed the participants and stated that in the 40th meeting of Standing Committee on Power System Planning of Western Region (SCPSPWR) held on 01.06.2016, the following scheme was agreed to control high fault current at Korba STPS (3x200 MW + 4x500 MW) of NTPC:

   (i) Korba STPS - Korba West 400 kV S/C line to be normally kept open.

   (ii) Korba STPS- Sipat STPS 400 kV S/C line and Sipat STPS – Raipur 400 kV S/C line to be reconfigured as Korba STPS- Raipur 400 kV S/C line bypassing at Sipat STPS. (bypassing arrangement at Sipat STPS already exists).

   Subsequently in the 41st meeting of SCPSPWR held on 21.12.2016, CSPTCL has raised concern over above proposal i.e. keeping the Korba STPS - Korba West 400 kV S/C line in normally open condition, as it would cause overloading of the 400 kV and 220 kV lines emanating from Korba (West) power plant under n–1–1 contingency conditions. In the meeting, it was decided that SLDC (Chhattisgarh) concerns / suggestion would be deliberated in joint meeting of CEA, CTU, WRPC, CSPTCL and WRLDC. Therefore, in line with the decision of the 41st meeting of SCPSPWR, this meeting has been convened to further deliberate on measures to control high fault level at 400 kV Korba (NTPC) S/s.

2. Director (PSP-1), CEA stated that an alternative proposal (say A2), in addition to proposal made in the 41st meeting of SCPSPWR (say A1), has also been studied in consultation with CTU and the same was circulated. The alternative proposal was reconfiguration of Korba (West) – Korba (NTPC) 400 kV line and Korba (NTPC) - Sipat 400 kV S/C line as Korba (W) – Sipat 400 kV S/C line through bypassing at Korba (NTPC)).

3. NTPC representative stated that in the alternative circulated two nos. of 400kV outlets from Korba (NTPC), one to Korba (W) and another to Sipat would not be available for evacuation of power. There may be constraints in power evacuation from Korba (NTPC) in case of n-1 contingency conditions of lines emanating from Korba (NTPC).

4. Endorsing the views of NTPC, WRLDC representative stated that sometimes high loading on the Korba(NTPC)- Sipat 400 kV S/C line is observed due to its short length. Therefore, bypassing of Korba(NTPC)-Sipat-Raipur 400 kV S/C line at Sipat (so as to form Korba (NTPC)-Raipur 400 kV line) is required as already proposed in alternative A1. It is seen that power normally flows from Korba(NTPC) to Korba(W) on Korba(W)- Korba (NTPC) interconnection, therefore opening of this line would help in reducing the loadings on transmission system connected with Korba(W) and underlying network of Chhattisgarh.

5. CSPTCL representative stated that they would prefer alternative A2. As far as the alternative A1 is concerned, overloading of 220 kV network may take place in case of N-1-1 contingency of 400 kV outlets from Korba(W). To reduce the short circuit level at Korba(NTPC), bus splitting could also be explored.

6. NTPC stated that bus splitting at Korba(NTPC) is not a feasible solution as auxiliary supply system is common for whole plant.

7. Director, CEA stated that another alternative, say A3, which involves bypassing of Korba(W)-Korba(NTPC) 400 kV line and Korba(NTPC)- Essar Mahan 400 kV line at Korba(NTPC) so as to form Korba(W)-Essar Mahan 400 kV line could also be explored. He added that there is substantial short circuit current contribution at Korba (NTPC) from Korba (West) and Sipat and to control the short circuit level at Korba (NTPC) opening of Korba (W) – Korba (NTPC) 400 kV line and bypassing of Korba (NTPC) - Sipat 400 kV S/C line & Sipat-Raipur 400 kV S/C line at Sipat are required.

8. In the meeting, it was agreed to carryout studies for 2021-22 time frame for three different alternatives as give below:

Alternative 1 (A1): Korba (NTPC) – Korba (W) 400 kV S/C open + Korba(NTPC) - Sipat STPS 400 kV S/C line and Sipat STPS – Raipur 400 kV S/C line to be bypassed at Sipat so as to form Korba STPS- Raipur 400 kV S/C line, as proposed in 41st meeting of SCPSPWR

Alternative 2(A3): Reconfiguration of Korba (West) – Korba (NTPC) 400 kV line and Korba (NTPC) - Sipat 400 kV S/C line as Korba (W) – Sipat 400 kV S/C line through bypassing at Korba (NTPC).

Alternative 3(A3): Reconfiguration of Korba(W)-Korba(NTPC) 400 kV line and Korba(NTPC)- Essar Mahan 400 kV line as Korba(W)-Essar Mahan 400 kV line through bypassing at Korba(NTPC)

Assumptions made in the Base Case are given below:

a) Studies have been carried out for 2021–22 time-frame the load of WR and Chhattisgarh is considered as 72 GW & 6000 MW respectively as per 19th EPS

b) All generators near to the Korba (NTPC) were kept on

c) 90% dispatch has been considered for generating stations in and around Korba (NTPC) i.e. Korba (NTPC), Sipat, Korba (West), Korba (East), Korba (Extension), Essar Mahan etc.

Study Cases:

CASE-1: Base Case + A1, CASE-2: Base Case +A2, CASE-3: Base Case + A3

The fault levels at various 400 kV buses near to the Korba (NTPC) in 2021 – 22 timeframe for above alternatives is as tabulated below:

S. No.	Bus	Base case (kA)	Case I (kA)	Case II (kA)	Case III (kA)
1	Korba (NTPC)	51	37	35	40
2	Korba (West)	38	18	25	20
3	Sipat STPS	39	28	34	38
4	Raipur I	26	26	26	26
5	Raipur II	38	38	38	38
6	Vindhyachal (I,II,III)	41	41	41	41

In case-3, as the fault level at Korba (NTPC) of 40 kA is observed, therefore the case was not studied further.

The power flows through various lines in base case and under contingencies as follows:

a) Base Case Power flows

S. No.	Transmission Element	MW
1	Korba (N) – Bhilai - I	287
2	Korba (N) – Bhilai - II	279
3	Korba (N) - Bhatapara	401
4	Korba (N) – Korba (W)	115
5	Korba (N) - Vindhyachal	-46
6	Korba – Birsinghpur D/C	2 x 283
7	Korba (N) - Sipat	444
8	Korba (N) – Essar Mahan	-180
9	Korba (N) – Raipur D/C	2 x 123
10	Korba (W) – Raita	349
11	Korba (W) – Bhilai	243
12	Korba (W) - Marwa	160
13	400/220 kV ICT at Korba (W)	-175 (Injection at 400 kV level)

b) Power flows through various lines interconnected with Korba (NTPC) in above alternatives including under n-1-1 contingencies

S. No.	Transmission Element	Case I	Case I under n-1-1	Case II	Case II under n-1-1
1	Korba (N) – Bhilai I	319	Out	365	Out
2	Korba (N) – Bhilai II	311	Out	375	Out
3	Korba (N) - Bhatapara	436	580	495	700
4	Korba (N) – Korba (W)	Open	Open	Bypass	Bypass
5	Korba (N) - Vindhyachal	-26	22	-4	71
6	Korba – Birsinghpur D/C	2 x 395	2 x 450	2 x 425	2 x 499
7	Korba (N) - Sipat	NA	NA	Bypass	Bypass
8	Korba (N) – Raipur	326	464	NA	NA
9	Korba (N) – Essar Mahan	-154	-95	-127	-35
10	Korba (N) – Raipur D/C	2 x 147	2 x 220	2 x 180	2 x 290

c) Power flows in above alternatives and under n-1-1 contingencies in CSPTCL network

S. No.	Transmission Element	Case I	Case I n-1-1	Case II	Case II n-1-1
1	Korba (W) – Raita	317	485	277	Out
2	Korba (W) - Bhilai	218	out	187	Out
3	Korba (W) - Marwa	118	Out	54	242
4	ICT 500 MVA, 400/220 kV	151	325	106	186

The results of studies on above options like power flows in base case, power flows during contingencies, short circuits levels etc.., are enclosed as Annexure II.

9. As per the study results, it is seen that the fault level is in within limits for both A1 & A2. In alternative A1, one 400 kV interconnections (Korba (NTPC) – Korba (W) 400 kV S/C line) would not be available from both Korba(W) and Korba (NTPC) 400 kV bus. But in alternative A2, two no. of 400 kV interconnections (Korba (NTPC) – Korba (W) 400 kV S/C line and Korba(NTPC) - Sipat STPS 400 kV S/C line) would not be available for evacuation of power from Korba (NTPC) 400 kV bus.

10. The study suggests the following alternative to control high fault current at Korba STPS (3x200 MW + 4x500 MW) of NTPC:
    i. Korba STPS - Korba West 400 kV S/C line to be normally kept open. CSPTCL to take Korba (W) to Korba (NTPC) 400 kV S/C line into service in case of planned shutdown of any of 400 kV lines emanating from Korba(W). This line would be normally idle charged from one end say Korba (NTPC).
    ii. Korba STPS- Sipat STPS 400 kV S/C line and Sipat STPS – Raipur 400 kV S/C line to be rearranged as Korba STPS- Raipur 400 kV S/C line bypassing at Sipat STPS. (bypassing arrangement at Sipat STPS already exists).
11. Members agreed with the above proposal. However, CSPTCL stated that they would convey their opinion on the proposal after consultation with their SLDC.

Meeting ended with thanks to the chair.

*****

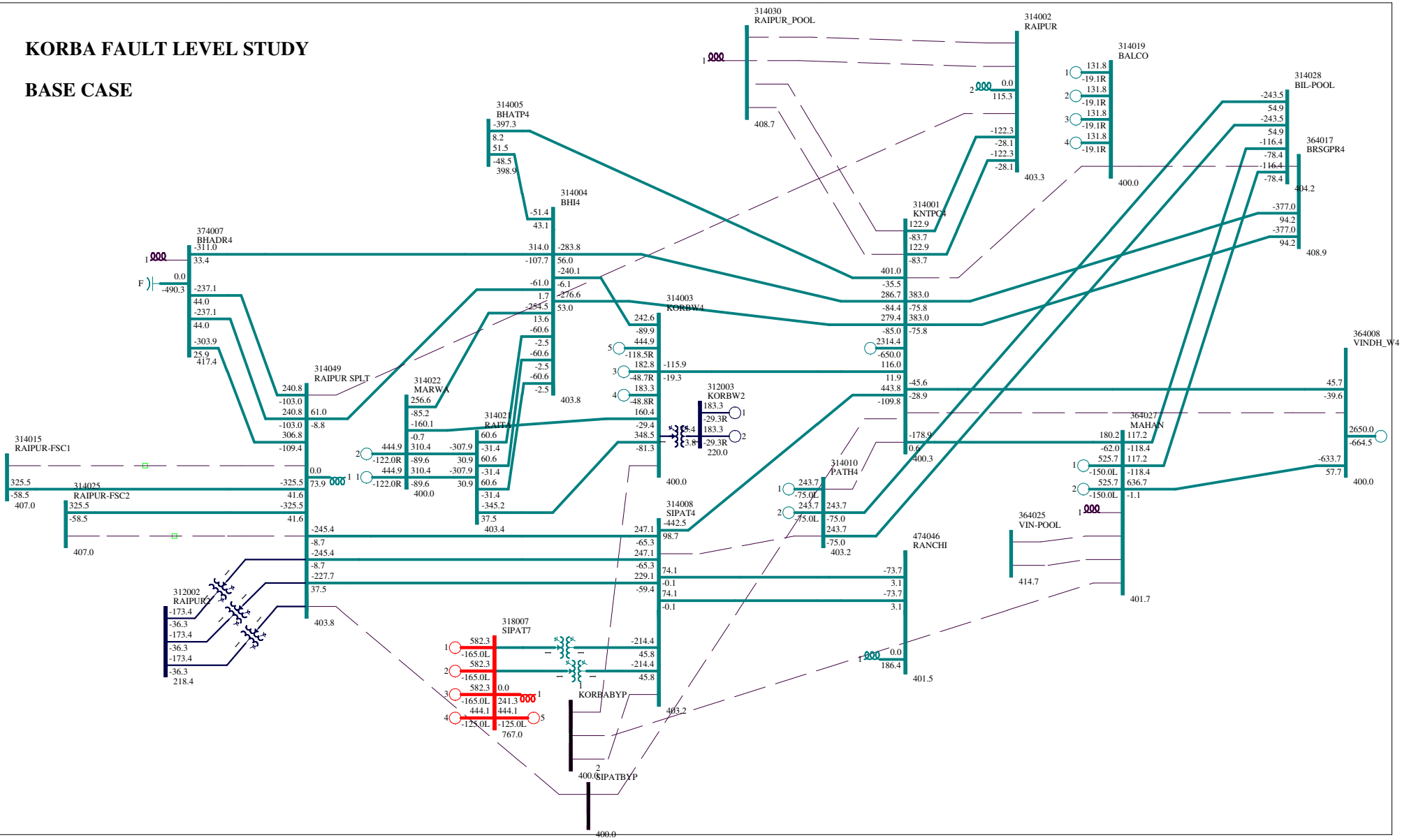
Annexure - I

List of Participants of a Meeting held on 22.09.2017 to discuss measures to limit High Fault level at NTPC Korba

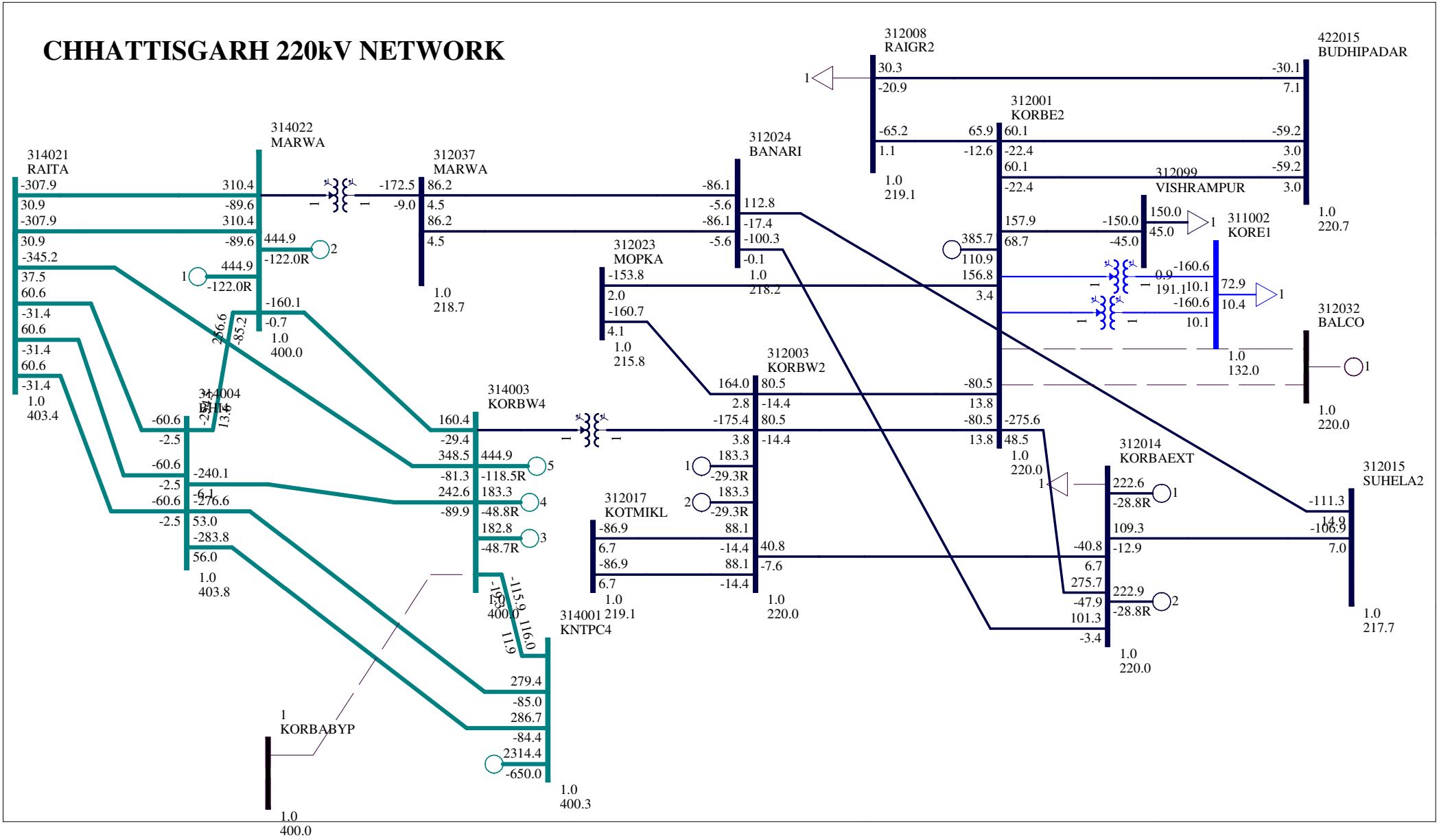
S.NO.	NAME	ORGANIZATION	DESIGNATION	MOBILE	E-MAIL
1	Ravinder Gupta	CEA	CE		
2	Awdhesh Kumar Yadav	CEA	Director		
3	Shiva Suman	CEA	DD		
4	Vikas Sachan	CEA	AD		
5	Nitin Deswal	CEA	AD		
6	Pratyush Singh	POWERGRID	Sr. Engr.	8826094863	pratyush.singh@powergridindia.com
7	P.S. Das	POWERGRID	Asst. GM	9433041837	psdas@powergridindia.com
8	Pushpa Seshadri	WRLDC POSOCO	Asst. GM	9869404482	pushpa@posoco.in
9	Rahul Chakrabarti	NLDC POSOCO	Sr. Engr.	9599449975	rahulchakrabarti@posoco.in
10	Subhash Thakur	NTPC	AGM	9650991067	subhashthakur@ntpc.co.in
11	Vivek Chauhan	NTPC	Mgr	9650999980	vivekchauhan@ntpc.co.in
12	D.K. Chawda	CSPTCL Raipur	SE (PL) O/o ED (C&D)	9425202572	dk.chawda576@gmail.com

KORBA FAULT LEVEL STUDY

BASE CASE

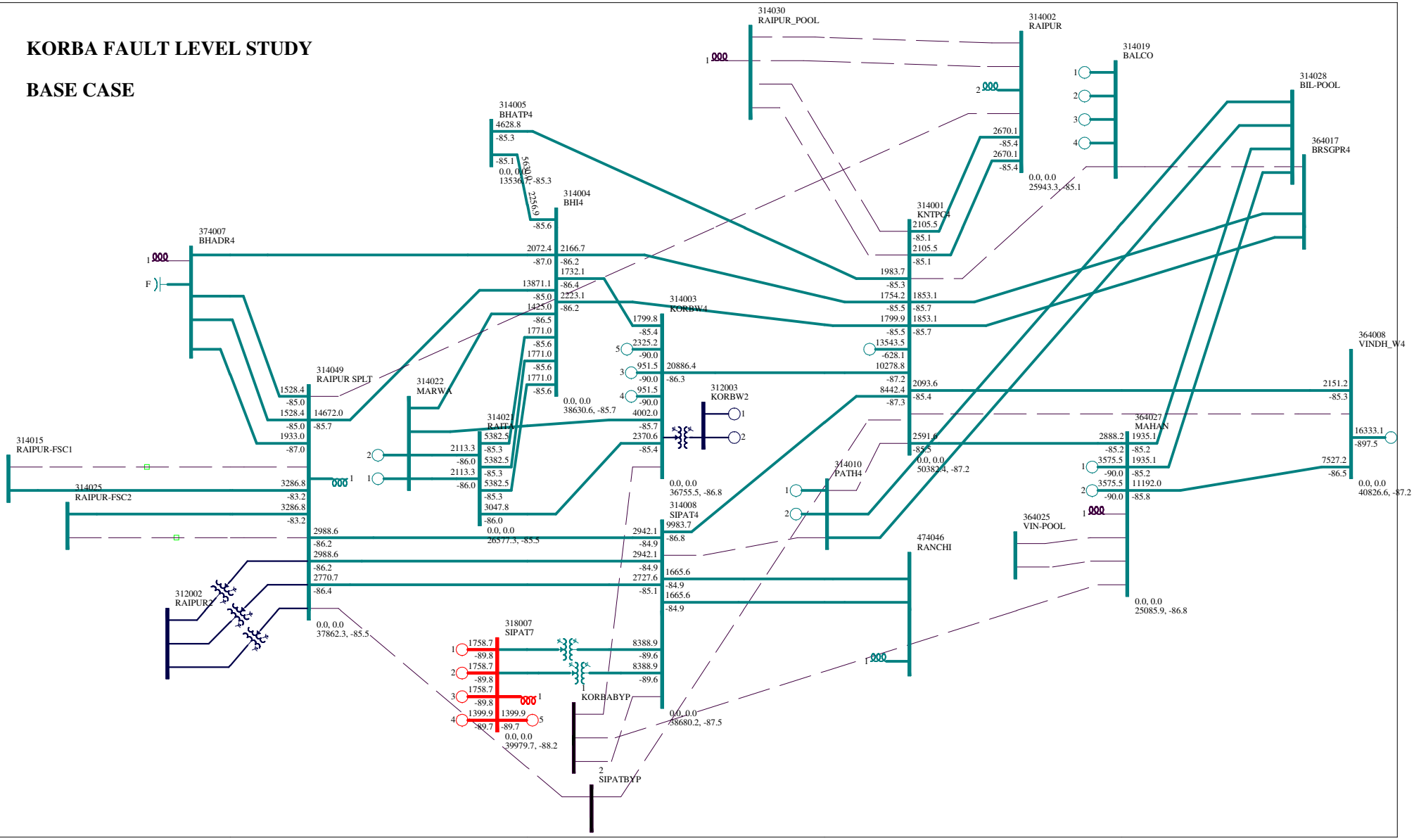


CHHATTISGARH 220kV NETWORK



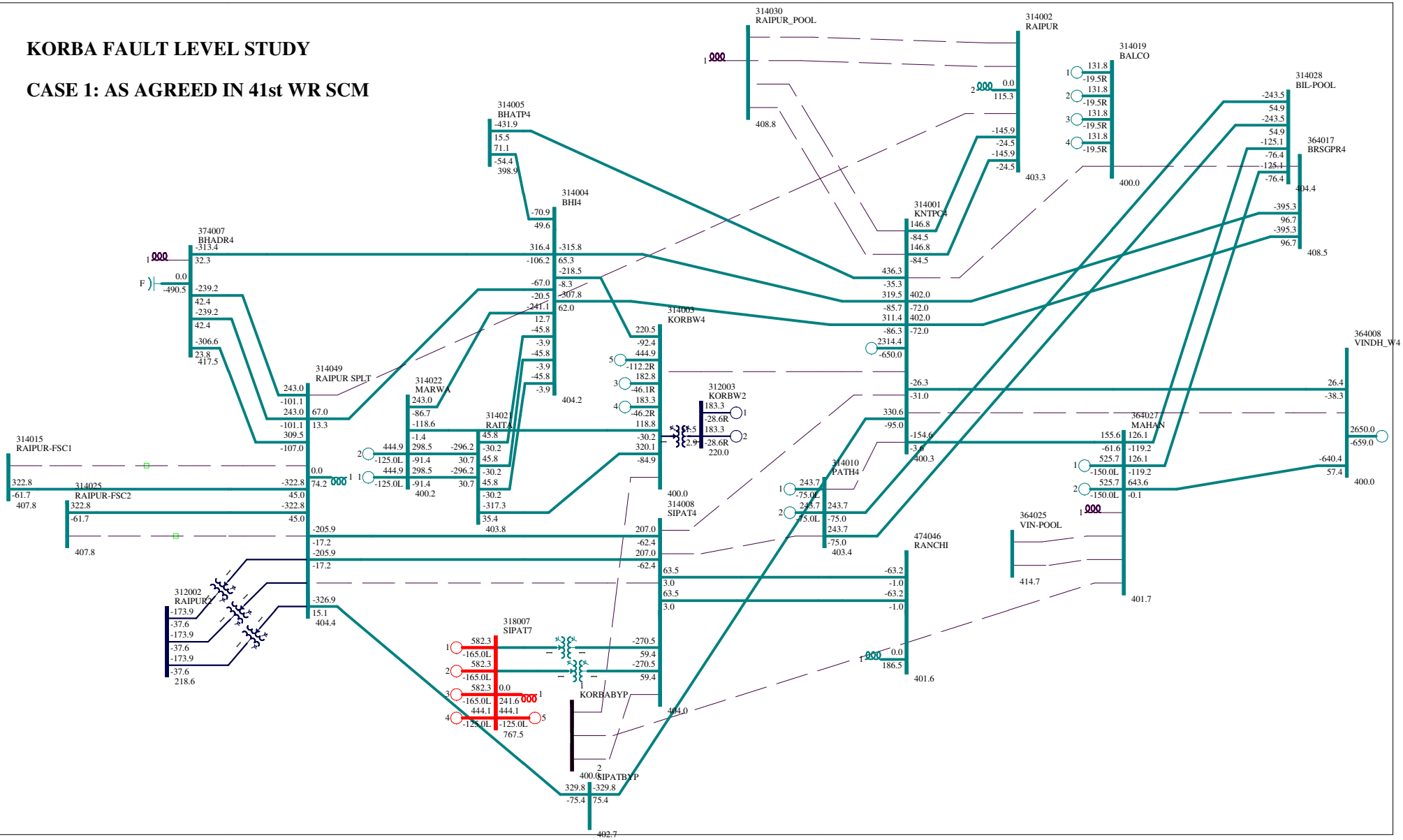
KORBA FAULT LEVEL STUDY

BASE CASE

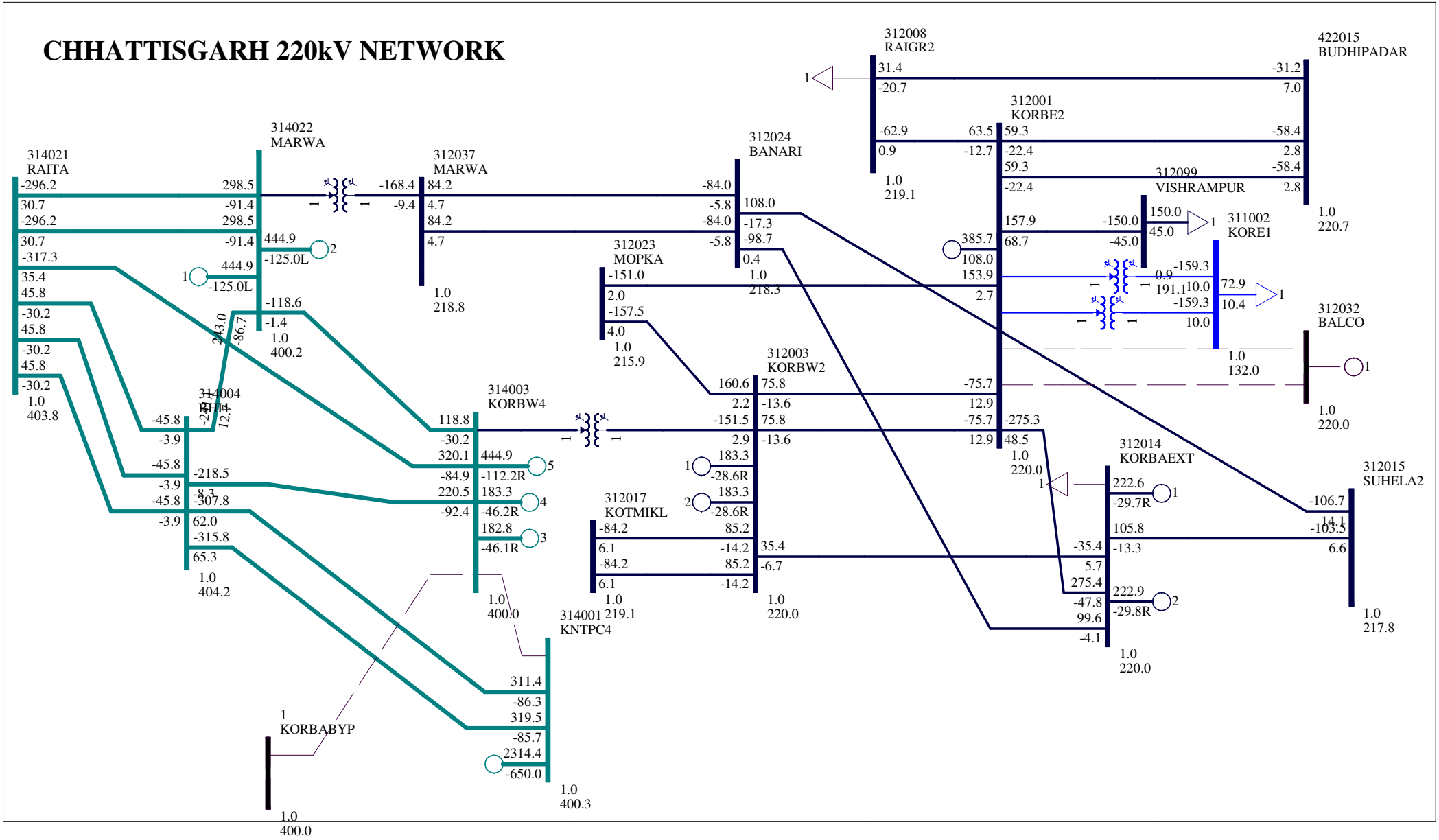


KORBA FAULT LEVEL STUDY

CASE 1: AS AGREED IN 41st WR SCM

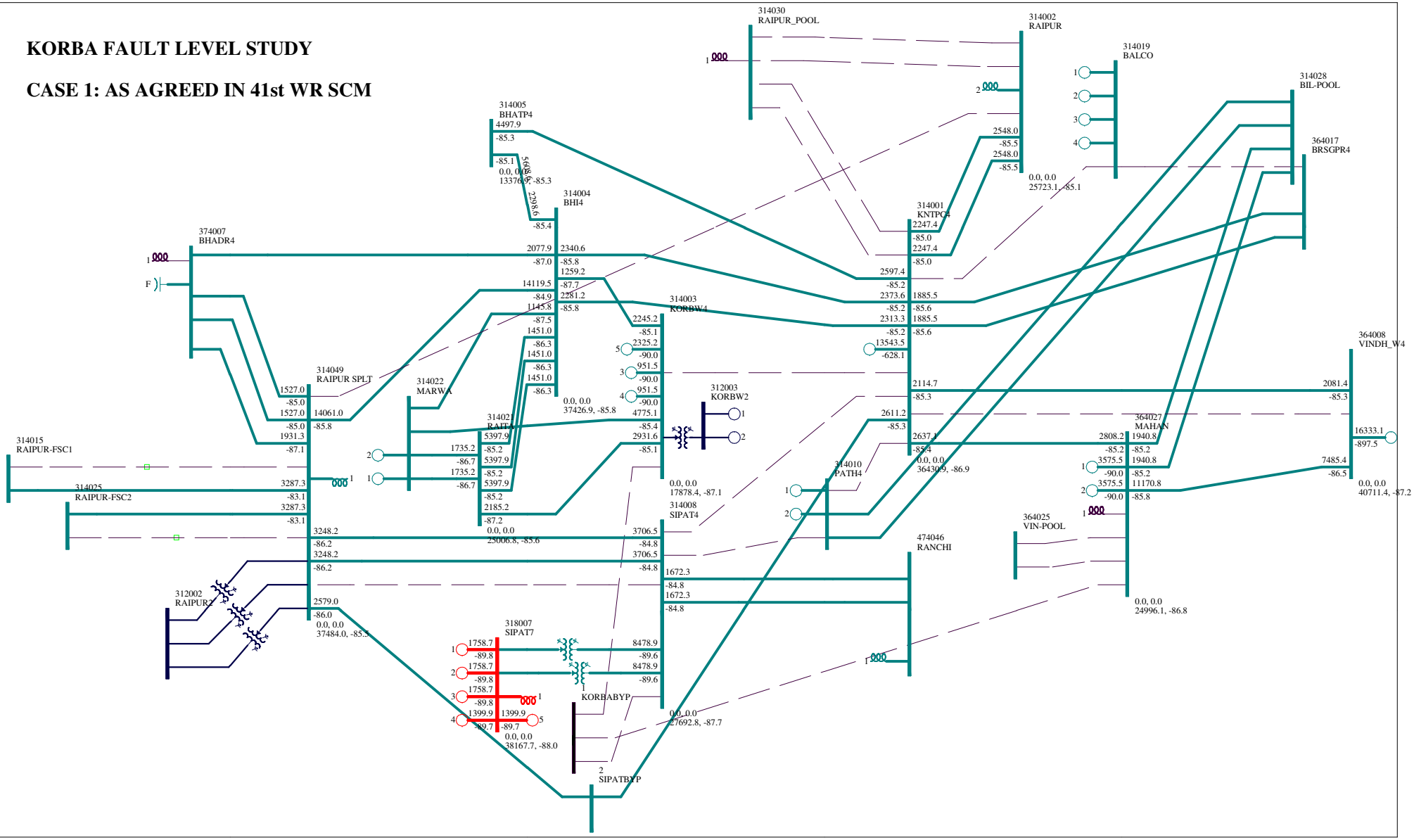


CHHATTISGARH 220kV NETWORK



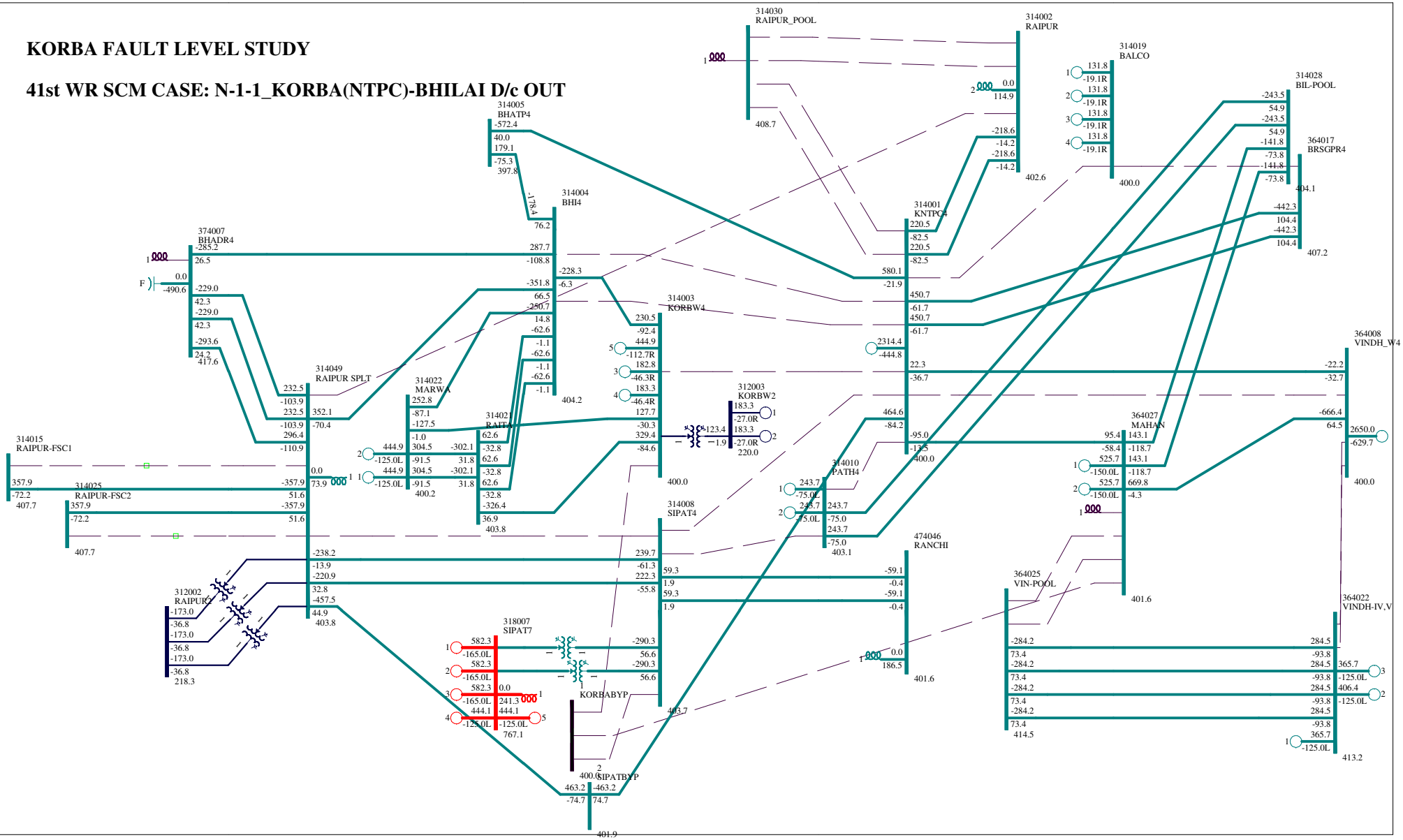
KORBA FAULT LEVEL STUDY

CASE 1: AS AGREED IN 41st WR SCM



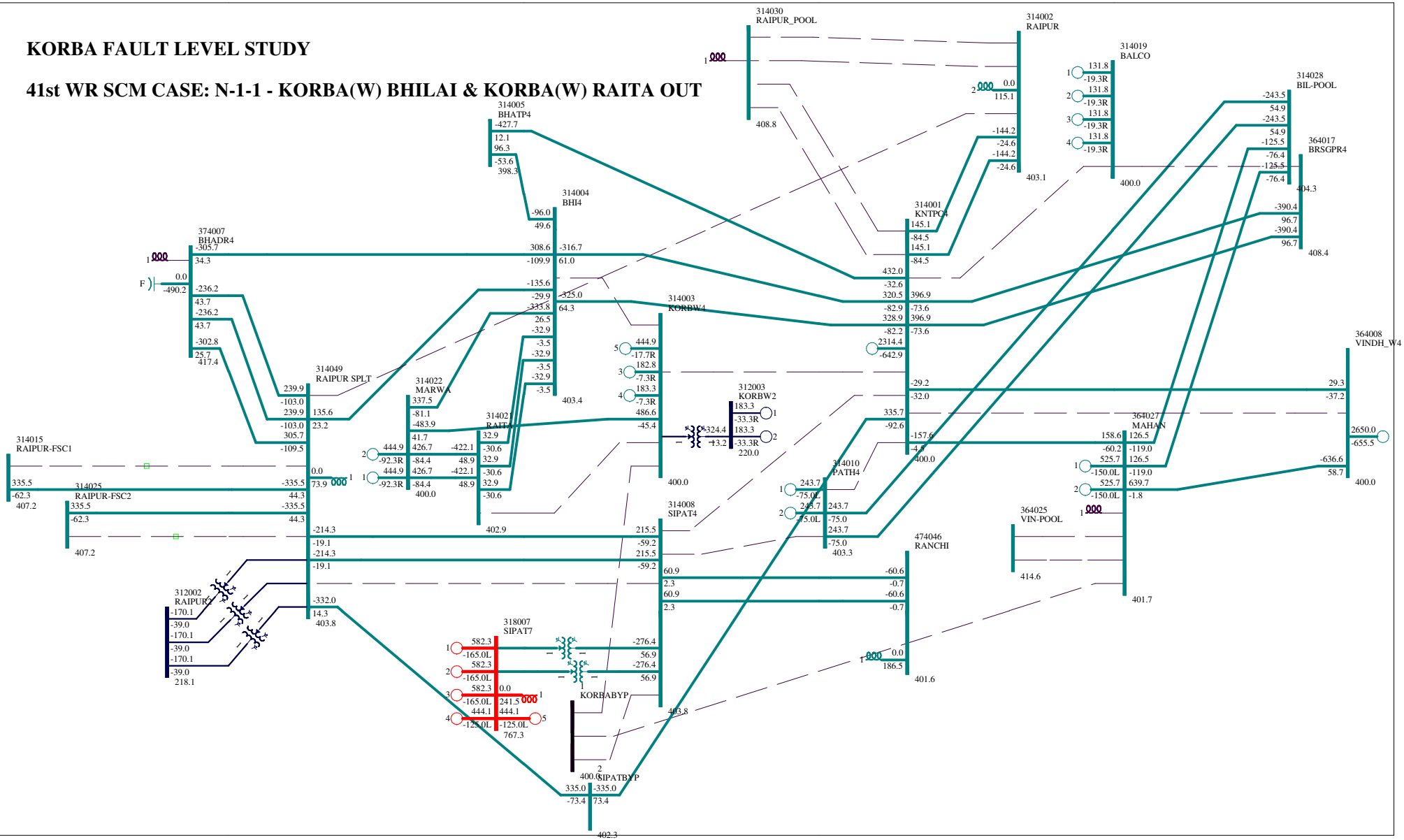
KORBA FAULT LEVEL STUDY

41st WR SCM CASE: N-1-1_KORBA(NTPC)-BHILAI D/c OUT

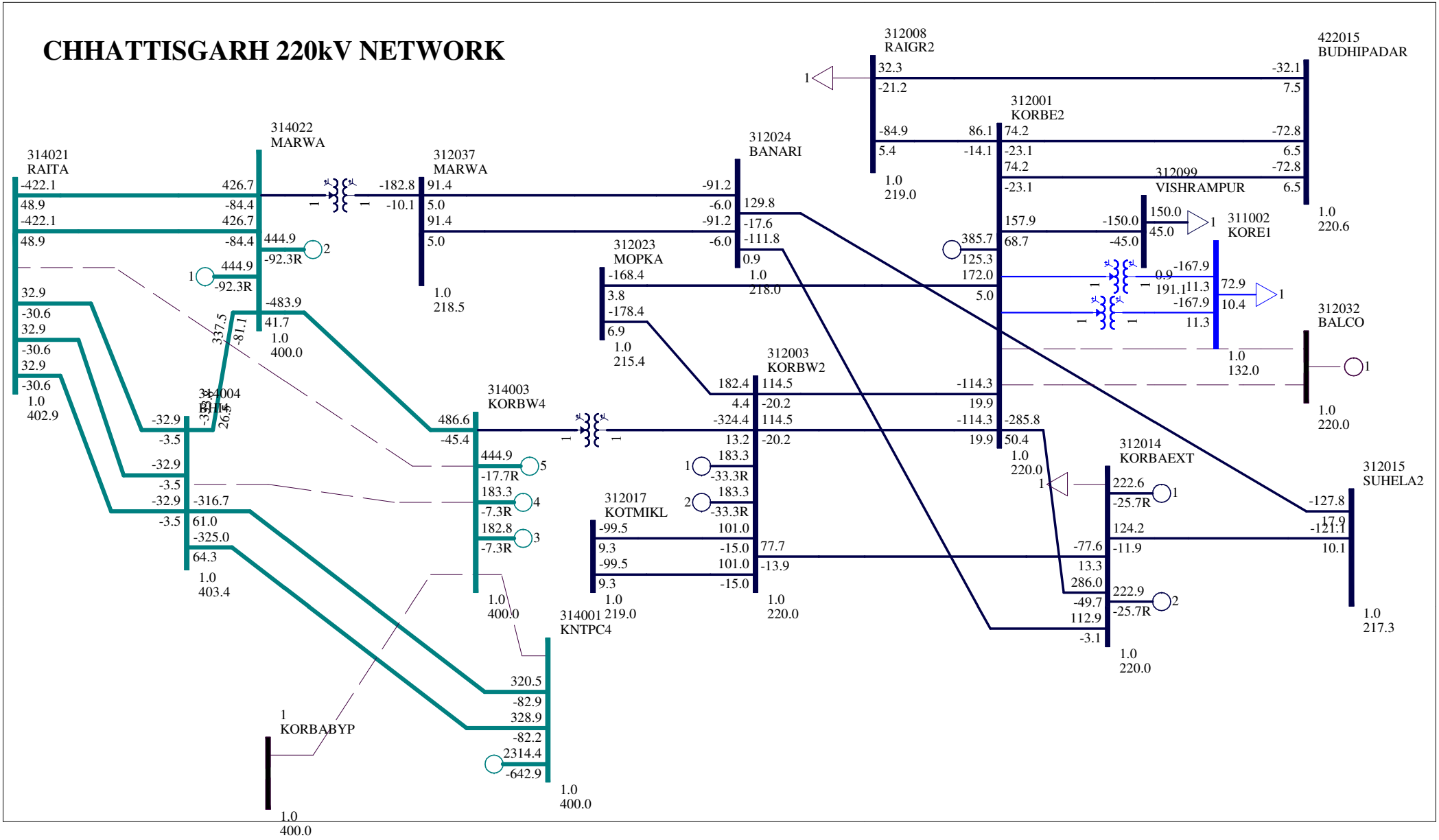


KORBA FAULT LEVEL STUDY

41st WR SCM CASE: N-1-1 - KORBA(W) BHILAI & KORBA(W) RAITA OUT

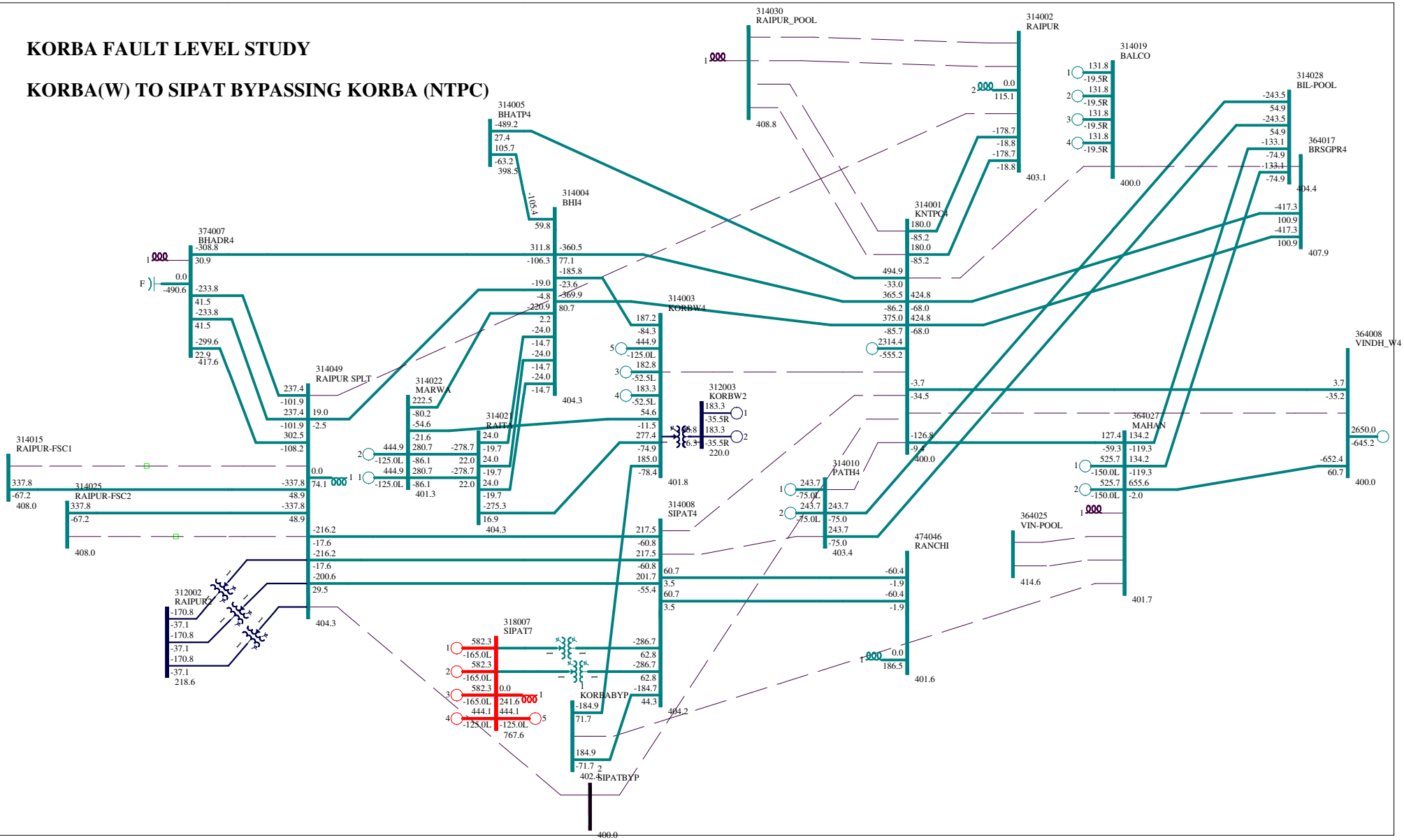


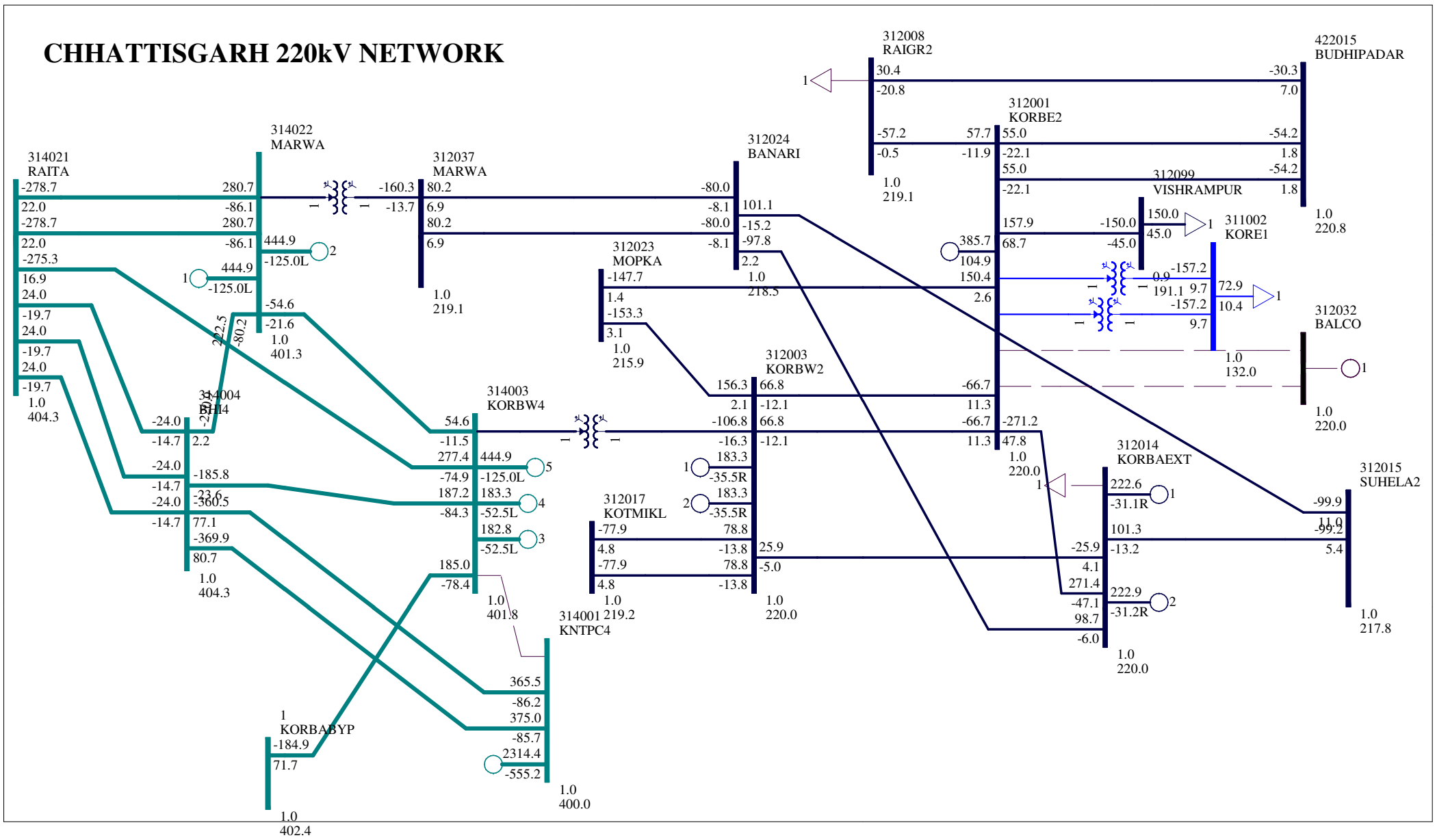
CHHATTISGARH 220kV NETWORK



KORBA FAULT LEVEL STUDY

KORBA(W) TO SIPAT BYPASSING KORBA (NTPC)




CHHATTISGARH 220kV NETWORK
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BUDHIPADAR
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KORBE2
312099
VISHRAMPUR
311002
KORE1
312032
BALCO
312023
MOPKA
312003
KORBW2
314004
BH14
314003
KORBW4
312017
KOTMIKL
312014
KORBAEXT
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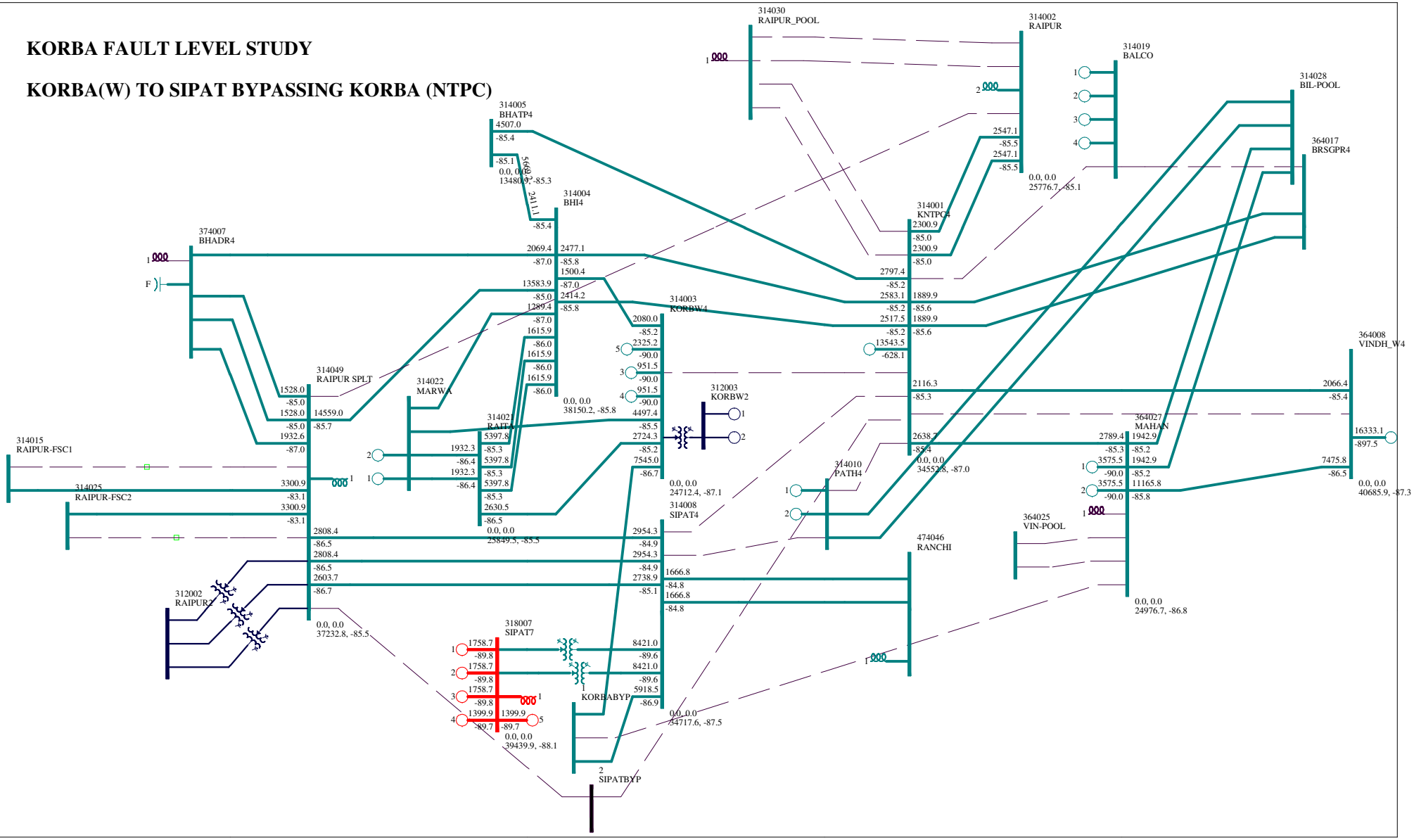
KNTPC4
KORBABYP

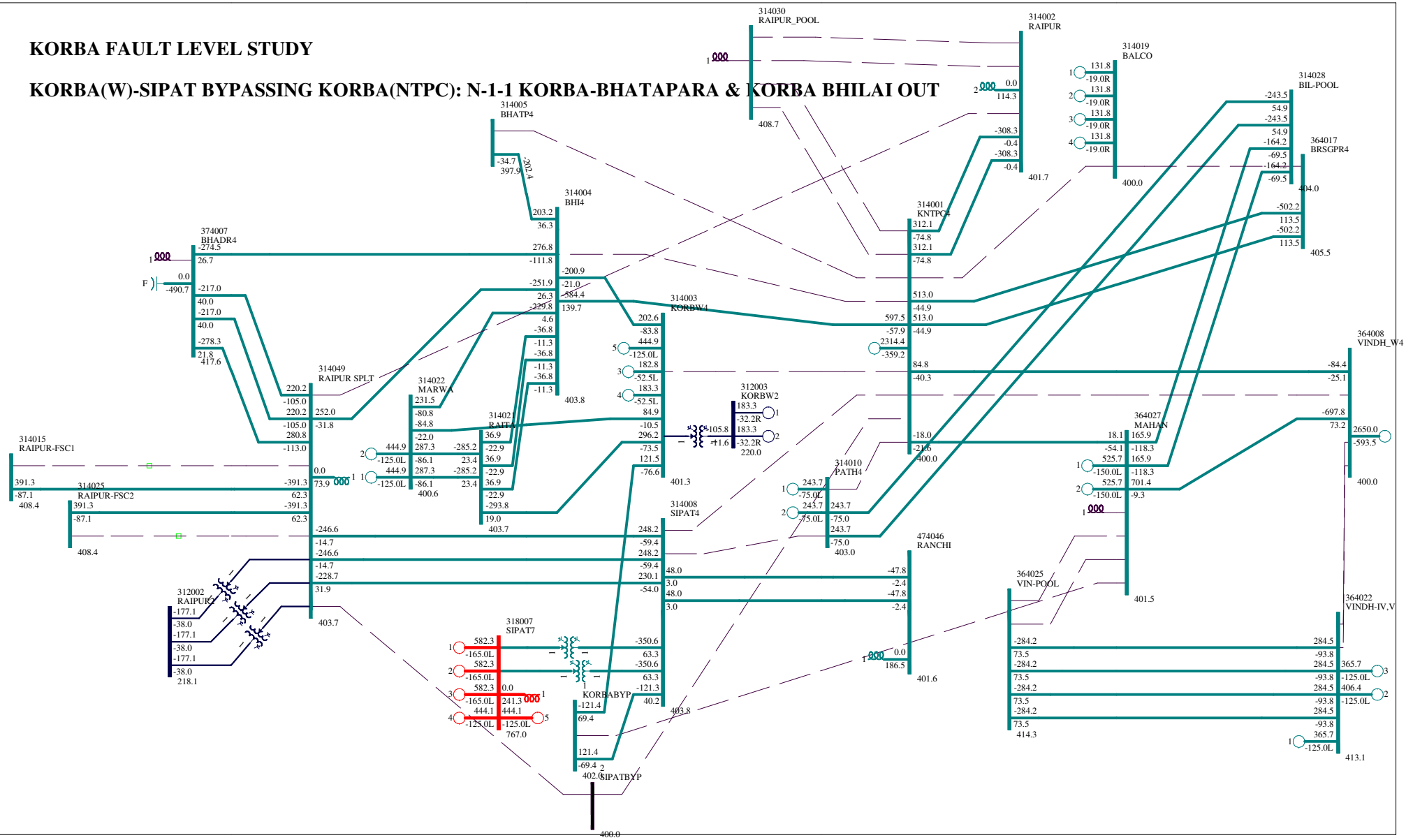
KORBA FAULT LEVEL STUDY

KORBA(W) TO SIPAT BYPASSING KORBA (NTPC)



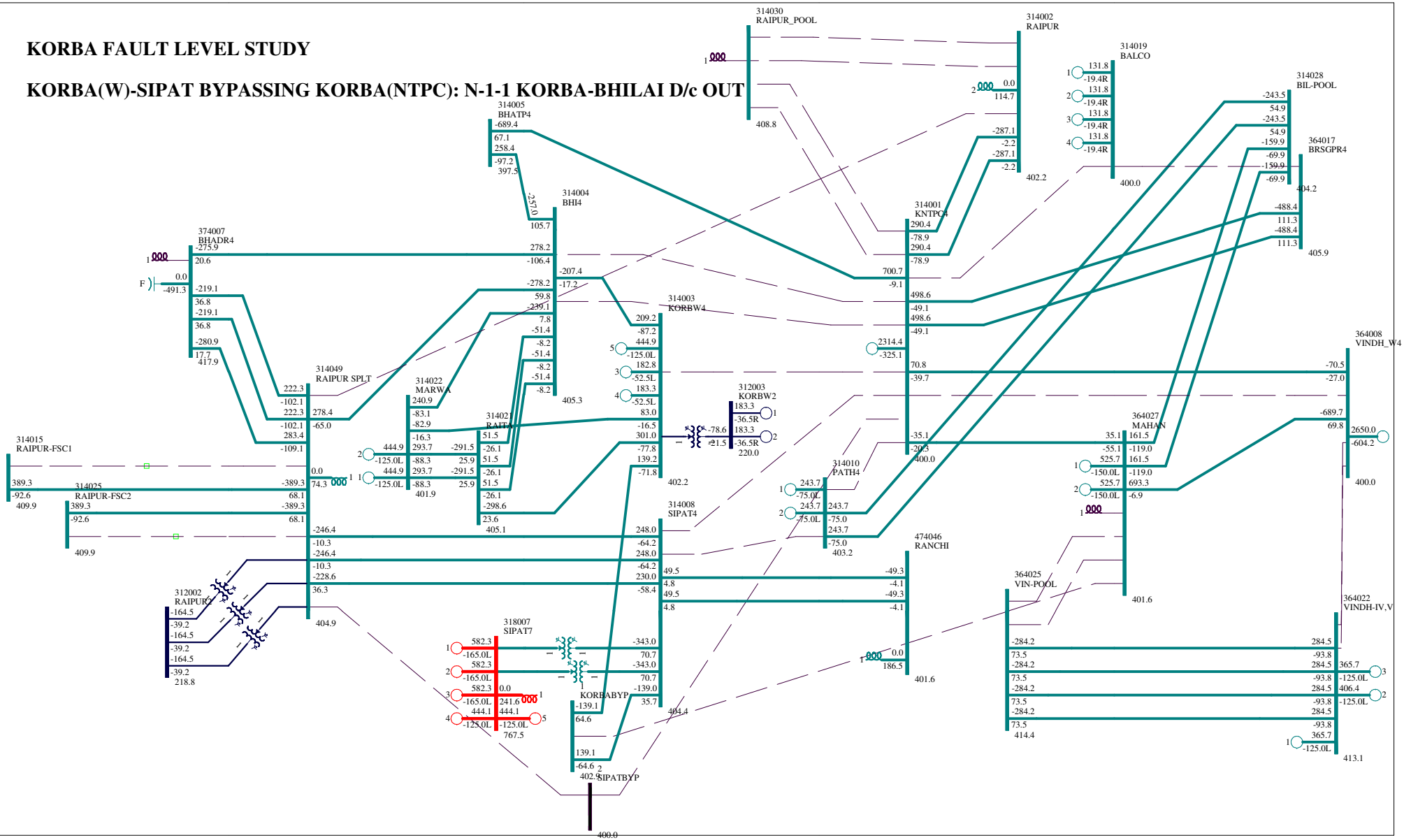
KORBA FAULT LEVEL STUDY

KORBA(W)-SIPAT BYPASSING KORBA(NTPC): N-1-1 KORBA-BHATAPARA & KORBA BHILAI OUT



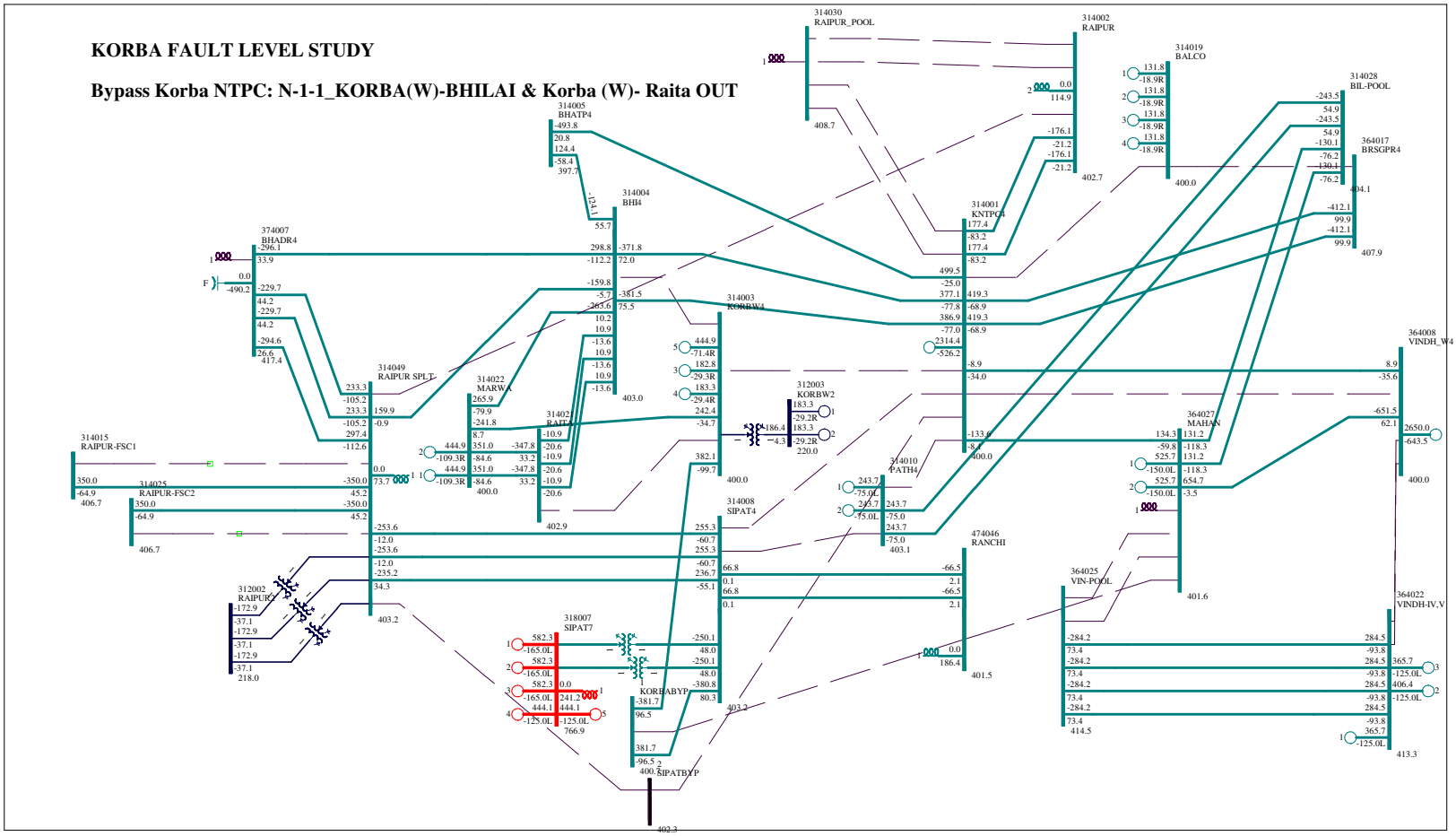
KORBA FAULT LEVEL STUDY

KORBA(W)-SIPAT BYPASSING KORBA(NTPC): N-1-1 KORBA-BHILAI D/c OUT



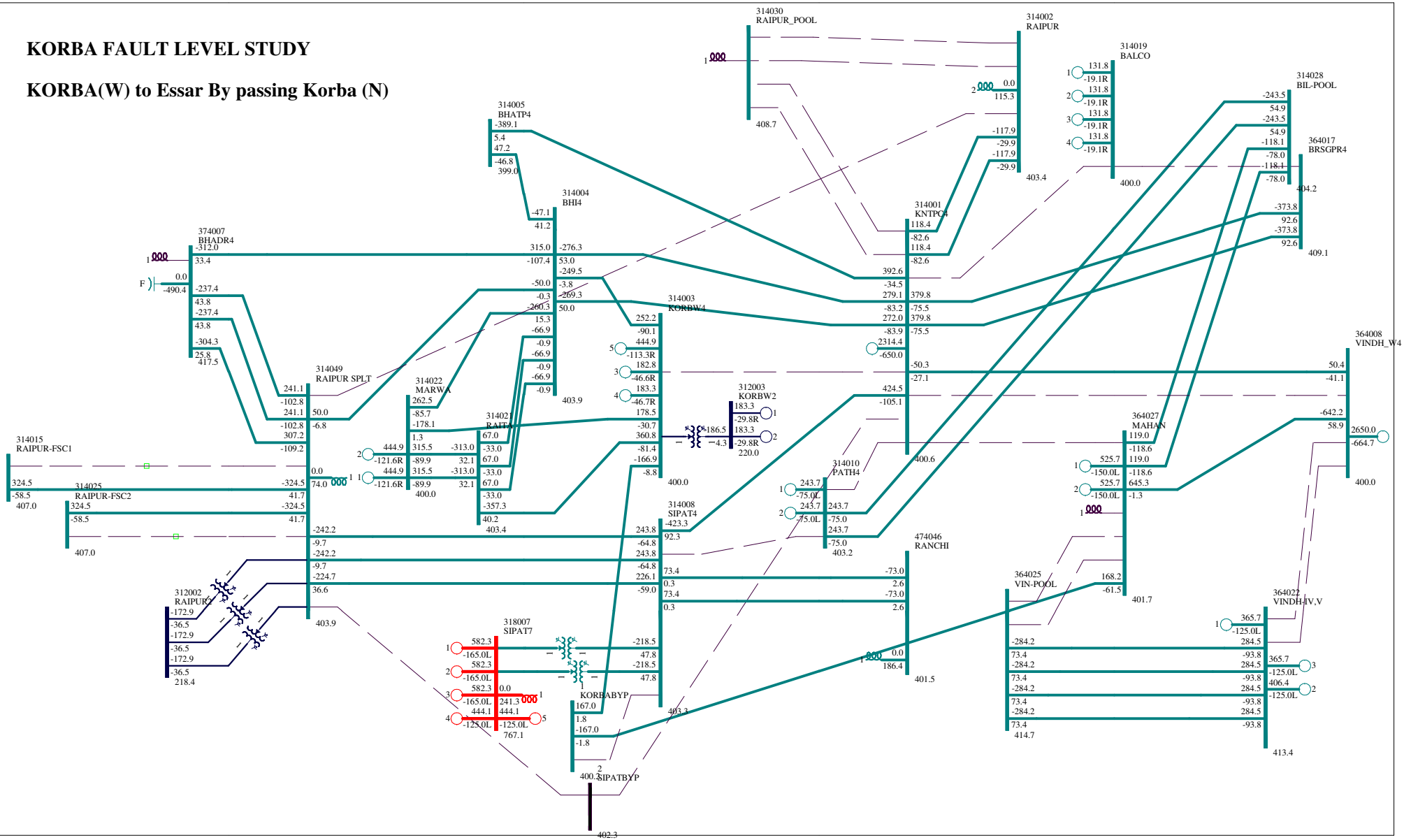
KORBA FAULT LEVEL STUDY

Bypass Korba NTPC: N-1-1_KORBA(W)-BHILAI & Korba (W)- Raita OUT



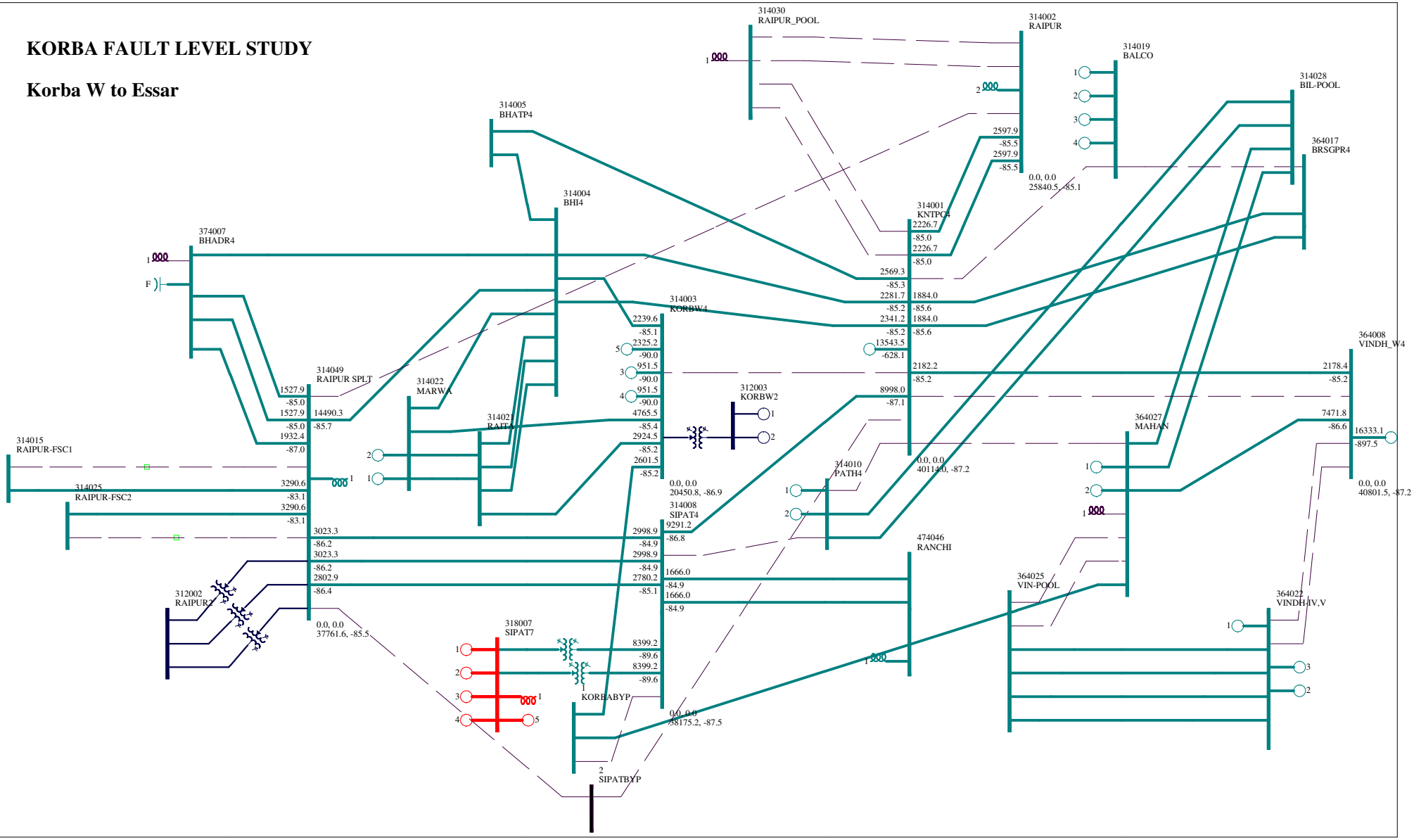
KORBA FAULT LEVEL STUDY

KORBA(W) to Essar By passing Korba (N)



KORBA FAULT LEVEL STUDY

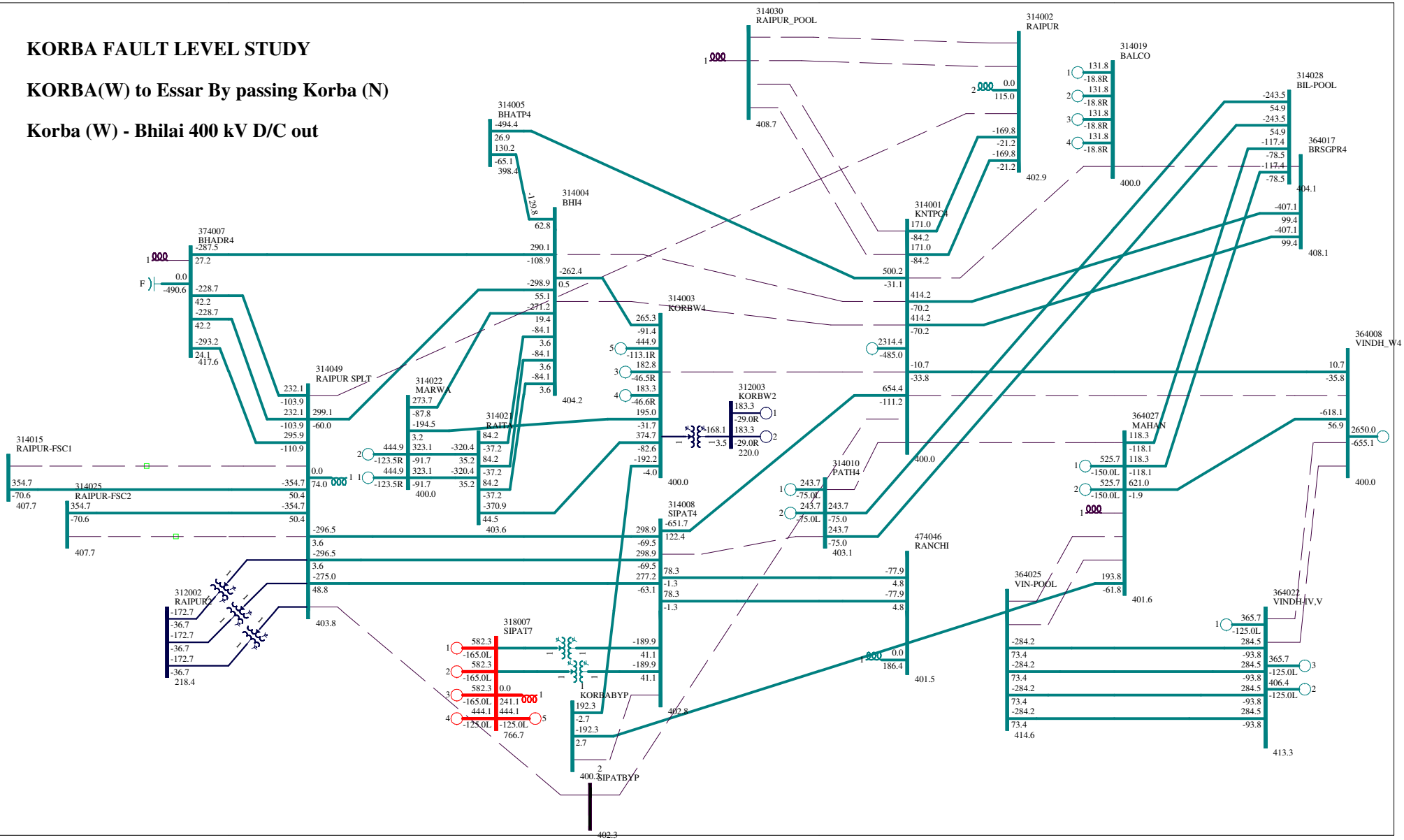
Korba W to Essar



KORBA FAULT LEVEL STUDY

KORBA(W) to Essar By passing Korba (N)

Korba (W) - Bhilai 400 kV D/C out



Annexure - 14.1

सत्यमेव जयते

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
विद्युत प्रणाली योजना एवं मूल्यांकन-I प्रभाग
Power System Planning & Appraisal-I Division

सं/ No. के.वि.प्रा./26/10/PSPA-I/2017/ 487-489 दिनांक /Date: 16.06.2017

सेवा में / To

1. COO (CTU), Power Grid Corporation of India Ltd., Saudamini, Plot No. 2, Sector – 29, Gurgaon – 122001
2. Executive Engineer (Projects), UT of Dadra & Nagar Haveli, Department of Electricity, Silvassa Ph. 0260-2642338/2230771

विषय / Subject: Minutes of the Meeting among CEA, CTU & DNH held on 01.06.2017 & 02.06.2017 at Silvassa, DNH to discuss and review the 220 kV outlets from Vapi II to DNH and intra state transmission system strengthening of DNH – reg.

महोदय / महोदया ,

The minutes of the meeting held on 01.06.2017 & 02.06.2017 at Silvassa, DNH to discuss and review the 220 kV outlets from Vapi II to DNH and intra state transmission system strengthening of DNH is enclosed.

भवदीय,

8/6/2017
(अवधेश कुमार यादव)
निदेशक

CC:
Member (PS), CEA

सेवा भवन, आर. के. पुरम-I, नई दिल्ली-110066 टेलीफैक्स: 011-26102045 ईमेल: pspandpa1.cea@gmail.com वेबसाइट: www.cea.nic.in
Sewa Bhawan, R.K Puram-I, New Delhi-110066 Telefax: 011-26102045 email: pspandpa1.cea@gmail.com Website: www.cea.nic.in

Minutes of the Meeting among CEA, CTU & DNH held on 01.06.2017 & 02.06.2017 at Silvassa, DNH to discuss and review the 220 kV outlets from Vapi II to DNH and intra state transmission system strengthening of DNH

In line with the decision of 41st meeting of Standing Committee on Power System Planning of Western Region (SCPSPWR) held on 21.12.2016, a meeting was held on 01.06.2017 & 02.06.2017 at Silvassa, DNH amongst CEA, CTU and DNH to discuss and review the 220 kV outlets from the 400/220kV Vapi II substation to DNH and intra state transmission system strengthening of DNH. The list of participants are enclosed at Annexure-I.

1. In the 41st meeting of SCPSPWR held on 21.12.2016, the following 220kV feeds from the 2x500MVA, 400/220kV Vapi-II substation and intra state system strengthening at 220 kV in DNH were proposed:

   I. 220kV feeds from the 2x500MVA, 400/220kV Vapi-II substation (**under ISTS**)
      a. Vapi-II – New Kharadpada 220kV D/c line (high capacity)
      b. Vapi-II – Sayali 220kV D/c line (high capacity)

   II. Intra-state Transmission System Strengthening in DNH network at 220 kV level
      a. LILO of 2nd ckt. of Vagchipa – Khadoli 220 kV DC line at Sayali Substation
      b. Kala (PG) – Khadoli 220kV 2nd D/c line (New)
      c. Kharadpada – New Kharadpada 220kV 2nd D/c line (New)
      d. Conversion of New Kharadpada 220kV switching station into 2x160MVA, 220/66 kV substation
      e. Augmentation of Transformation capacity at 220/66kV Vagchipa substation by 160 MVA (3rd ICT)

2. POWERGRID in their comprehensive system study of transmission network of DNH for 2021-22 time frame (considering the 400/220 kV,500 MVA ICT at Kala, Vagchipa and Sayali 2200/ 66 kV substations as additional augmentation in transmission system) has highlighted the following constraints, without the 220 kV feed to DNH from proposed 400/220 kV substation at Vapi-II:

   a. 3x315MVA, 400/220kV ICTs at Vapi (PG) and 2x315+1x500MVA, 400/220kV ICTs at Kala (PG) substations violate N-1 criteria
   b. With the commissioning of Kala – Kudus (MSETCL) 400kV D/c line overloading on Kala – Khadoli 220kV D/c line is observed. Further, Khadoli – Sayali 220kV line gets overloaded under outage of Vaghchipa – Sayali 220kV line. Kala (PG) – New Kharadpada 220kV D/c line does not satisfy n-1 contingency criteria.

c. Sayali – Rakholi 66kV D/c and Rakholi – Khadoli 66kV D/c lines are heavily loaded even under normal conditions and loading becomes worse under various outage conditions.
d. Kharadpada – Amli as well as Kharadpada – Piparia – Amli 66kV lines are very heavily loaded both under normal and outage conditions.
e. Vaghchipa 2x160MVA ICTs & Sayali 2x100MVA ICTs do not satisfy n-1 outage criteria.

For mitigation of the above constraints, the following augmentations has been proposed in the study report:

a. Vapi-II – New Kharadpada 220kV D/c line (high capacity)
b. Vapi-II – Sayali 220kV D/c line (high capacity)
c. LILO of 2nd ckt. of Vagchipa – Khadoli 220 kV DC line at Sayali Substation
d. Kala (PG) – Khadoli 220kV 2nd D/c line.
e. Kharadpada – New Kharadpada 220kV 2nd D/c line.
f. Conversion of New Kharadpada 220kV switching station into 2x160MVA, 220/66 kV substation
g. Augmentation of Transformation capacity at 220/66kV Vagchipa substationby 160 MVA (3rd ICT)
h. Vaghchipa – Dadra 66kV line, which is under construction, may be constructed with high capacity/HTLS conductor.
i. Khadoli (220/66kV) – Khadoli (66/11kV) 66kV D/c line shall have to be strengthened through another 66kV D/c line or re-conductoring with high capacity/HTLS conductor

3. Site visit of all the existing 220kV level substations of DNH viz. Kharadpada, New Kharadpada, Sayali and Khadoli substations was carried out on 01.06.2017 to assess the availability of space at these substations. It was found that space for additional 220kV bays is available at New Kharadpada (1 no.) and Khadoli (2 nos.) existing substations. There was space for creation of three no. of 220 kV GIS bay at Sayali out of which two nos. of bays has already been proposed by DNH for installation of 2X100 MVA ICTs at Sayali and one no. GIS bay could be utilised as line bay. DNH has also proposed establishment of Bhilosa 220 kV switching station by LILO of one ckt. of Vapi-Kharadpada 220 kV D/C line for giving supply to Bhilosa industries at 220 kV level.

   In view of the space constraint, it was observed that the implementation of following augmentations proposed in DNH system would not be possible:

   - Conversion of New Kharadpada 220kV switching station into 2x160MVA, 220/66 kV substation
   - Vapi-II – Sayali 220kV D/c line (high capacity)
   - Vapi-II – New Kharadpada 220kV D/c line (high capacity)
   - Kharadpada – New Kharadpada 220kV 2nd D/c line

4. Joint studies were carried out on 02.06.2017, wherein several alternatives of 220kV feed to DNH from the proposed 400/220 kV Vapi-II were studied. The augmentations to overcome the constraints listed under item 2 considering the space constraints at existing 220 kV substations were also studied (Study results enclosed at Annexure-II).

5. After detailed deliberations and power flow studies, the following transmission system was agreed:

I. 220 kV connectivity from 400/220 kV, 2X500 MVA Vapi – II substation to DNH (Transmission System under ISTS)

a. Vapi-II – Sayali D/C 220kV line (From Vapi-II upto LILO point of one circuit of Vapi(PG) –Khadoli 220kV D/C line at Sayali substation with ampacity equivalent to twin zebra conductor).
b. Interconnection with LILO section (of LILO of one circuit of Vapi(PG) – Khadoli 220kV D/C line at Sayali substation) so as to form Vapi-II – Sayali 220 kV D/C line and Vapi- Khadoli 220 kV D/C line. The LILO section is with zebra conductor.

II. Intra State system strengthening in DNH transmission network

220 kV system

a. Kala – Khadoli 220 kV (2^{nd}) D/C line.
b. Establishment of 220 kV switching station at Bhilosa (GIS) with provision of 8 nos. of 220 kV bays (4 nos. equipped line bays and 4 nos. future bays). (Out of the 4 equipped line bays, 2 nos. line bays are for LILO of one ckt. of Vapi- Kharadpada 220 kV D/C line at Bhilosa and 2 nos. line bays are for Bhilosa industries)
c. LILO of one ckt. of Vapi- Kharadpada 220 kV D/C line at Bhilosa.
d. Establishment of Vagchipa 220/66, 2X160 MVA substation by LILO of both ckts of Vapi-Khadoli 220 kV D/C line. (already under implementation).
e. Conversion of Sayali 220 kV switching station to 2X100 MVA, 220/66 kV substation.
f. Conductor replacement of the LILO section (of LILO of one circuit of Vapi(PG) –Khadoli 220kV D/C line at Sayali substation) with ampacity equivalent to twin zebra conductor depending on the loading of the lines in future, if required.

66 kV system

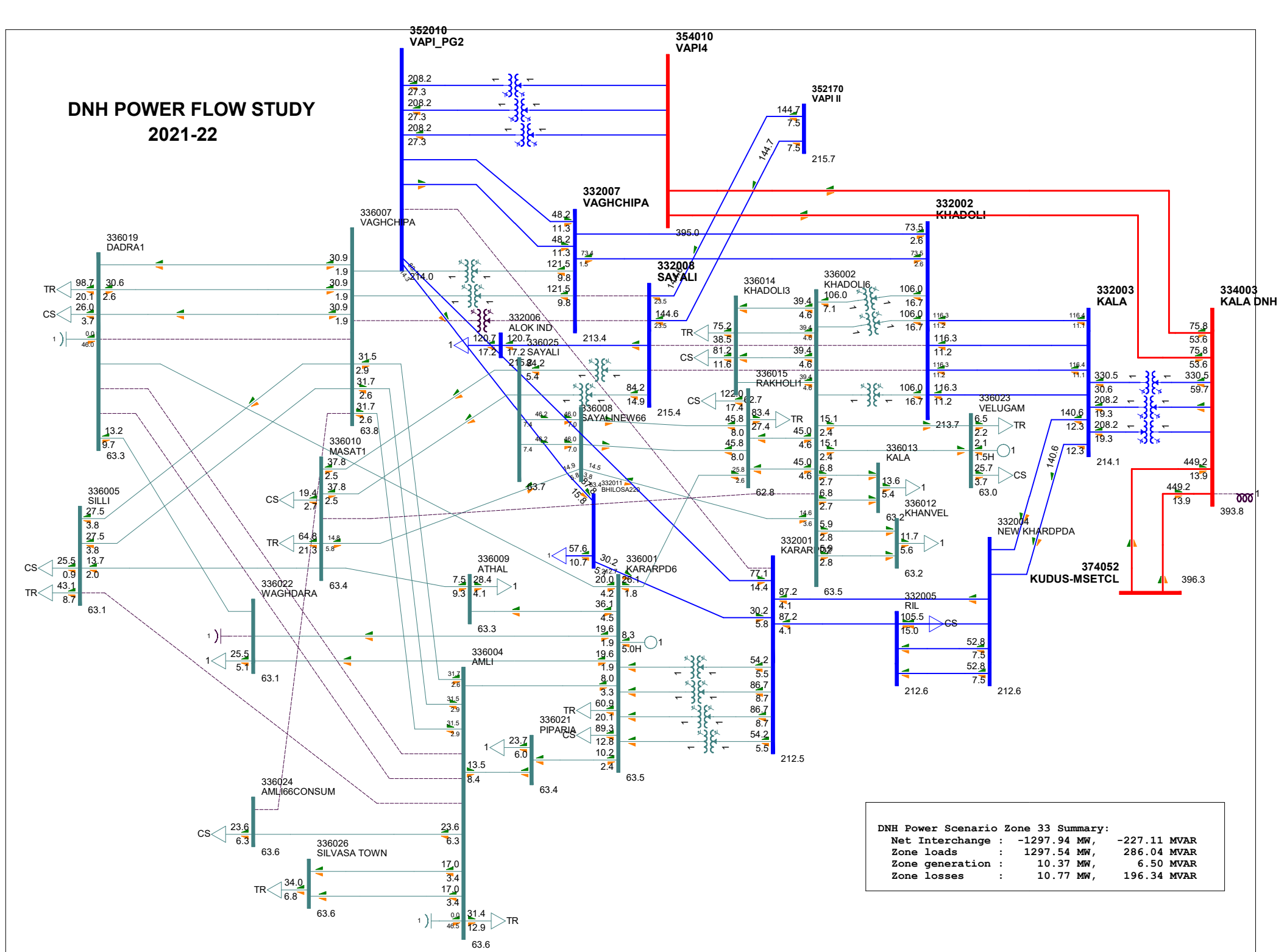
g. Establishment of three 66kV circuits between Vaghchipa & Dadra
h. Establishment of three 66kV circuits between Vaghchipa & Amli
i. 66 kV Vaghchipa – Silli D/C line

j. Establishment of Sayali new 66/11 kV substation with LILO of Sayali 220/66 kV- Rakholi 66 kV D/Cline at Sayali new and LILO of Masat – Khadoli 66kV S/C line at Sayali New 66/11kV S/s.
k. Amli- Silvassa Town 66 kV D/C line.
l. Shifting of about 20MVA bulk load from Amli to Silli

Annexure I

List of the participants of the meeting held on 1st to 2nd June 2017 at Silvasa, Dadra and Nagar Haveli to review transmission system of DNH.

S.No	Name & Designation	Organisation	E-mail & contact number
1	Awdhesh Kumar Yadav, Director	CEA	
2	Vikas Sachan, Asst. Director	CEA	
3	Ramchandra DGM	POWERGRID	ramachand@powergridindia.com Mob. 9910378128
4	Pratyush Singh Sr. Engineer	POWERGRID	Pratyush.singh@powergridindia.com Mob. 8826094863
5	H. M. Patel Executive Engineer	DNH	hmpatel39@gmail.com
6	H.C. Surma Asst. Engineer	DNH	hcsurma@gmail.com


DNH POWER FLOW STUDY
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354010
VAPI4
352170
VAPI II
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VAGHCHIPA
332008
SAYALI
332002
KHADOLI
332003
KALA
334003
KALA DNH
374052
KUDUS-MSETCL
336007
VAGHCHIPA
336019
DADRA1
336005
SILLI
336022
WAGHDARA
336010
MASAT1
336006
ALOK IND
336025
SAYALI
336008
SAYALINEW66
336014
KHADOLI3
336002
KHADOLI6
336015
RAKHOLI1
336023
VELUGAM
336013
KALA
336012
KHANVEL
332001
KARAR
332004
NEW KHARDPDA
332005
RIL
336009
ATHAL
336001
KARARPD6
336004
AMLI
336021
PIPARIA
336024
AMLI66CONSUM
336026
SILVASA TOWN
332011
BHILOSA220
DNH Power Scenario Zone 33 Summary:
Net Interchange : -1297.94 MW, -227.11 MVAR
Zone loads : 1297.54 MW, 286.04 MVAR
Zone generation : 10.37 MW, 6.50 MVAR
Zone losses : 10.77 MW, 196.34 MVAR

Annexure - 15.1

भारत सरकार / Government of India
विद्युत मंत्रालय / Ministry of Power
केन्द्रीय विद्युत प्राधिकरण / Central Electricity Authority
विद्युत प्रणाली योजना एवं मूल्यांकन- I प्रभाग
Power System Planning & Appraisal - I Division
सेवा भवन, आर.के.पुरम, नई दिल्ली - 110066
Sewa Bhawan, R. K. Puram, New Delhi-110066

[ISO 9001:2008]

संख्या:26/10/PSP&A-I/2017/ 254-259 दिनांक: 26.04.2017

सेवा में,

1. Member Secretary, WRPC, F – 3, Opp: SEEPZ, MIDC Area, Marol, Andheri (E), Mumbai - 400093
2. COO, CTU (Planning), PGCIL, Saudamani, Plot No. 2, Sector-29, Gurgaon-122001
3. CEO, POSOCO, B-9, Qutub Institutional Area, Katwaria Sarai, New Delhi-110016
4. Director (Operations), Mahatransco, Prakashganga, Plot No. C -19, Bandra (E), Mumbai – 400051
5. DGM, Reliance Power Transmission Limited, 5th floor, J M D Galleria, Sohna Road, Sector – 48, Gurgaon - 122018

विषय: **Minutes of the Meeting held on 12.04.2017 at CEA, New Delhi to discuss the issues related to low voltage in the areas of Solapur District, Maharashtra – reg.**

महोदय / महोदया,

Please find enclosed herewith the minutes of a special meeting held on 12.04.2017 at CEA to discuss the proposal of MSETCL – interim arrangement to address the low voltage problem in areas of Solapur district, Maharashtra. This is for kind information and necessary action.

भवदीय / Yours' faithfully,

शिवा सुमन
26/04/2017

(शिवा सुमन / Shiva Suman)
उप निदेशक / Dy. Director

सम्लग्न / Encl: यथोपरि / As above

प्रतिलिपि / CC: सदस्य (विद्युत प्रणाली) Member (PS), के वि प्रा / CEA

Minutes of Meeting held on 12.04.2017 to discuss the issues related to Low Voltage problem in Solapur area

The list of participants is enclosed as Annexure–I.

1.0 CE, PSP&A–I, CEA welcomed the participants for the meeting. He stated that this meeting has been called to discuss the interim arrangement proposed by MSETCL. The proposal involves charging a part of the existing 400 kV Solapur (PG)–Karad S/C line at 220 kV level using one circuit of under construction Solapur (PG)-Bale 220 kV D/C line as an interim arrangement. MSETCL has intimated that the proposal was to resolve low voltage problems in Solapur District during agriculture peak load. This interim arrangement has been discussed in 493rd OCC meeting held on 10th March, 2017 at Vindhyachal, wherein, it was deliberated that any reconfiguration of the network would require approval of CEA / CTU and the Reliance Power Transmission Ltd.

2.0 Director, PSP&A–I, CEA informed that MSETCL vide its letter no. MSETCL/CO/STU/2818 dated 18.03.2017 sent the proposal (copy enclosed as Annexure-II). He said that Parli–Karad 400 kV S/C line was LILO at 400 kV Lamboti S/s (i.e. Solapur - MSETCL). Subsequently, under WRTS–II, LILO of 400 kV Lamboti-Karad S/C line at Solapur (PG) was implemented by M/s Reliance Power Transmission Limited (RPTL).

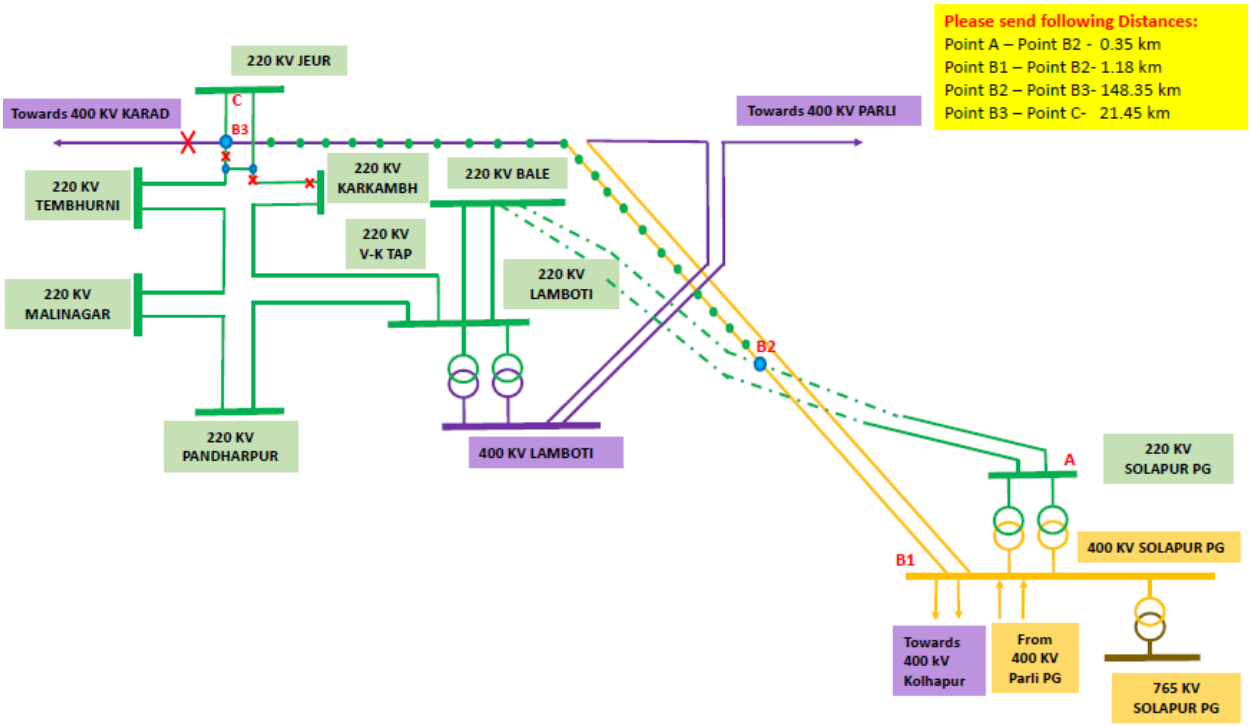
3.0 MSETCL representative intimated that 220 kV substations at Pandharpur, Malinagar, Jeur, Tembhurni and Karkambh of Solapur district are fed from 400/220 kV Lamboti S/s through radially connected 220 kV Lamboti – Karkambh – Jeur (189 km) line and 220 kV Lamboti – Pandarpur – Malinagar – Tembhurni – Jeur (166 km) line. During the peak agriculture load (6 AM to 12 Noon), these lines are loaded beyond SIL limit thus the low voltage observed at all above substations and the voltage at Lamboti S/s at 400 kV level is also low i.e. ranging from 370 kV to 400 kV. He informed that to address the low voltage problem, 220 kV Solapur (PG) – Bale D/C was planned and the same is under implementation (expected to be commissioned by September 2017). Further a 400/220 kV 2x500 MVA S/s at Tembhurni / Karjat is also planned in 2021–22 time frame to mitigate the low voltage problem.

4.0 MSETCL representative added that existing Solapur (PG)–Karad 400 kV S/C line is crossing 220 kV Solapur (PG)–Bale D/C line, Karkambh–Jeur S/C line and Tembhurni – Jeur S/C line. The present proposal is to charge a section of Solapur (PG) – Karad 400 kV S/C line at 220 kV by interconnecting it with part of 220 kV Solapur (PG)-Bale (one circuit) line and Tembhurni–Jeur 220 kV S/C line so as to form Solapur (PG)–Jeur 220 kV S/C line.

5.0 CE, PSP&A–I, CEA stated that from the proposal submitted by MSETCL, it is observed that some portion of 400 kV Solapur-Karad S/c line at Solapur (PG) and Karad end would remain unutilized. The proposal also involves tapping (formation T) at 220 kV level at some points. He added that section 44 (6) of CEA Regulations, 2010 (Measures relating

Safety and Electric Supply), states, "*There shall not be tapping of another transmission line from main line for 66 kV and above class of lines*".

6.0 MSETCL representative agreed to modify the scheme so as to remove all tappings at 220 kV voltage level. In the revised schematic Solapur (PG) would be connected to Jeur and Jeur - Karkambh line would be opened at suitable location and Jeur would be connected to Tembhurni at that location. The idle section of Jeur - Karkambh line from Karkambh end may be charged for anti-theft purpose. Similarly, idle sections of Solapur (PG) - Karad line from Solapur (PG) and from Karad ends may also be charged to avoid theft. The schematic of the above proposal is given below:



Block diagram – interconnection of various S/s of Solapur area

7.0 Director, PSP&A–I stated that the study results submitted by MSETCL indicate 257 MW of power flowing through 220 kV Solapur (PG) – Jeur line. This means that 220 section of Solapur (PG) - Bale line is over loaded. He suggested that MSETCL must explore the possibility of charging idle section of Solapur (PG) - Karad line from Karad end at 220 kV and connect it to Tembhurni or Karkhamb S/s so as to provide additional feed to area around Jeur.

8.0 MSECTCL representative stated that Solapur (PG) - Bale 220 kV D/C line has been designed for maximum operating temperature of 85°C. As per CEA planning criterion, the 220 kV S/c line with ACSR Zebra conductor can carry 769A (264 MW at 0.9 power factor) with ambient temperature of 40°C. The loading of 257 MW is for peak agriculture load during morning hours, when the ambient temperature is also low. The charging of idle

section of Solapur – Karad line from Karad end at 220 kV would require one no. 220 kV bay at Karad and shifting of line from 400 kV portion of the switchyard to 220 kV switchyard. MSETCL agreed to explore the possibility.

9.0 CTU representative stated that 400 kV Lamboti is a weak source and studies indicate a voltage difference of 10 kV between Solapur (PG) and Lamboti at 400 kV. He suggested that a 400 kV D/C interconnection may be planned between Solapur (PG) and Lamboti. MSETCL was requested to examine the proposal of bypassing the LILO of Karad – Parli at both Solapur (PG) and Lamboti S/s and interconnect LILO portions to form Solapur (PG) – Lamboti 400 D/C line. MSETCL agreed to explore this option.

10.0 NLDC representative stated that M/s MSETCL should implement Under Voltage Load Shedding (UVLS) relays at all its S/s at the earliest, in order to improve grid safety and security. It was also suggested that in order to improve the voltage profile, adequate reactive compensation at 33 kV and below voltage level may be implemented by MSETCL at the earliest. MSETCL agreed for the same.

11.0 Representative of M/s Reliance Power Transmission Limited expressed concern about the recovery of tariff and availability of the LILO portion i.e. LILO of Lamboti - Karad 400 kV S/C line at Solapur (PG) implemented by M/s RPTL after implementation of this interim arrangement. He informed that the transmission asset of RPTL has been mortgaged and consent from lenders would be required. He added that change of ownership of the transmission asset is under process and prior consent of new owner would be required.

12.0 CE (PSPA-I), CEA stated that there will be no impact on transmission tariff and availability after the implementation of the interim arrangement. This being an ISTS asset, the manner of usage of this asset would be decided by CEA, CTU and the constituents of Western Region. Therefore, no permission from lenders / prospective owner is required. CTU representative stated that their 1 no. of 400 kV bay at Solapur (PG) should also be deemed 100% available, as per regulatory norms.

13.0 After further deliberations, following was agreed.

i) The proposal of MSETCL as shown in the block diagram above was agreed as an interim arrangement to mitigate the low voltage problem faced in Solapur district.

ii) The interim arrangement shall be disconnected by Dec, 2017 or after the completion of Solapur (PG) – Bale 220 kV D/C line, whichever is earlier.

iii) The above proposal is agreed in principle and the proposal would be put up in forthcoming meeting of the Standing Committee on Power System Planning of Western Region for ratification.

iv) All the expenditure for implementation of the interim arrangement and its restoration shall be borne by M/s MSETCL.

v) MSETCL shall expedite the implementation of 400/220 kV Tembhurni / Karjat sub-station along with upstream and downstream network.

vi) MSETCL shall implement Under Voltage Load Shedding (UVLS) relays at all its S/s at the earliest and provide adequate reactive compensation at 33 kV and below voltage level in Solapur district at the earliest.

vii) MSETCL shall explore interconnection between Solapur (PG) – Lamboti (MSETCL) by using LILO portions of Parli - Karad 400 kV line at Solapur (PG) and Lamboti.

viii) The idle section of Solapur (PG) – Karad 400kV S/c line along with the line bays at Solapur (PG) end shall be deemed 100% available subjected to regulatory norms.

The meeting ended with thanks to the chair.

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Annexure - I

List of participants of the meeting held on 12.04.2017 at CEA, New Delhi to discuss the issues related to low voltage problem in the areas of Solapur District, Maharashtra.

S. No.	Name	Designation & Organization	Contact No.	e - mail ID
1	Shri. Ravindra Gupta	Chief Engineer, CEA	9968286184	ravindergupta_cea@nic.in
2	Shri. Awdhesh Kumar Yadav	Director, CEA	9868664087	awd.cea@gmail.com
3	Shri. Shiva Suman	Dy. Director, CEA	9013929260	shivvasumanmedak@gmail.com
4	Shri. Vikas Sachan	Assistant Director, CEA	7838263649	vikas.cea@gov.in
5	Shri. Nitin Deswal	Assistant Director, CEA	9717818349	nitindeswal@nic.in
6	Shri. Ashok Pal	GM (CTU-Plg)	9910378105	ashok@powergridindia.com
7	Shri. Pratyush Singh	Engineer (CTU-Plg)	8826094863	pratush.singh@powergridindia.com
8	Shri. N. Nallarasan	DGM (POSOCO)	8527077022	nallarasan@posoco.in
9	Shri. R. H. Satpute	SE (MSETCL)	9930128535	ravindra.rhs@rediffmail.com
10	Shri. Vinay G. Khedekar	Add. EE (MSETCL)	9619850189	khedekarvg@yahoo.com
11	Shri. Naveen Nagpal	DGM (RPTL)	9350718386	naveen.nagpal@relianceada.com

महापारेषण

MAHARASHTRA STATE ELECTRICITY TRANSMISSION COMPANY LIMITED

CIN No: U40109MH2005SGC153646

Name of Office : Office of the Director (Project)
Office Address : Prakashganga, 8th floor, Plot C -19, E - block, BKC, Bandra (E), Mumbai: 400051.
Contact No. : (O) (022) 2659 5004, **(P)** (022)-2659 2162, **Fax:** (022) – 2659 5258
E-Mail Id : dirprj@mahatransco.in **Website :** www.mahatransco.in

MSETCL/CO/STU/ No - 2818 **Date:** 18 MAR 2017

To,
Chief Engineer (SP&PA),
Central Electricity Authority,
Sevabhavan, R. K. Puram,
New Delhi-110066
Fax – 011 26102045

Sub: - Proposal for charging of 400 kV Solapur PG – Karad line on 220 kV Level as an interim arrangement for resolving low voltage problems in Solapur District.

Ref: - 1) Letter from this office no. MSETCL/CO/STU/2349 dated 06/03/2017.

Sir,

With ref to above subject, it is to submit that, at present MSETCL is observing Low Voltage problems regularly at Pandharpur, Malinagar, Jeur, Tembhurni and Karkambh S/s in Solapur District during Agriculture peak load.

While analyzing the low voltage problem, it is observed that the demand in Pandharpur, Malinagar, Jeur, Tembhurni and Karkambh area is around 580 MW associated with 245 MVAR reactive power. This demand is mainly catered by 220 kV Lamboti – Karkambh – Jeur – 189 km and 220 kV Lamboti – Pandharpur – Malinagar – Tembhurni – Jeur line – 166 km, which are operated radially due to transmission constraints. This long lines are loaded beyond SIL limit causing low voltage problem.

Also, incoming voltage at 400 kV Lamboti during peak hours is always on lower side ranging from 370 kV to 400 kV, being weak 400 kV source.

In view of above, to remove above said constraints 400 kV Tembhurni/ Karjat S/s is considered in STU plan for year 2021-22. However, till commissioning of 400 kV Tembhurni/ Karjat S/s, it is necessary to make immediate short arrangement to resolve the issue.

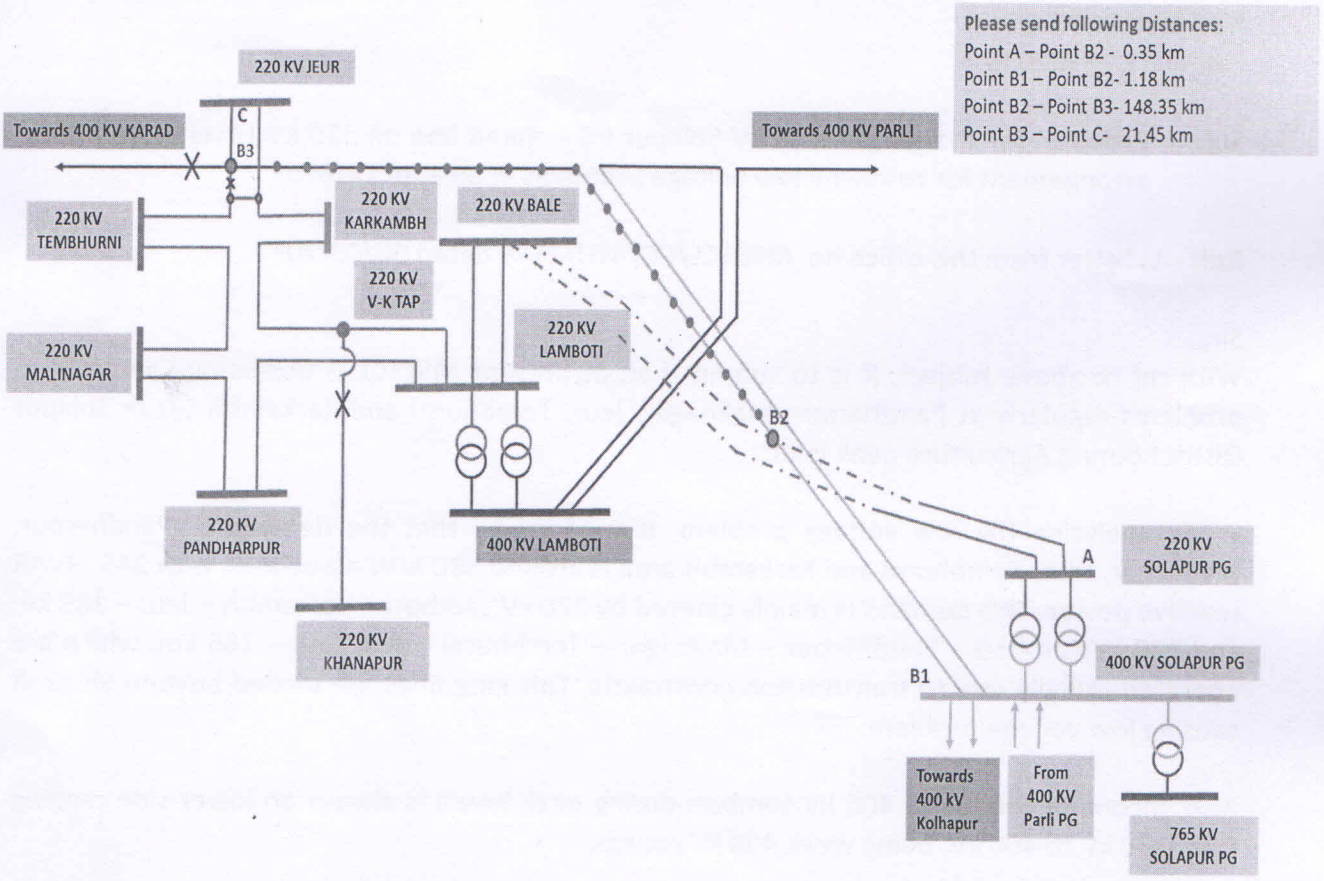
Sub: - *Proposal for charging of 400 kV Solapur PG – Karad line on 220 kV Level as an interim arrangement for resolving low voltage problems in Solapur District.*

Hence, the proposal for charging of 400 KV Solapur (PG) to Karad line on 220 KV as an interim arrangement was submitted vide letter cited under ref. (1), to CTU, WRLDC and WRPC..

Further, the proposal was discussed in detail in 493rd OCC of Western Region held on 10.03.2017. All the authorities were appraised on the relevant aspects of proposed arrangement, interfacing, benefits, system studies, load flows after re-alignment, POC implication etc. There was in principle agreement with the proposal subject to SCM approval.

Accordingly, following proposal is put forth for kind consideration.

SLD of Interim arrangement



Load Flow Study:

The load flow study is simulated with following cases.

Base Case: With Existing network.

Case-1: With conversion of 400 kV Solapur PG –Karad line to 220 kV Solapur PG – Jeur S/c line.

The study results are as below.

Bus Voltages:

Sr. No.	Bus	BASE CASE Voltages in KV	Case-1 Voltages in KV
1	400 kV Solapur (PG)	0.985	0.986
2	400 kV Solapur (MSETCL)	0.956	0.976
3	220 kV Solapur (PG)	0.982	0.980
4	220 kV Lamboti	0.937	0.976
5	220 kV Jeur	0.871	0.950
6	132 kV Jeur	0.879	0.954
7	33 kV Jeur	0.843	0.924
8	220 kV Karkambh	0.895	0.944
9	33 kV Karkambh	0.871	0.921
10	220 kV Tembhurni	0.862	0.933
11	33 kV Tembhurni	0.850	0.924
12	220 KV Malinagar	0.857	0.920
13	132 KV Malinagar	0.852	0.913
14	33 KV Malinagar	0.835	0.900
15	220 KV Pandharpur	0.886	0.938
16	33 KV Pandharpur	0.886	0.904

Line Flows:

Sr. No.	Lines	BASE CASE Flow in MW	Case-1 Flow in MW
1	400 KV Solapur (PG) - Karad S/C	200	OUT
2	400 KV Solapur (PG) - Solapur S/C	285	222
3	220 KV Solapur (PG) - Jeur S/C	NA	257
4	220 KV Lamboti - VK_Tap S/C	150	83
5	220 KV VK_Tap S/C - Karkamb	181	82
	220 KV Karkamb – Jeur S/C	139	-
6	220 KV Karkamb – T-Tembhurni S/C	-	42
	220 KV Tembhurni – T-Tembhurni S/C	-	172
	220 KV T-Tembhurni - Jeur S/C	-	131
7	220 KV Jeur - Tembhurni S/C	63	OUT
8	220 KV Tembhurni - Malinagar S/C	30	139
9	220 KV Pandharpur - Malinagar S/C	134	64
10	220 KV Lamboti - Pandharpur S/C	226	182
11	400 / 220 Solapur (PG) {2x315 MVA}	39	296
12	440 / 220 KV Lamboti {2x500 MVA}	662	560
13	400 / 220 Karad {3x315 MVA}	351	300

Sub: - *Proposal for charging of 400 kV Solapur PG – Karad line on 220 kV Level as an interim arrangement for resolving low voltage problems in Solapur District.*

Observation:

Base Case (Load Flow study for existing network)

- It is observed that the Voltages of 220 KV, 132 KV and 33 KV Jeur bus are below its rated value i.e. 192 kV, 116 kV & 28 kV respectively.
- Also, Voltages at 220 KV Tembhurni, 220 KV Malinagar and 220 KV Karkamb are very low during peak hours.

Case-1: (Charging of 400 kV Solapur PG – Karad line on 220 kV by converting it to 220 kV Solapur PG – Jeur S/c line by suitable connection arrangement at intersecting section of 400 kV Solapur PG – Karad line near 220 kV Jeur S/s)

- Voltage improvement is observed after the interim arrangement, Voltages of 220 KV, 132 KV and 33 KV Jeur bus are improved up to 209 kV, 126 kV & 31 kV respectively. Also Voltages at 220 KV Tembhurni, 220 KV Malinagar and 220 KV Karkamb are observed to be improved and within permissible limit.
- The loading of 220 KV Solapur (PG) – Jeur Line is 257 MW. Which will give relief to lines emanating from 400/220 kV Lamboti S/s. Also, it will give relief to 400/220 kV ICT by 100 MW.
- With the interim arrangement, flow of 400/220 KV, 2 X315 MVA ICT at 400 KV Solapur PG is increased from 39 MW to 296 MW, thereby improving its utilization.

Benefits:

1. Additional 220 kV strong source will be available for Jeur, Malinagar, Tembhurni and Karkambh.
2. This arrangement will give relief to 400/220 kV Lamboti ICT.
3. Power flow of 400/220 kV Solapur PG will increase from 40 MW to 340 MW, thereby improving its utilization.
4. Voltages profile of Jeur, Tembhurni, Malinagar and Karkambh will improve.

Proposal from STU:

In view of above, you are requested to approve the above proposal for charging of 400 kV Solapur PG – Karad line on 220 kV Level as an interim arrangement till commissioning of 400 kV S/s Tembhurni/400 kV Karjat.

It is also requested to take this matter for discussion in special SCM along with PGCIL, WRLDC and R-Infra Transmission officials.

Thanking You.

Yours faithfully,

Director (Project)
MSETCL

Copy s.w.r.s. to:

1) Chairman & Managing Director, MSETCL, C.O. Mumbai
2) The Member Secretary, Western Regional Power Committee, F-3, MIDC Area, Andheri (East), Mumbai – 400093
3) Director (Project), PGCIL Saudamini, Plot No. 2, Sector-29, Gurgaon-122001, Haryana, Fax – 0124 2571932
4) Executive Director (WRTS-I) Power Grid Corporation of India Ltd., Regional Headquarters Sampriti Nagar, Nari Ring Road, P.O. : Uppalwadi, Nagpur, Pin Code–440 026.
5) The Genaral Manager, Western Region Load Dispatch Centre, F-3, MIDC Area, Andheri (E.), Marol, Mumbai – 400093

Copy to:

1) Chief Engineer (STU)/(Project Schemes)/(O&M), MSETCL, C.O., Mumbai
2) Chief Engineer (SLDC), Kalwa.
3) Chief Engineer, EHV CC O&M, Pune.

महापारेषण

MAHARASHTRA STATE ELECTRICITY TRANSMISSION COMPANY LIMITED

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Office Address : Prakashganga, 8th floor, Plot C -19, E - block, BKC, Bandra (E), Mumbai: 400051.
Contact No. : (O) (022) 2659 5003, **(P)** (022)-2659 2236, **Fax:** (022) – 2659 0383
E-Mail Id : dirprj@mahatransco.in **Website :** www.mahatransco.in

MSETCL/CO/STU/ No - 5607 Date: 29 MAY 201

To,

Chief Engineer (SP&PA), Central Electricity Authority, Sevabhavan, R.K.Puram, New Delhi-110066 Fax – 011 26102045.	**COO, CTU, PGCIL** Saudamini, Plot No. 2, Sector-29, Gurgaon-122001, Haryana Fax – 0124 2571809.

Sub: - Consent for Interconnection of MSETCL Lines with PGCIL Lines.

Ref: - M/s. Tata Power Co. Ltd's Letter No. TP/VRS/2017/168 dtd. 14.03.2017.

Sir,

With reference to the above, it is to inform that M/s. Tata Power Co. Ltd., has planned to connect to 400 kV MSETCL network by making LILO arrangement on 400 kV Talegaon (PG)- Kalwa ckt for their 400 kV Vikhroli S/S planned for the year 2021-22 in the STU five year plan the details are as follows,

Sr. No.	Name of Line	Length of Line CKT Km.	District	Year / Remarks
1	LILO of 400 kV Talegaon (PG)- Kalwa Line at Vikhroli (2021-22)	14	Mumbai	To have alternate source to import power from Maharashtra grid.

Further, STU has planned new EHV S/S and EHV lines included in the STU five year plan which are proposed to be connected with the PGCIL sub-stations for system strengthening point of view. The scope of the scheme and the details of the lines are as under:

INTERCONNECTION OF MSETCL WITH PGCIL LINES PROPOSED IN THE PLAN

Sr. No.	Interconnection at PGCIL sub-station.	Name of Line	Year / Remarks
1	400 kV Wardha(PG)	220 KV Wardha(PG) –Yavatmal D/C line – 140 Km (Instead of 220 kV Wardha(PG)-Ghatodi	FY 2017-18 (WIP) Bay already allotted
2	400 kV Solapur (PG)	220 kV DC line from 400 kV Solapur (PG) - 220 kV Bale	FY 2016-17 (WIP) Bays allocated

Sr. No.	Interconnection at PGCIL sub-station.	Name of Line	Year / Remarks
3	400 kV Talegaon (PG)	Conversion of existing 220 kV S/C Urse - Chinchwad line to M/C line for portion between Chinchwad substation to prop 220 kV PGCIL Talegaon line LILO point (Loc. No. 50) -58.1 kM	FY 2016-17 (WIP)
4	400/220 kV Padghe – II (Kudus)	LILO of one circuit of 400 kV Tarapur – Padghe D/C at Padghe – II (Kudus) – 15 kms	FY 2017-18 (WIP)
5	400 kV Aurangabad(PG)	LILO on one ckt of 220 kV Aurangabad (PG) - Shendra D/C line at 220 kV Phulambri.	FY 2019-20 Bays not required
6	400 kV Parli(PG)	LILO on Single ckt of 220 kV Parli - Harangul line at Parli (PG) – 20 Km	FY 2018-19 02 Bays required at Parli PG
7		LILO on 220 kV Parli -Osmanabad S/C line at Parli (PG) – 10 Km	FY 2018-19 02 Bays required at Parli PG
8	400 kV Solapur (PG)	LILO of second ckt of 400 kV South Solapur (PG) - Kolhapur DC line at 400 kV Alkud – 30 ckt kms	FY 2016-17 Bays not required
9	400 kV Pune (PG)	LILO on both circuits of 400 kV Parli (PG) – 765 kV Pune (PG) DC line at Lonikand – II	FY 2017-18 Bays not required
10	400 kV Boisar PG	LILO of one ckt of 220 kV Borivali - Boisar (M) M/C line at Boisar PG and 220 kV Nalasopara at Boisar PG Idle line	FY 2016-17 Bays already allocated
11	400/220 kV Balsane (Shivajinagar)	LILO of both ckt of 400 kV Dhule – Sardar Sarovar D/C line at 400 kV Balsane Pooling S/s - 36 ckt kms	FY 2019-20 Bays not required

It is requested to take up further needful action for including above proposal in the ensuing Standing Committee Meeting.

Thanking You.

Yours faithfully,

Director (Projects)
MSETCL

Copy s.w.r.s. to:

1) **Chairman & Managing Director, MSETCL, C.O. Mumbai**
2) **Director (Project), PGCIL,** Saudamini, Plot No. 2, Sector-29, Gurgaon-122001
3) **Member Secretary,** WRPC, MIDC Area, Marol, Andheri East, Mumbai - 400 094
   ... It is requested to take this matter for discussion in ensuing WRPC meeting.

Copy to:

1) Chief Engineer (STU)/(P&D)/ (C&M), MSETCL, C.O., Mumbai
2) Chief Engineer (SLDC), Kalwa.
3) Chief Engineer, EHV CC O&M,Vashi.