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

सं.: 51/4/(41वी)/वि.प्र.यो.मू- 2/2017/ 1172–1185 दिनांक:12 सितम्बर, 2017
No.: 51/4/(41st)/PSPA-II/2017/ Dated:12th September, 2017

सेवा मे / To,

संलग्न सूची के अनुसार
As per list enclosed

विषय: दक्षिणी क्षेत्र के लिए विद्युत प्रणाली योजना पर स्थायी समिति की 41 वीं बैठक की कार्यसूची।
Subject: Agenda for 41st meeting of Standing Committee on Power System Planning for Southern Region.

महोदय(Sir)/महोदया(Madam),

दक्षिणी क्षेत्र के लिए विद्युत प्रणाली योजना पर स्थायी समिति की 41 वीं बैठक 22सितंबर 2017 को 10:00 बजे से चेन्नई (तमिलनाडु) में आयोजित की जायेगी। बैठक की कार्यसूची संलग्न है। कृपया बैठक में सम्मिलित होकर अनुग्रहीत करें।

The 41st meeting of the Standing Committee on Power System Planning of Southern Region will be held at 10:00 hrs on 22nd September 2017 at Chennai (Tamilnadu). Agenda for the meeting is enclosed.

Kindly make it convenient to attend the meeting.

भवदीय/Yours faithfully,

12/9/2017

(एस.के.राय.महापात्र/S.K.Ray Mohapatra)
मुख्य अभियंता/ Chief Engineer

Agenda Note for 41st Meeting of Standing Committee on Power System Planning in Southern Region (SCPSPSR)

Date: 22.09.2017; **Time**: **10:00 Hrs**

Venue: Chennai, Tamilnadu

1.0 Confirmation of the minutes of 40th meeting of the Standing Committee

The Minutes of 40th meeting of the Standing Committee on Power System Planning of Southern Region held on 19th November, 2016, were issued vide CEA's letter No. 51/4/(40th)/ PSPA-II 2016/ 92-103 dated 16th February 2017.

Based on observations of APTRANSCO, the corrigendum was issued vide CEA's letter no. 51/4/(40th)/PSPA-II-2017/245-258 dated 17th March, 2017.

No comments have been received. The minutes of 40th Meeting as circulated, along with corrigendum, may be confirmed.

Follow up issues of previous meetings of SCPSPSR

2.0 Temporary Rearrangement of 400 kV Vemagiri-I(AP)-Vemagiri-II(PG) D/C transmission line till the commissioning of "Strengthening of transmission system beyond Vemagiri" Scheme

2.1 In the 39th Standing Committee Meeting Power Grid informed that in the absence of the scheme - "Strengthening of transmission system beyond Vemagiri" and with generation at East Coast, 400 kV Vemagiri-I(AP)-Vemagiri-II(PG) D/C line will be 'Limiting Constraint' and Total Transfer Capacity(TTC) for import of power to Southern Region gets adversely affected.

2.2 In order to relieve overloading of Vemagiri-I(AP)-Vemagiri-II(PG), different options were studied. It was proposed that one circuit of Vemagiri(PG)-Vemagiri(AP) may be connected with KV Kota and other circuit may be connected to Vijayawada (PG). The issue was also discussed in the Joint Meeting of Southern Region held in Bangalore during 14-17 March, 2016 and 40th Standing Committee meeting.

2.3 In the 40th CTU Standing Committee meeting PGCIL informed that the proposed rearrangement is an interim arrangement required for about one and half years and will be restored with the commissioning of "Strengthening of transmission system beyond Vemagiri".

2.4 Scheduled COD of "Strengthening of transmission system beyond Vemagiri" is April 2019. PGCIL vide their letter dated 16.03.2017 had requested for early commissioning of the scheme.

2.5 Members may discuss.

3.0 Temporary arrangement at Bidadi GIS for connecting one circuit of 400kV D/C Tumkur (Vasanthanarsapura)- Bidadi Quad line with one circuit of 400kV D/C Bidadi- Nelamangala line.

3.1 In the 39th Standing committee meeting PGCIL proposed the following arrangement for Bidadi GIS:

a) For termination at Bidadi GIS, it is proposed to interconnect one circuit of Tumkur (Vasanthanarsapura)- Bidadi Quad line with one circuit of 400kV D/C Bidadi-Nelamangala line and the remaining circuit from Tumkur (Vasanthanarsapura) will be terminated at Bidadi GIS utilizing the vacated bay.

b) For termination at Tumkur (Vasanthanarsapura) S/S, available bays 400kV D/C Tumkur (Vasanthanarsapura)- Yelahanka line(as this line is stuck up in RoW issue) can be utilized for Tumkur (Vasanthanarsapura)- Bidadi Quad D/C line.

3.2 GM(SR-II), POWERGRID informed that bays at Tumkur (Vasanthanarsapura) and Bidadi for Tumkur (Vasanthanarsapura) – Bidadi 400kV Quad D/C line would be ready by March, 2017 and this temporary arrangement would be restored after completion of the bays.

3.3 PGCIL may update.

4.0 Edayarpalayam 400/230-110kV S/S under the scope of TANTRANSCO

4.1 In 38th SCPSPSR it was decided that establishment of Edayarpalayam 400/230-110 kV substation with 2x500MVA transformer at Edayarpalyam and 2x125 MVAr bus reactors will be in the scope of TANTRANSCO while Edayarpalayam – Myvady (Udumelpet) 400 kV D/C quad line will be in the scope of PGCIL.

4.2 During 40th Standing Committee meeting TANTRANSCO requested that "Edayarpalayam- Myvady 400 kV D/C quad line in the scope of PGCIL may be dropped and instead of that Edayarpalayam – Anikadavu 400 kV D/C quad line shall be taken up by TANTRANSCO". In this way, the wind power injected in the Edayarpalayam 400kV S/S will be transmitted to the wind corridor of Thoppakundu-Anikadavu- Rasipalayam 400kV S/S. CEA had suggested that both the lines can be considered i.e Edayarpalyam-Myvady 400kV D/C quad line and Edayarpalayam – Anikadavu 400 kV D/C quad line after proper studies.

4.3 TANTRANSCO vide their letter dated 24.08.2017 (Annexure-4.1) requested to revise ATS of the 400kV connectivity for the establishment of Edayarpalyam 400/230-110kV S/S as shown below:

400kV connectivity

Under PGCIL's Scope

i. PGCIL Myvadi –Edayarpalyam ,400kV D/C quad line

ii. Puglaur HVD/C station- Edayarpalyam ,400kV D/C quad line

Under TANTRANSCO's Scope

i. LILO of Myvady- Anaikadavu 400kV S/C line at Edayarpalyam

ii. 400kV D/C line from sanctioned Coimbatore 765/400kV S/S to Edayarpalyam

iii. 3x315 MVA ,400/230kV ICTs instead of 2x500 MVA 40/0230kV ICTs and 3x200 MVA, 400/110kV ICTs at Edayarpalyam

4.4 TANTRANSCO has carried out study duly incorporating above system for different scenarios (result enclosed at Annexure 4.2)

4.5 Members may discuss.

5.0 Transmission system for evacuation of power from Uppur TPS (2x800 MW) of TNEB in Tamil Nadu.

5.1 During the joint study meeting held on 14-17 March, 2016 at SRPC office, Bangalore "Transmission system for evacuation of power from Uppur TPS (2x800 MW) of TNEB in Tamil Nadu" was discussed. In the 40th SCPSPSR, TANTRANSCO furnished the following Transmission system for evacuation of power from Uppur TPS (2x800 MW) and load flow studies:

ATS for UPPUR – 2X800MW project:

i) 765kV D/C line from Uppur switchyard to Virudhunagar 765/400kV substation.

ii) 2X240MVAR, 765kV bus reactors at the Uppur 765kV switchyard.

Establishment of 765/400kV S/S in Virudhunagar (For Uppur ATS and Renewable Generation Pooling):

2X1500MVA, 765/400kV ICTs with the following 765kV and 400kV connectivity

765kV Connectivity:

i) 765kV D/C connectivity to the Coimbatore 765/400kV S/S with 240MVAR, 765kV switchable line reactors at each line at both ends.

ii) 765kV D/C connectivity to the Ariyalur 765/400kV S/S with 240MVAR, 765kV switchable line reactors at each line at both ends. This line work will be taken up with the proposal of Udangudi Thermal power projects Stage II & III (each 2X660MW).

400kV Connectivity:

i) 400kV D/C Quad line from Kayathar 400kV S/S.

ii) 400kV D/C Quad line from Kamuthi 400kV S/S.

iii) 400kV D/C twin moose line from Thappagundu 400kV S/S.

5.2 In the meeting CTU said that in the preliminary studies carried out March 2016, it has been observed that there is lot of injection from state generation to the ISTS network. Therefore, detailed studies with proper LGBR for Tamil nadu and SR as a whole may be needed

5.3 A joint meeting was held with officials from CEA, CTU and TANTRANSCO on 23.01.17, in the office of POWERGRID, Gurgaon. Simulation studies was carried out for 2020-21-time frame considering Tamil Nadu load as 20270 MW (based on draft 19th EPS). State Generation of about 12000 MW and CGS/LTA allocation of about 9000 MW were considered. Different cases have been studied (enclosed at Annexure-5) to assess the impact of ±800 kV Raigarh – Pugalur HVDC and Renewable Generation in Tamil Nadu.

5.4 Study results indicate that the following system is sufficient for evacuation of 2x 800 MW Generation at Uppur.

ATS for UPPUR – 2X800MW project:

i) 765kV D/C line from Uppur switchyard to Virudhunagar 765/400kV substation.

ii) 2X240MVAR, 765kV bus reactors at the Uppur 765kV switchyard.

Establishment of 765/400kV SS in Virudhunagar (For Uppur ATS and Renewable Generation Pooling):

2X1500MVA, 765/400kV ICTs with the following 765kV and 400kV connectivity

765kV Connectivity:

i) 765kV D/C connectivity to the Coimbatore 765/400kV S/S with 240MVAR, 765kV switchable line reactors at each line at both ends.

400kV Connectivity:

i) 400kV D/C Quad line from Kayathar 400kV S/S.

ii) 400kV D/C Quad line from Kamuthi 400kV S/S.

iii) 400kV D/C twin moose line from Thappagundu 400kV S/S.

5.5 Proposed Transmission system shall also help in evacuation of Wind Generation in Virudhnagar/Kayathar area.

5.6 With regard to Virudhunagar – Ariyalur 765 kV D/C, it is opined that the line is not required for evacuation of 2 x 800 MW Generation at Uppur. Requirement of the said line shall be reviewed after attaining certainty over Udangudi Generation Stage II & III (each 2 x 660 MW)

5.7 Member may discuss.

6.0 Evacuation scheme for SEPC-1X525 MW

6.1 During the 38th meeting of SCPSPSR, evacuation scheme of SEPC was discussed and it was decided that the, earlier agreed system for Udangudi Stage I and II may be sufficient to evacuate power from Udangudi 2X660MW (Stage I) and SEPC 1X525 MW. In the joint meeting with officials from CEA, CTU and TANTRANSCO 23.01.17, study has been carried out considering SEPC (study results enclosed at Annexure-5) and it is observed from results that there is no problem for evacuation of SEPC.

6.2 TANTRANSCO vide their letter no. 26.04.2017 (Annexure-6.1) requested for revised connectivity to Thennampatty 400kV substation instead of Ottapidarm as a temporary measure (Studies enclosed at Annexure 6.2)). TANTRANSCO further informed that the time frame for the establishment of Ottapidaram 400/230-110kV substation shall take more than 2 years. SEPC has requested TANGEDCO to provide start up power for its Auxiliaries by April 2018 and they are expecting their plant to get commissioned by August 2018.

6.3 CEA has been requested that the power from the SEPC 1X525 MW Power Plant shall be evacuated through the ongoing Thennampatty 400kV S/S as a temporary measure by erecting a 400 kV D/C line from SEPC 1X525 MW Power Plant to Thennampatty 400/230-110 kV Substation. While commissioning the Ottapidaram 400kV substation, the above SEPC – Thennampatty 400kV D/C line shall be made LILO at the Ottapidaram 400kV S/S thereby restoring the original connectivity of SEPC 1X525 MW Power Plant to Ottapidaram 400kV S/S as approved in the Standing Committee. There will be additional link line (approximately 30kM) between Ottapidaram and Thennampatty 400kV substation which shall be used for reliability purpose. The line length from SEPC 1X525 MW Power Plant to Thennampatty 400kV D/C will be approximately 60kM and it will be constructed matching with the commissioning of SEPC – 1X525MW Power Plant.

6.4 Members may discuss.

7.0 Kudankulam Units 3&4 - Additional Evacuation lines required by NPCIL

7.1 TANTRANSCO stated that during 36th SCPSPSR, for the evacuation of power from Kudankulam Units 3&4, the following ATS has been evolved:

400kV D/C Quad line to Tuticorin Pooling station from units 3&4 switchyard and suitable rearrangement at Kudankulam units 1 &2 Generation switchyard.

With the final rearrangement, there will be three numbers of 400kV lines (2 nos to Tirunelveli and 1 no to Tuticorin) that will emanate from both the plants i.e: KKNPP-1&2 and KKNPP-3&4.

7.2 In 40th Standing Committee Meeting the issue related to the additional evacuation line for Kudankulam unit 3&4 was discussed, where PGCIL informed that the present system is adequate to evacuate power from Kudankulam as they have not received any LTA application from Kudankulam - 3 & 4. Once the LTA application for Kudankulam 3& 4 is received then further system will be planned after proper studies and the same was agreed.

7.3 TANTRASCO vide their letter dated 26.04.2017 (Annexure -7) has requested to consider proposal of constructing additional evacuation lines from Kudankulam Atomic Power plant to the nearby TANTRANSCO's 400kV S/S. they informed that erection of additional evacuation lines from Kundankulam to nearby TANTRANSCO's 400kV S/S [Kayathar (existing) 400/ 230-110kV S/S, Kanarpatty (under construction) 400/230-110kV S/S, Pavoorchatram(Thennampatty) (under construction)) 400/230-110kV S/S, Ottapidaram (planned) 400/230-110kV S/S] will give more reliability and operational flexibility. In view of the Row Issues, erection of the above lines may be considered in well advance.

7.4 CTU may update.

8.0 Installation of 3rd ICTs at Madurai and Trichy 400/230kV substations

8.1 PGCIL informed that, installation of 3rd ICTs at Trichy and Madurai is being implemented by POWERGRID under the schemes SRSS-XX and SRSS-XXIII. During the 39th Meeting of Standing Committee held on 28.12.2015 Director(Trans), TANTRANSCO made a request for early commissioning of ICT at Madurai. ICT at Madurai S/s is ready for charging and ICT at Trichy would be ready by January, 2017. However, the extensions of 230kV Main and Transfer Buses in TANTRANSCO Switchyard at Trichy and Madurai substations are not yet ready. PGCIL informed that this issue was also discussed in the 30th SRPC meeting held on 27.08.2016 wherein TNEB assured necessary action at their end. Accordingly, TANTRANSCO may be requested to expedite the 230kV connection arrangement at both Trichy and Madurai substations.

8.2 TANTRANSCO informed that 230kV connection arrangement at both Trichy and Madurai substations would be ready by June'17.

8.3 TANTRANSCO may update the status.

9.0 Provision of exclusive 220kV feeder to CPRI, Hyderabad for their online 350 MVA short circuit test facility

9.1 In the 40th Standing committee meeting, TSTRANSCO informed that CPRI, Hyderabad wanted to establish a 350 MVA short circuit test facility at their existing UHVRL, CPRI, Hyderabad and has requested to carry out the technical feasibility study to provide 220kV power supply from nearest 220kV TSTRANSCO substation to their existing laboratory at CPRI, Uppal.

9.2 TSTRANSCO addressed the issue to PGCIL, as the proposed loading of CPRI has direct bearing on 400/220kV Ghanapur (PGCIL) and requested to communicate the acceptance for extending the supply to CPRI. During the meeting it was decided that the proposal was in principally agreed subject to joint studies by CEA, SRPC, CTU, SRLD/C and TSTRANSCO. CPRI has submitted DPR after incorporating TSTRANSCO observations.

9.3 CPRI conducted study on the Grid impact on the establishment of 350 MVA online short circuit transformer test facility at CPRI. The report was submitted to CEA on 28.02.2017.CEA and CTU has reviewed the report and observation/comments has been sent via email dated 05.07.2017 (Annexure-9.1). In response to the comments CPRI has submitted clarifications vide email dated 12.07.2017 (Annexure-9.2).

9.4 Subsequently, TANTRANSCO vide letter dated 18.08.2017 sought revision in the study considering the scenario of proposal with underground cable etc. the revised study report was submitted vide email dated 28.08.2017 (Annexure – 9.3). There is no major change in the revised report conclusion.

9.5 Member may discuss.

Transmission planning proposals by Tamil Nadu

10.0 Transmission scheme modification of Manali & Korattur 400/230-110kV substation in Chennai Region

10.1 During the 34th meeting of SCPSPSR held on 16.04.2012 at Hyderabad, establishment of Korattur and Manali 400/230-110kV substations were approved with the following connectivity:

i) Upgradation of existing Korattur 230/110kV S/S to 400/230-110kV GIS S/S with 2X315 MVA 400/230kV ICT and 2X200MVA, 400/110kV ICT.
ii) Upgradation of existing Manali 230/110kV S/S to 400/230-110kV GIS S/S with 2X315 MVA 400/230kV ICT and 2X200MVA, 400/110kV ICT.
iii) LILO of one of the NCTPS Stage II-Alamathy 400kV D/C line at Korattur 400/230kV S/S.
iv) Korattur- Manali 400kV D/C line with HTLS conductor.
v) Thervoikandigai-Korattur 400kV S/C line

vi) Thervoikandigai-Manali 400kV S/C line

10.2 Considering RoW issues TANTRANSCO vide their letter no CE/Plg. &R.C/SE/SS/EE1/AEE1/F.Stg.committee/D.471 dt 28.12.16 (Annexure-10.1) has requested for revised connectivity for Korattur and Manali 400/230-110kV substations as follows

i) One of the NCTPS Stage II –Alamathy 400kV D/C will get split and the NCTPS II end will be connected to Manali 400kV SS and Alamathy 400kV end will be connected to Korattur 400kV SS.
ii) Korattur-Manali 400kV SC line instead of D/C line with HTLS conductor.

10.3 Further, TANTRANSCO vide their letter no CE/Plg. &R.C/SE/SS/EE1/AEE1/F.Stg.committee/D.18/17dt 20.01.17 (Annexure-10.2) has requested for in principle approval for the modification in connectivity for Korattur and Manali 400/230-110kV substations. They have stated that Manali S/S is to be commissioned shortly, however, the work for Korattur 400kV S/S is yet to be awarded. Hence a revised interim connectivity is proposed for Manali by making LILO of one circuit of NCTPS Stage II –Alamathy 400kV D/C line at Manali 400kV S/S. After the establishment of Korattur 400kV SS, the connectivity as proposed in letter dated 28.12.2016 will be restored.

10.4 Considering the delay in upgradation of Korattur 230kV S/S to 400kV and construction of Thervoikandigai-Korattur and Thervoikandigai –Manali 400kV line, in-principle approval is conveyed for the revised proposal -LILO of one circuit of 400kV NCTPS stage II-Alamathy (D/C) line at the Manali 400kV S/S as an interim arrangement

The ultimate transmission scheme shall be as follows:

i) Upgradation of the existing Korattur 230/110kV S/S to 400/230-110kV GIS S/S with 2x315MVA 400/230kV ICTs & 2x200MVA,400/110kV ICT.
ii) Upgradation of the existing Manali 230/110kV S/S to 400/230-110kV GIS S/S with 2x315 MVA 400/230kV ICTS & 2x200MVA,400/110kV ICT.
iii) 400kV Alamathy –Korattur S/c line & 400kV NCTPS stage II –Manali S/C line by modifying one of NCTPS Stage II –Alamathy 400kV D/C line
iv) Korattur –Manali 400kV S/C line with HTLS conductor.
v) 400kV Thervoikandigai-Korattur S/C line
vi) 400kV Thervoikandigai –Manali S/C line

10.5 CEA vide its letter dated 6th July 2017 (Annexure-10.3) has given in-Principle approval for Revised Connectivity for commissioning of Manali 400/230-110kV substation.

10.6 Members may confirm.

11.0 Request for keeping Thappagundu and Anikadavu 400kV bays at Myvadi (Udumalpet) 400kV Substation under control of TANTRANSCO

11.1 TANTRANSCO vide their letter no CE/ Plg. &R.C /SE/ SS/ EE1/ AEE1 /F.Stg. committee/D.12/17 dated 12.01.2017 (Annexure-11), has informed that in the 34th SCPSPSR held on 16th April, 2012, Thappagundu-Anaikadavu 400kV D/C line with LILO of the D/C line at Udumalpet 400/230kV(PGCIL) substation, was agreed. They have further informed that in Udumalpet 400/230kV substation, the 400kV bus with 3X315 MVA ICTs are owned by PGCIL and the 230kV bus and the associated 230kV feeders are owned by TANTRANSCO.

11.2 TANTRANSCO has requested that in Udumalpet 400kV SS, the extended 400kV bus with the above Thappagndu and Anikadavu 400kV feeders, may be kept under the control of TANTRANSCO and PGCIL may be requested to hand over the bays after the completion of the works. Further depending on the load growth, in the event of providing 4th 400/230kV ICT or any other connectivity from Udumalpet 400kV SS, it may be evolved from TANTRANSCO 400kV bus in future.

11.3 Members may discuss.

12.0 Establishment of Konthagai 400/230kV substation in Madurai region

12.1 TANTRANSCO vide their letter no. dated 05.05.2017 (Annexure-12.1) proposed to establishment of Konthagai 400/230kV, 2X315 ICT to feed the load of Madurai region. TANTRANSCO has carried out load flow studies (enclosed at Annexure -12.2) for the 2019-2020 network for the establishment of Konthagai 400/230kV S/S and following Connectivity has been proposed:

400kV Connectivity:

a) LILO of one of the Kaythar - Karaikudi 400kV D/C quad line at Konthagai.

b) 400kV D/C line from the proposed Virudhnagar 765/400kV substation to Konthagai.

230kV Connectivity:

a) LILO of Pasumalai-Anupankulam 230kV line at Konthagai

b) LILO of Samayanllur-alagarkoil 230kV line at Konthagai

c) 230kV S/C line to the sanctioned K.Pudur 230kV S/S from Konthagai.

d) 230kV S/C line to the proposed Thummakundu 230/110kV S/S from Konthagai.

12.2 Members may discuss.

13.0 NLCIL-NNTPP (2x500 MW) – Startup Power Requirement

13.1 NLC India limited is constructing Neyveli New Thermal Power Plant (2x500 MW) at Neyveli, Tamilnadu. The construction works of the project are in advance stage and start up power about 32.5 MW is required for trial operation of all major equipment of the plant likely from February 2017.

13.2 Connectivity of the plant with 400kV Grid system was granted by PGCIL through LILO of Neyveli TS-II –Pondicherry 400kV S/C at NNTPS generation switchyard. The same is scheduled to be completed on 30.04.2018 by PGCIL.

13.3 As the startup power is required likely from February 2017, NLC India Limited proposed to avail startup power supply through the LILO of 230kV Tie Lines I &II(connecting NLC TPS –II and TPS-I).but SRLD/C vide Letter NO. SRLD/C/MO/2016/6341 dated 05.01.2017 had informed that connectivity for NNTPP is granted through 400kV TS II-Pondy LILO lines and hence for startup power drawl through 230kV tie lines I & II as requested will be possible only after obtaining connectivity from CTU for these two lines.

13.4 Members may discuss.

14.0 Power evacuation Scheme of 500MW Kadaladi Ultra Mega Solar PV Power Project in Narippaiyur of Kadaladi Taluk in Ramnad district under state sector

14.1 TANTRANSCO vide their letter no. CE/Plg.&R.C/SE/SS/EE1/AEE1/F.Stg. committee/D.198 dated 20.06.17 (Annexure-14.1) informed that 500MW "Kadaladi Ultra Mega Solar Power Project" at Narippaiyur of Kadaladi Taluk in Ramanathapuram District under State sector is expected to commissioned by May 2019.

14.2 TANTRANSCO further informed total installed capacity of solar power plants in Tamil Nadu so far is 1698MW.In Ramnad and Virudhunagar districts, the following private solar power projects are commissioned/under execution, apart from the Solar power projects of smaller capacity throughout the state.

a. Trichuli - 500MW (150MW commissioned)
b. Kamuthi - 648MW - commissioned
Total injection in Kamuthi - 1148MW

For the power evacuation of the above solar projects, Kamuthi 400/230-110kV substation has been already commissioned.

14.3 For the evacuation of 500MW Solar power injection at Kadaladi following connectivity has been proposed:

i) Kadaladi – Kamuthi 400kV D/c line (40kM)
ii)Kamuthi-Thappagundu 400kV D/c line
iii) Kamuthi-Thappagundu 400kV D/c line LILO at Virudhnagar S/S (original connectivity of proposed Virudhnagar S/S

Further it is proposed to strengthen the 230kV network from Karikudi to Trichy region.

14.4 Load flow studies submitted by TANTRANSCO of the year 2019-20 are enclosed at Annexure-14.2.

14.5 Members may discuss.

15.0 Power evacuation Scheme for the proposed Kundah PSHEP 4x125 MW & Sillahalla Pumped storage HEP 2000MW project in Coimbatore region

15.1 TANTRANSCO vide their letter dated 01.08.2017 (Annexure-15.1) informed that execution works have been started for establishment of Kundah Pumped Stoarge Hydro Electric project of 4x125 MW. The projects programmed to be commissioned by the year 2020-21

15.2 In addition to the above, Sillahalla pumped storage Hydro Electric Project(4x500 MW) was proposed in Nilgiris District. It has been proposed to execute the Sillahalla project in two stages with 4x250 MW in each stage. Execution of the Stage-I of the project is in the preliminary stage.

15.3 The power evacuation lines of the above projects are to be erected in the reserve forest area. It is difficult to get a new corridor in forest area. Hence, it is decided to evolve a comprehensive proposal taking in to consideration the above two projects, even though the time period for the commissioning of the two projects are different.

15.4 The following proposal has been evolved for power evacuation of Kundah Pumped Storage Hydro Electric Project (KPSHEP) – 4x125 MW taking in to account the subsequent addition of Silahalla Pumped Storage HEP stage I – 4x250 MW.

With commissioning of KPSHEP – 4x125 MW:

Establishment of 400/230 kV Substation with 3X315 MVA or 2X500 MVA ICTs at Parali (near existing Kundah PH III) with the following 400 kV and 230 kV connectivity.

400 kV connectivity:

It has been proposed to erect 400 kV D/C line with HTLS conductor from Parali 400/230 kV SS to Karamadai 400 kV Substation. The 400 kV D/C line will be erected utilizing the existing Kundah PH –III – Karamadai 230 kV SC line on SC tower by converting it in to 400 kV line as follows.

(i) 400 kV D/C line on D/C tower from Parali 400/230 kV SS up to location 57 (Hilly terrain area)

(ii) 400 kV D/C line on MC tower (to accommodate 400 kV D/C line for Sillahalla project also in future) from location 57 to Karamadai 400/230 kV SS (Plains area).

230 kV connectivity

(i) From KPSHEP – 4x125 MW, 3 numbers of 230 kV lines to Parali 400/230 kV SS in multi circuit tower in addition to the existing Kundah PH II to Kundah PH III 230 kV SC line utilizing that 230 kV corridor.

(ii) From existing Kundah PH III – 3x60 MW switchyard, 230 kV D/C line to Parali 400/230 kV SS.

With commissioning of Sillahalla Pumped Storage – Stage I HEP – 4x250MW:

(i) 400 kV D/C line on D/C tower from Silahalla PSHEP Stage I to Parali 400/230 kV SS.

(ii) 400 kV D/C line on D/C tower from Parali 400/230 kV to SS Karamadai 400/230 kV SS shall be erected by utilising Kundah PH II – Arasur 230 kV SC corridor in hilly terrain.

(iii) 400 kV D/C line using the Multi circuit tower in plains from location 57 to Karamadal 400 Kv substation to be commissioned matching with commissioning of Sillahalla PSHEP Stage-I (4x250 MW)

15.5 Load flow study has been carried out by TANTRANSCO duly incorporating above system (Results enclosed at Annexure 15.2)

15.6 During the materialization of the Sillahalla HEP Stage II (4x250 MW), Load flow study will have conducted for further system strengthening at Karamadai 400/230kV substation

15.7 Members may discuss.

16.0 Upgradation of the existing Tharamani 230/110/33 kV substation instead of Mylapore 400/230kV substation

16.1 In the 37th Standing Committee upgradation of Mylapore 230kV GIS Substation was approved. TANTRANSCO vide their letter dated 24.08.2017 (Annexure-16.1) informed that this scheme could not be execute due to severe RoW issue in lying of 400kV UG cable.

16.2 As an alternate to Mylapore 400/230kV GIS substation, it has been proposed to upgrade the exiting Tharamani 230/110/33kV substation into 400/230-110kV substation with 2x500 MVA, 400/230kV ICTs, 2x200MVA, 400/110kV ICTs and 2x125 MVAr bus reactor by making LILO of the sanctioned Sholinganllur- Guindy 400kV S/C feeder. TANTRANSCO has carried out load flow studies (results enclosed at 16.2)

16.3 All the existing and sanctioned 230V and 110kv feeders of Tharamani 230/110 substation have been considered to feed the existing and future loads

16.4 Members may discuss.

17.0 Overloading of NLC TS-II 2X250MVA, 400/230kV existing ICT

17.1 In NLC TS-II power plant, evacuation of power from 3X210MW is at 230kV level and power evacuation from the remaining 4X210MW is at 400kV level totaling 1470MW of generation with 2X250MVA, 400/230kV ICT's.

17.2 TANTRANSCO vide their letter no. dated 01.04.2017 (Annexure 17.1) informed that at present, the above 2X250MVA ICT's are getting over loaded and SRLD/C has suggested SPS to avoid over loading of this ICT's. SRLD/C has stated that this issue would get resolved with the commissioning of 2X500MVA, 400/230kV ICT's at NNTPS.

17.3 To ascertain the ICT's loading at NLC TS-II, Load Flow study has been conducted for the 2020-21-year network condition. NNTPS - 2X500MW generation with 2X500MVA, 400/230kV ICT's at NNTPS and 230kV substation at Neyveli (with the existing 230kV and 110kV connectivity of NLC Ts-1) to be commissioned by TANTRANSCO have been considered in the study. Further, NNTPS to Ariyalur 400kV D/C line has also been included in the study. In addition, the existing ILFS – 2X600MW generation is also considered in the study. From the study results (enclosed at Annexure-17.2), the following have been observed.

a. Base Case: With NNTPS – 2X500MW Generation (Replacing the existing NLC TS-1)

b. Case 1: Base Case + Sankarapuram 230/110kV SS + With Ariyalur 765/400kV SS 230kV Link Lines. (Link lines to Thiruvannamalai, Sankarapuram and Villupuram 230kV substations.)

In Base Case even with NNTPS – 2X500MVA ICT's, the two ICT's at NLC TS-II switchyard will be over loaded. NNTPS ICT's are used for the injection of NNTPS - 2X500MW generation only. Moreover, NNTPS injection at 400kV level also comes to NLC TS-II 400kV bus.

In the sanctioned Ariyalur 765/400kV substation, 230kV connectivity to the existing Thiruvannamalai, Villupuram and sanctioned Sankarapuram 230/110kV substations are suggested and field feasibility has been requested.

In Case 1, with this 230kV link lines, the loading of ICT's at NLC TS-II is reduced but still the ICT's are in over loaded condition only.

Due to low impedance path, more power from the NLC TS - II 4X210MW generation at 400kV level tries to step down through 400/230kV ICTs. Any other system

strengthening works undertaken by TANTRANSCO in this area also will not reduce the over loading of the above ICTs.

17.4 Hence, it is suggested to enhance the existing 2X250MVA ICTs capacity at NLC TS – II switchyard to 2X500MVA by NLC so as to avoid the above over loading.

17.5 Member may discuss.

18.0 Commissioning of 400/110kV 2nd ICT at Alamathy 400/230-110kV substation in Chennai.

18.1 TANTRANSCO vide their letter dated 16.08.2017(Annexure-18) informed that Establishment of Alamathy 400/230-110kV substation has been approved in the Standing Committee Meeting on Power System Planning of Southern Region in the year 2000-2001. In the 12th, 15th and 16th Standing Committee meeting, the 400kV connectivity for the Alamathy 400kV substation has been discussed. But the 400/230kV and 400/110kV ICT details are not available in the Standing Committee meeting minutes.

18.2 In the Alamathy 400kV substation, 3X315MVA 400/230kV ICT's and 1X200MVA, 400/110kV ICT are available. The existing 400/110kV ICT has reached 190MVA peak on 24.04.2016 and the sustained peak is 180MVA. Hence, 2nd 400/110kV ICT has been sanctioned to meet the load growth and to meet N-1 criteria. It is programmed to commission the above 2nd, 400/110kV ICT at Alamathi on 16.08.2017.

18.3 TANTRANSCO requested to give ratification for the commissioning of 400/110kV, 2nd ICT at Alamathy 400/230-110kV substation.

18.4 Member may confirm.

19.0 Establishment of Koyambedu 400/230 kV substation.

19.1 TANTRANSCO vide their letter dated 24.08.2017 (Annexure-16.1) requested for Establishment of 400/230 kV substation with 2x315MVA,400/230 kV ICTs and 2x125 MVAr bus reactor by making LILO of any one of the NCTPS Stage –II – Sunguvarchatram 400 kV feeders.

19.2 Considering the following 230 kV connectivity, TANTRANSCO has been conducted Load flow study for various cases for the time frame of 2020-2021-year network condition and the study results are enclosed (Annexure-19.2).

i. LILO of the Koyambedu – Guindy 230 kV feeder.

ii. 230 kV SC UG cable from the proposed Koyambedu 400 kV SS to Koyambedu CMRL 230 kV substation.

iii. 230 kV SC UG cable from the proposed Koyambedu 400 kV SS to Porur 230 kV substation

19.3 Member may discuss

20.0 Modification in Associated Transmission System for NCTPS Stage –III (1x800 MW) and ETPS Replacement (1x660 MW)

20.1 In the 37th Standing committee on Power system planning in Southern Region the following ATS for NCTPS Stage – III (1 X 800 MW) and ETPS Replacement (1X660MW) were approved-

ATS for NCTPS Stage – III (1 X 800 MW)

i. 765kV D/C line from NCTPS Stage III switchyard to the North Chennai Pooling station. (Generation at 765kV level)

ii. 1X240MVAR, 765kV Bus Reactor at generation switchyard

ATS FOR ETPS Replacement (1X660MW) :

i. 765kV D/C line from ETPS Replacement switchyard to North Chennai Pooling station. (Generation at 765kV level)

ii. 765kV D/C inter link to NCTPS Stage III for reliability.

iii. 1X240MVAR, 765kV Bus Reactor at generation switchyard.

20.2 TANTRANSCO vide their letter dated 24.08.17 (Annexure - 16.1) have suggested following modification to reduce cost of investment

i. The sanctioned 765 kV North Chennai Pooling station is to be connected with North Chennai Stage – III and Ennore Replacement with 765 kV SC lines instead of 765 kV D/C lines for power evacuation.

ii. Further North Chennai Stage – III is also to be linked with Ennore replacement with 765 kV SC line instead of 765 kV D/C lines for reliability purpose.

20.3 TANTRANSCO carried out study based on the above for the various scenario (Annexure-20). From the above results, TANTRANSCO had observed the following:

i. The total power generated from the above two generating stations is 1460 MW.

ii. Since the 765 kV SC line with Hexa Zebra conductor is capable of carrying 2000 MW, the evacuation of 1460 MW in SC line is sufficient.

iii. During N-1 condition also, the reliability is ensured.

20.4 Member may discuss.

21.0 Establishment of Manalmedu 400/230kV substation.

21.1 TANTRANSCO vide their letter dated 29.08.2017 (Annexure -21.1) informed that the power demand of Trichy region is increasing rapidly. This substation is planned as a system strengthening measure at 400 kV level in Thiruvarur-Nagapattinam area.

21.2 TANTRANSCO has been proposed to establish a 400/230 kV SS at Manalmedu with 400 kV connectivity from Ariyalur 765/400 kV substation, thereby part of power generated from thermal power stations at Chennai Region will be utilized in Trichy region. Land has been identified at Manalmedu in Nagapattinam district in coastal part of Trichy Region for the establishment of Manalmedu 400/230kV substation.

21.3 Manalmedu 400/230kV substation

ICT and Bus reactors:

1. 2x500 MVA, 400/230 KV ICT
2. 2 X 80MVAr bus Reactor

400 KV CONNECTIVITY:

1. 400 KV D/C Link line from the proposed Ariyalur 765/400 KV S/S to Manalmedu.
2. 400 KV D/C Link line from the proposed Neyveli (TNEB) 400 KV SS Manalmedu.

230 KV CONNECTIVITY

1. LILO of Neyveli TS-II - Kadalangudi 230kV line at Manalmedu
2. Kumbakonam - Manalmedu 230kV S/C line.
3. Narimanam- Manalmedu 230kV S/C line.

21.4 TANTRANSCO has carried out Load flow studies considering above for 2020-21 network condition (Results are enclosed at Annexure-21.2)

21.5 Member may discuss.

22.0 Establishment of Neyveli 400/230 KV Substation - By Upgradation of the proposed Neyveli (TNEB) 230 KV SS.

22.1 TANTRANSCO vide their letter dated 29.08.2017 (Annexure -21.1) informed that Overloading of 400/230 kV 250 MVA ICTs at Neyveli TS II has been observed resulting in cascade tripping of nearby substations. Generation from Thermal power stations in Neyveli is the only source for the entire Villupuram and Trichy regions where demand is growing rapidly. Hence the establishment of a 400/230KV SS at Neyveli by upgradation of the proposed 230 KV Neyveli (TNEB) SS into 400 KV substation is essential.

22.2 TANTRANSCO has proposed to have 400 kV connectivity to the Neyveli 400 kV SS (TANTRANSCO) from New Neyveli 400 kV SS. It has also been proposed to have 400 KV D/C link from Neyveli 400 KV SS to the proposed Manalmedu 400 KV SS.

ICT and Bus reactors:

1. 2 x315 MVA, 400/230 KV ICT
2. 2 X 80MVAr bus Reactor

400 KV CONNECTIVITY:

1. 400 KV D/C Link line from New Neyveli Thermal power station 400 KV SS.
2. 400 KV D/C Link line from the proposed Manalmedu 400 kV SS.

22.3 Members may discuss.

23.0 Enhancement of ICT Capacity of 400/230kV from 2 x 315 MVA to 2 X 500 MVA and 400/110 kV from 2 x 200 MVA to 3 X 200 MVA at K.R.Thoppur (Salem-TNEB) 400/230 kV SS.

23.1 TANTRANSCO vide their letter dated 29.08.2017(Annexure-21.1) informed that K.R.Thoppur (Salem-TNEB) 400 kV substation was commissioned during the year 1988. The total Interconnecting transformer capacity at K.R.Thoppur 400/230-110 kV SS is 1030 MVA with 2 nos. of 400/230 kV 315 MVA ICT and 2 nos. 400/110 kV 200 MVA ICT. The peak reached in the ICTs at K.R.Thoppur are as follows.

315 MVA, 400/230 kV ICT - 1	-	287.09 MVA
315 MVA, 400/230 kV ICT - 2	-	283.26 MVA
200 MVA, 400/110 kV ICT - 3	-	187.32 MVA
200 MVA, 400/110 kV ICT - 4	-	180.05 MVA

23.2 The existing ICTs are already in fully loaded condition and it is difficult to carry out the maintenance activities. Hence, it is essential to erect 400/110KV ICT with 1 x 200 MVA capacity in addition to the existing 400/110 kV, 2 X 200 MVA ICTs to reduce the overloading problem at K.R.Thoppur (Salem) 400/230-110 kV SS and the work for the above is under progress. Further, since the space for erection of additional one number 400/230 kV, 315 MVA ICT is not available, it is proposed to enhance the 400/230 kV ICT capacity from 2 X 315 MVA to 2 X 500 MVA.

23.3 TANTRANSCO has conducted Load Flow study (enclosed at Annexure -23.2) for the 2020-2021 year network condition for the above proposals.

1. Enhancement of 400/230 KV ICT capacity from 2 x 315 MVA, to 2 X 500 MVA.
2. Erection of 1 X 200 MVA, 400/110 KV ICT in addition to the existing 2 X 200 MVA, 400/110 kV ICTs.

From the study results (enclosed at Annexure 23.2), following had been observed by TANTRANSCO.

i. The line loadings are found to be normal.

ii. The loadings of ICTs are also found to be normal.

iii. Even during contingency condition, the loadings of the ICTs and lines are found to be within limits.

23.4 Members may discuss.

Transmission planning proposals by Andhra Pradesh

24.0 Re-arrangement of 400kV Quad Moose D/C line from existing Kalpaka 400/220 kV SS to proposed 400/220 kV SS at Maradam, Vijayanagaram.

24.1 In the 36th Standing committee meeting Garividi (Maradam)-Kalpaka quad moose line was approved. APTRANSCO vide their letter no. dated 30/01/2017 (Annexure-24.1) has informed that due to severe ROW issue in Vennelapalem and Swayambhuvaram Villages, APTRANSCO proposed re-arrangement for completion of 400kV Quad Moode D/C line from 400kV Kalpalka SS to 400kV Garividi SS (Maradam)

i. The proposed 400kV QMD/C line from Garividi SS (Maradam) is connecting to existing 400kV Kalpaka- Vemagiri D/C line at loc No. 14 by disconnecting the 400 kV Kalpaka-Vemagiri D/C line between location Nos. 14 & 15.

ii. The Loc No. 15 of 400kV Kalpaka-Vemagiri D/C line will be connected to Loc No.2 of 400 kV Kalpaka –Simadhiri Circuit-I

24.2 The study has been carried out duly incorporating the above proposal and it is observed that loading on transmission line in order during N-1 contingency with rearrangement (study result at Annexure-24.2).

24.3 Considering above CEA vide letter dated 11.05.2017 (Annexure-24.3) has given in-principle approval for following schemes of APTRASCO:

i. 400kV Kalpaka –Garividi (Maradam) Twin Moose D/C line
ii. 400kV Vemagiri –Simhadri-I S/C line
iii. 400kV Kalpaka-Vemagiri S/C line
iv. 400kv Kalpaka- Simhadri-I lines (3 circuits)

24.4 APTRANSCO may present, Members may discuss.

25.0 Erection of 220 kV D/C/SC line from 400/220 kV Nannur to 220 kV Brahmanakotkur – Alternate proposal to make LILO of 220 kV Nannur – Regumanugadda line to 220/11 kV Brahmanakotkur Substation

25.1 APTRANSCO vide their letter no. CE(IPC&PS)/SE(PS)/DE(SS&LTSS)/ADE-2/F. HNSS_LIS/D. No.292/2017 dated 23.06.2017 (Annexure 25.1) informed that APTRANSCO has accorded approval for erection of 220kV D/C/SC line from 400/220kV Nannur SS to 220/11kV Brahmanakotkur SS for extension of power supply to 220/11kV Munchumari SS in Kurnool district and the subject works were commenced and stopped as this line is passing near to the inner horizontal surface area and may cause obstuction for further expansion of the proposed Orvakal Green Field Airport in Kurnool district.

25.2 In this regard, a meeting was held in CEA on 10.07.2017 with APTRANSCO, TSTRANSCO and CTU (Copy of MOM at –Annexure- 25.2) and In-Principle, proposed LILO of Narnoor(AP)-Regumanugadda (Telangana) 220kV S/C line at Brahmankotkur (AP) was agreed

25.3 Member may confirm.

26.0 Extension of 398.7 MW of power supply to Chintalapudi Lift Irrigation Scheme at 220 kV and 132 kV level at three stages in West Godavari district.

26.1 APTRANSCO vide their letter No. CE(IPC&PS)/SE(PS)/DE(SS&LTSS)/ADE-2/F. SCM/D. No. 308/2017, Dt. 03.08.2017 (Annexure -26) proposed the following dedicated scheme for extension of 398.7 MW of power supply to Chintalapudi Lift Irrigation Scheme at 220 kV and 132 kV level in three stages in West Godavari district.

<u>For Stage - I (97.1 MW) & Stage – II (267 MW)</u>

i. Erection of 400/220 kV Substation at Guddigudem with 2 x 315 MVA PTRs
ii. Erection of 220/11 kV Substation at Thadipudi
iii. Making of 400 kV D/C LILO (1 KM approx.) of 400 kV HNPCL - KV Kota D/C line at proposed 400 kV Guddigudem S/S.
iv. Laying 220 kV D/C line (18 KM approx.) from 400/220 kV Guddigudem to proposed 220/11 kV Thadipudi SS.

<u>For Stage – III (34.6 MW)</u>

i. Erection of 132/11 kV Reddyganapavaram SS.
ii. Erection of 132/11 kV Routhugudem SS.
iii. Laying 132 kV D/C line (30 KM approx.) from 220 /132 kV KV Kota SS to proposed 132/11 kV Reddyganapavaram SS.
iv. Laying 132 kV D/C line (4 KM approx.) from Reddyganapavaram SS to proposed 132/11 kV Routhugudem SS.

26.2 Member may discuss

27.0 Replacement of Moose conductor with Invar conductor on existing 400 kV TMD/C line from VTS-IV to Sattenapalli instead of erection of proposed 2nd D/C line from VTS-IV to Sattenapalli with Quad Moose.

27.1 In the 39th Standing Committee Meeting erection of 400 kV Quad Moose D/C line from VTS to Sattenapalli SS for evacuation of 1 x 800 MW power plant of APGENCO at Dr. NTTPS, Vijayawada was approved.

27.2 APTRANSCO vide their letter dated 03.08.2017(enclosed at Annexure 26) informed that due to Right of Way problems and up-coming new Capital Region area, it is not possible to lay the another 400 kV Quad Moose D/C line from VTS to Sattenapalli SS for evacuation of evacuation of 1 x 800 MW power plant of APGENCO at Dr. NTTPS, Vijayawada.

27.3 Hence, APTRANSCO proposed for replacement of Moose conductor with Invar conductor on existing 400 kV TMD/C line from VTS-IV to Sattenapalli SS instead of erection of proposed 2nd D/C line from VTS-IV to Sattenapalli with Quad Moose for evacuation of evacuation of 1 x 800 MW power plant of APGENCO at Dr. NTTPS, Vijayawada.

27.4 Member may discuss.

Transmission planning proposals in Kerala

28.0 Requirement of two additional bays at Cochin East for implementation of 220kV Substation, by drawing 220kV D/C feeder from 400kV substation at Cochin East owned by M/s PGCIL

28.1 KSEB vide their letter no. dated 09.05.2017(Annexure-28) informed that The power from the 2000MW HVD/C station, currently under implementation at Thrissur, is planned to be evacuated by LILO-ing of 400kV Cochin East – Madakathara D/c line at HVD/C Station. At present 220kV downstream connectivity from 400kV Substation Cochin East (Pallikkara) is only towards 220kV Substations of KSEBL at Kalamassery and Bhramapuram. Accordingly, for economic and efficient evacuation of power available at 400kV substation, Cochin East, additional 220kV outlets are to be planned.

28.2 KSEB further informed that the demand growth of Emakulam district is considerable and is one of the major industrial hubs of the State. It is also hosting several strategic institutions like Southern Naval Command, Cochin Port, Naval Physical and Oceanographic Laboratory, Cochin Refinery etc. Hence having a strong networked source of 220 kV substations will be beneficial for providing a stable and reliable power supply to the area.

28.3 Accordingly, KSEBL has proposed upgrading the 110kV Substation at Aluva to 220 kV by constructing a 220kV D/c feeder from 220kV Substation Kalamassery. This work is planned under the Transgrid 2.0 project of KSEBL and was already sanctioned during the 39th meeting of the SCPSP. Aluva is a major load centre of Kerala, now being fed from 220kV substation, Kalamassery at 110kV level and partly supported by 66kV line from Pallivasal hydroelectric station. The proposed 220kV Substation at Aluva was sanctioned with 8 feeder bays, 2 transformer bays and one bus coupler bay.But considering the difficulty in obtaining a RoW for the proposed 220kV link to Aluva from 220kV S/s Kalamassery and in order to facilitate a 220kV Substation having a source from 400kV Substation, the 220kV connectivity to 220kV Substation Aluva is proposed from 400kV substation Cochin East, by constructing 11.1 km 220kV D/c feeder through multi circuit towers. Feeding Aluva at 220kV level from 400kV substation, Cochin East will provide redundancy and enable KSEBL to efficiently evacuate power from the HVD/C node, made available through the above ISTS substation.

28.4 KSEB requested for approval for construction of the 220kV D/c feeder from 400kV substation Coachin East to 220kV substation Aluva in lied of already sactioned 220kV D/c connectivity from 220kV substation Kalamassery and sparing two additional bays available at 400kv substation Coachin East PGCIL for the same.

28.5 Member may discuss.

29.0 400kV Udupi (UPCL)-Kasargode D/C line

29.1 Udupi PCL (Manglore) – Kasargode – Kozhikode (Areekode) 400kV (Quad) D/c link along with 400/220 kV Substation at Kasargode was agreed in the 35th meeting of Standing Committee (SCM) on Power System Planning of Southern Region held on 04.01.2013.In the 31st meeting of Empowered Committee (EC) held on 25.02.2013 the scheme Udupi PCL (Manglore) – Kasargode – Kozhikode (Areekode) 400kV (Quad) D/c link along with 400/220 kV Substation at Kasargode was recommended for implementation through TBCB subject to obtaining

(i) commitment from the Kerala Government that the land compensation only for tower footing should be paid in the Right of Way (RoW)

(ii) commitment from Udupi Power Corporation Limited (UPCL) to provide two no. of 400 kV bays at Mangalore (UPCL) switchyard.

29.2 During the 36th SCM held on 4.9.2013, it was informed that Kerala State Government had given the commitment for compensation of RoW suggested in EC meeting. However, UPCL stated that no surplus land was available with them to erect the two

no. of bays and as per their PPA any additional expenditure that may incur on account of maintenance of the above bays needs to be approved by their buyers.

29.3 During the 38th SCM held on 07.03.2015, it was intimated that based on site visit bays can be constructed at UPCL switchyard by extending its generation switchyard and dismantling of some civil structures. KPTCL opined that with the construction of Udupi – Kasargode 400kV (quad) D/c line, the Udupi – Hasan 400kV D/c line will be underutilized. With regard to including two line bays at Udupi switchyard, KPTCL agreed to intimate their views after getting the views of the ESCOMs. Accordingly, it was decided that implementation of the UPCL- Kasargode 400kV D/C line can be initiated after considering views of Karnataka ESCOMS, if communicated within a month. The matter was again discussed in the 39th SCM held on 28th & 29th December 2015 wherein it was agreed that only Udupi – Kasargode 400kV line will be implemented as per tariff policy of Government of India as ISTS project. Further, it was also agreed that Kasargode – Kozhikode (Areekode) 400kv D/c line would be implemented as intra-state transmission project to be implemented by Kerala state.

29.4 In the 40th SCM held on 19th November 2016, KSEBL had proposed new transmission system as a state project under Wayanad – Kasargode Green Power Corridor Project. In this project the location of 400kV Substation at Kasargode was changed from Mylatty to Cheemeni. In this reference, following was agreed for connectivity to Kasargode (Cheemeni).

i. Construction of a 2x500MVA 400/220kV, 2 x 200MVA 220/110kV, Substation at Kasargode (Cheemeni)

ii. 220kV connectivity from Kasargode (Cheemeni) to existing 220kV substations at Kanhirode, Thaliparamba, Ambalathara and Mylatty.

iii. Construction of a 400kV Substation at Wayanad (Kattikulam)

iv. Interconnectivity of 400kV Switching Station Wayanad (Kattikulam) to 400kV Substation Kasargode (Cheemeni).

29.5 Since, there has been change in the earlier agreed transmission network, a meeting was held in CEA on 28.08.2017. In the meeting system studies were carried out by incorporating KSEB proposal and UPCL evacuation scheme for proposed additional 2x800 units (enclosed Annexure 29) and following was agreed:

(i) There is a requirement of additional double circuit outlets for Udupi switchyard for evacuation of power from Udupi Expansion (2x800MW). Replacing existing transmission conductors of 400kV D/C Udupi-Hassan line to HTLS conductors would not be enough.

(ii) A committee consisting members from KPTCL, KSEBL and UPCL will visit UPCL generation switchyard for resolving the issue of land for providing additional bays.

29.6 Members may discuss.

Transmission planning proposals by Karnataka

30.0 Evacuation of proposed additional 2x 800 MW generation of UPCL.

30.1 KPTCL vide their letter no CEE(P&C)/SEE(Plg)/EE(PSS)KCO-97/64345/2016-17 dated 16 Jan, 2017 (Annexure-30.1) have proposed the following evacuation system for the additional 2 nos of 800 MW units:

i) 400kV UPCL-TK Halli Quad Moose D/C line
ii) Establishment of 400/220kV ,2x500 MVA TK Halli S/S.
iii) 400kV TK Halli - Somanahalli Quad Moose D/C line

30.2 KPTCL vide their letter CEE(P&C)/SEE(Plg)/EE(PSS)KCO-97/81346/2017-18 dated 05.06.2017(Annexure-30.2) informed that the above proposed transmission scheme involves construction of 400 kV D/C line between UPCL and TK Halli which passes through the Western Ghats comprising of dense forest and eco-sensitive zone for a distance of about 55 km. In view of various environmental and execution related issues and to avoid uncertainties in getting forest clearance and timely completion of the project the proposed evacuation scheme for additional 2 X 800 MW units of M/s UPCL is revised as follows.

i. Re-conductoring of existing 400 kV UPCL-Hassan (Shantigram) D/C line with HTLS conductor from UPCL to proposed 400 kV Hebbanahalli sub-station (400 kV Hebbanahalli s/s as approved in Yethinahole Drinking Water supply Project Scheme).
ii. Establishing 2 X 500 MVA, 400/220 kV sub-station at TK Halli.
iii. 400 kV D/C line with Quad Moose conductor from proposed 400 kV Hebbanahalli s/s to proposed TK Halli s/s.
iv. 400 kV D/C line with Quad Moose conductor from proposed 400 kV TK Halli s/s to 400 kV Somanahalli s/s.

30.3 Load flow study was conducted for 2021-22-time frame (enclosed at Annexure -29) for the revised evacuation scheme in the meeting held on 28.08.2017 (mentioned in ahenda point no. 29)

30.4 Member may discuss.

31.0 Installation of 2x125 MVA bus reactor at UPCL switchyard

31.1 KPTCL vide their letter dated 14.12.2016 (Annexure-31) informed that UPCL has requested approval for installation of 2x125 MVAr bus reactor at UPCL switchyard

31.2 CEA in 39th meeting os standing committee on Power System Planning of the southern region has recommended the same.

31.3 KPTCL requested for suggestion/opinion regarding necessity of installing 2x125 MVAr bus reactor at 2x600MW UPCL switchyard.

Members may discuss.

32.0 Proposal to establishing 2 X 500 MVA, 400/220 kV sub-station at Huliyurdurga in Tumkur district

32.1 KPTCL vide their letter no. CEE(P&C)/SEE(plg)/EE(PSS)KCO-97/64345/2016-17 dated 14.02.17 (Annexure -32) has proposed to establish 2 X 500 MVA, 400/220 kV sub-station at Huliyurdurga in Tumkur district with LILO arrangement of existing 400 kV Nelamangala-Bastipura (Mysore) D/C Twin Moose line.

32.2 The proposed 400 kV sub-station is intended to relieve loads of 400 kV Nelamangala and Bastipura sub-stations and provide reliable power supply to the 220 kV sub-stations in the vicinity.
Load flow is conducted with the following transmission scheme of the proposed 400 kV Huliyurdurga.

- LILO of 400 kV D/C Nelamangala - Bastipura Twin Moose line to Huliyurdurga
- 2 X 500 MVA, 400/220 kV Transformers
- LILO of proposed 220 kV Anchepalya – Nagamangala line to Huliyurdurga with conversion of SC to D/C line.

32.3 Members may discuss.

33.0 Approval for establishing 400/220/66kV sub-station at Yettinhole in Sakaleshpura taluk, Hassan district

33.1 KPTCL vide their letter no. CEE(P&C)/SEE(plg)/EE(PSS)KCO-97/64329/2016-17 dated 22.10.16 (Annexure -33) had informed that M/s. Karnataka Neeravari Nigama Ltd., (M/s. KNNL) a Govt. of Karnataka undertaking has requested KPTCL for arranging power supply to an extent of 219.44 MW for “Yethinahole Integrated drinking water supply Project” to provide drinking water supply to Districts of Kolar and Chikkaballapur in Karnataka by diverting water from Netravati River flowing in the western Ghats of Karnataka.

33.2 KPTCL proposed following connectivity with the Grid for granting scheme of the said project:

i. Establishment of 400/220 KV, 4x167 MVA sub-station near Hebbanahally by LILO of UPCL-Shantigram (Hassan) 400kV D/C line

ii. Establishment of 220/66 KV, 2x50 MVA sub-station in the downstream to feed the consumer stations of M/s. KNNL

With this arrangement, it is proposed to feed the consumer station of M/s KNNL to an extent of 188.99 MW at 220kV voltage class and 30.5 MW at 66kV Voltage class.

33.3 Members may discuss.

34.0 Establishing 3 x 500 MVA, 400/220 kV sub-station at Mylasandra (Electronic City) in Bangalore

34.1 KPTCL informed that establishing 3 x 500 MVA, 400/220 kV sub-station at Mylasandra (Electronic City) in Bangalore is approved with LILO of 400 kV Somanahalli-Kolar SC Twin Moose line.

34.2 KPTCL had requested for strengthening of upstream lines to 3 X 500 MVA, 400/220 kV Mylasandra sub-station in view of substantial load growth in the vicinity by conducting necessary joint studies in consultation with PGCIL.

34.3 Members may discuss.

35.0 Evacuation of power from 2 X 700 MW gas based combined cycle power plant of M/s Karnataka Power Corporation Ltd., (KPCL) at Bidadi

35.1 KPTCL vide letter dated 24th June 2015 had communicated to CEA to request for approval for evacuation of power from 2 X 700 MW gas based combined cycle power plant of M/s Karnataka Power Corporation Ltd., (KPCL) at Bidadi through extended bus connectivity at 400 kV voltage level with the existing 400/220 kV PGCIL Bidadi sub-station.

35.2 M/s KPCL has approached KPTCL for evacuation scheme for evacuation of power from 2 X 700 MW gas based combined cycle power plant at Bidadi. Government of Karnataka has accorded approval to allocate the entire power generated from Bidadi Combined Cycle Power Plant to Bangalore Electricity Supply Company Ltd., (BESCOM). The 400kV switchyard of KPCL generation and 400/220 kV PGCIL sub-station at Bidadi are located adjacent to each other. Hence the possibility of evacuation of power from the proposed generation may be considered through extended bus connectivity at 400 kV voltage level with the existing 400/220 kV PGCIL Bidadi sub-station in order to minimise the issue of space constraint and RoW issues.

35.3 KPTCL may present. Members may discuss.

36.0 Reactive power compensation at 400kV sub –stations at Davanagere and Talaguppa

36.1 During 39th meeting of standing committee on power system planning of southern region 125 MVAr reactor are proposed at Talaguppa and Davanagere to mitigate the high voltage problem.

36.2 KPTCL vide their letter CEE(P&C)/SEE/(Plg)/EE(PSS)KCO-97/64329/2016-17/20519-21 dated 20.03.2017 (Annexure-36) informed that 63 Mvar bus reactor are commissioned each at 400kV Talaguppa and Davagere which are not consider for the study.

36.3 KPTCL requested to clarigy the reactive compensation required at at Talaguppa and Davanagere.

36.4 Members may discuss.

37.0 Establishing 2x500 MVA,400/220kV GIS sub-station at Peenya in Bengaluru city

37.1 KPTCL vide their letter no. CEE(P&C)/SEE(Plg)/EE(PSS)KCO-97/64345/2016-17 dated 17.07.2017 (Annexure -37.1) informed that they are planning to establish 2 x 500 MVA, 400/220 kV GIS sub-station at Peenya in Bengaluru City with 400 kV D/C line using Quad Moose conductor from existing 400/220 kV Nelamangala sub-station.

37.2 The proposed 400 kV sub-station is intended to reduce loads of 400 kV Nelamangala and to relieve overloading of 220kV lines feeding peenya, NRS 400 kV Peenya sub-station there is considerable reduction in system loss with increased reliability in power supply to the 220 kV sub-stations in the ring mains of Bengaluru city.

37.3 KPTCL has carried out studies considering 400 kV Peenya sub-station with the following connectivity.

a. Peenya –Nelamangala 400kV D/C Quad Moose line
b. 2x500 MVA, 400/220 kV transformers.

The 220 kV lines emanating from the proposed 400/200 kV sub-station are as follows:

a. Bus extension to 220 kV Peenya (Existing)
b. 220 kV D/C line with Drake conductor to 220/66 kV NRS.

37.4 KPTCL has carried out studies and result of load flow study is placed as annexure-37.2.

37.5 Member may discuss.

38.0 Inclusion of Rampura limits – Jaglur 400kV D/C line and strengthening of Gadag-Lingapura 220kV D/C line under 'Green Energy Corridor'

38.1 In the 39th Standing committee establishment of 2 X500 MVA, 400/220 kV sub-station at Jagalur in Jagalur Taluk, Davanagere district" was approved with construction of 400kV Multi circuit Quad Moose ACSR line for a length of 40kms from proposed 400/220kV Jagalur substation to LILO the proposed BPS-C.N.Halli D/C Quad Moose ACSR line.

38.2 KPTCL vide their letter dated 28.04.2017 (Annexure-38) informed that the land acquisition for establishing 400 kV CN Halli sub-station is under process and commissioning of 400 kV CN Halli s/s may is getting delayed.

38.3 However, the subject work of establishing 400/220 kV Jagalur sub-station is under fast progress and is expected to be commissioned by December, 2017 with 400 kV D/C line from Bellary Pooling Station for a line length of 65 km (Rampura limits-Jagalur).

38.4 In this regard, load flow study is conducted for 2018-19 time frame for system light load conditions .Considering 400/220 kV Jagalur sub-station with 400 kV D/C line from Bellary Pooling Station. 400 kV CN Halli sub-station is not considered for study. Results are enclosed as annexure. As seen from the load flow study results due to large quantum of RE generatiogs in the vicinity of Jagalur, there is step up of power from 220kV to 400 kV voltage level to an extent of 260 MW at Jagalur which is being evacuated to Bellary Pooling station (BPS) through 400 kV D/C line between Jagalur and BPS.

38.5 The actual DPR cost of "Establishing 2 X 500 MVA, 400/220 kV sub-station at Jagalur in Jagalur Talu k, Davanagere district" is Rs 223.28 Crores and the project is awarded to M/s KEC International for Rs 229.55 Crores, the awarded cost as against the project cost of Rs 484.36 Crores approved by CEA which has reduced due to modified LILO distance of 400 kV BPS-CN Halli DC line with Quad Moose conductor to proposed 400 kV Jagalur sub-station from 40 km to 0.88 km.

38.6 The 400 kV Rampura limits-Jagalur DC line (from Bellary Pooling station) with Quad Moose conductor for a distance of 65 km with DPR cost of Rs 168.04 Crores is awarded to M/s KEC for Rs 178.02 Crores and the work is under progress. Since the subject 400 kV DC line is facilitating for reliable evacuation of RE generations in the vicinity of Jagalur and also due to decrease in the actual DPR cost of Jagalur 400 kV sub-station, the400 kV DC line may be included under th~ package of "Establishing 2 X 500 MVA, · 400/220 kV sub-station at Jagalur in Jagalur Taluk, Davanagere district" which is part of Green Energy Corridor scheme approved by CEA.

38.7 Further, the project of establishing 400/220 kV Doni sub-station at Doni in Gadag district with LILO of 400 kV Guttur (Davanagere) - Guddadahalli (Munirabad) Twin Moose SC line to the proposed 400 kV Doni sub-station is approved for total project cost of Rs. 132.49 Crores by CEA under Green Energy Corridor scheme and the project is awarded to M/s KEC International for Rs 176.38 Crores.

38.8 The 220 kV connectivity from proposed 400 kV Doni sub-station is approved with LILO of 220 kV DC line with Drake conductor between Gadag and Lingapura to the proposed 400 kV Doni. sub-station. ·Gadag being the wind zone, many UP.COming wind· generators are proposed to be connected to 220 kV and 110 kV downst~eam stations of 220/110 kV Gadag sub-station to an extent of about 520 MW (Including existing WPP).

38.9 KPTCL requested the following:

a. To include 400 kV Ram~ura limits-Jagalur DC line (from Bellary Pooling station) with Quad Moose conductor for a distance of 65 km with DPR cost of Rs 168.04 Crores under the package of " Establishing 2 X 500 MVA, 400/220 kV sub-station at Jagalur in Jagalur Taluk, Davanagere district".
b. Approval for the proposal of strengthen ing the 220 kV DC line with Drake conductor between Gadag to Lingapura switching station via prop.400/220 kV Dhoni sub-station by Drake equivalent HTLS conductor with

Transmission planning proposals in Telangana

39.0 Revised proposal for connectivity of Telangana STPP (2x800 MW), proposal for erection of 400/220/132kV Rayadurg SS, LILO of both circuits of 400kV Mamidipalli-Dindi to the upcoming 400kV Maheshwaram SS and 400kV QMD/C line from 400kV Dichpally SS to upcoming 400kV Nirmal SS to meet the requirement of additional outlet for SCCL power plant (2x600 MW)

39.1 Transmission evacuation scheme of Kaleshwaram Lift Irrigation Project was discussed and agreed in the 37th meeting of SCPSPSR and some modification in the scheme was approved in 40th SCPSPSR [Para No. 23.5 (A)]. The evacuation scheme of Telangana STPP (2x800) was agreed in the 40th SCPSPSR [Para No.23.5(C)].

39.2 TSTRANSCO vide their letter no. dated 27/03/2017 (Annexure-39.1) requested CEA to Give in-Principle approval for modification in the above scheme.

The modifications proposed by TSTRANSCO are given below:

i. 400kV QMD/C Line from Telangana STTP Stage-I (2x800 MW) to 400 KV Ramadugu LI SS duly incorporating following 220kV downstream loads.
   a) LILO of both circuits of 220kV Durshed-Sircilla at 400/220 Ramadugu SS.
   b) LILO of 220kV Malyalpalli -Bheemgal at 400/220kV Ramadugu SS

ii. Proposal for making LILO of 400kV SCCL-Nirmal line at 400kV Yellampalli LI SS instead of making LILO of 400kV SCCL- Ramadugu line at 400kV Yellampalli LI SS

iii Proposal for erection of 400/220/132kV Rayadurg S/S (instead of 400/220kV RC Puram) with following downstream connectivities for system improvement
   a) LILO of 220kV Shapurnagar - Gachibowli at 400/220/132KV Rayadurg S/S
   b) LILO of 220kV Erragadda – Gachibowli at 400/220/132kV Rayadurg S/S
   c) LILO of 220kV Miyapur – Gachibowli at 400/220/132kV Rayadurg S/S
   d) 132kV D/C line from Rayadurg SS to 132kV Madhapur S/S

e) 132kV D/C line from Rayadurg SS to 132kV Jubilee Hills S/S
f) LILO of 132kV Erragada – Shivarampally S/C line to 400/220/132kV Rayadurg S/S

iv. Proposal for erection of 400kV QMD/C line from 400kV Dichpally Substation to upcoming 400kV Nirmal Substation (to meet the requirement of additional outlet for SCCL power plant (2x600 MW) as mentioned in minutes of meeting of 40th Standing Committee on Power System Planning of Southern Region at Item No. 23.7(a).

v. Proposal for making LILO of both circuits of upcoming 400kV Dindi – Mamdipalli to upcoming 400kV Maheshwaram SS.

vi. Along with these proposals TSTRASCO requested for augmentation of transformer at existing 400/220/132 kV Malkaram SS and 400/220 kV Shankarpally SS with 4th 500 MVA ICT each to meet forthcoming additional agricultural load.

39.3 In this regard, a meeting was held on 11th April, 2017 in the office of Chief Engineer (PSPA-II), with TSTRANSCO and POWERGRID.The study has been carried out duly incorporating the above proposal and it is observed that loading on transmission line in order (study result at Annexure-39.2).

39.4 Considering above, CEA, vide their letter No. 58/1/2017/CEA/PSPA-II/354 dated 01.05.2017(Annexure-39.3) has given in-principle approval to Telangana TSTRANSCO to carry out following transmission scheme/work:

New Work:

1) LILO of both circuits of Dindi – Mamdipalli 400kV D/C line at Maheshwaram 400/220kV S/S of TSTRANSCO.
2) Dichpally - Nirmal 400kV D/C Quad line.

Change in the Scope of earlier agreed schemes:

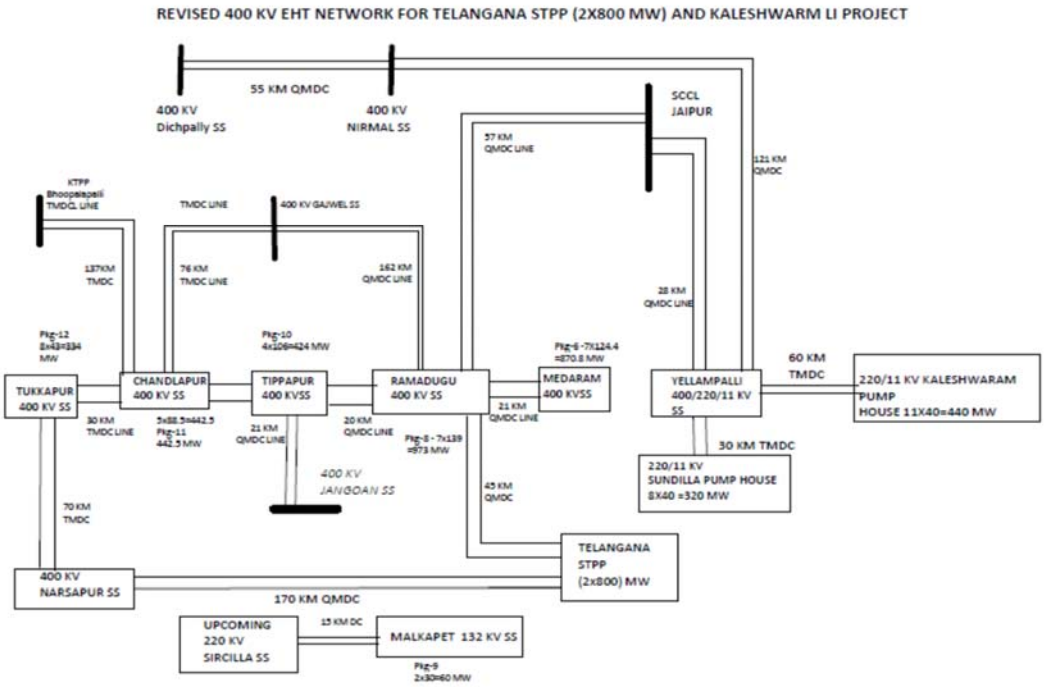
3) Transmission system for Telangana STPP (2x800):

i. 400kV QMD/C Line from Telangana STTP Stage-I (2x800 MW) to 400 KV Ramadugu LI SS
ii. LILO of both circuits of 220KV Durshed-Sircilla at 400/220 Ramadugu SS.
iii. LILO of 220kV Malyalpalli -Bheemgal at 400/220kV Ramadugu SS
iv. 400kV Quad Moose line from proposed Telangan STPP 2x800 MW to upcoming 400kV Narsapur SS
v. Erection of 400/220/132kV Rayadurg
vi. LILO of 220kV Shapurnagar - Gachibowli at 400/220/132KV Rayadurg SS
vii. LILO of 220kV Erragadda – Gachibowli at 400/220/132kV Rayadurg SS
viii. LILO of 220kV Miyapur – Gachibowli at 400/220/132kV Rayadurg SS
ix. 220 kV Single Moose D/C line from upcoming 400 kV Narsapur to proposed 220 kV Borampet SS
x. 220 kV Single Moose D/C line from proposed 220 kV Borampet SS to existing 220 KV Miyapur SS
xi. 220 kV Single Moose D/C line from proposed 220 kV Borampet SS to existing 220 KV Shapurnagar SS.
xii. 132kV D/C line from Rayadurg SS to 132kV Madhapur SS

xiii. 132kV D/C line from Rayadurg SS to 132kV Jubilee Hills SS
xiv. LILO of 132kV Erragada – Shivarampally SC line to 400/220/132kV Rayadurg SS
xv. 125 MVAR bus reactor at Telangana STPP (2x800 MW), Ramagundam

4) Kaleshwaram Lift Irrigation Project:
i. Erection of 400 KV SS at Ramadugu, Karimnagar Dist Pkg-8
ii. Erection of 400 KV SS at Medaram, Karimnagar Dist Pkg-6
iii. Erection of 400 KV SS at Tippapur, Karimnagar Dist Pkg-10
iv. Erection of 400 KV SS at Tukkapur, Medak Dist Pkg-12
v. Erection of 400 KV SS at Chandlapur, Medak Dist Pkg-11
vi. Erection of 400/220 KV SS at Yellampalli, Karimnagar Dist
vii. Erection of 220 KV SS at Yellampalli Pump House, Karimnagar Dist
viii. Erection of 220 KV SS at Sundilla Pump House, Karimnagar Dist
ix. Erection of 220 KV SS at Kaleshwaram Pump House, Karimnagar Dist
x. Erection of 132 KV SS at Malakpet, Karimnagar Dist Pkg-9
xi. Erection of LILO of both circutis of 400 KV Quad Moose D/C line from SCCL Jaipur - Gajwel at proposed Ramadugu SS
xii. Erection of 400 KV Quad Moose D/C line from 400 KV Ramadugu LI SS to 400 KV Medaram LI SS
xiii. Erection of 400 KV Quad Moose D/C line from 400 KV Ramadugu LI SS to 400 KV Tippapur LI SS
xiv. Erection of 400 KV Quad Moose D/C line from 400 KV Tippapur LI SS to 400 KV Chandlapur LI SS
xv. Erection of LILO of both circuits of 400 KV Twin Moose D/C line from KTPP - Gajwel at Chandlapur LI SS
xvi. 400 KV Twin Moose D/C line from 400 KV Chandlapur LI SS to 400 KV Tukkapur LI SS
xvii. 400 KV Twin Moose D/C line from 400 KV Tukkapur LI SS to 400 KV Narasapur SS
xviii. LILO of both circuits of 400kV SCCL-Nirmal line at 400kV Yellampalli LI SS
xix. Erection of 220 KV D/C line from 400/ 220 KV Yellampalli SS to 220/11 KV Sundilla pump house
xx. Erection of 220 KV Twin Moose D/C line from 400/220 KV Yellampalli LI SS to 220/11 KV Kaleshwaram pump house
xxi. Erection of 132 KV D/C line from upcoming 220 KV Sircilla SS to the proposed 132 KV Malakpet SS.
xxii. 125 MVAR bus reactor at Chadulapur 400kV LI SS

39.5 Schematic diagram of 400kV system of above scheme is given as below-



39.6 Members may confirm.

40.0 Augmentation of Power Transformer at existing 400/220/132 kV Malkaram SS and 400/220 kV Shankarpally SS with 4th 400/220 kV, 500 MVA transformer

40.1 TSTRANSCO vide their letter no. Dir(Proj)/SE(PS)/DE(SS)/ADE-3/F.4th PTR/D.No.45/17 dated 16.02.2017 (Annexure-40) informed that the loadings on existing 3x315 MVA Power Transformers (PTRs) at 400/220/132 kV Malkaram SS (85%) and 400/220 kV Shankarpally SS (70%) have crossed 60% of full load value.

40.2 TSTRANSCO has requested for communicate approval for augmentation of PTR at existing 400/220/132 kV Malkaram SS and 400/220 kV Shankarpally SS with 4th 500 MVA PTR to meet the forthcoming additional agricultural load.

40.3 CEA, vide their letter No. 58/1/2017/CEA/PSPA-II/354 dated 01.05.2017(enclosed at Annexure-39.3) has given in-principle approval to Telangana for Augmentation of Transformers:

(i) 4th 500MVA 400/220kV transformer at Malkaram S/S

(ii) 4th 500MVA 400/220kV transformer at Shankarpally S/S

40.4 Members may confirm.

41.0 400/220kV Asupaka S/S with 2x315 MVA and LILO of one circuit of 400kV Kalpaka –Khammam Line to 400kV Asupaka

41.1 TSTRANSCO vide their letter dated 18.05.17 (Annexure-41.1) requested for approval to charge 400/220kV Asupaka S/S with 2x315 MVA with LILO of one circuit of 400kV Kalpaka –Khammam Line to 400kV Asupaka.

41.2 In this regard a meeting was held on 10th July, 2017 in the office of Chief Engineer (PSPA-II) CEA with CTU, APTRANSCO and TSTRANSCO (MoM enclosed at Annexure-41.2). In the meeting following were informed by representative of TSTRANSCO-

a) APTRANSCO (before bifurcation of states) had envisaged 400/220kV Sub-station at Asupaka (2x315 MVA) by making LILO of one circuit of 400kV Kalpaka - Khammam D/C Line at Asupaka SS with the following 220kV downstream connectivity to meet the LI loads under Indira Sagar Rudramakota Lift Irrigation Scheme:

   1. Asupaka - Medipally 220kV D/C line (12.01km)
   2. Asupaka - Bandarugudem 220kV D/C line (14.84km)
   3. 220/11kV Medipally Substation (2x25MVA)
   4. 220/11kV Asupaka SS (3x50MVA)
   5. 220/11kV Bandarugudem SS (3x50MVA)

b) The representative of TSTRANSCO informed that after formation of Telangana State, the works in 220kV substations at Medipally and Bandarugudem were stopped as the intake pump house and gravity canal etc came under the geographical limits of Andhra Pradesh. But work at Asupaka was in progress. For effective utilization of 400/220kV Asupaka Substation which came under newly created Telangana state, TANTRANSCO proposed to revise 220/132kV downstream connectivity as follows:

   1. Upgradation of existing 132/33kV Aswaraopet SS to 220kV with 2x100MVA, 220/11kV transformer.
   2. Asupaka -Aswarapet 220kV D/C (20km)
   3. Stringing of 2nd circuit on the existing Aswaraopet - B.Gangaram 132kV S/C Line on D/C tower (30km).

c) The works of 400/220kV Asupaka Sub- Station and LILO of one circuit of 400kV Kalpaka - Khammam D/C Line have been completed and are ready for charging. The works of 220/132kV Line and associated Sub Stations are under progress.

d) 400kV Kalpaka - Khammam Line and 400/220kV Asupaka substation was intra-state transmission system and was not discussed in any Standing Committee Meeting of Southern Region.

e) LI schemes that were proposed to be feed from Asupaka 400/220kV Substation (before bifurcation of states) have been dropped and works related to Meddipply and Bandarugudem have been stopped The proposed LILO of one circuit of Kalpaka –Khamman 400kV D/C line at Ashupaka Sub station and the 220/132kV downstream connectivity is agreeable to both states of Telangana and Andhra Pradesh.

41.3 After deliberation, In Principle, it was decided to allow TSTRANSCO to charge 400kV Asupaka S/S (2x315MVA,400/220kV) and LILO of one circuit of 400kV Kalpaka-Khammam Line to 400kV SS.CTU will carry out the study for reactive compensation requirement at 400kV Asupaka Substation for line charging and over voltage control. The charging of line and energization of Asupaka substation is to be planned properly with the reactors available at Khammam and Kalpaka end.

41.4 CTU have carried out charging studies (enclosed at Annexure-41.3) and it is observed that total rise in voltage without reactor while charging from Kalpakka(Vizag) end is 19.7 kV. However, by providing 63 MVAr line reactor at Asupaka the voltage rise can be restricted to 5.9 kV. Accordingly, it is suggested to provide 63 MVAr Switchable line reactor. Further, to control high voltage under light load condition bus reactor of 80 MVAr may also be provided.

41.5 Member may discuss.

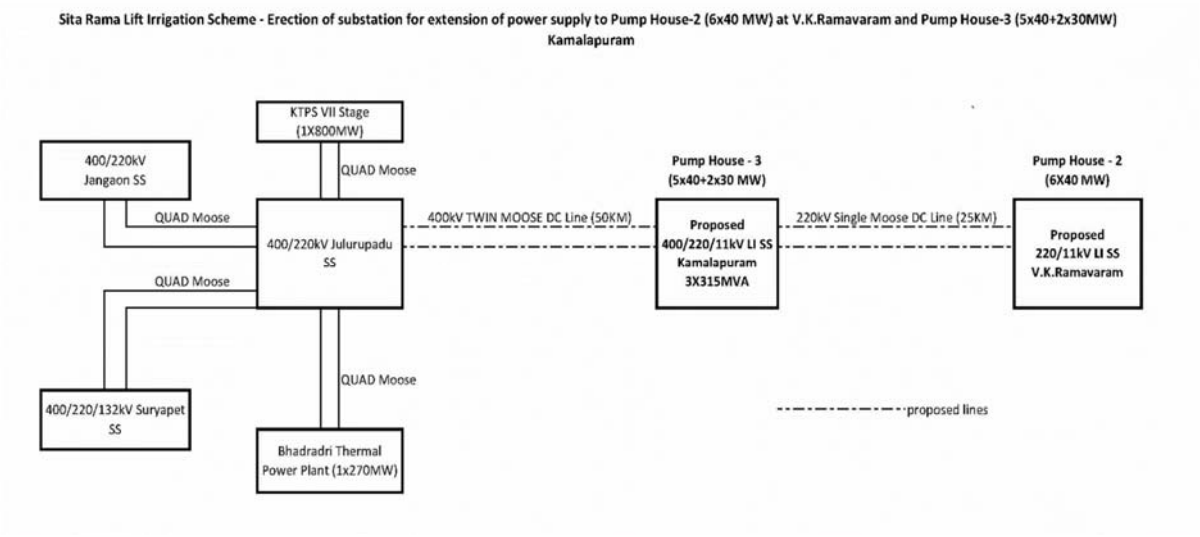
42.0 Sita Rama Lift Irrigation Scheme – Erection of Substation for extension of power supply to Pump House – 1 (6x25 MW) at B.G. Kothur (V) Ashwapuram(M) and Pump House -2 (6x40 MW) at V.K. Ramavaram (V) Mulakalapally (M) and Pump House 3 (5x40+2x30MW) Kamalapuram(V) Chandrugonda(M) in Bhadradri Kothagudem District

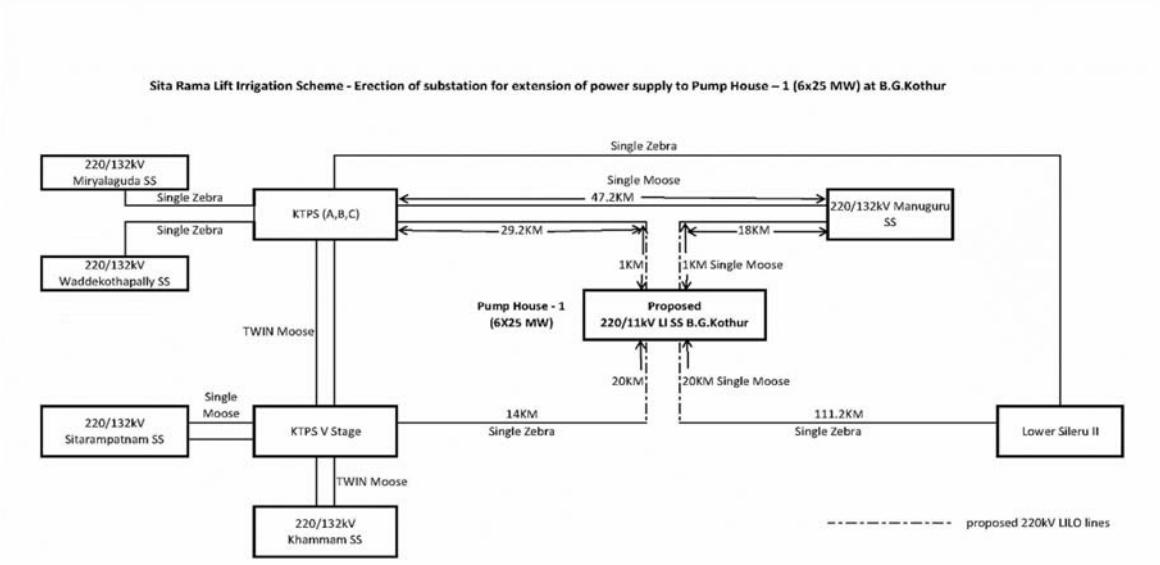
42.1 TSTRANSCO vide their letter no dated 01.08.2017 (Annexure-42) requested to extend power supply to Pump House – 1 (6x25 MW) at B.G. Kothur (V) Ashwapuram(M) and Pump House -2 (6x40 MW) at V.K. Ramavaram (V) Mulakalapally (M) and Pump House 3 (5x40+2x30MW) Kamalapuram(V) Chandrugonda(M) in Bhadradri Kothagudem District under Sita Rama Lift Irrigation Scheme.

42.2 The following connectivity is proposed for above scheme:

i. 220/11kV SS at Pump House – 1 (6x25 MW) at B.G. Kothur(V) Ashwapuram (M) in Bhadradri Kothagudem District
ii. 220/11 kV SS at Pump House – 2 (6x40 MW) at V.K. Ramavaram (V) Mulakalapally (M) in Bhadradri Kothagudem District
iii. 400/220/11kV SS (3x315 MVAV) at Pump House 3 (5x40+2x30 MW) Kamalapuram(V) Chandrugonda(M) in Bhadradri Kothagudem District
iv. LILO of one circuit of 220 kV KTPS – Manuguru Line to Proposed Pump House -1 at B.G. Kothur for a length of 1 km.
v. LILO of 220 kV KTPS V – Lower Sileru II Line to Proposed Pump House -1 at B.G. Kothur for a length of 20 km.
vi. 400 kV Twin Moose D/C line from 400/220 kV Julurupadu SS to Pump House -3 at Kamalapuram for a length of 50 km.
vii. 220 kV Single Moose D/C line from Pump House -3 at Kamalapuram to Pump House -2 at V.K. Ramavaram for length of 25km.

The Schematic diagram of the above scope is shown below:





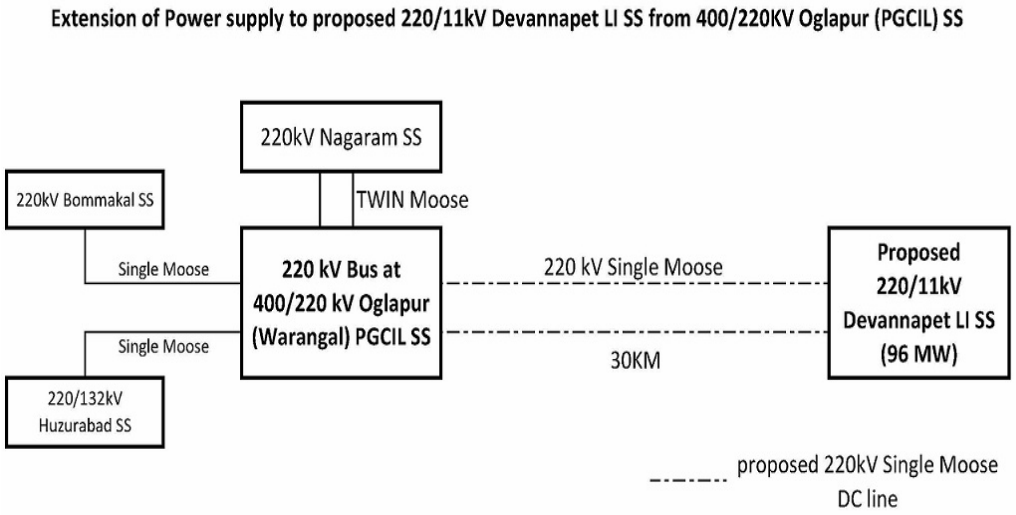
43.0 Extension of Power supply under Phase-III, J.Chokka Rao Devadula Godavari Lift Irrigation Scheme – Construction of 220/11kV Substation Devannapet at Warangal Urban District , 220 KV Single Moose D/C line from 400/220KV Oglapur (PGCIL) SS to proposed 220/11kV Devannapet LI SS

43.1 TSTRANSCO vide their letter dated 22.07.2017 (Annexure-43) informed that The Chief Engineer, I & CADD, Godavari Lift Irrigation Scheme, Warangal vide letter dated: 30.01.2017, has requested to extend the power supply at 220kV level to shaft 13

near at Devannapet (V) @ km. 49.060 for package-III Pump House in Warangal Rural District under Phase-III of J.Chokka Rao Devadula Godavari Lift Irrigation Scheme.

43.2 In view of the above, TSTRANSCO proposed a new 220kV Single Moose D/C line from 400/220kV Oglapur (PGCIL) SS to the proposed 220/11kV Devannapet SS (96MW) for a length of 30kM based on the field feasibility report.

43.3 The Schematic diagram of the above scope is shown below:



43.4 Member may discuss

Agenda by CTU :

44.0 Revision of connectivity with 230 kV S/c line with high capacity conductor suitable to carry 300 MW at nominal voltage from Suzlon Wind farms at Chandragiri, Kumarapuram and Kadambur.

44.1 M/s. Suzlon Power Infrastructure Ltd.(SPIL) was earlier granted connectivity for 3x300 MW and LTA for 3x75 MW for their proposed wind generation projects at Tirunelveli Pooling Station as per the details below:

Suzlon (Chandragiri wind farm) – Tiruneveli PS 230kV D/c line.

Suzlon (Kumarapuram wind farm) –Tiruneveli PS 230kV D/c line.

Suzlon (Kadambur wind farm) – Tiruneveli PS 230kV D/c line.

44.2 SPIL, vide letter dated 25.01.2017 requested POWERGRID to provide three 230kV Bays at Tirunelveli PS, initially, as they are planning 230 kV S/c on D/c towers.

44.3 The above matter was also put up in agenda of follow up meeting of 21st connectivity/LTA of SR constituents held on 21.02.2017, however SPIL could not

participate in the meeting. After detailed deliberations it was decided that matter may be discussed in the forthcoming Standing Committee meeting of SR.

44.4 Subsequent to above meeting, a separate meeting has been convened by CEA with POWERGRID & SPIL on 27.06.2017 for discussing the above issue. In the meeting, POWERGRID informed that subsequent to aforementioned grants, numerous connectivity applications from Wind Generators have been received in Southern region and considering bay space constraints at the ISTS substations, the connectivity was proposed to be granted with 1 no. 230 kV S/c line with high capacity conductor suitable to carry 300 MW for subsequent applications. In view of above, it was proposed to review the grant for connectivity to SPIL with 230 kV S/c line with high capacity conductor suitable to carry 300 MW line from Suzlon Wind farms each at Chandragiri, Kumarapuram and Kadambur.

44.5 SPIL informed that their consortium partner consider reliability in their assessment, hence they prefer 230 kV D/c line considering n-1 contingency. SPIL also informed that they are yet to start work on implementation of above connectivity lines. CTU representative informed that CEA Transmission planning criteria (Jan'13) for wind and solar projects specifies:

"The 'N-1' criteria may not be applied to the immediate connectivity of wind/solar farms with the ISTS/Intra state Grid."

44.6 Therefore, considering bay space issues at Tirunelveli S/s and huge wind potential in the area, 230 kV S/c line with high capacity conductor suitable to carry 300 MW is preferable. This would also save generators/developer in saving of cost of line bays (GIS). SPIL agreed for revision of grant with 230 kV S/c line with high capacity conductor suitable to carry 300 MW from Suzlon Wind farms each at Chandragiri, Kumarapuram and Kadambur.

44.7 Chief Engineer (PSP&PA-II), CEA opined that it is always better to construct D/c towers instead of S/c towers in view of rising ROW issues. Accordingly, it was suggested that Wind Developers having requirement for S/c line may collaborate with some other developer passing through same corridor with S/c requirement so as to optimally utilize precious right-of-way by using D/c towers.

44.8 M/s Suzlon indicated that Chandragiri and Kumarapuram may use same ROW to a certain extent and therefore can explore possibility of using D/c towers for both wind farms with one circuit for each farm.

44.9 Accordingly, Chief Engineer (PSP&PA-II), CEA suggested SPIL to construct their 230 kV S/c lines each form Chandragiri and Kumarapuram WFs on D/c tower in the common corridor. Similarly, with regard to 230 kV S/c line from Kadambur WF they may find suitable partner to share the space on D/c tower.

44.10 It was decided to revise the grant of connectivity to M/s. Suzlon Power Infrastructure Ltd.(SPIL) for their 3x300 MW proposed wind generation projects near Tirunelveli area as per the details below:

44.11 Suzlon(Chandragiri wind farm) – Tirunelveli PS 230kV S/c line(with high capacity conductor suitable to carry 300 MW at nominal voltage) Suzlon(Kumarapuram wind farm) –Tirunelveli PS 230kV S/c line(with high capacity conductor suitable to carry 300 MW at nominal voltage)Suzlon(Kadambur wind farm) – Tirunelveli PS 230kV S/c line(with high capacity conductor suitable to carry 300 MW at nominal voltage) Development of above connectivity line(s) as well as 230kV terminating line bays shall be under the scope of SPIL.

44.12 Members may note.

45.0 New transmission system approved for grant of connectivity to applications.

During the follow up meeting of 21st connectivity/LTA of SR constituents held on 21.02.2017 connectivity was agreed for some connectivity applications. Further, Agenda for the 22nd Southern Region constituents meeting regarding Connectivity/LTA Applications of IPPs in SR was circulated by CTU and connectivity was proposed for some applications. Details of connectivity agreed/proposed are as below:

45.1 **Gooty**

Many connectivity applications were received for grant of connectivity at Gooty S/s. However, Gooty 400/220kV substation is a POWERGRID S/s while 220kV switchyard is owned and operated by STU. Moreover, in the 40th SCM of SR held on 19.11.2016 it was decided that connectivity needs to be provided at ISTS point. It was informed that additional space at Gooty S/s is not available to establish separate 220 kV switchyard. Keeping above in view, it was proposed that a new substation at suitable location near existing Gooty 400/220 kV S/s may be established and to be inter connected with existing substation through 400 kV (High Capacity) D/c line and connectivity can be provided at this new Gooty S/s. It was opined that 1x500 MVA, 400/220kV ICT shall be sufficient for connectivity. Accordingly, following transmission system was agreed/proposed for 25 nos. of connectivity applications.

Common ISTS System for providing Connectivity:

- Establishment of new 400/220kV S/s at suitable location near Gooty along with 1x500 MVA, 400/220kV ICT with bus sectionaliser
- Gooty(New)–Gooty(existing) 400kV HTLS(Quad moose equivalent) D/c line

Connectivity system specific to Applicants:

Sl. No	Applicant	Connectivity Sought (MW)	Start Date	Connectivity transmission system
Agreed in follow up meeting of **21st connectivity/LTA of SR constituents**				

1.	Enerfra Project(India) Pvt. Ltd	300	March, 2020 (tentative)	Enerfra Project(India) – Gooty(New) 220kV S/c line (with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with line bays at both ends
2.	Gamesa Renewable Pvt. Ltd.	350	March, 2020 (tentative)	Gamesa Renewable – Gooty(New) 220kV D/c line along with line bays at both ends
3.	Gamesa Renewable Pvt. Ltd.	300	March, 2020 (tentative)	Gamesa Renewable – Gooty(New) 220kV S/c line (with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with line bays at both ends
4.	Regen Wind Farm (AP) Pvt. Ltd.(672 MW)	672	March, 2020 (tentative)	Regen Wind Farm – Gooty(New) 220kV (Twin Moose) D/c line along with line bays at both ends
5.	Wind World (India) Ltd.(400 MW)	400	31st March, 2020	Wind World (India) – Gooty(New) 220kV D/c line along with line bays at both ends
6.	Dharmapuram Wind Farms Pvt. Ltd.(300 MW)	300	March, 2020 (tentative)	Dharmapuram Wind – Gooty(New) 220kV S/c line (with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with line bays at both ends
7.	Sabashpuram Wind Farms Pvt. Ltd.(250 MW)	250	March, 2020 (tentative)	Sabashpuram Wind – Gooty(New) 220kV S/c line along with line bays at both ends
8.	Nansurala Wind Farms Pvt. Ltd.(250 MW)	250	March, 2020 (tentative)	Nansurala Wind – Gooty(New) 220kV S/c line along with line bays at both ends
9.	Enerfra Projects (India) Pvt. Ltd.(500 MW)	500	March, 2020 (tentative)	Enerfra Projects – Gooty(New) 220kV D/c line along with line bays at both ends
10.	Green Infra Wind Energy Ltd.(400 MW)	400	March, 2020 (tentative)	Green Infra Wind – Gooty(New) 220kV D/c line along with line bays at both ends
Proposed in Agenda for 22nd connectivity/LTA of SR constituents				
11.	Devarabanda Renewable Energy Pvt. Ltd.– (Wind)	200	30th Sept, 2018	Devarabanda Renewable Energy Pvt. Ltd. – Gooty(New) 220 kV S/c line along with the associated bays at Gooty(New) & generation switchyard.
12.	Tuljapur Windfarms Pvt. Ltd.	150	30th Sept, 2018	Tuljapur Windfarms Pvt. Ltd. – Gooty(New) 220 kV S/c line along with the associated bays at Gooty(New) & generation switchyard.
13.	Kutch Renewable Pvt. Ltd.– (Wind)	200	30th Sept, 2018	Kutch Renewable Pvt. Ltd. – Gooty(New) 220 kV S/c line along with the associated bays at Gooty(New) & generation switchyard.
14.	Mytrah Energy (India) Pvt. Ltd. (Veldurthi Wind Farm)	250	31st May, 2020	Mytrah Energy (India) Pvt. Ltd. (Veldurthi Wind Farm) – Gooty(New) 220 kV S/c line along with the associated bays at Gooty(New) & generation switchyard.
15.	Mytrah Energy (India) Pvt. Ltd. (Karadikonda Wind Farm)	250	31st Mar, 2023	Mytrah Energy (India) Pvt. Ltd. (Karadikonda Wind Farm) – Gooty(New) 220 kV S/c line along with the associated bays at Gooty(New) & generation switchyard.

16.	Poovani Wind Farms Pvt. Ltd.	100	30th Sep, 2018	Poovani Wind Farms Pvt. Ltd. – Gooty(New) 220 kV S/c line along with the associated bays at Gooty(New) & generation switchyard.
17.	Powerica Ltd. (Yerukalacheruvu) – (Wind)	150	1st April, 2018	Powerica Ltd. – Gooty(New) 220 kV S/c line along with the associated bays at Gooty(New) & generation switchyard.
18.	Powerica Ltd. (Dharmavaram)– (Wind)	250	1st April, 2018	Powerica Ltd. – Gooty(New) 220 kV S/c line along with the associated bays at Gooty(New) & generation switchyard.
19.	Sreeja Infrastructure Pvt. Ltd.– (Wind)	350	30th Sept,2018	Sreeja Infrastructure Pvt. Ltd. – Gooty(New) 220 kV D/c line along with the associated bays at Gooty(New) & generation switchyard.
20.	Ecoren Energy India Pvt. Ltd.– (Wind)	250	13th Dec, 2018	Ecoren Energy India Pvt. Ltd. – Gooty(New) 220 kV S/c line along with the associated bays at Gooty(New) & generation switchyard.
21.	Anemoi Energy Pvt. Ltd.– (Wind)	300	1st June, 2020	Anemoi Energy Pvt. Ltd. – Gooty(New) 220 kV S/c line(with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with the associated bays at Gooty(New) & generation switchyard.
22.	Soganur Pvt. Ltd.– (Wind)	300	1st Sept, 2019	Soganur Pvt. Ltd. – Gooty(New) 220 kV S/c line(with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with the associated bays at Gooty(New) & generation switchyard.
23.	Anemoi Energy Pvt. Ltd.– (Wind)	300	1st Sept, 2020	Anemoi Energy Pvt. Ltd. – Gooty(New) 220 kV S/c line(with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with the associated bays at Gooty(New) & generation switchyard.
24.	Anemoi Energy Pvt. Ltd.– (Wind)	300	1st May, 2020	Anemoi Energy Pvt. Ltd. – Gooty(New) 220 kV S/c line(with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with the associated bays at Gooty(New) & generation switchyard.
25.	Clean Wind Power (Kurnool) Pvt. Ltd.	300	30th Sep,2021	Clean Wind Power (Kurnool) Pvt. Ltd. – Gooty(New) 220 kV S/c line(with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with the associated bays at Gooty(New) & generation switchyard.

45.2 **Munirabad**

Sl. No.	**Applicant**	**Connectivity Sought (MW)**	**Start Date**	**Connectivity transmission system**
Agreed in follow up meeting of 21st connectivity/LTA of SR constituents				

1.	Orange Ashok Wind Power Pvt. Ltd.(250 MW)	250	Progressively from 31st March, 2020 to 31st March, 2021	Orange Ashok Wind – Munirabad(New) 220kV S/c line along with line bays at both ends
2.	Renew Wind Energy (TN) Pvt. Ltd.(400 MW)	400	March, 2020 (tentative)	Renew Wind Energy – Munirabad(New) 220kV D/c line along with line bays at both ends
3.	Green Infra Wind Energy Ltd.(400 MW)	400	March, 2020 (tentative)	Green Infra Wind Energy – Munirabad(New) 220kV D/c line along with line bays at both ends
Proposed in Agenda for 22nd connectivity/LTA of SR constituents				
4.	Ostro Dakshin Power Pvt. Ltd.-(Wind)	**300**	31st Mar, 2018	Ostro Dakshin Power Pvt. Ltd. – Munirabad(New) 220kV S/c line (with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with the associated bays at both ends.
5.	Axis Wind farm (Anantapur) Pvt. Ltd.	300	31st Mar, 2018	Axis Wind farm (Anantapur) Pvt. Ltd. – Munirabad(New) 220kV S/c line (with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with the associated bays at at both ends.
6.	Clean Wind Power Tuticorin Pvt. Ltd.	300	30th Sept, 2018	Clean Wind Power Tuticorin Pvt. Ltd. – Munirabad(New) 220kV S/c line (with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with the associated bays at at both ends.
7.	Mytrah Energy (India) Pvt. Ltd. (Kyadiguppa Wind Farm)	200	31st Mar, 2022	Mytrah Energy (India) Pvt. Ltd. (Kyadiguppa Wind Farm) – Munirabad(New) 220kV S/c line along with the associated bays at both ends.
8.	IMPEL Renewable Power Pvt. Ltd.-(Wind)	250	31st Dec, 2018	IMPEL Renewable Power Pvt. Ltd. – Munirabad(New) 220kV S/c line along with the associated bays at at both ends.

Many connectivity applications were received for grant of connectivity at Munirabad S/s. However, Munirabad 400/220kV substation is a POWERGRID S/s while 220kV switchyard is owned and operated by STU and space is not available for establishing a new 220 kV ISTS switchyard. Keeping above in view, it was proposed that a new substation at suitable location near existing Munirabad 400/220 kV S/s may be established and to be inter connected with existing substation through 400 kV (High Capacity) D/c line and connectivity can be provided at this new Munirabad S/s. It was also decided that,

1x500 MVA, 400/220kV ICT at Munirabad(New) shall be sufficient for connectivity. Accordingly, following transmission system was agreed/proposed for 8 nos. of connectivity applications.

Common ISTS System for providing Connectivity:

- Establishment of new 400/220kV S/s at suitable location near Munirabad along with 1x500 MVA, 400/220kV ICT
- Munirabad(New) – Munirabad (existing) 400kV HTLS(Quad moose equivalent) D/c line

Connectivity system specific to Applicants:

45.3 Trichy

1 no. connectivity application was received for grant of connectivity for 200 MW at Trichy S/s. It was informed that as per the information available there is space available for 1 no. of 500 MVA, 400/230kV ICT bay along with 1 no. 230kV bay at Trichy S/s of POWERGRID.

Further two more applications seeking connectivity at Trichy 400/230kV S/s were received from Jan'17 onwards.

However, due to space constraints development of AIS 230kV bus would be difficult within the available space at Trichy. Feasibility of establishment of 230kV bus as GIS has been explored and it was found that GIS bus can be accommodated along with 2 nos. of 230kV bays. Accordingly, it was proposed that the connectivity to two applicants i.e. Gamesa Renewable Pvt. Ltd. and Viralipatti Renewable Pvt. Ltd. may be granted at this separate 230kV GIS bus.

Accordingly, following transmission system was agreed/proposed for 2 nos. of connectivity applications.

Common ISTS System for providing Connectivity:

- Installation of 1x500 MVA, 400/230kV ICT at Trichy S/s
- Establishment of separate 230kV GIS bus

Connectivity system specific to Applicants:

Sl. No.	Applicant	Connectivity Sought (MW)	Start Date	Connectivity transmission system
Agreed in follow up meeting of 21st connectivity/LTA of SR constituents				

1	Gamesa Renewable Pvt. Ltd.(200 MW)	200	March, 2019 (revised)	Gamesa Renewable – Trichy S/s 230 kV S/c line along with line bays at both ends
Proposed in Agenda for 22nd connectivity/LTA of SR constituents				
2	Viralipatti Renewable Pvt. Ltd.-(Wind)	200	30th Sept, 2018	Viralipatti Renewable Pvt. Ltd.– Trichy 230 kV S/c line along with the associated bays at Trichy & generation switchyard.

However after grant of connectivity to these applications, the entire space at Trichy shall be utilized and space for terminating additional 220 kV lines would not be available for providing connectivity to remaining third applicant.

Keeping above in view, a new substation was proposed in the vicinity of existing Trichy 400/230 kV PS, inter connected with existing substation through 400 kV (High Capacity) D/c line.

Accordingly, following transmission system was proposed for remaining 1 no. of connectivity application.

Common ISTS System for providing Connectivity:

a. Establishment of new 400/230kV S/s near Trichy S/s along with 1x500 MVA, 400/230kV ICT

b. Trichy S/s (New) – Trichy S/s (Existing) 400kV HTLS(Quad moose equivalent) D/c line

Connectivity system specific to Applicants:

Sl. No.	Applicant	Connectivity Sought (MW)	Start Date	Connectivity transmission system
Proposed in Agenda for 22nd connectivity/LTA of SR constituents				
1	Saunshi Renewable Energy Pvt. Ltd.-(Wind)	200	31st Mar, 2019	Saunshi Renewable Energy Pvt. Ltd. – Trichy S/s (New) 230 kV S/c line along with the associated bays at Trichy S/s (New) & generation switchyard.

45.4 Tirunelveli

Many connectivity applications were received for grant of connectivity at Tirunelveli S/s. However, it was informed that after allocating bays for developers based on the deliberations held in 21st Southern Region constituents Meeting regarding Connectivity/LTA Applications of IPPs in SR, there is no space available at Tirunelveli PS for providing connectivity to the above applicants. Keeping above in view, it was proposed that a new substation at suitable location near existing Tirunelveli 400/230 kV PS may be established and to be inter connected with existing substation through 400 kV (High Capacity) D/c line and connectivity may be provided at this new Tirunelveli PS. It

was also decided that, 1x500 MVA, 400/230kV ICT at Tirunelveli PS(New) shall be sufficient for connectivity. Accordingly, following transmission system was agreed/proposed for 16 nos. of connectivity applications.

Common ISTS System for Connectivity:

- Establishment of new 400/230kV S/s at suitable location near Tirunelveli PS along with 1x500 MVA, 400/230kV ICT
- Tirunelveli PS (New) – Tirunelveli PS (Existing) 400kV HTLS(Quad moose equivalent) D/c line

Connectivity system specific to Applicants:

Sl. No	Applicant	Connectivity Sought (MW)	Start Date	Connectivity transmission system
Agreed in follow up meeting of 21st connectivity/LTA of SR constituents				
1.	Wind World (India) Ltd.(300 MW)	300	31st March, 2020 (Revised)	Wind World (India) – Tirunelveli PS(New) 230kV S/c line (with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with line bays at both ends
2.	Aspan Infrastructure Ltd. (200 MW)	200	March, 2020 (tentative)	Aspan Infrastructure – Tirunelveli PS(New) 230kV S/c line along with line bays at both ends
3.	Clean Wind Power Bhavnagar Pvt. Ltd. (100 MW)	100	March, 2020 (tentative)	Clean Wind Power Bhavnagar – Tirunelveli PS(New) 230kV S/c line along with line bays at both ends
4.	Anantapur Windfarms Pvt. Ltd. (200 MW)	200	March, 2020 (tentative)	Anantapur Windfarms – Tirunelveli PS(New) 230kV S/c line along with line bays at both ends
5.	Clean Wind Power Tuticorin Pvt. Ltd. (100 MW)	100	March, 2020 (tentative)	Clean Wind Power Tuticorin – Tirunelveli PS(New) 230kV S/c line along with line bays at both ends
6.	Sitac Kabini Renewables Pvt. Ltd. (250 MW)	250	March, 2020 (tentative)	Sitac Kabini Renewables – Tirunelveli PS(New) 230kV S/c line along with line bays at both ends
7.	Kurnool Wind Farms Pvt. Ltd. (200 MW)	200	March, 2020 (tentative)	Kurnool Wind Farms – Tirunelveli PS(New) 230kV S/c line along with line bays at both ends
Proposed in Agenda for 22nd connectivity/LTA of SR constituents				
8.	Mytrah Energy (India) Private Ltd (Maniyachi Wind Farm)	200	31st Mar, 2020	Mytrah Energy (India) Private Ltd (Maniyachi Wind Farm) – Tirunelveli PS (New) 230 kV S/c line along with the associated bays at Tirunelveli PS (New) & generation switchyard.

9.	Praptha Renewable Energy Pvt. Ltd. (Thoothukudi Wind Farm)	250	30th Mar, 2018	Praptha Renewable Energy Pvt. Ltd. – Tirunelveli PS (New) 230 kV S/c line along with the associated bays at Tirunelveli PS (New) & generation switchyard.
10.	Saffron Ecopower Venture Pvt. Ltd.-(Wind)	250	30th Sept, 2018	Saffron Ecopower Venture Pvt. Ltd. – Tirunelveli PS (New) 230 kV S/c line along with the associated bays at Tirunelveli PS (New) & generation switchyard.
11.	Green Infra Renewable Energy Ltd.-(Wind)	250	15th March, 2018	Green Infra Renewable Energy Ltd. – Tirunelveli PS (New) 230 kV S/c line along with the associated bays at Tirunelveli PS (New) & generation switchyard.
12.	Greenmint Power Pvt. Ltd.-(Wind)	400	31st March, 2019	Greenmint Power Pvt. Ltd.– Tirunelveli PS (New) 230 kV D/c line along with the associated bays at Tirunelveli PS (New) & generation switchyard.
13.	Ecoren Anemoi Winds Pvt. Ltd.-(Wind)	250	14th March, 2019	Ecoren Anemoi Winds Pvt. Ltd. – Tirunelveli PS (New) 230 kV S/c line along with the associated bays at Tirunelveli PS (New) & generation switchyard.
14.	Green Infra Wind Energy Ltd.	250	30th Sept, 2018	Green Infra Wind Energy Ltd.– Tirunelveli PS (New) 230 kV S/c line along with the associated bays at Tirunelveli PS (New) & generation switchyard.
15.	Sitac Starcap buildwell Private ltd-(Wind)	600	31st Mar, 2019	Sitac Starcap buildwell Private ltd – Tirunelveli PS (New) 230 kV D/c line (with high capacity conductor suitable to carry at least 600 MW at nominal voltage) along with the associated bays at Tirunelveli PS (New) & generation switchyard.
16.	Clean Wind Power (Tuticorin) Pvt. Ltd	300	31st Mar, 2019	Clean Wind Power (Tuticorin) Pvt. Ltd – Tirunelveli PS (New) 230 kV S/c line (with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with the associated bays at Tirunelveli PS (New) & generation switchyard

45.5 **Pugalur**

1 no. application is received earlier for connectivity at Pugalur 400/230 kV substation. During the 21st meeting, it was mentioned that no space is available at Pugalur (Existing) S/s for providing connectivity to the applicant. It was also deliberated that connectivity

may be considered at new Pugalur where HVD/C is being planned. However, looking into difference in time frame, it was proposed that POWERGRID may relook into the space availability at Pugalur(Existing) S/s.

Accordingly, possibility of accommodating one more 230kV line was looked into. After reviewing the space at Pugalur S/s, it was found that 1 no. of 230kV bay can be accommodated in the space available for future extension of 400 kV Switchyard. However after grant of connectivity to this application, the entire space at Pugalur shall be utilized and space for terminating additional 400 kV & 230 kV lines would not be available at Pugalur S/s.

After detailed deliberations, it was agreed to grant connectivity to M/s Green Infra Wind Energy Ltd at Pugalur(existing) through 230 kV S/c line as below :

Sl. No.	Applicant	Connectivity Sought (MW)	Start Date (As per application)	Connectivity transmission system
Agreed in follow up meeting of 21st connectivity/LTA of SR constituents				
1.	Green Infra Wind Energy Ltd.(250 MW)	250	31st March, 2018	Green Infra Wind Energy Ltd.(250 MW) – Pugalur S/s 230 kV S/c line along with associated bays (to be implemented by applicant)

Further five applications seeking connectivity at Pugalur 400/230kV S/s were received from Jan'17 onward.

As no space is available at Pugalur S/s for terminating additional 400 kV & 230 kV lines, it was proposed that a new substation at suitable location in the vicinity of Pugalur area may be established and to be inter connected with Dharmapuri(Salem New) substation through 400 kV (High Capacity) D/c line.

Accordingly, following transmission system was proposed for 5 nos. of connectivity applications.

ISTS System for providing Connectivity:

- Establishment of new 400/230kV S/s near Pugalur area along with 1x500 MVA, 400/230kV ICT
- Pugalur(New) – Dharmapuri(Salem New) 400kV HTLS(Quad moose equivalent) D/c line

Connectivity system specific to Applicants:

Sl. No	Applicant	Connectivity Sought (MW)	Start Date	Connectivity transmission system
Proposed in Agenda for 22nd connectivity/LTA of SR constituents				
1.	Mytrah Energy (India) Pvt. Ltd. (K Paramathi Wind Farm)	200	31st Mar, 2022	Mytrah Energy (India) Pvt. Ltd.– Pugalur(New) 230 kV S/c line along with the associated bays at Pugalur S/s (New) & generation switchyard.
2.	Zalki Renewable Pvt. Ltd.-(Wind)	200	31st Mar, 2019	Zalki Renewable Pvt. Ltd.– Pugalur(New) 230 kV S/c line along with the associated bays at Pugalur S/s (New) & generation switchyard.
3.	Umrani Renewable Pvt. Ltd.-(Wind)	200	31st Mar, 2019	Umrani Renewable Pvt. Ltd.– Pugalur(New) 230 kV S/c line along with the associated bays at Pugalur S/s (New) & generation switchyard.
4.	Hertz Wind Parks Pvt. Ltd.-(Wind)	250	21st Mar, 2019	Hertz Wind Parks Pvt. Ltd.– Pugalur(New) 230 kV S/c line along with the associated bays at Pugalur S/s (New) & generation switchyard.
5.	Clean Wind Power (Tuticorin) Pvt. Ltd.	300	31st Mar, 2020	Clean Wind Power (Tuticorin) Pvt. Ltd.– Pugalur(New) 230 kV S/c line (with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with the associated bays at Pugalur(New) S/s & generation switchyard.

45.6 **Narendra**

Three connectivity applications were received for grant of connectivity at Narendra S/s. However, there is no space available at existing 220kV switchyard of Narendra S/s for providing connectivity to the applicants. Accordingly, following transmission system was proposed for 3 nos. of connectivity applications.

Common ISTS System for providing Connectivity:

- Establishment of 400kV Narendra along with 1x500 MVA, 400/220kV ICT on adjacent land/new location
- Inter connection with existing 400kV Narendra through 400kV bus extension/ Narendra(existing) to Narendra(New) through 400kVHTLS(Quad moose equivalent) D/c line
- Establishment of separate 220kV GIS/AIS bus

Connectivity system specific to Applicants:

Sl. No	Applicant	Connectivity Sought (MW)	Start Date	Connectivity transmission system
Proposed in Agenda for 22nd connectivity/LTA of SR constituents				
1.	Wind World (India) Ltd.	500	31st Mar. 2019	Wind World (India) Ltd. – Narendra 220 kV D/c line along with the associated bay at Narendra & generation switchyard.
2.	Mytrah Energy (India) Pvt. Ltd. (Guledakoppa Wind Farm)	200	31st Mar, 2022	Mytrah Energy (India) Pvt. Ltd. – Narendra 220 kV S/c line along with the associated bay at Narendra & generation switchyard.
3.	Clean Wind Power (Tuticorin) Pvt. Ltd.	300	31st Mar, 2021	Clean Wind Power (Tuticorin) Pvt. Ltd.– Narendra 220 kV S/c line(with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with the associated bay at Narendra & generation switchyard

45.7 Hyderabad

One connectivity application was received for grant of connectivity at Hyderabad S/s. There is no space is available for establishment of separate 220kV switchyard Hyderabad S/s. However, space is available at Maheshwaram (Hyderabad) 765/400kV GIS substation for establishment of separate 220kV GIS switchyard. Accordingly, following transmission system was proposed for 1 no. of connectivity application.

ISTS Transmission System for Connectivity:

- Establishment of separate 220kV GIS bus with 1x500 MVA, 400/220kV ICT at Maheshwaram 765/400kV S/s.

Connectivity system specific to Applicants:

Sl. No	Applicant	Connectivity Sought (MW)	Start Date	Connectivity transmission system
Proposed in Agenda for 22nd connectivity/LTA of SR constituents				
1.	Mytrah Energy (India) Pvt. Ltd. (Tapaspalle Wind Farm)	200	31st Mar, 2022	Mytrah Energy (India) Pvt. Ltd.– Maheshwaram(Hyderabad) 220 kV S/c line along with the associated bays at Maheshwaram & generation switchyard

45.8 Hiriyur

Four connectivity applications were received for grant of connectivity at Hiriyur S/s. However, space for only two 220kV bay is available at Hiriyur (Existing) S/s. It was proposed to grant connectivity to two applicants i.e. M/s Mytrah Energy (India) Pvt. Ltd. and M/s IMPEL Power Solutions Pvt. Ltd. at Hiriyur (Existing) S/s through 220 kV S/c line at Hiriyur (Existing) S/s.

However after grant of connectivity to this application, the entire space at Hiriyur shall be utilized and space for terminating additional 220 kV lines would not be available.

Keeping above in view, it was proposed that a new substation in the vicinity of existing Hiriyur 400/220 kV S/s may be established and inter connected with existing substation through Quad/HTLS 400 kV D/c line and connectivity to other two applicants i.e. M/s INOX Wind Infrastructure Service Ltd. & Clean Wind Power (Tuticorin) Pvt. Ltd. was proposed to be provided at this new Hiriyur S/s.

Accordingly, following transmission system was proposed for 4 nos. of connectivity applications.

ISTS Transmission System for Connectivity:

- Establishment of new 400/230kV S/s near Hiriyur along with 1x500 MVA, 400/220kV ICT
- Hiriyur (New) – Hiriyur (Existing) 400kV HTLS(Quad moose equivalent) D/c line

Connectivity system specific to Applicants:

Sl. No	Applicant	Connectivity Sought (MW)	Start Date	Connectivity transmission system
Proposed in Agenda for 22nd connectivity/LTA of SR constituents				
1.	Mytrah Energy (India) Pvt. Ltd. (Lakkenahalli Wind Farm)	200	31st May, 2022	Mytrah Energy (India) Pvt. Ltd. – Hiriyur (Existing) 220 kV S/c line along with the associated bay at Hiriyur & generation switchyard.
2.	IMPEL Power Solutions Pvt. Ltd.- (Wind)	250	31st Dec, 2018	IMPEL Power Solutions Pvt. Ltd. – Hiriyur (Existing) 220 kV S/c line along with the associated bay at Hiriyur & generation switchyard.
3.	INOX Wind Infrastructure Service Ltd.	500	01st Dec, 2019	INOX Wind Infrastructure Service Ltd.– Hiriyur (New) 220 kV D/c line along with the associated bays at Hiriyur (New) & generation switchyard.

4.	Clean Wind Power (Tuticorin) Pvt. Ltd.	300	31st Mar, 2022	Clean Wind Power (Tuticorin) Pvt. Ltd.– Hiriyur (New) 220 kV S/c line(with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with the associated bays at Hiriyur (New) & generation switchyard.

45.9 **Mahaboob Nagar**

Four connectivity applications were received for grant of connectivity at Raichur S/s. Raichur 400/220kV substation is a KPTCL S/s. Further, there is no 220kV switchyard at Raichur 765/400kV S/s of POWERGRID.

After reviewing the space at Raichur 765/400kV S/s, it was found that 220kV switchyard can be established in the space available for extension of 400kV switchyard. Keeping above in view, it was proposed that a new 220kV GIS switchyard may be established. Accordingly, following transmission system was proposed for 4 nos. of connectivity applications.

Common ISTS System for providing Connectivity:

- Establishment of 220kV GIS bus with 1x500 MVA, 400/220kV ICT at Raichur 765/400kV substation.

Connectivity system specific to Applicants:

Sl. No	Applicant	Connectivity Sought (MW)	Start Date	Connectivity transmission system
Proposed in Agenda for 22nd connectivity/LTA of SR constituents				
1.	Induvasi Wind farm Pvt. Ltd.	300	1st June, 2018	Induvasi Wind farm Pvt. Ltd.– Raichur(New) 220 kV S/c line (with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with the associated bay at Raichur(New) & generation switchyard.
2.	Kondapalli Wind farm Pvt. Ltd.	300	1st June, 2018	Kondapalli Wind farm Pvt. Ltd.– Raichur(New) 220 kV S/c line (with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with the associated bay at Raichur(New) & generation switchyard.

3.	Achyuta Power Pvt. Ltd.-(Wind)	250	1st June, 2019	Achyuta Power Pvt. Ltd. – Raichur(New) 220 kV S/c line along with the associated bay at Raichur(New) & generation switchyard.
4.	Clean Wind Power (Tuticorin) Pvt. Ltd-(Wind)	300	31st Mar, 2021	Clean Wind Power (Tuticorin) Pvt. Ltd– Raichur(New) 220 kV S/c line (with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with the associated bay at Raichur(New) & generation switchyard

45.10 **Khammam**

One connectivity application was received for grant of connectivity at Khammam S/s. However, Khammam 400/220kV substation is a POWERGRID S/s whereas 220kV switchyard is owned and operated by STU.

There is space available for 1 no. of 500 MVA, 400/220kV ICT bay along with 01 no. 220kV bay at Khammam S/s of POWERGRID. Accordingly, following transmission system was proposed for 1 no. of connectivity application.

ISTS Transmission System for providing Connectivity:

- Installation of 1x500 MVA, 400/220kV ICT at Khammam S/s
- Establishment of Separate 220kV bus.

Connectivity system specific to Applicants:

Sl. No	Applicant	Connectivity Sought (MW)	Start Date	Connectivity transmission system
Proposed in Agenda for 22nd connectivity/LTA of SR constituents				
1.	Mytrah Energy (India) Pvt. Ltd. (Gowravaram Wind Farm)	200	31st Mar, 2022	Mytrah Energy (India) Pvt. Ltd.– Khammam 220 kV S/c line along with the associated bay at Khammam & generation switchyard

46.0 Dedicated Transmission Lines for Connectivity proposed for discussion in 22nd connectivity/LTA meeting of SR constituents

In addition to above, the following dedicated transmission system was proposed for connectivity in agenda for 22nd connectivity/LTA of SR constituents.

Sl. No	Applicant	Location	Connectivity Sought (MW)	Start Date	Connectivity transmission system
Proposed in Agenda for 22nd connectivity/LTA of SR constituents					
1	Mytrah Energy (India) Pvt. Ltd. (Mettupalayam Wind Farm)	Coimbatore, Tamil Nadu	200	31st Mar, 2022	Mytrah Energy (India) Pvt. Ltd. – Palakkad 220kV S/c line along with line bays at both ends
2	Mytrah Energy (India) Pvt. Ltd. (Devanallur Wind Farm)	Tiruppur, Tamil Nadu	200	31st Mar, 2022	Mytrah Energy (India) Pvt. Ltd.– Arasur 230 kV S/c line along with the associated bay at Arasur & generation switchyard.
3	NLC India Limited (TPS-II Second Extn) (2x660 MW) - Thermal	Neyveli, Tamil Nadu	350	1st April, 2021	NLC India Limited (TPS-II Second Extn)– Neyveli TPS-I EXPN. switchyard 400 kV (quad) D/c line along with the associated bays.
4	Impel Alternate Energy Pvt. Ltd.-(Wind)	Kadapa, Andhra Pradesh	250	31st Dec, 2018	Impel Alternate Energy Pvt. Ltd.– NP Kunta 220 kV S/c line along with the associated bays at NP Kunta & generation switchyard.
5	Ecoren Energy India Pvt. Ltd.-(Wind)	Kadapa, Andhra Pradesh	250	14th Mar, 2019	Ecoren Energy India Pvt. Ltd.– NP Kunta 220 kV S/c line along with the associated bays at NP Kunta & generation switchyard.
6	Benigere Energy Pvt. Ltd.-(Wind)	Ananthapur Andhra Pradesh	300	1st Mar, 2020	Benigere Energy Pvt. Ltd.– Pavagada 220 kV S/c line(with high capacity conductor suitable to carry at least 300 MW at nominal voltage) along with the associated bays at Pavagada & generation switchyard.

Members may discuss.

47.0 Dedicated Transmission Lines for Connectivity agreed in earlier meetings

The following dedicated transmission system was agreed and granted for various IPPs in earlier LTA/connectivity meeting of Southern Region.

Sl. No	Applicant	Location	Connectivity granted(MW)	Start Date	Agreed in Con/LTA meeting	Connectivity transmission system
1	Suzlon Power Infrastructure Limited	Coimbatore,Tamil Nadu	180	Dec, 2012	16th, 04.09.2013	Suzlon switchyard – Pugalur 230 kV D/c line along with bays at both ends

2	Mytrah Energy India Ltd	Tirunelveli	300	31st Mar, 2022	17th, 31.07.2014	Mytrah Energy India Ltd – Tirunelveli PS 230kV D/c line along with line bays at both ends
3	Samalkot power Limited – Gas	East Godavari, Andhra Pradesh	2214	Feb, 2017	20th, 13.07.2016	Samalkot – Vemagiri-II (PG) 400 kV D/c Quad line along with bays at both ends
4	Regen Wind Farm (Vagarai) Pvt. Ltd	Dindigul, Tamil Nadu	600	14th March 2016	20th, 13.07.2016	Regen PS – Pugalur 230 kV D/c (Twin Moose) line along with bays at both ends
5	Inox Wind Infrastructure Services Ltd (Aynaruthu Wind Farms)	Tirunelveli, Tamil Nadu	500	Sept, 2017	20th, 13.07.2016	Inox PS – Tirunelveli PS 230 kV D/c (Single Moose) line along with bays at both ends
6	Renew Power Ventures Pvt. Ltd.	Karur, Tamil Nadu,	400	31st March 2018	21st, 19.11.2016	Renew Power Ventures Pvt. Ltd– Pugalur 230kV D/c line along with bays at Pugalur & generation switchyard
7	Orange Sironj Wind Power Pvt. Ltd.	Thoothukudi, Tamil Nadu	**200**	31st March 2019	21st, 19.11.2016	Orange Sironj Wind – Tirunelveli PS 230kV S/c line along with bays at both ends
8	Regen Wind Farm (TN) Pvt. Ltd	Tirunelveli, Tamil Nadu	384	1st January 2018	21st, 19.11.2016	Regen Wind Farm – Tirunelveli PS 230kV D/c line along with bays at both ends
9	Ostro Alpha Wind Pvt. Ltd.	Tirunelveli Dist, Tamil Nadu	**400**	31st March 2019	21st, 19.11.2016	Ostro Alpha Wind – Tirunelveli PS 230kV D/c line along with bays at both ends
10	BLP Energy Pvt. Ltd.	Thoothukkudi, Tamil Nadu	250	31st Aug 2018	21st, 19.11.2016	BLP Energy – Tirunelveli PS 230kV S/c line along with bays at both ends
11	Greenmint Power Pvt. Ltd.	Tuticorin, Tamil Nadu	200	01st June 2018	21st, 19.11.2016	Greenmint Power – Tirunelveli PS 230kV S/c line along with bays at both ends
12	Gamesa Renewable Pvt. Ltd.	Thoothukudi, Tamil Nadu	**400**	31st March 2019	21st, 19.11.2016	Gamesa Renewable – Tirunelveli PS 230kV D/c line along with bays at both ends

Members may approve.

48.0 Replacement of 2x315 MVA ICTs at Gazuwaka with 2x500 MVA ICTs

48.1 During 31st SRPC Meeting held on 25.02.2017, APTRANSCO expressed concern on the overloading of 400/220kV, 2x315 MVA ICTs at Gazuwaka. Further, POSOCO in

its operational feedback has also informed that N-1 contingency criteria is not being satisfied for above ICTs at Gazuwaka. The matter was also discussed in the 39th Standing committee of SR held on 28-29 Dec' 15 wherein it was informed that space is not available for installation of additional ICT at Guzuwaka.

48.2 Accordingly, POWERGRID, during 31st SRPC meeting, proposed to replace existing transformers with 2x500 MVA ICTs. It was agreed to take up the matter in the next standing committee meeting of SR.

48.3 Keeping above in view, POWERGRID vide letter dated 02.08.2017, proposed for replacement of 400/220 kV, 2x315 MVA existing ICTs at Gazuwaka with 2x500 MVA ICTs.

48.4 Member may discuss.

49.0 Operational Feedback from POSOCO

Transmission Constraints:

S. No	Corridor	Season/ Antecede nt Conditions	Description of the constraints	Has the constraint occurred in earlier
1	400kV Nellore Pooling Station - Nellore DC line	Whole Year	With Full Generation at SEPL (600 MW), MEPL (300 MW) & TPCIL (2x660 MW) , the 400kV NPS- Nellore D/C flow is usually more than 1500 MW and it has reached up to 1900 MW. With further commissioning of Units at MEPL(stage-2- 2x350MW) , the problem will aggravate	Yes
2	400kV Gooty-Nelamangala line & 400kV Gooty-Somanahalli line	Whole Year	With increase of SR Import to 5900 MW (ATC) and increase of Drawl by Karnataka & due to non- commissioning of 400kV Tumkur-Yelahanka DC line, the flow on 400kV Gooty-Nelamangala & 400kV Gooty-Somanahalli line are loading heavily without N-1 security. Loading on these lines have been partially relieved after 400kV Tumkur-Bidadi/Nelamangala rearrangement.	Yes

3	400kV Udumalpet-Palakkad DC line	Whole year	Kerala drawl is mainly through 400kV Udumalpet-Palakkad D/C line. 400kV Mysore- Kozhikode DC line commissioned but the flow is limited by the ICT capacity at Kozhikode. Present loading on these lines is in the range of 420-500 MW.	Yes
4	400kV Hiriyur-Nelamangala DC line	Whole year	With Full generation at Jindal TPS, Bellary TPS, Low generation at UPCL and high wind generation, the flow on 400kV Hiriyur-Nelamangala D/C line is continuously above 550MW. The commissioning of YTPS generators will further aggravate the situation. Non-	Yes
5	400kV Vemagiri - Gazuwaka	Whole year	765kV Angul – Srikakulam –Vemagiri D/C was commissioned in Dec 2016 and 400kV Gazuwaka – Vijaywada (Nunna) was made LILO at 765/400kV Vemagiri. However in absence of other associated transmission network in the area 400kV Vijaywada – Vemagiri was overloading (~800MW) and was constraint in importing power from NEW grid. Hence 400kV Vijaywada - Vemagiri is kept open resulting in increase in power flow through 400kV Vemagiri-Gazuwaka.	Yes
6	220 kV Bangalore Metro Network	Whole Year	220 kV Metro networks (Bangalore Urban area) are now radialised to prevent overloading of lines. The radialisation decreases the reliability of supply.	Yes
7	Overloading of 220 kV Shoolagiri-Hosur(TN)-Yerrandahalli - Somanahalli SC line	Whole Year	Somanahalli, Yerrandahalli and Hosur are Industrial areas. 220kV Yerandahalli is connected with Hosur (TN) and Somanahalli. Normally, 220kV Yerandahalli is split and part of its load is fed from Hosur (TN) as the Entire load cannot be met from either side (Somanahalli or Hosur). The line flow on this line is also causing high flows on Shoolagiri-Hosur 230 kV S/C line.	Yes

8	220 kV Sharavathy-Shimoga lines (3 nos) and 220 kV Sharavathy-Talaguppa line (3Nos.).	During full generation in Sharavathi	With full generation at Sharavathy HEP (>900 MW) there is no N-1 reliability on 220 kV Sharavathy-Shimoga lines and With re-arrangement of circuits at Sharawathi, now there are 3 circuits to Talaguppa. With this the constraint relieved some extent.	Yes
9	Constraints for Rayalaseema TPS Generation Evacuation	Whole Year	The Southern AP loads have increased and with increased generation at Rayalaseema TPP (5 units on bar at present , 220 MW each and 5th unit has been added without augmenting the evacuation system which was designed for 2 units of 220 MW) the line loadings on the following 220 kV lines are of concern, 220kV Chinakampalli- Renigunta S/C, 220kV Chinakampalli-Rajampeta S/C, 220kV	Yes
10	Constraints in Nagjheri PH evacuation	Whole Year	The 220kV Nagjheri – Ambewadi DC, 220kV Ambewadi – Narendra DC, 220kV Kaiga – Kodasally SC & 220kV Kadra – Kodasally SC lines are severely over-loaded. Re-conducturing of the above lines to HTLS is suggested.	
11	Constraints in Chennai 230kV System	Whole Year	230kV Alamatty-Manali DC line, 230kV Manali-koratur, 230kV Kalavindapattu-S.PKoil, 230kV Kalavindapattu-Siruseri, 230kV NCTPS-ETPS line are severely loaded.	Yes
12	Overloaded 220kV Lines in Tamil Nadu	Whole Year	The following lines are heavily loaded in Southern Tamil Nadu 230kV Madurai - Sembatty S/c, 230kV Madurai - Theni S/c , 230kV Pugalur - Mywadi S/c, 230kV Pudanchandai-Pugalur line	Yes
13	Constraints in 230kV Evacuation lines of MTPS and	Whole year	230kV Kundah PH4-Thudialur line, 230kV MTPS-MTPS-III-Gobi line, 230kV MTPS-Ingur line and 230kV Pugalur4-Mywadi line, 230kV Arasur-Arasur Dc line	Yes
14	Constraints in wind Evacuation	During wind season	230kV Veerannam-Abhishekpatti line, 230kV Karaikudi-Pudukottai line are loaded heavily during Wind season	Yes

ICT Constraints

S. No	ICT	Season/ Antecedent Conditions	Description of the constraints	Has the constraint occurred in earlier quarter? Details
1	400/220kV 2x315MVA ICTs at	Whole Year	N-1 condition not satisfied in few occasions	Yes
2	400/220kV 2x315MVA ICTs at	Whole Year	N-1 condition not satisfied in few occasions	Yes
3	400/220k 3X500 MVA ICTs	Whole Year	N-1 condition not satisfied in few occasions	Yes
4	400/220kV 3X500 MVA ICTs	Whole Year	N-1 condition not satisfied in few occasions	Yes
5	400/220kV 3X500 MVA ICTs at	Whole Year	N-1 condition not satisfied in few occasions. Second ICT at Hoody which was under outage since June 2016	Yes
6	400/220kV 2X315 MVA ICTs at	Whole Year	N-1 condition not satisfied in few occasions	Yes
7	400/220kV 2X315	Whole Year	N-1 condition not satisfied in few occasions	Yes
8	400/230kV 2X315MVA ICTs at	Whole Year	N-1 condition not satisfied in few occasions	Yes
9	400/230kV 2X315MVA ICTs at	Whole Year	N-1 condition not satisfied in few occasions	Yes
10	400/230kV 2X315MVA ICTs at	Whole Year	N-1 condition not satisfied in few occasions	Yes
11	400/220 kV 3X315 MVA ICTs	Whole Year	N-1 condition not satisfied in few occasions	Yes
12	400/220kV 2X315 MVA ICTs	Whole Year	N-1 condition not satisfied in few occasions	Yes
13	400/220 kV 2X315 MVA ICTs at UPCL	Whole Year	N-1 condition not satisfied in few occasions	Yes
14	400/220 kV 3X315 MVA ICTs	During peak	N-1 condition not satisfied in few occasions	No

ANNEXURE-4.1

TANTRANSCO
(Subsidiary of TNEB Ltd.)

From

T.Senthilvelan, B.E.,
Director/Transmission Projects,
TANTRANSCO,
144, Anna Salai,
Chennai -2.

To

The Member (Power System),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi 110 066.

Lr.No.CE/Plg&R.C/SE/SS/EE1/AEE1/F.Stg. Committee/D.256 /2017 dt.24.08.17

Dear Sir,

Sub: Upgradation of existing Tharamani 230/110/33 kV substation into 400/230-110 kV substation, establishment of Koyambedu 400/230 kV substation and revised 400 kV connectivity for the establishment of Edayarpalayam 400/230-110 kV SS – 765 kV SC line instead of DC line from NCTPS Stage-III to 765KV North Chennai Pooling Station - Approval requested for ATS - Regarding.

Ref: 1. CEA Lr.No.51/4/(41st)/PSPA-II/2017 dt. 16.08.2017
2. Lr.No.CE/Plg&R.C/SE/SS/EE1/AEE1/F.stg.committee/D.167/2017 dt.23.05.17
3. Lr.No.CE/Plg&R.C/SE/SS/EE1/AEE1/F.Kudankulam/D.137/2017 dt.26.04.17
4. Lr.No.CE/Plg&R.C/SE/SS/EE1/AEE1/F. stg.committee /D.249/17 dt.16.08.17
5. Lr.No.CE/Plg&R.C/SE/SS/EE1/AEE1/F. stg.committee /D.198 dt.20.06.17
6. Lr.No.CE/Plg&R.C/SE/SS/EE1/AEE1/F. stg.committee /D.237/2017 dt.1.08.17

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1.0 In the letter under reference cited (1), it has been proposed to convene 41st meeting of Standing committee on Power System Planning for Southern Region in the third week of September, 2017.

2.0 The following agenda points may be taken up in the forthcoming meeting in addition to the already furnished agenda points vide our letter cited under references (2),(3),(4),(5),(6) (Copies enclosed):

i. Upgradation of the existing Tharamani 230/110/33 kV substation into 400/230-110 kV substation in the Chennai South Region instead of already approved Mylapore 400/230 kV substation.

ii. Establishment of a new 400/230 kV substation at Koyambedu to meet out the load growth at Koyambedu in Chennai West region.

iii. Revision of ATS by retaining the original 400 kV connectivity for the establishment of Edayarpalayam 400/230-110 kV substation with 3 X 315 MVA, 400/230 kV ICTs instead of 2 X 500 MVA, 400/230 kV ICTs i.e., making LILO of the Myvadi – Anaikadavu 400 kV SC line at the Edayarpalayam 400 kV SS.

iv. Revision of ATS of the NCTPS Stage – III (1 X 800 MW) & ETPS Replacement (1 X 660 MW) generating stations by changing the 765 kV lines to 765 kV North Chennai pooling station and between the generating stations from 765 kV DC line to 765 kV SC line.

3.0 In this regard, the following are stated.

i. Upgradation of Mylapore 230 kV GIS SS into 400 kV SS was sanctioned in the 37th Standing committee on Power system planning for Southern Region. The sanctioned scheme could not be executed due to severe ROW issues in laying of 400kV UG cable.

ii. As an alternate to Mylapore 400/230 kV GIS substation, it has been proposed to upgrade the existing Tharamani 230/110/33 kV substation into 400/230-110 kV substation.

iii. Further, proposal for the establishment of new 400/230 kV substation at Koyambedu has also been evolved to meet out the growing demand of power at Koyambedu in Chennai west region and the surrounding area.

4.0 The following 400 kV and 230 kV connectivities have been considered for conducting load flow study for the above mentioned two nos. substations.

4.1 <u>Tharamani 400/230 – 110 kV substation :</u>

Establishment of 400/230 – 110 kV substation at Tharamani with 2X500MVA,400/230 kV ICTs, 2 X 200 MVA, 400/110 kV ICTs and 2 X 125 MVAr bus

reactors by making LILO of the sanctioned Sholinganallur – Guindy 400 kV SC feeder instead of already approved Mylapore 400 kV SS. All the existing and sanctioned 230kV & 110 kV feeders of Tharamani 230/110 kV substation have been considered to feed the existing and future loads.

4.2 Koyambedu 400/230kV substation:

Establishment of 400/230 kV substation with 2X315MVA,400/230 kV ICTs and 2 X 125 MVAr bus reactor by making LILO of any one of the NCTPS Stage –II – Sunguvarchatram 400 kV feeders.

The following 230 kV connectivities have been considered.

i. LILO of the Koyambedu – Guindy 230 kV feeder.

ii. 230 kV SC UG cable from the proposed Koyambedu 400 kV SS to Koyambedu CMRL 230 kV substation.

iii. 230 kV SC UG cable from the proposed Koyambedu 400 kV SS to Porur 230 kV substation.

5.0 Based on the above, Load flow study has been conducted for various cases for the time frame of 2020-2021 year network condition and the study results are enclosed. From the above study results, the following have been observed.

i. The line loadings are found to be normal.

ii. The loadings of ICTs in both the stations are also found to be normal.

iii. Even during contingency condition, the loadings of the ICTs and lines are found to be within limits.

6.0 Revised 400 kV connectivity for the establishment of Edayarpalayam 400/230-110 kV substation

6.1 In the 38th Standing Committee on Power system planning for Southern Region, CEA has stated that establishment of Edayarpalayam 400/230-110 kV substation with 2x500 MVA, 400/230 kV ICTs and 2x125 MVAr bus reactors will be in the scope of TANTRANSCO (LILO of Udumalpet- Anikadavu 400kV S/c line at Edayarpalyam S/s is dropped for the time being) while Edayarpalayam –Myvady 400 kV DC quad line will be in the scope of PGCIL. TANTRANSCO will commission Edayarpalyam substation in the time frame matching with the requirement of Raigarh- Pugalur HVDC system.

6.2 However, TANTRANSCO vide their letter dated 13.06.2016 has requested that "Edayarpalayam- Myvady 400 kV DC quad line which was in the scope of PGCIL may be dropped and instead of that Edayarpalayam – Anikadavu 400 kV DC quad line shall be taken up by TANTRANSCO". In this way, the wind power injected in the Edayarpalayam 400kV SS will be transmitted to the wind corridor with Thoppakundu, Anikadavu, and Rasipalayam 400kV substations.

6.3 In the 40th Standing Committee Meeting on Power system planning for Southern Region, CEA has suggested that both the lines can be considered i.e., Edayarpalayam- Myvady 400 kV DC quad line and Edayarpalayam – Anikadavu 400 kV DC quad line but after proper load flow studies.

6.4 It is requested to revise the ATS of the 400 kV connectivities for the establishment of Edayarpalayam 400/230-110 kV substation as shown below.

400 kV Connectivity

Under PGCIL's scope :

i. 400 kV DC quad line from PGCIL Myvadi 400 kV SS.

ii. 400 kV DC quad line from Pugalur HVDC station.

Under TANTRANSCO's scope :

i. LILO of Myvady – Anaikadavu 400 kV SC line.

ii. 400 kV DC line from sanctioned Coimbatore 765/400 kV SS.

iii. 3 X 315 MVA, 400/230 kV ICTs instead of 2 X 500 MVA 400/230 kV ICTs and 3 X 200 MVA, 400/110 kV ICTs

7.0 765 kV SC line instead of DC line from NCTPS Stage-III (1 X 800 MW) to 765KV North Chennai Pooling Station, 765 kV SC line instead of DC line from ETPS Replacement (1 X 660 MW) to 765KV North Chennai Pooling Station and 765 kV SC line instead of DC line from NCTPS Stage-III (1 X 800 MW) to ETPS Replacement Power Projects (1 X 660 MW).

7.1 The following are the approved ATS for NCTPS Stage – III (1 X 800 MW) and ETPS Replacement (1X660MW) in the 37th Standing committee on Power system planning in Southern Region.

ATS for NCTPS Stage – III (1 X 800 MW)

i. 765kV DC line from NCTPS Stage III switchyard to the North Chennai Pooling station. (Generation at 765kV level)

ii. 1X240MVAR, 765kV Bus Reactor at generation switchyard

ATS FOR ETPS Replacement (1X660MW) :

i. 765kV DC line from ETPS Replacement switchyard to North Chennai Pooling station. (Generation at 765kV level)

ii. 765kV DC inter link to NCTPS Stage-III for reliability.

iii. 1X240MVAR, 765kV Bus Reactor at generation switchyard.

7.2 The following modifications have been suggested to reduce the cost of investment.

i. The sanctioned 765 kV North Chennai Pooling station is to be connected with North Chennai Stage – III and Ennore Replacement with 765 kV SC lines instead of 765 kV DC lines for power evacuation.

ii. Further North Chennai Stage – III is also to be linked with Ennore replacement with 765 kV SC line instead of 765 kV DC lines for reliability purpose.

7.3 Based on the above, Load flow study has been conducted for the various cases and the study results are enclosed. From the above study results, the following have been observed.

i. The total power generated from the above two generating stations is 1460 MW.

ii. Since the 765 kV SC line with Hexa Zebra conductor is capable of carrying 2000 MW, the evacuation of 1460 MW in SC line is sufficient.

iii. During N-1 condition also, the reliability is ensured.

8.0 Summarizing, approval is requested for the following schemes :

i. It is proposed to upgrade the existing Tharamani 230/110/33 kV substation into 400/230-110 kV substation instead of already approved Mylapore 400/230 kV substation

ii. It is proposed to establish a new 400/230 kV substation at Koyambedu to meet out the growing demand at Koyambedu and the surrounding area.

iii. Revision of the ATS by retaining the original 400 kV connectivity i.e., LILO of Myvady – Anaikadavu 400 kV SC line at the Edayarpalayam 400/230-110 kV substation with 3 X 315 MVA, 400/230 kV ICTs instead of 2 X 500 MVA, 400/230 kV ICTs.

iv. By considering the cost benefit, the ATS of the NCTPS Stage – III (1 X 800 MW) & ETPS Replacement (1 X 660 MW) power projects may be revised. Already approved 765 kV DC lines from North Chennai pooling station and link lines between the power projects may be revised as 765 kV SC line.

9.0 Hence, it is requested that the above four proposals may be taken up as agenda points in the forthcoming 41st meeting of the Standing Committee on Power System Planning for Southern Region in addition to the already furnished eleven agenda points vide letter cited under reference(2),(3),(4),(5) and (6). The abstract of 15 nos. proposals for which Standing Committee approval is requested is also furnished in the Annexure.

24/08/2017

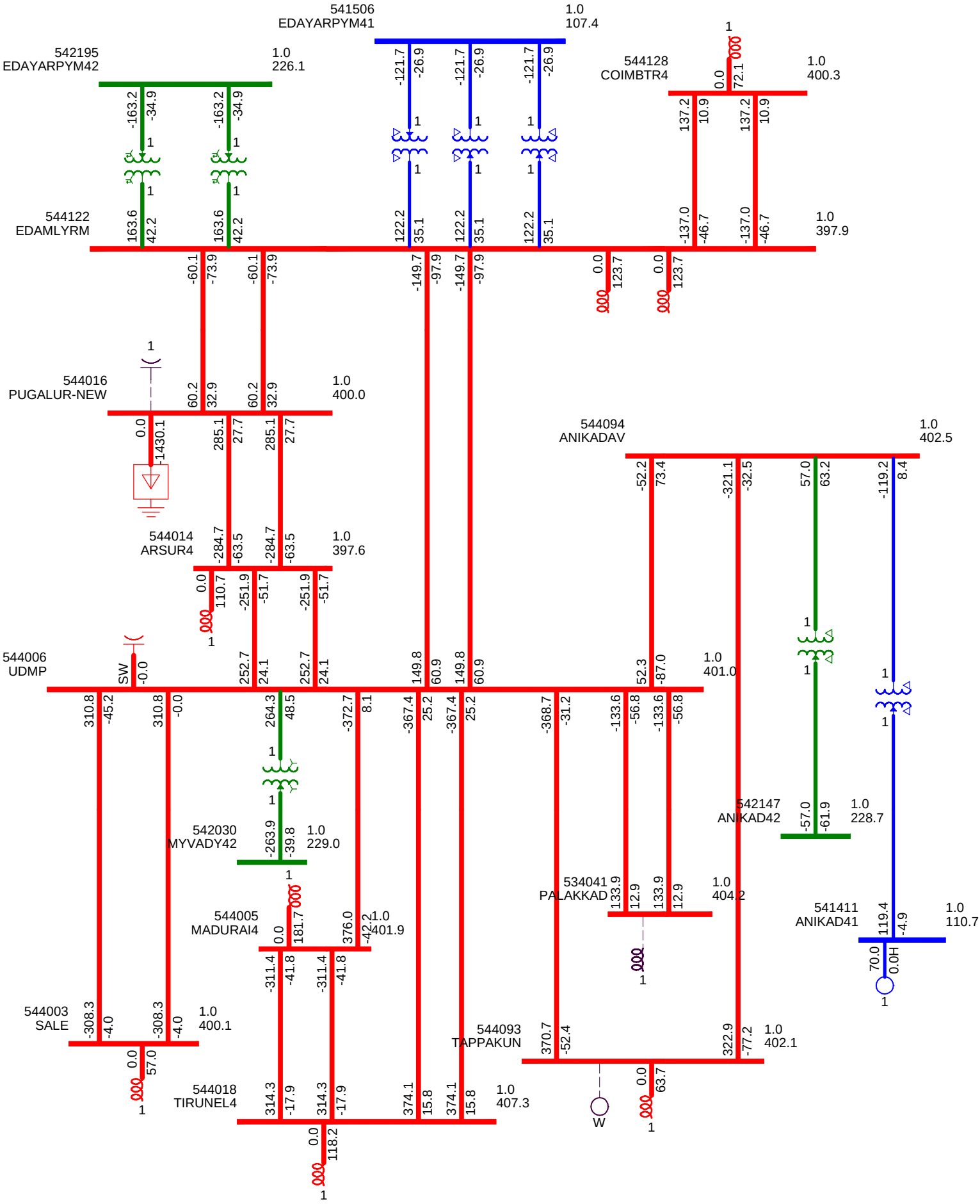
(R.S.Usha)
Chief Engineer/Planning & R.C
For Director/Transmission Projects

Enclosures:

1. Annexure.
2. Copy of the references 2,3,4,5 and 6.
3. Study results in sav. File - by email.

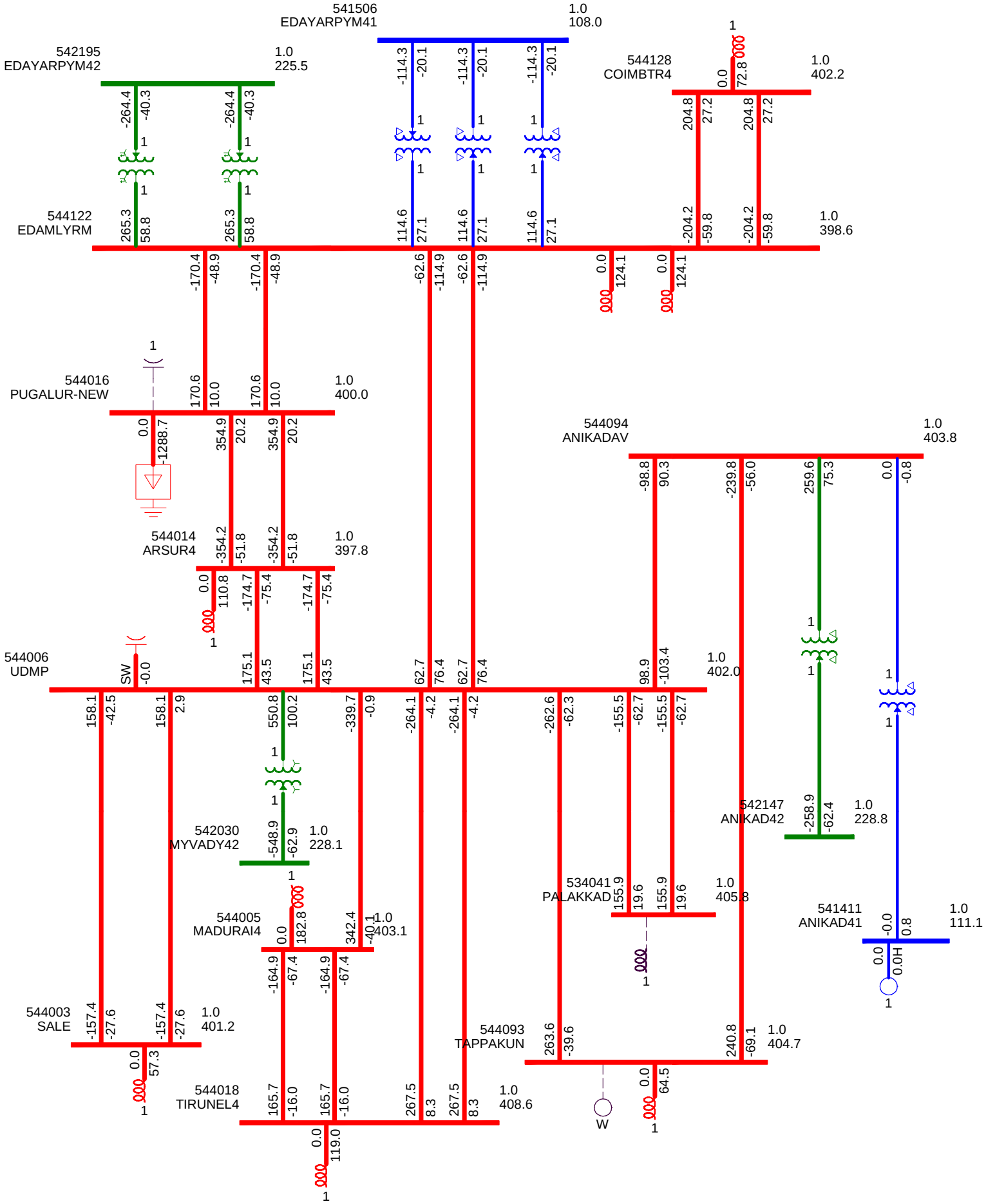
ANNEXURE-4.2/1

BASE CASE(FWFH): EDAYARPALAYAM 400/230-110 KV SS WITHOUT LILO OF MYVADI-ANIKADAVU 400 KV SC LINE



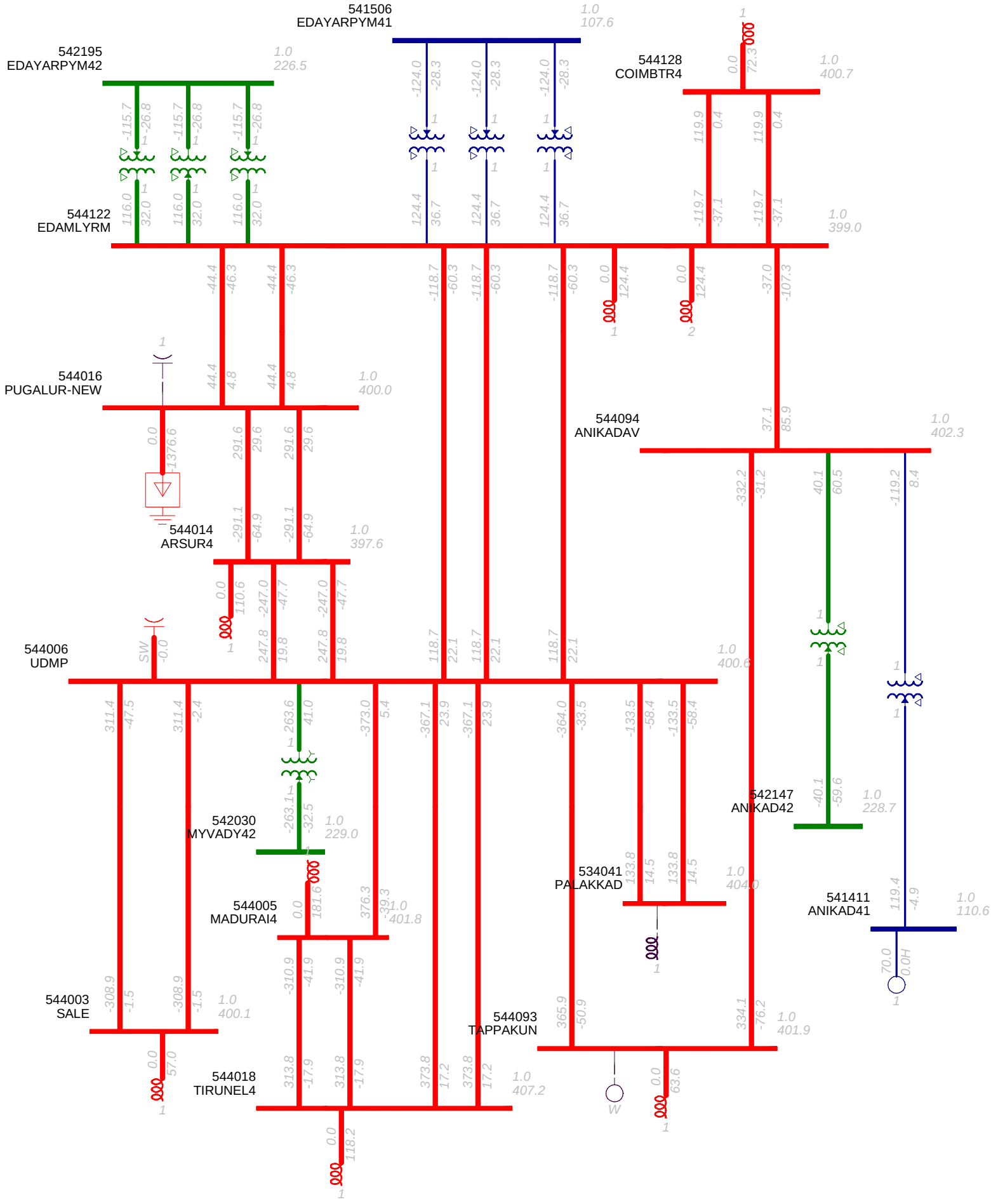
ANNEXURE-4.2/2

BASE CASE(NWNH): EDAYARPALAYAM 400/230-110 KV SS WITHOUT LILO OF MYVADI-ANIKADAVU 400 KV SC LINE



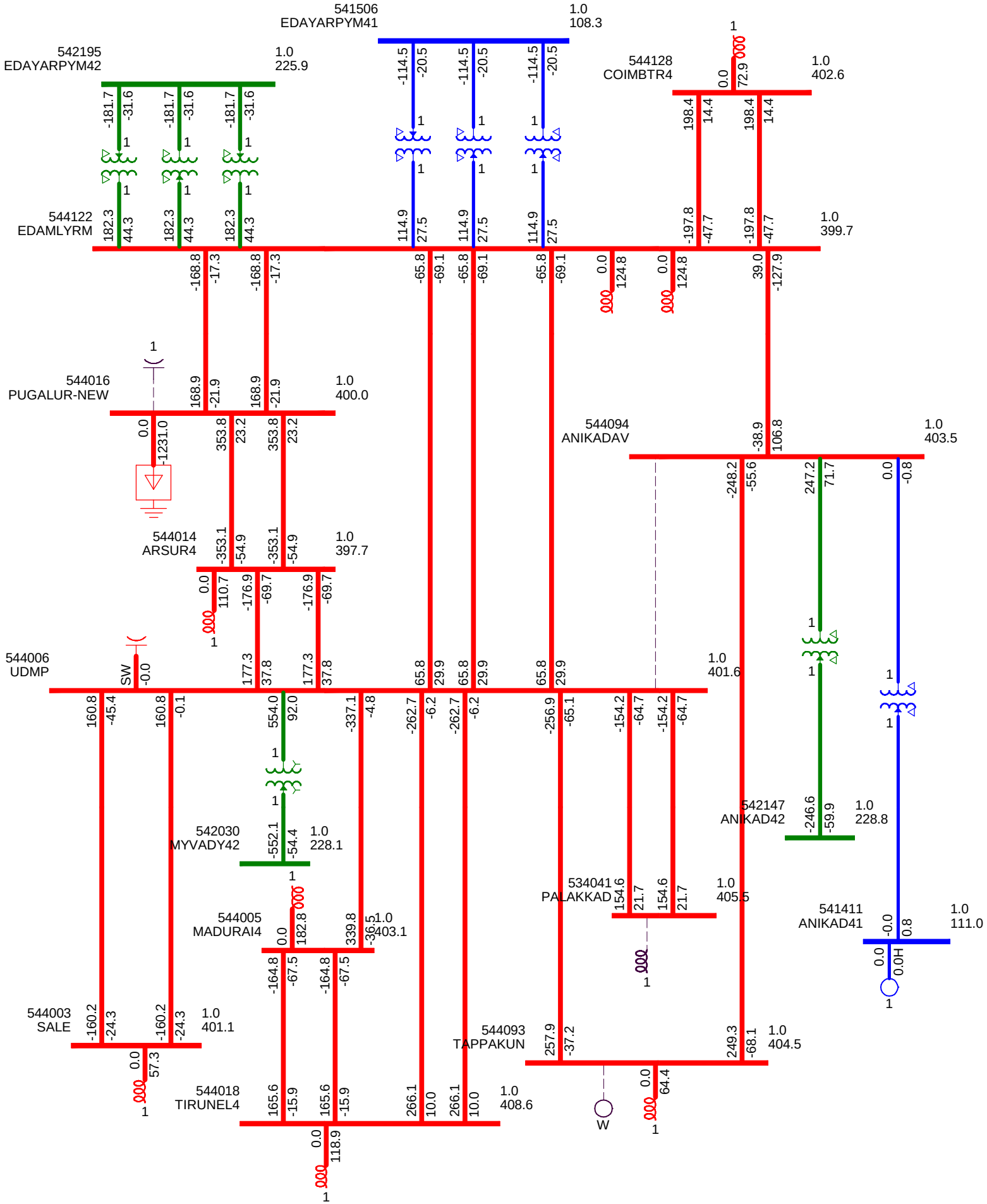
ANNEXURE-4.2/3

CASE1(FWFH): EDAYARPALAYAM 400/230-110 KV SS WITH LILO OF MYVADI-ANIKADAVU 400 KV SC LINE



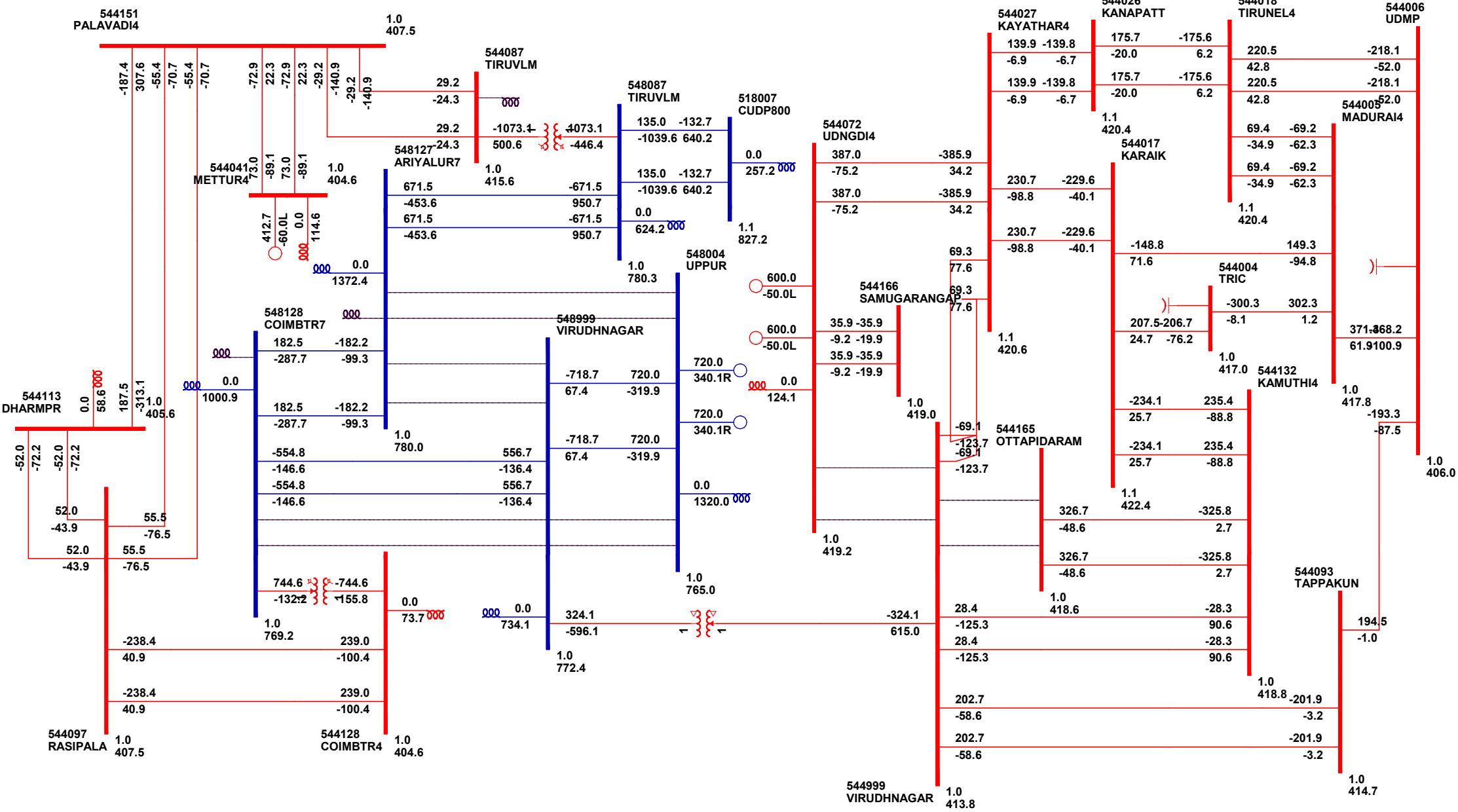
ANNEXURE-4.2/4

CASE1(NWNH): EDAYARPALAYAM 400/230-110 KV SS WITH LILO OF MYVADI-ANIKADAVU 400 KV SC LINE



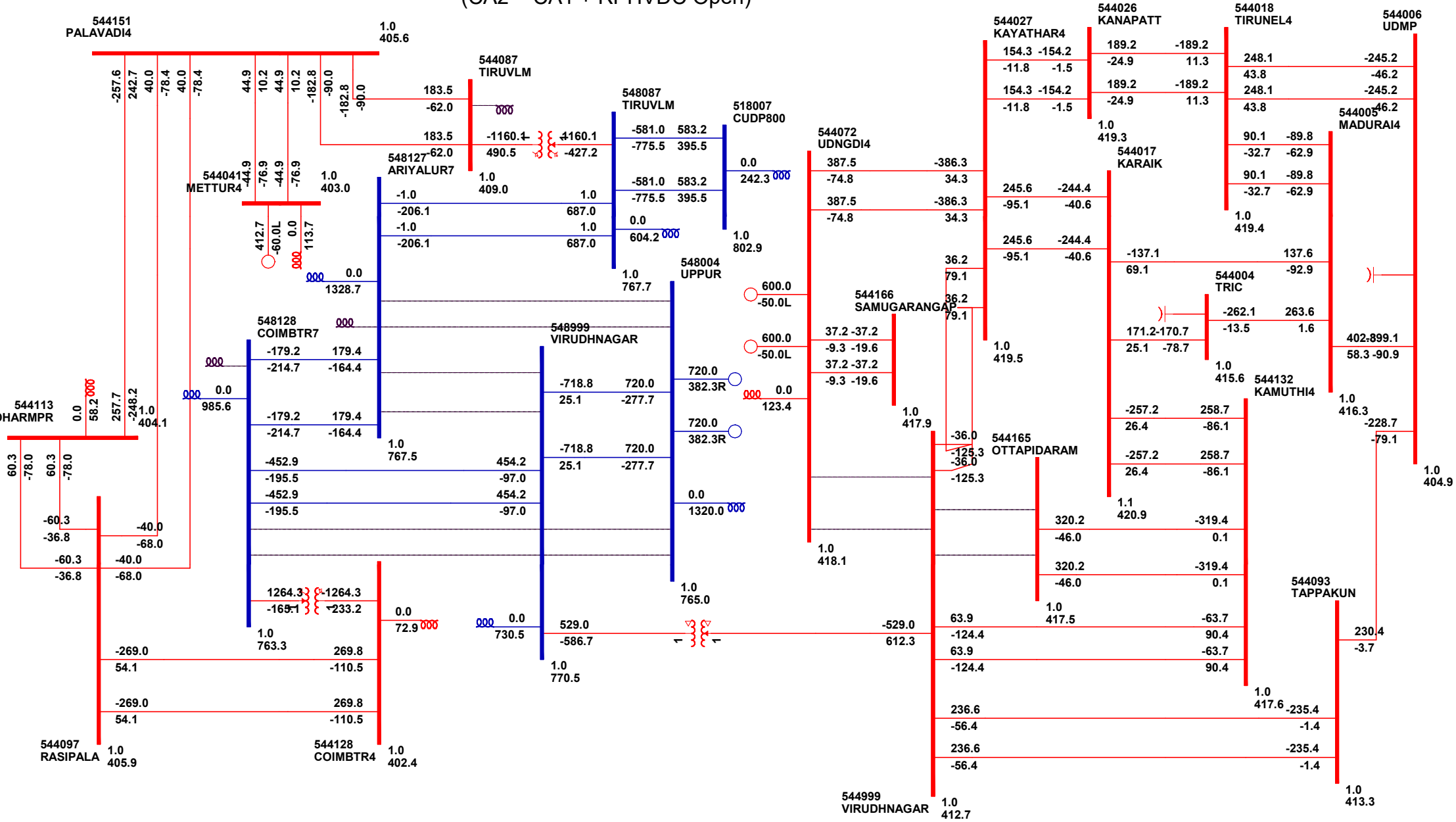
LOAD FLOW STUDY - UPPUR 2X800 MW THERMAL POWER PROJECT

(CA1 Base Less RE RPHVDC 4000MW)



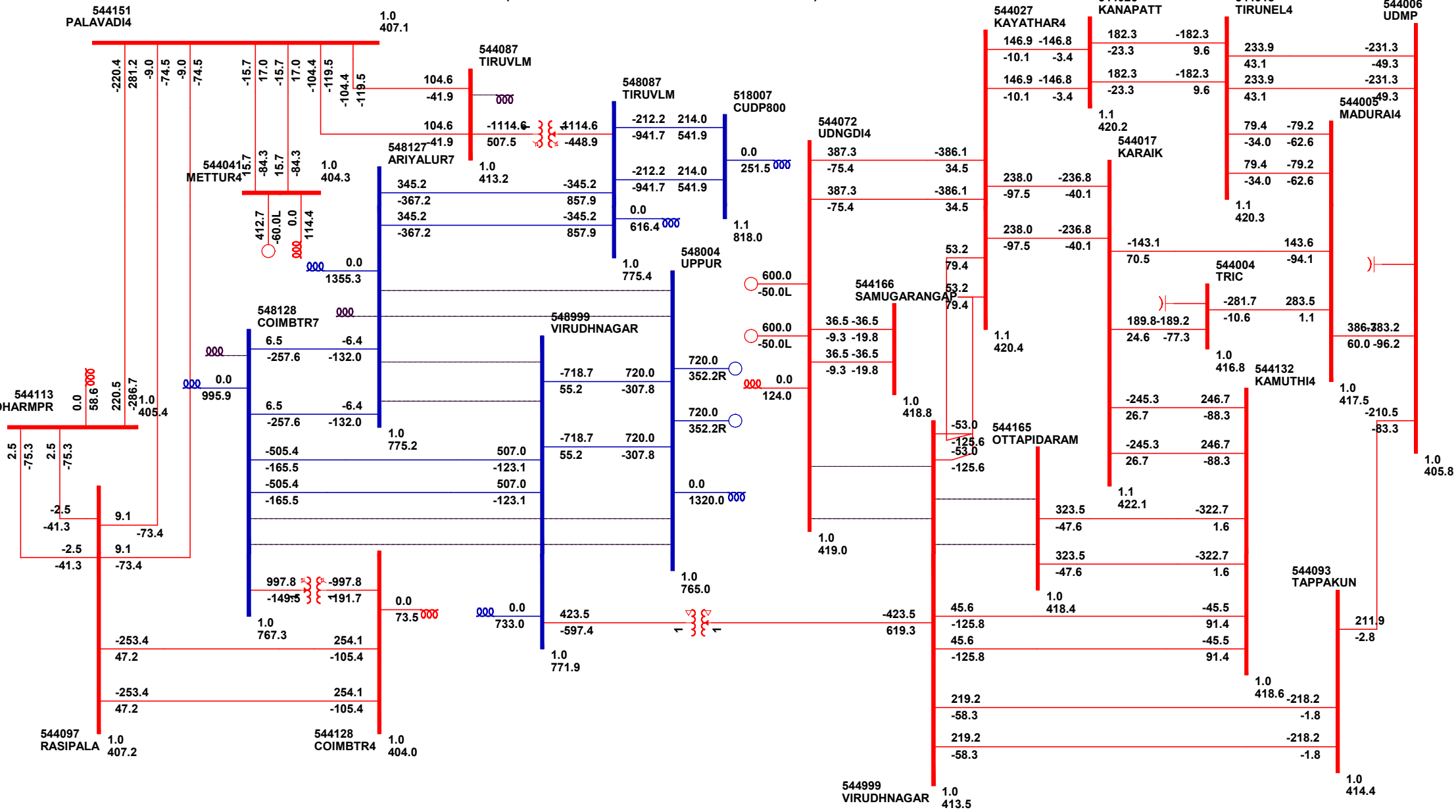
LOAD FLOW STUDY - UPPUR 2X800 MW THERMAL POWER PROJECT

(CA2 = CA1 + RPHVDC Open)



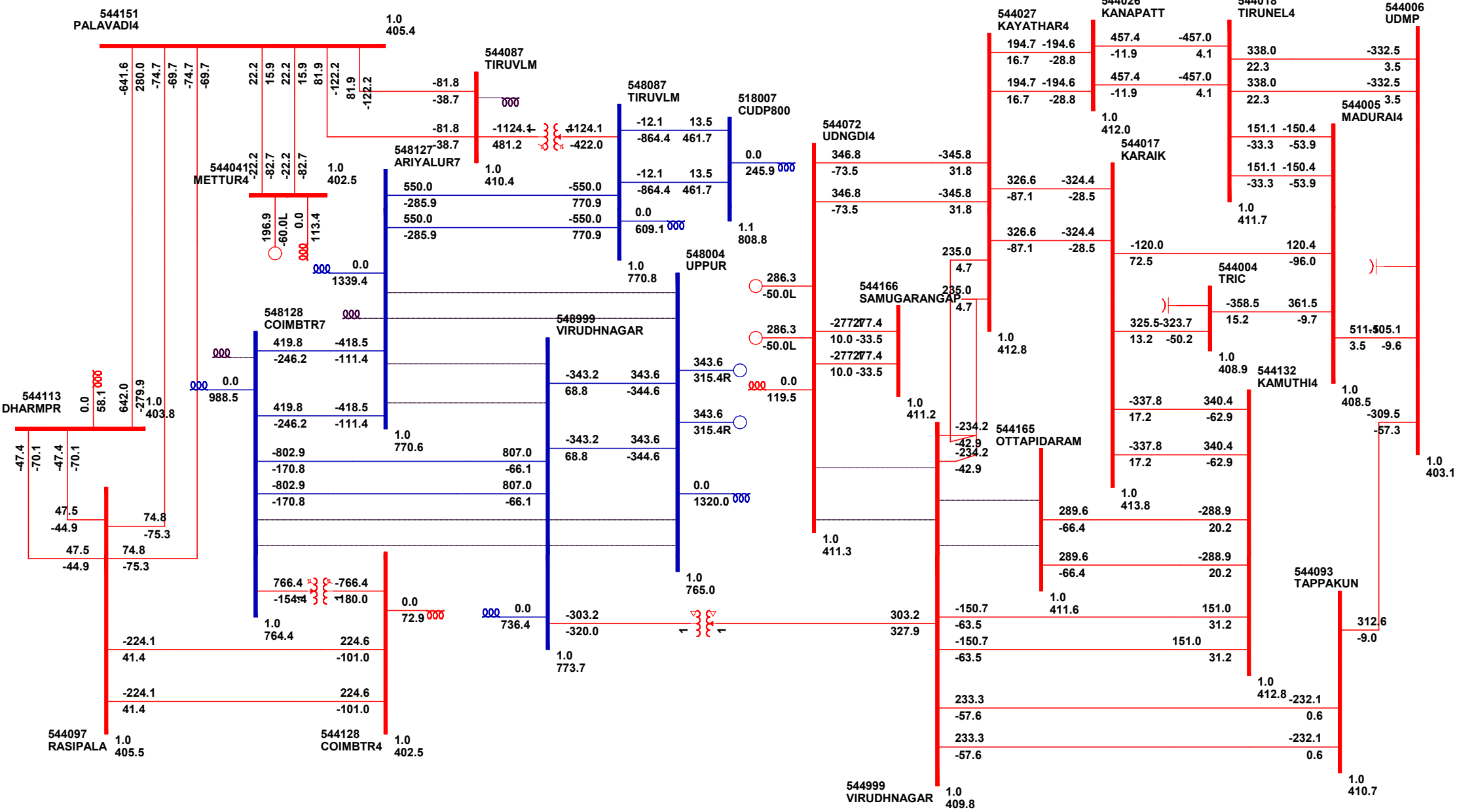
LOAD FLOW STUDY - UPPUR 2X800 MW THERMAL POWER PROJECT

(CA3 = CA1+ RPHVDC 2000MW)



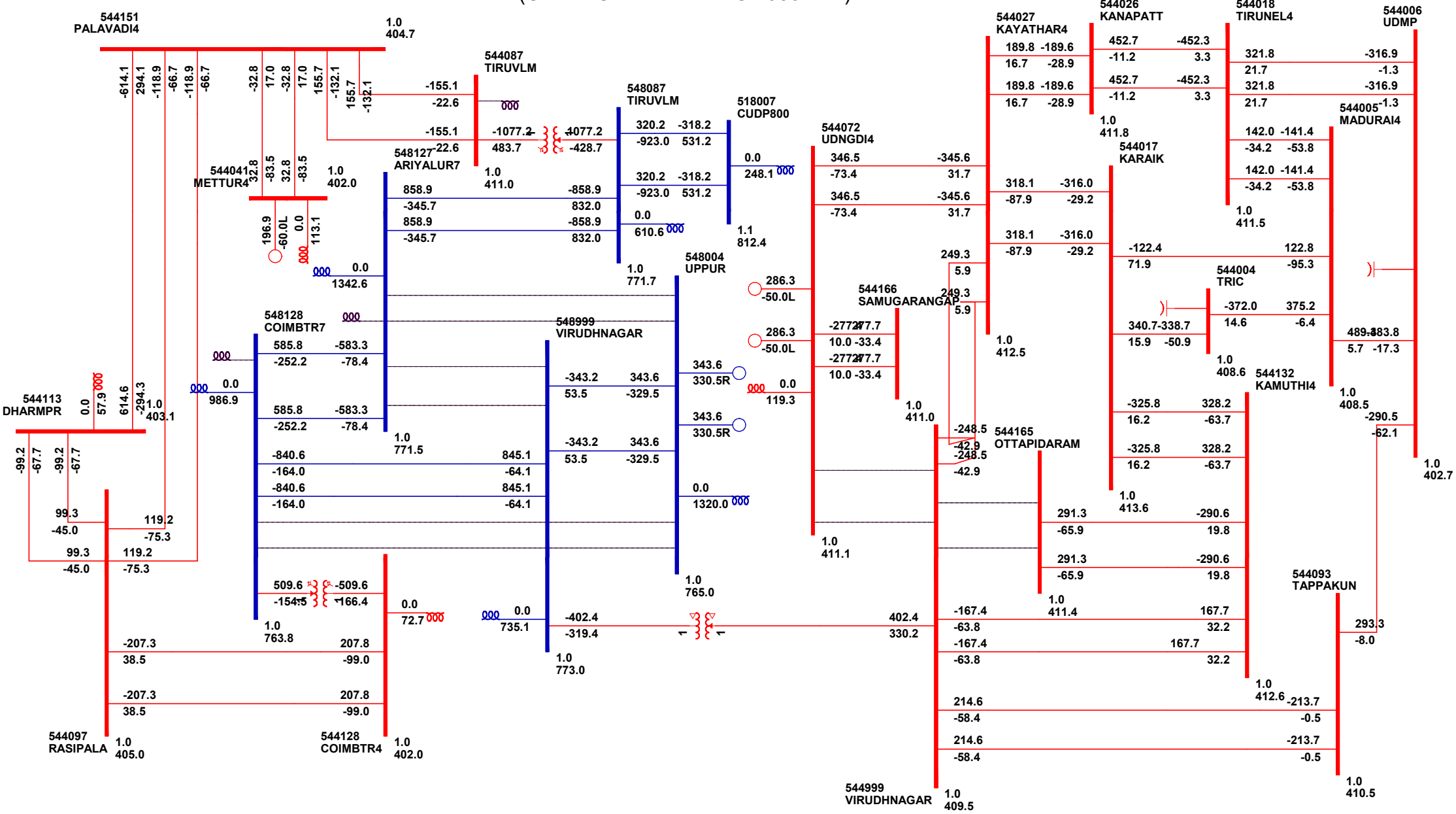
LOAD FLOW STUDY - UPPUR 2X800 MW THERMAL POWER PROJECT

(CB1 = CA3 + Full RE + 2000 MW HVDC)



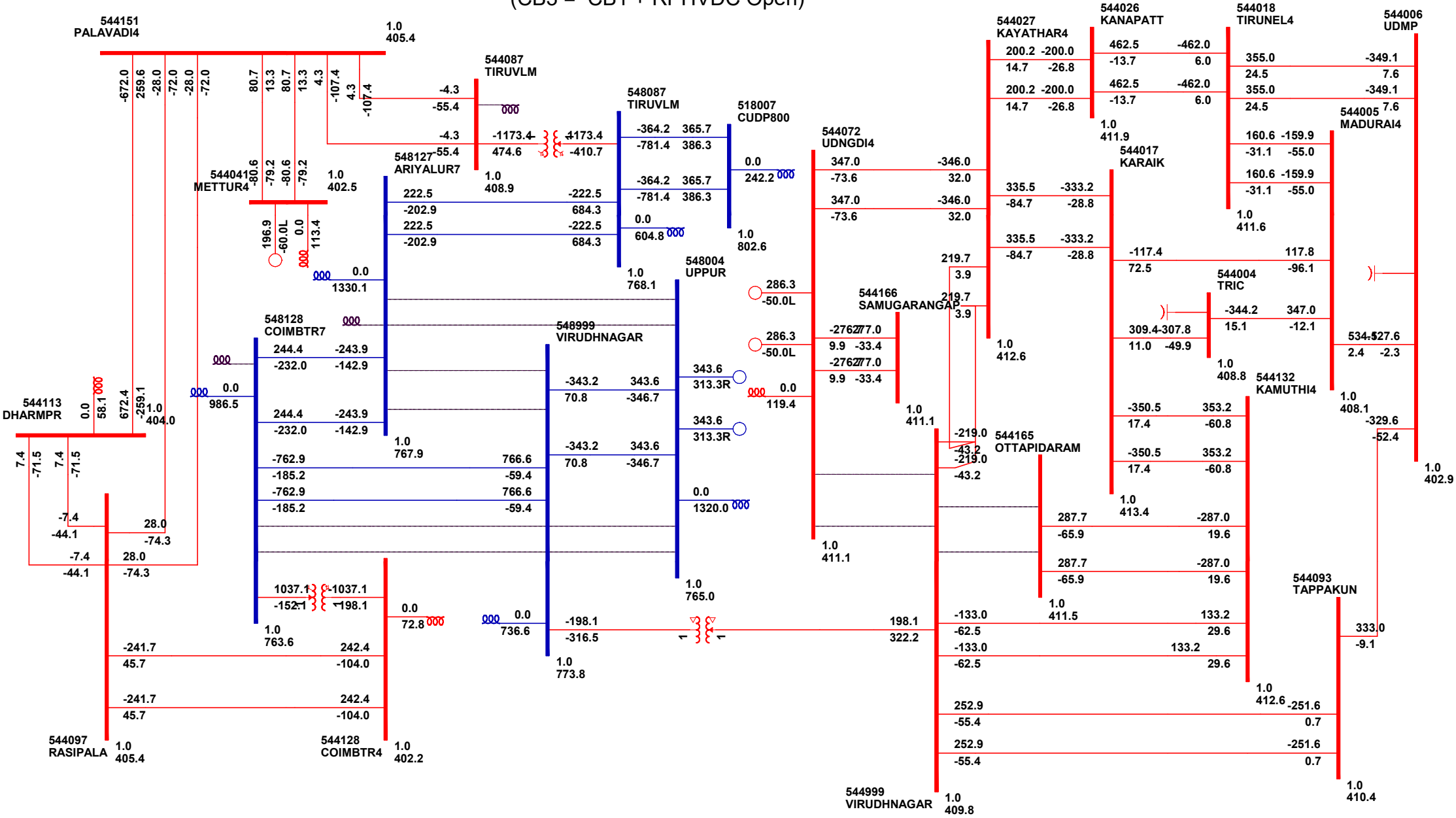
LOAD FLOW STUDY - UPPUR 2X800 MW THERMAL POWER PROJECT

(CB2 = CB1 + RPHVDC 4000 MW)



LOAD FLOW STUDY - UPPUR 2X800 MW THERMAL POWER PROJECT

(CB3 = CB1 + RPHVDC Open)



TAMILNADU TRANSMISSION CORPORATION LTD.

(Subsidiary of TNEB Ltd.)

From

Er.T.Senthilvelan, B.E.,
Director/Transmission Projects,
TANTRANSCO,
144, Anna Salai,
Chennai -2.

To

The Member (Power System),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi 110 066.

Lr.No.CE/Plg.&R.C/SE/SS/EE1/AEE1/F.SEPC/D. 136 /17 dt. 26.04.17

Dear Sir,

Sub: SEPC -1X525MW Revised connectivity to Thennampatty 400kV substation instead of Ottapidaram as a temporary measure- request to CEA - Reg.

****

1.0. SEPC Power Private Limited – 1X525MW has executed PPA with TANGEDCO for establishment of 1X525MW Thermal Power Plant at Tuticorin as an IPP of TANGEDCO. Based on the application for grid connectivity, the following proposal has been evolved based on Load Flow Study.

"400kV D/C line to the proposed Ottapidaram 400/230-110kV substation".

1.1. In Principle approval has been accorded in the 38th Standing Committee meeting on power System and Planning of Southern Region held on 7th March, 2015 for the above scheme.

1.2. Some clarifications were sought in the above meeting and TANGEDCO has given the above details. It is expected that the SEPC evacuation scheme will be cleared in the ensuing Standing Committee meeting.

2.0. In this regard, the following are stated,

i. The acquisition of the land for the establishment of Ottapidaram 400/230-110kV substation was delayed and now the land has been acquired.

ii. The time frame for the establishment of Ottapidaram 400/230-110kV substation is more than 2 years.

C/o Member (Power System)
By, No.
Date

iii. SEPC requires start up power by April 2018 and unit is expected to be commissioned by August 2018.

iv. Hence, it is suggested that the power from the SEPC 1X525 MW Power Plant may be evacuated through the ongoing Thennampatty 400kV SS as a temporary measure by erecting a 400 kV DC line from SEPC 1X525 MW Power Plant to Thennampatty 400/230-110 kV Substation.

v. While commissioning the Ottapidaram 400kV substation, the above SEPC – Thennampatty 400kV DC line will be made LILO at the Ottapidaram 400kV SS thereby restoring the original connectivity of SEPC 1X525 MW Power Plant to Ottapidaram 400kV SS as approved in the Standing Committee.

vi. There will be additional link line (approximately 30kM) between Ottapidaram and Thennampatty 400kV substations which shall be used for reliability purpose.

vii. The length of the line from SEPC 1X525 MW Power Plant to Thennampatty 400kV SS is about 60kM and it will be constructed matching with the commissioning of SEPC – 1X525MW Power Plant.

viii. One of the sanctioned evacuation lines for the Udangudi project is from Kayathar 400kV SS. The erection work for the establishment of Udangudi - 2X660MW Thermal Power Plant is yet to be started. Hence, as of now there will not be much congestion in Kayathar – Kanarpatty – Tirunelveli 400kV DC line. In the event of commissioning of Udangudi power plant, the Ottapidaram 400 kV Substation and its associated 400kV lines will be commissioned and hence there will not be any congestion in ISTS substation and its associated lines.

Hence, it is requested to take up the above issue in the next Standing committee meeting as an agenda for the approval of the Ottapidaram – Thennampatty 400kV DC link line for reliability purpose so that TANTRANSCO will take up the SEPC – Thennampatty 400kV DC line now which will be later LILOed at the Ottapidaram 400kV SS.

For taking further action please.

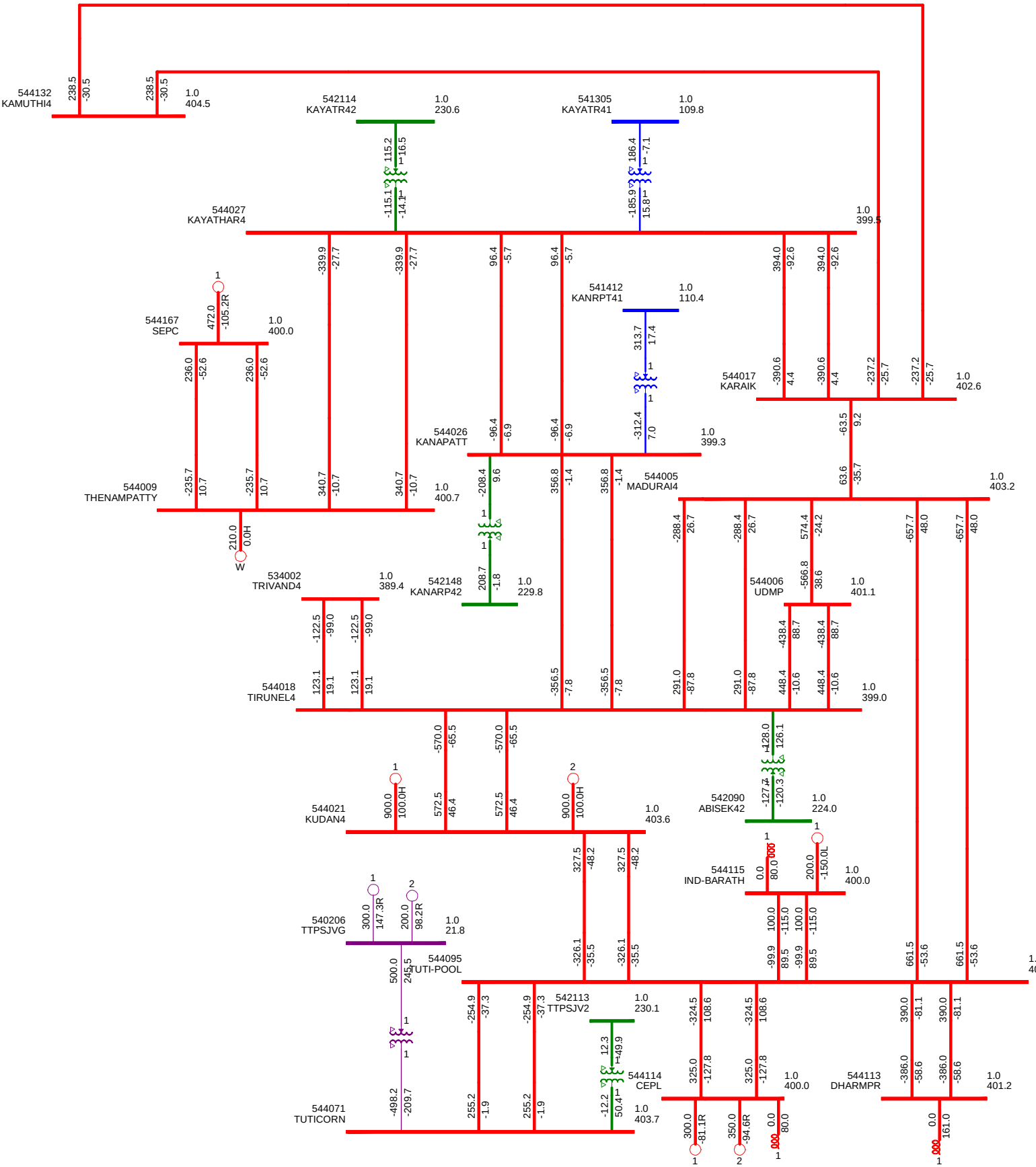
26/04/2017

(R.S.Usha)
Chief Engineer/Planning & R.C
For Director/Transmission Projects

2/2

SEPC - 1X525MW TEMPORARY CONNECTIIVTY TO THENNAMPATTY 400KV SUBSTATION

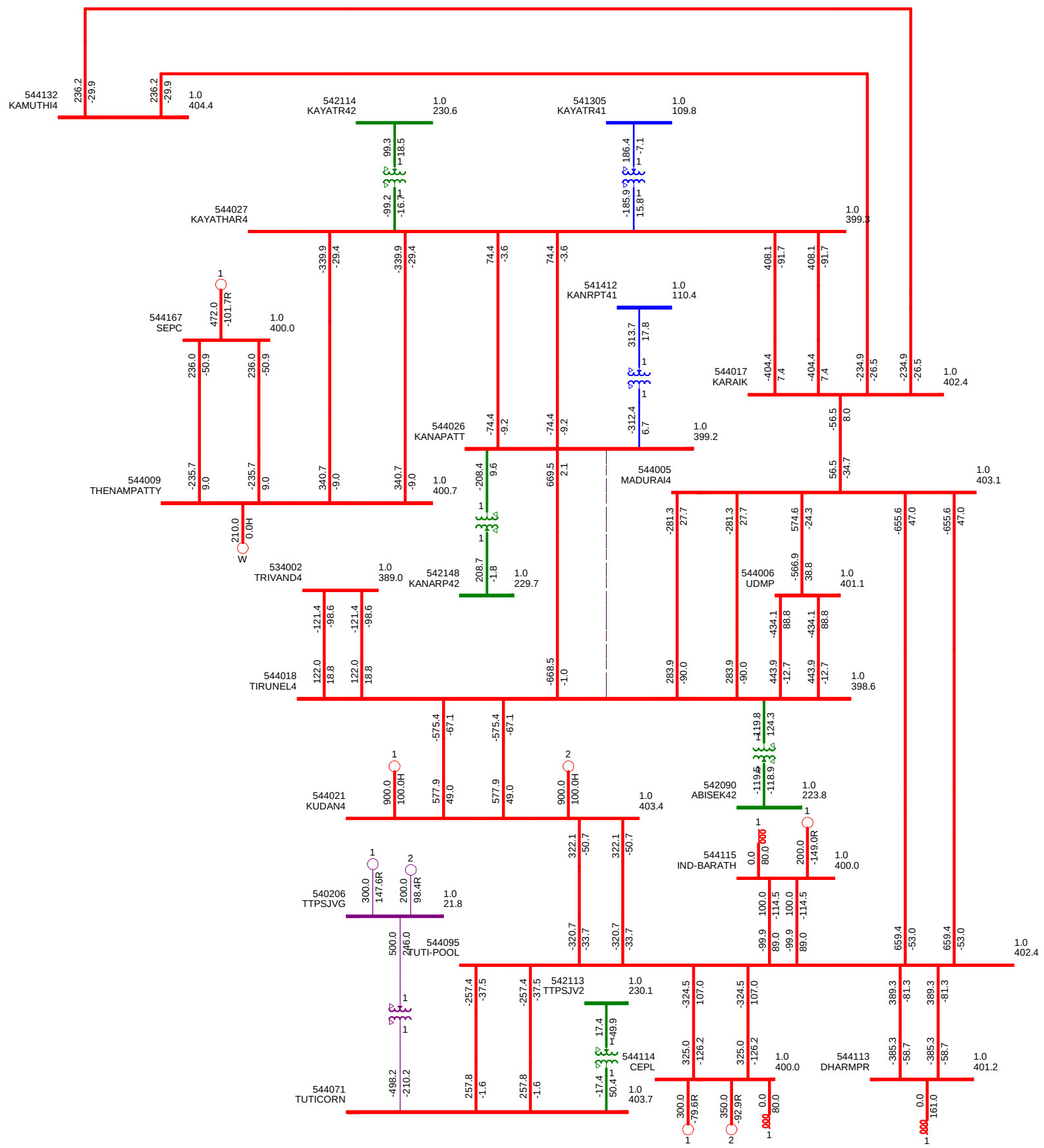
BASECCASE - FULL WIND CONDITION



SEPC - 1X525MW TEMPORARY CONNECTIIVTY TO THENNAMPATTY 400KV SUBSTATION

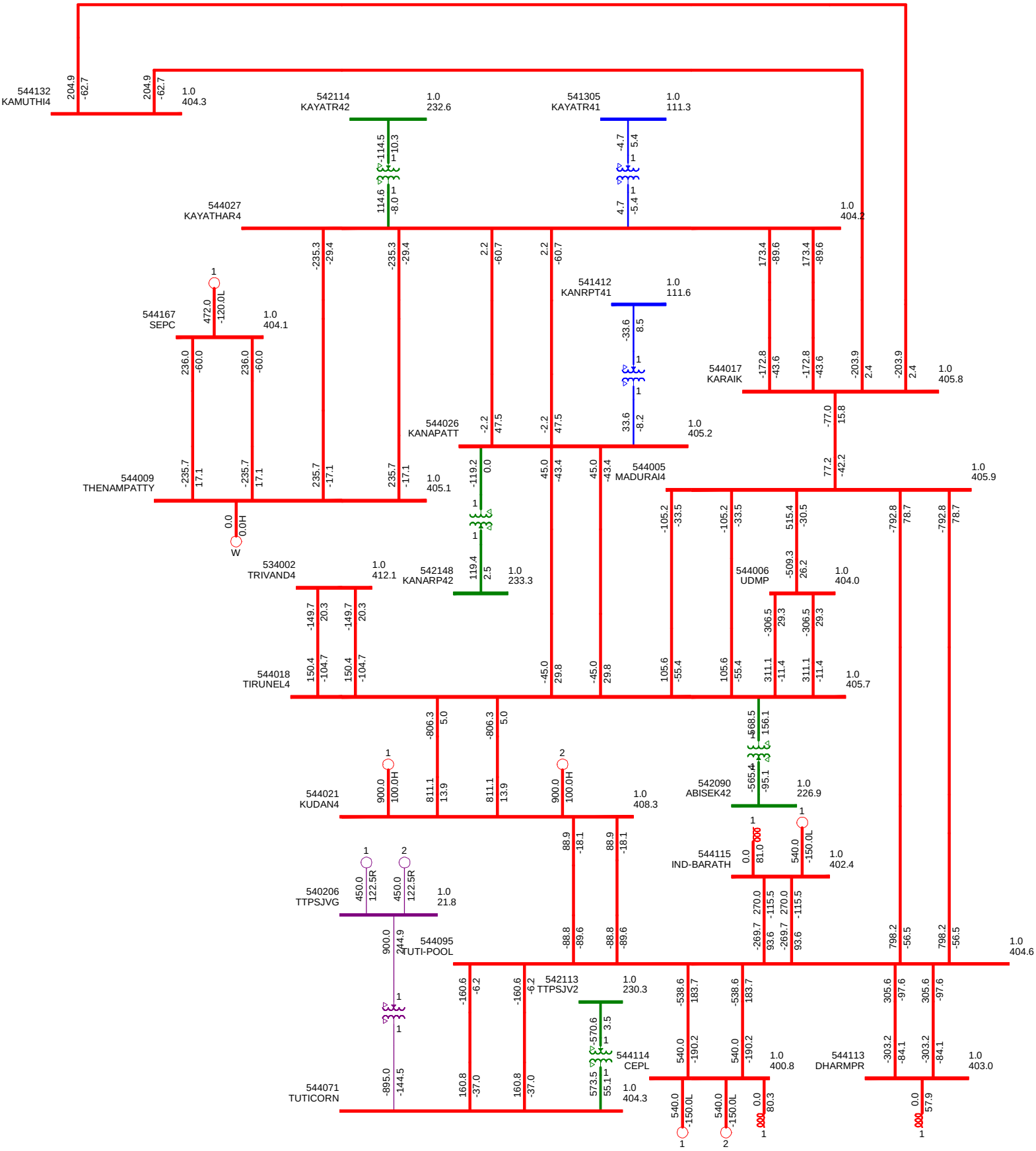
OUTAGE : BASE CASE + OUTAGE OF ONE OF THE KANARPATTY - ABISEKAPATTY 400KV DC LINE

FULL WIND CONDITION



SEPC - 1X525MW TEMPORARY CONNECTIIVTY TO THENNAMPATTY 400KV SUBSTATION

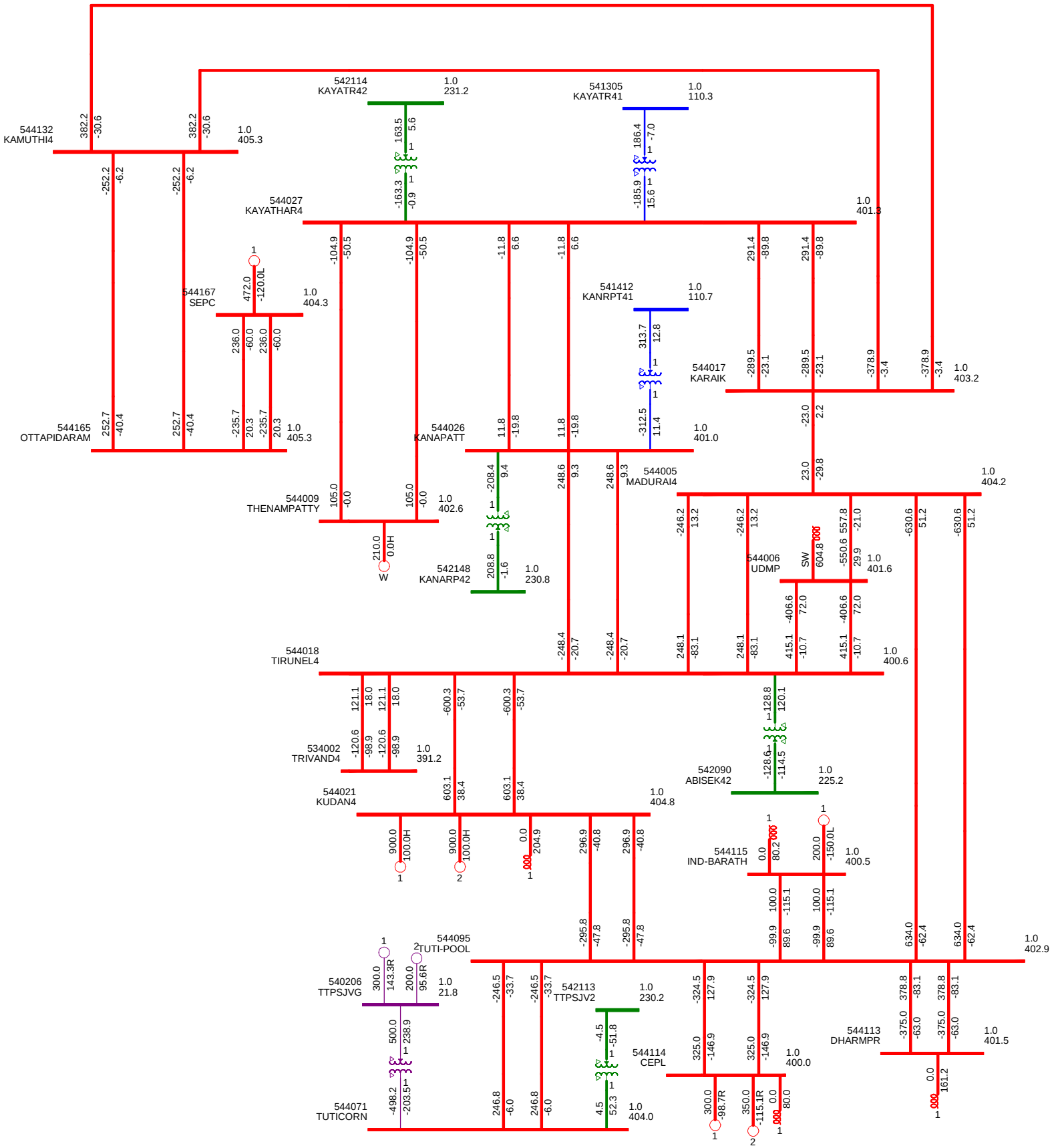
BASECCASE - NIL WIND CONDITION



SEPC - 1X525MW PERMANENT CONNECTIIVTY

CASE1 : WITH 400KV DC CONNECTVITY FROM SEPC TO OTTAPIDARAM 400KV SS

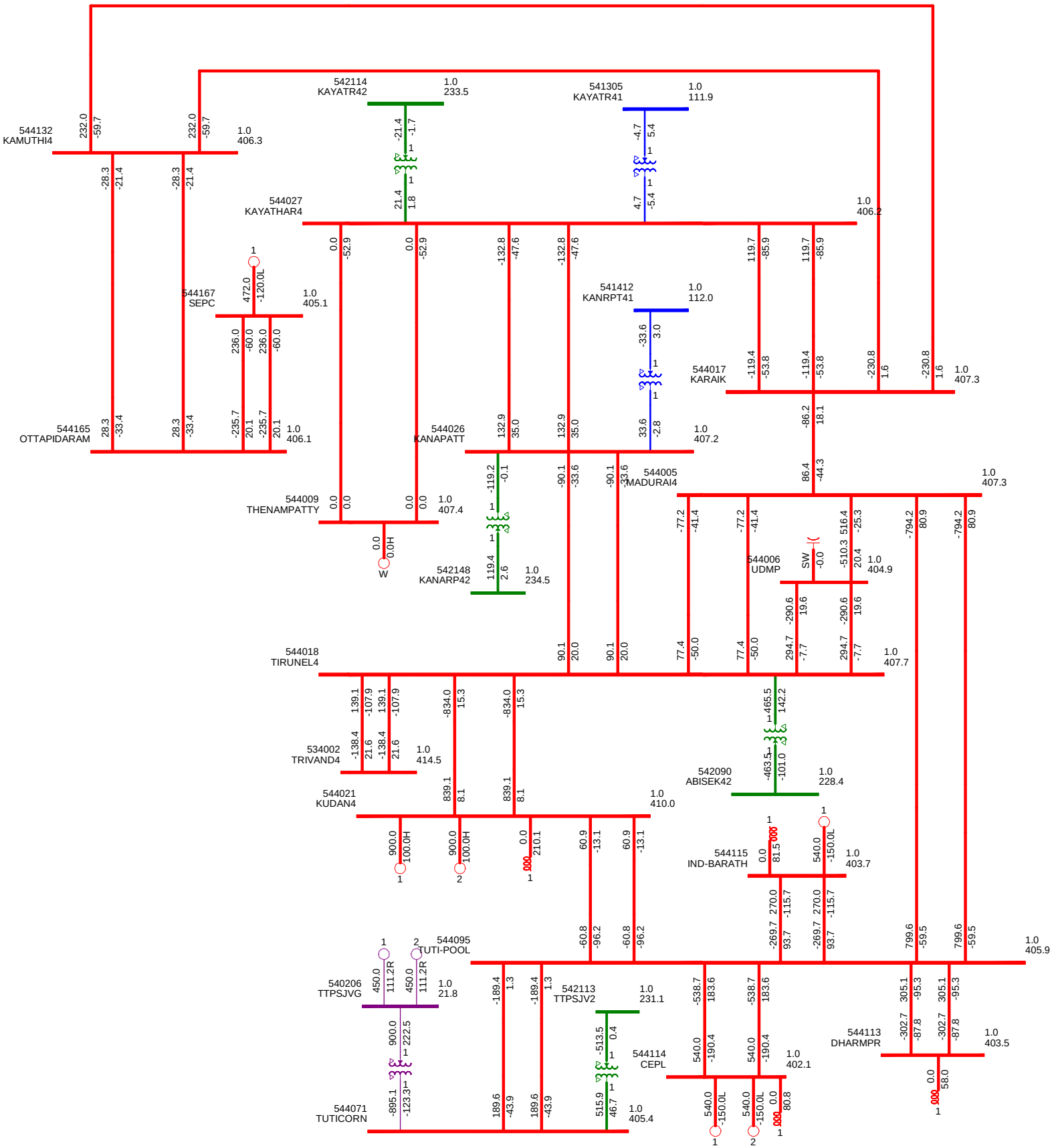
FULL WIND CONDITION



SEPC - 1X525MW PERMANENT CONNECTIIVTY

CASE1 : WITH 400KV DC CONNECTVITY FROM SEPC TO OTTAPIDARAM 400KV SS

NIL WIND CONDITION



TAMILNADU TRANSMISSION CORPORATION LTD.
(Subsidiary of TNEB Ltd.)

From

T.Senthilvelan, B.E.,
Director/Transmission Projects,
TANTRANSCO,
144, Anna Salai,
Chennai -2.

To

The Member (Power System),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi 110 066.

Lr.No.CE/Plg.&R.C/SE/SS/EE1/AEE1/Kudankulam/D.131 /2017 dt.26-04-17

Sub: Kudankulam Units - Additional Evacuation lines required by NPCIL – Reminder - Regarding.

Ref:1. Lr.No.CE/Plg.&R.C/SE/SS/EE1/AEE1/Kudankulam/D.321 /17 dt.06 -09-16
2. MoM of 40th Standing Committee held on 19th November, 2016 at Hyderabad.

****

TANTRANSCO has requested NPCIL vide reference (1) cited above, that additional evacuation lines which are to be planned from Kudankulam Atomic Power plant units 3 & 4, may be terminated in any of the TANTRANSCO substations nearby. It was also assured that TANTRANSCO will construct the above evacuation lines along with bays at both ends.

2.0. The above TANTRANSCO proposal was taken as an agenda point in the 40th Standing Committee Meeting held on 19.11.2016 at Hyderabad and the following has been agreed.

"PGCIL informed that the present system is adequate to evacuate power from Kudankulam as they have not received any LTA application from Kudankulam - 3 & 4. Once the LTA application for Kudankulam 3& 4 is received then further system will be planned after proper studies and the same was agreed."

ANNEXURE-7/2

3

3.0. Erection of additional evacuation lines from Kudankulam to the nearby TANTRANSCO's 400 kV Substations will give more reliability and operational flexibility. In view of the RoW issues, erection of the above lines may be considered well in advance.

Hence, it is requested to consider TANTRANSCO's proposal of constructing additional evacuation lines from Kudankulam Atomic power plant to the nearby TANTRANSCO's 400 kV Substations.

21/4/17 AEE1 | 21/04/17 EE1 | SE/SS 21/4 | 22/04/2017 CE/Plg & R.C 21/4 | 25/4 Dir/TP 21/4

Copy to

The Chief Operating Officer(CTU),
Power Grid Corporation of India Ltd.,
Saudamini, Plot No. 2,
Sector-29, Gurgaon-122001,
Haryana.

On 07/05/17 11:21 AM, **Vms Prakash Yerubandi {वी.एम.एस. प्रकाश येरूबंदी}** <yvmsprakash@powergridindia.com> wrote:

Sir/Madam,

Draft report submitted by CPRI for Grid impact study due to establishment of 350 MVA short circuit transformer test facility at CPRI, Uppal Hyderabad have been reviewed and comments/Clarifications are given below :

1. How did CPRI arrive at I_{test} Value (Page no. 10) during failure (i.e 2 kA for 35 MVA Transformer) is not clear?

2. Dynamic simulations have not been carried out to assess the impact of short circuit test on stability.

3. Soft Copy(Excel) for Test Currents and Sizing of Series reactor(Annexure-III & IV) may be provided by CPRI.

4. It was mentioned that available short circuit power at secondary of station transformer should be between 2500 – 2800 MVA for 350 MVA short circuit facility(page no.8). How do they arrive at this value? Is it based on some standard? If so, the same may be provided.

5. In block diagram(Page no. 7)), why no reactor is provided in series with LV Test Object? Similarly, why no high current transformer is provided in series with HV Test Object?

6. Voltage dip at 400 kV Ghanpur S/s may also be provided during testing and equipment failure.

7. PSS/E file on which simulations are carried out may also be provided

The matter may be taken up suitably with CPRI.

It may also be mentioned that during 40th Standing Committee Meeting on 19.11.2016, it was agreed convene separate meeting to conduct joint studies by CEA,SRPC,CTU,SRLDC and TSTRANSCO.

Thanks & Regards
V M S Prakash
Dy. Manager
CTU-Planning
POWERGRID
M:09560890042

From: Pardeep Jindal [mailto:jindal_pardeep@yahoo.co.in]
Sent: 17-Apr-2017 13:02
To: Mukesh Khanna {मुकेश खन्ना}; Vms Prakash Yerubandi {वी.एम.एस. प्रकाश येरूबंदी}; V. Thiagarajan {वी. त्यागराजन}
Subject: Fw: CPRI _ONLINE_Hyderabad

----- Forwarded Message -----

Gmail Bhagwan Bairwa <bhagwan02@gmail.com>

Fw: FW: CPRI _ONLINE_Hyderabad

2 messages

sharan Rishika <rishika_sh@yahoo.com> Thu, Jul 13, 2017 at 12:44 PM
Reply-To: sharan Rishika <rishika_sh@yahoo.com>
To: Bhagwan Bairwa <bhagwan02@gmail.com>

Regards,

Rishika Sharan

Director

CEA

Ph-9868021299

On Wednesday, July 12, 2017 6:00 PM, Pradeep Nirgude <pmnirgude@cpri.in> wrote:

Dear Sir/s

Please find the below point wise to the comments received from CEA.
1. This value corresponds to the situation when the transformer under test fails very badly so that it offers zero impedance. In such cases, the expected current at primary terminal of the transformer is 2 KA.
2. Max. expected voltage drop is considered to be not more than 10% in any of the test case. Hence dynamic simulation is felt not necessary.
3. Annexure -III is attached and Annexure-IV is not related to the work and may be ignored please.
4. The available short circuit power at secondary of the station transformer is 2500-2800 MVA for the proposed test facility considering techno-economic design of the short circuit transformers. However in order to ensure that voltage drop does not exceed due to the fault power drawn from the network, it is required to have 10 times the faults power of the station transformer.
5. Reactor and resistor are inserted on the primary side of the high current transformer(HCT) in order to control current and power factor. HCT is necessary for the testing of LT switch-gear.
6. Voltage drop at 400 kV Ghanapur is 1.15% and 3.1 % for without and with failure of the test equipment. Since this is not significant/low and was therefore not provided in the report.
7. PSSE file is attached herewith.

I hope all below comments are addressed as appropriately.

It is requested to call for a joint meeting of all concerned at the earliest for any other doubt/clarification regarding this study.

With kind regards
Pradeep Nirgude
9440114115

Draft Report

Grid Impact Study Due To Establishment of 350 MVA Short Circuit Transformer Test Facility at CPRI, Uppal Hyderabad

Power Systems Division
Central Power Research Institute-Bangalore-560080
March, 2017

Executive Summary

Central Power Research Institute (CPRI) is one of the Premier Power Research Institute involved in Power System Research, Testing and Consultancy. Over the years, the CPRI has augmented its Research and Testing facility by establishment of new advance testing facilities in various testing laboratories in Bangalore and other CPRI laboratories in the country.

As a part of the XII Plan capital project, Hyderabad unit of CPRI has proposed an establishment of 350 MVA online test facility at CPRI, Uppal Hyderabad. In this laboratory it is proposed to test all 11kV & 33 kV Class distribution transformer by drawing the required test short circuit current from the 220kV Ghanapur substation of Transmission Company of Telangana limited (TSTRANSCO) located around 15 KM from the proposed online short circuit test facility.

In this report a feasibly study has been carried out by Power Systems Division of CPRI to assess the impact of online testing on the local grid in terms of nodal voltage drop. It is observed that the available three phase short circuit power at 220kV Ghanapur is around 13226.71 MVA considering the existing network (Dec 2016). From the simulation study it is computed that, voltage drop at 220 kV Ghanapur s/s is around 2.18%, at 220kV Hayathnagar s/s is 3.50 %, when 350 MVA short circuit power is drawn for testing a 35 MVA, 33kV class distribution three phase transformer. However, this voltage drop may go upto 5.89% at Ghanapur 220kV s/s and 9.47% at 220kV Hayathnagar s/s, when the 35 MVA transformer may fail during its online testing.

Hence it is concluded, that nodal voltage drop in the Telangana Transco limited (TSTRANSCO) during online testing of transformers is well within permissible CEA steady state voltage drop tolerances.

1.0 Introduction

As a part of XII plan capital project, CPRI Hyderabad has proposed an online short circuit test facility at Uppal, Hyderabad. The proposed online short circuit test facility will be designed for testing the distribution transformers and low voltage electrical appliances. The required short circuit test power will be drawn from the Ghanapur 400/220/132kV substation of Transmission Company of Telangana limited (TSTRANSCO) located around 15 KM from the proposed online short circuit test facility.

In this context, a power systems simulation study has been conducted by CPRI study team to assess the impact of online short circuit test facility on the Ghanapur substation and nearby substations of TSTRANSCO.

2.0 Scope of the study

The scope of the work is broadly classified as under;

(a) To calculate the impact of CPRI Hyderabad online test facility on local Transco power grid substations in terms of ***short circuit current drawl***, ***voltage dips*** *and*
(b) To study and calculate the test ***voltage drop in the local network under test fails during testing.***

To carry out the above studies, CPRI had collected the latest Indian Grid Network in PSSE format from TSTRANSCO. Indian Grid generation/load data details are given in Table 1 below.

Table 1: Total Generation/load Details

India Power Grid Data	Oct-Dec. 2016	Generation	Load
		1.576 GW	1.516 GW

3.0 Network Details & Short circuit level at Ghanapur Substation

The load flow results for the Ghanapur 220 substation are tabulated in Table.2 and Table 3, below indicating the power flow and nodal voltage profile of the buses which are in close vicinity of the Ghanapur 220kV substation. Fig 1 shows the Single line diagram of the 220kV Ghanapur SS along with power flows. As per the information provided by TSTRANSCO (email dated- Annexure-I), the network configuration is modified. The one feeder of Ghanapur to Malkaram is now shifted to Ghanapur to Moulali through a hybrid single zebra and 1000 sq.mm UG cable. Another feeder from Ghanapur to Malkaram is connected between Ghanapur to Moulali through hybrid single zebra and 1000 sq.mm UG cable & LILO at Infosys. The simulated TSTRANSCO network one-layer away from Ghanapur 220kV is shown in Annexure-II.

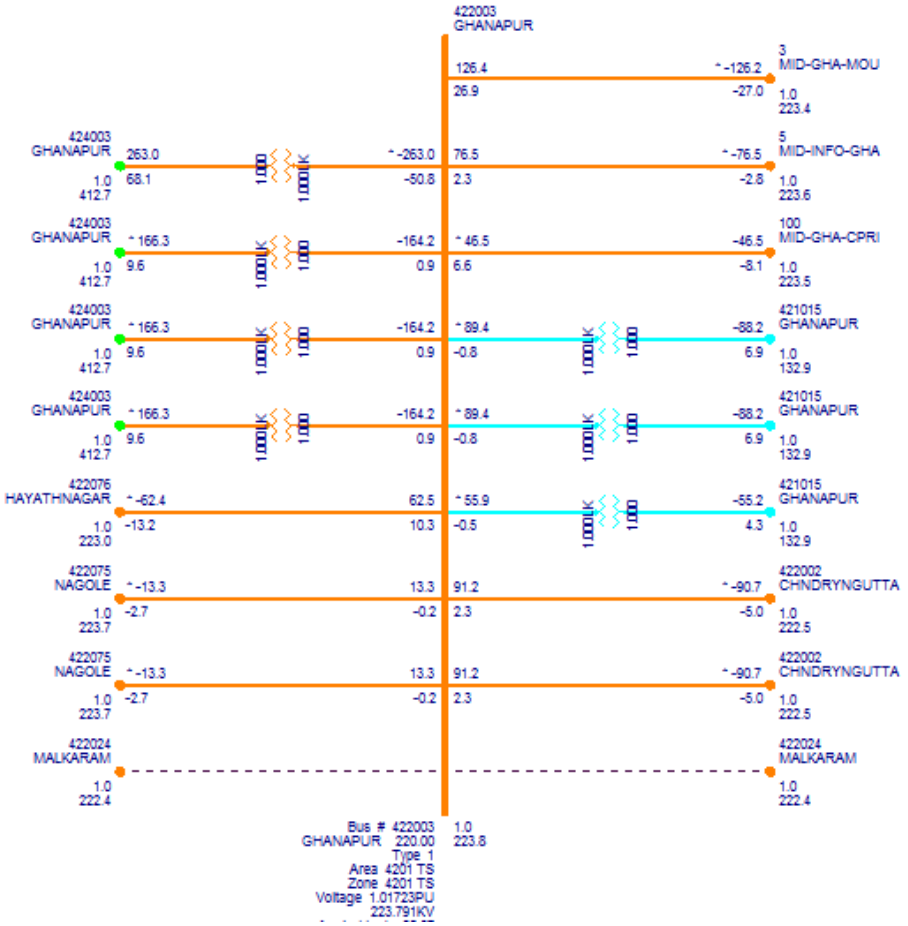


Fig 1 Power flows at Ghanapur 220kV Substation

Table 2: Load flow details at Ghanapur 220kV and 132kV.

	Bus Name	Voltage	P	Q	S
From	**To**	**kV**	**MW**	**MVAR**	**MVA**
GHANAPUR 220kV	GHANAPUR-1	132	89.4	-0.8	89.4
	GHANAPUR-2	132	89.4	-0.8	89.4
	GHANAPUR-3	132	55.9	-0.5	55.9
	CHADRTTA-1	220	91.2	2.3	91.2
	CHADRTTA-2	220	91.2	2.3	91.2
	MOULALI (Via MID-GHA-MOU)	220	126.4	27	129.2
	INFOSYS(Via MID-INF-GHA)	220	76.5	2.3	76.5
	GHANAPUR-1	400	-164.2	0.9	164.2
	GHANAPUR-2	400	-164.2	0.9	164.2
	GHANAPUR-3	400	-164.2	0.9	164.2
	GHANAPUR-4	400	-263	-50.8	267.8
	NAGOLE-1	220	13.3	-0.2	13.3
	NAGOLE-2	220	13.3	-0.2	13.3
	HAYATHNAGAR-1	220	62.5	10.3	63.3
	CPRI (Via MID-GHA-CPRI))	220	46.5	6.6	47
GHANAPUR 132kV	Load	132	35.3	11.5	37.1
	Shunt	132	0	-35.5	35.5
	BIBNAGAR	132	27.9	2.2	28
	BIBNAGAR	132	27.9	2.2	28
	BANLAUDA	132	69.8	-3.1	69.9
	IMLIBUN	132	70.6	4.6	70.8
	GHANAPUR-1	220	-88.2	6.9	88.5
	GHANAPUR-2	220	-88.2	6.9	88.5
	GHANAPUR-3	220	-55.2	4.3	55.3

Table 3: Voltage profile of Buses in vicinity of Ghanapur substation.

Bus Name	Voltage	Voltage	
	Vn(kV)	PU	V (kV)
GHANAPUR 220	220	1.0172	223.784
HAYATHNAGAR	220	1.0136	222.992
GHANAPUR132	132	1.0065	132.858
HYT	33	0.9656	31.8648
CHADRATTA	220	1.0115	222.53
NAGOLE	220	1.0167	223.674
GHANAPUR 400	400	1.0317	412.68
INFOSYS	220	1.0165	223.63
TALLAPALLI	400	1.0426	417.04
KURNOOL	400	1.0707	428.28
BIBINAGAR	132	1.002	132.264
BANLAUDA	132	0.9982	131.7624
CHANDRATTA	132	0.9986	131.8152
IMBLIBUN	132	0.9928	131.0496
NAGOLE	132	1.0041	132.5412
MOULALI	220	1.0133	222.926
MAMDILI	220	1.0135	222.97
HIAL	220	1.0127	222.794
BONGLUR	220	1.0114	222.508
RSTPS NTPC	400	1.0353	414.12
MAMIDIPALLY	400	1.012	404.8
GAJWEL	400	1.0331	413.24
MALKARAM	400	1.0342	413.68

Three phase and Line-line faults are simulated at Ghanapur 220kV substation and the short circuit current and fault MVA are listed in the Table. 4 below corresponding to 1.0 P U pre-fault voltage. Table 5 (a) shows the short circuit current contribution from various elements connected to the 220kV Ghanapur bus and Table 5 (b) shows short circuit current contribution from grid at CPRI 220kV S/S.

Table 4: Fault levels at Ghanapur 220kV SS

Ghanapur	**220kV**	**3 Phase short ckt. fault**		**Phase-phase fault**	
		kA	MVA	kA	MVA
		34.71	13226.72	30.06	11454.68

Table 5 (a): Fault current contribution at 220kV Ghanapur SS from nearby buses

Bus Name	Voltage	IA (A)	IA ang	IB(A)	IB ang	IC(A)	IC ang
MOULALI (Via MID-GHA-MOU)	220	7163	98.49	7163	-21.51	7163	-141.51
INFOSYS(Via MID-INF-GHA)	220	4311.8	99.12	4311.8	-20.88	4311.8	-140.88
CPRI (Via MID-GHA-CPRI))	220	0	0	0	0	0	0
GHANAPUR	132	546.9	105.18	546.9	-14.82	546.9	-134.82
GHANAPUR	132	546.9	105.18	546.9	-14.82	546.9	-134.82
GHANAPUR	132	351.3	105.18	351.3	-14.82	351.3	-134.82
CHNDRYNGUTTA	220	3172	99.5	3172	-20.5	3172	-140.5
CHNDRYNGUTTA	220	3172	99.5	3172	-20.5	3172	-140.5
NAGOLE	220	0	0	0	0	0	0
NAGOLE	220	0	0	0	0	0	0
HAYATHNAGAR	220	0	0	0	0	0	0
GHANAPUR	400	3299.8	99.15	3299.8	-20.85	3299.8	-140.85
GHANAPUR	400	3299.8	99.15	3299.8	-20.85	3299.8	-140.85
GHANAPUR	400	3299.8	99.15	3299.8	-20.85	3299.8	-140.85
GHANAPUR	400	5650.7	87.92	5650.7	-32.08	5650.7	-152.08
Total		34711.1	-82.49	34711.1	157.51	34711.1	37.51

Table 5 (b): Fault current contribution at 220kV CPRI SS from Grid

Bus Name	Voltage	IA (A)	IA ang	IB(A)	IB ang	IC(A)	IC ang
Hayathnagar	220	4753.2	98.87	4753.2	-21.13	4753.2	-141.13
Ghanapur	220	12497.7	98.88	12497.7	-21.12	12497.7	-141.12
Total		17251.9	-81.13	17251.9	158.87	17251.9	38.87

4.0 Laboratory Details

The testing lab is planned for testing of all distribution transformer (Voltage range 11kV & 33kV) and low voltage electrical appliances. The complete list of the transformers, which are intended to be tested in this lab are listed in Annexure-III. For studying the online testing impact on the grid, a few transformers rating are considered which are quite common and have highest MVA rating. These are referred as dominant test cases in this report and are listed in Table 6.

The required test current is calculated based on the rating of the transformer and standard short circuit test power [IEC 60076-5(standard short circuit power is 500 MVA for voltage class rating upto 24kV, 1000MVA for 36 kV class transformers)] and is calculated as per Eq.(1) below.

$$\text{I test} = \frac{U}{\sqrt{3}(Zs+Zt)} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

U= Rated test voltage

Zs is the short-circuit impedance of the supply system

Zs=$\frac{Us^2}{S}$, in ohms per phase (equivalent star connection)

Zt= Transformer impedance in ohms.

Table.6. List of dominant test cases.

Transformers class (T2)	Test Transformer details					
	ID	Rated Power (Three Phase)	Rated Line voltage		Impedance	No. of Phases
			U1 (Primary)	U2 (secondary)		
		MVA	kV	kV	%	no
11 kV	3	0.5	11	0.433	4	3
	10	3	11	0.433	6.25	3
33 kV	13	0.5	33	0.433	4	3
	20	3	33	0.433	6.25	3
	25	5	33	11	7.15	3
	29	16	33	11	8	3
	30	35	33	11	10	3

The required test current is controlled by adequate selection and tuning of series reactor (XL). The value of test current and series reactor are calculated for complete list of test equipment and are listed in Annexure-IV & V.

The block diagram of the proposed CPRI Hyderabad online testing facility is as shown in Fig.2. The input short circuit power will be drawn from the Ghanapur 220 kV as well as Hayathnagar 220kV substation via single moose conductors. The configuration and line lengths are mention in Annexure-VI.

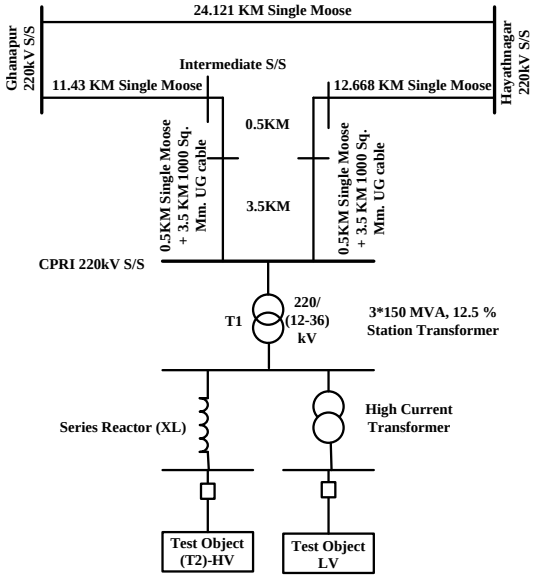


Fig 2: CPRI HYD Online testing single line diagram

5.0 Station Short Circuit Transformer (T1) Details

In this lab, it is planned to test all the distribution transformer having primary voltage from 11 kV to 33 kV and low voltage appliances. There will be three no. of single phase short circuit station transformer in the lab. The primary of these transformer will be connected in delta with 220kV network supply and secondary winding have two tapping (MV1-12kV &MV2-12kV) will be connected in star/delta to match the test transformer no load voltage. The primary of the test transformer is energized from the secondary of the station short circuit transformers. The proposed connection and rating of station transformer are listed in Table. 7.

Table 7 Station transformer details

Transformer Rating (T1)		Rated Line voltage			Impedance
		Primary side	Secondary side		
		U1	U2	U2	
Single Phase	Three Phase Bank	Delta	Winding1	Winding2	
MVA	MVA	kV	kV	kV	%
150	450	220	12	12	12.5

6.0 Methodology

Three phase short circuit fault will be simulated on the secondary of the test transformer and three phase input supply will be given on the primary side of the test transformer through station transformers. As listed in Table. 7, the primary sides of the station transformers are connected in delta connection with 220kV supply voltage. The secondary winding of the short circuit transformer will be connected in star/delta to obtain the required no load test voltage for various class of transformer under test for duration of 250 to 500 msec as per IEC 60076.

During simulation, the line to line voltage drop on the network (upto 2 lavel from Ghanapur 220kV) is evaluated as per eq.(2) below for normal as well as test transformer failure case.

$$\text{Voltage drop} = \frac{V_{ph\text{-}ph}\,(\text{prefault}) - V_{ph\text{-}ph}\,(\text{during fault})}{V_{ph\text{-}ph}\,(\text{prefault})} \quad \ldots\ldots\ldots\ldots\ldots (2)$$

7.0 Grid Impact Results

The result are grouped in two sections as under;

A) During Normal testing:

As per the testing requirements, three phase short circuit test will be simulated for duration of 250 to 500 msec on secondary of the test transformers. The voltage drop at grid connection point nearby to it is tabulated in Table 8, for dominant test cases. It is observed that, the highest voltage drop is 3.50% at Hayathnagar 220kV s/s, 2.18% at

220kV Ghanapur s/s, for 35MVA, 33/11kV class transformer at grid connection point Ghanapur 220 kV substation.

Table 8: Voltage Drops up to two levels away from the bus feeding CPRI HYD test facility (Ghanapur 220kV SS)

BUS NAME	Vn	3-Phase Short Circuit						
		Id 3, Itest= 34.8A	Id 10, Itest= 123.3A	Id 13, Itest= 35.3A	Id 20, Itest= 130A	Id 25, Itest= 184.8A	Id 29, Itest= 462.5A	Id 30, Itest= 707A
		(0.5MVA)	(3.0MVA)	(0.5MVA)	(3.0MVA)	(5.0 MVA)	(16.0MVA)	(35MVA)
		Voltage Drop						
	kV	%	%	%	%	%	%	%
Test TF Primary	33	11.66	18.83	10.28	14.11	16.33	27.28	37
ST TF secondary	33	0.56	1.99	0.57	2.11	3.01	7.5	11.63
CPRI220 kV S/S	220	0.21	0.76	0.22	0.8	1.14	2.85	4.51
Intermediate S/S	220	0.18	0.66	0.19	0.7	0.99	2.48	4.14
GHANAPUR 220	**220**	**0.11**	**0.38**	**0.11**	**0.4**	**0.57**	**1.42**	**2.18**
HAYATHNAGAR	**220**	**0.17**	**0.6**	**0.17**	**0.64**	**0.91**	**2.26**	**3.50**
GHANAPUR132	132	0.09	0.32	0.09	0.34	0.48	1.2	1.84
HYT	33	0.17	0.6	0.17	0.64	0.91	2.26	3.50
CHADRATTA	220	0.07	0.24	0.07	0.26	0.37	0.93	1.43
NAGOLE	220	0.11	0.38	0.11	0.4	0.57	1.42	2.18
GHANAPUR 400	400	0.05	0.19	0.06	0.21	0.3	0.75	1.15
INFOSYS	220	0.1	0.35	0.1	0.37	0.53	1.31	2.01
TALLAPALLI	400	0.02	0.08	0.02	0.08	0.12	0.3	0.45
KURNOOL	400	0.01	0.05	0.01	0.05	0.07	0.18	0.27
BIBINAGAR	132	0.09	0.32	0.09	0.34	0.48	1.2	1.84
BANLAUDA	132	0.08	0.26	0.08	0.28	0.41	1.01	1.55
CHANDRATTA	132	0.07	0.24	0.07	0.26	0.37	0.92	1.41
IMBLIBUN	132	0.08	0.28	0.08	0.3	0.43	1.07	1.64
NAGOLE	132	0.11	0.38	0.11	0.4	0.57	1.42	2.18
MOULALI	220	0.07	0.29	0.08	0.31	0.45	1.12	1.71
MAMDILI	220	0.06	0.19	0.06	0.21	0.31	0.76	1.17
HIAL	220	0.06	0.2	0.06	0.22	0.31	0.77	1.19
BONGLUR	220	0.07	0.22	0.06	0.24	0.34	0.85	1.3
RSTPS NTPC	400	0.03	0.08	0.03	0.1	0.14	0.6	0.53
MAMIDIPALLY	400	0.04	0.15	0.04	0.17	0.24	0.59	0.92
GAJWEL	400	0.04	0.12	0.04	0.14	0.21	0.51	0.78
MALKARAM	400	0.05	0.17	0.05	0.19	0.27	0.67	1.02

B) During test equipment failure:

The grid impact results are also calculated when test equipment fails during testing. These conditions are simulated by short circuiting the transformer impedance during secondary side simulated three phase faults. The voltage drop at grid connection point

and buses in vicinity of Ghanapur SS during test equipment failure are listed in Table. 9. It is observed that, the highest voltage drop is 9.47 at 220kV Hayathnagar s/s, 5.89 % at 220kV Ghanapur s/s, for 35MVA, 33/11kV class transformer at Ghanapur during test equipment failure.

Table 9: Voltage Drops up to two levels away from the bus feeding CPRI HYD test facility (Ghanapur 220kV SS) during test equipment failure

BUS NAME	Vn	3-Phase Short Circuit						
		Id 3, Itest= 316.4A	Id 10, Itest= 695.4A	Id 13, Itestf= 364.3A	Id 20, Itest= 978.2A	Id 25, Itest= 1.20kA	Id 29, Itest= 1.78kA	Id 30, Itest= 2.00kA
		(0.5MVA)	(3.0MVA)	(0.5MVA)	(3.0MVA)	(5.0 MVA)	(16.0MVA)	(35.0MVA)
		Voltage Drop						
	kV	%	%	%	%	%	%	%
Test TF Primary	33	99.98	99.99	99.97	99.99	100	100	100
ST TF secondary	33	4.79	10.58	5.52	14.94	18.42	27.51	31.43
CPRI220 kV S/S	220	1.82	4.02	2.1	5.68	7	10.46	12.19
Intermediate S/S	220	1.58	3.5	1.82	4.94	6.09	9.1	11.19
GHANAPUR 220	**220**	**0.91**	**2.01**	**1.05**	**2.83**	**3.49**	**5.22**	**5.89**
HAYATHNAGAR	**220**	**1.44**	**3.19**	**1.66**	**4.51**	**5.56**	**8.3**	**9.47**
GHANAPUR132	132	0.77	1.7	0.89	2.4	2.96	4.42	4.98
HYT	33	1.44	3.19	1.66	4.51	5.56	5.22	9.47
CHADRATTA	220	0.59	1.31	0.69	1.86	2.29	3.42	3.86
NAGOLE	220	0.91	2.01	1.05	2.83	3.49	5.22	5.89
GHANAPUR 400	400	0.48	1.06	0.55	1.49	1.84	2.75	3.1
INFOSYS	220	0.84	1.85	0.97	2.61	3.22	4.82	5.43
TALLAPALLI	400	0.19	0.42	0.22	0.59	0.73	1.08	1.22
KURNOOL	400	0.11	0.25	0.13	0.35	0.44	0.65	0.74
BIBINAGAR	132	0.77	1.7	0.89	2.4	2.96	4.42	4.98
BANLAUDA	132	0.65	1.43	0.75	2.02	2.49	3.72	4.19
CHANDRATTA	132	0.59	1.3	0.68	1.83	2.26	3.37	3.8
IMBLIBUN	132	0.69	1.52	0.79	2.14	2.64	3.94	4.45
NAGOLE	132	0.91	2.01	1.05	2.83	3.49	5.22	5.89
MOULALI	220	0.71	2.13	0.82	2.22	2.74	4.1	4.62
MAMDILI	220	0.49	1.08	0.56	1.52	1.87	2.8	3.16
HIAL	220	0.49	1.09	0.57	1.54	1.9	2.84	3.21
BONGLUR	220	0.54	1.2	0.62	1.69	2.09	3.12	3.51
RSTPS NTPC	400	0.22	0.49	0.25	0.69	0.85	1.27	1.43
MAMIDIPALLY	400	0.38	0.85	0.44	1.2	1.47	2.2	2.48
GAJWEL	400	0.33	0.72	0.38	1.02	1.26	1.88	2.12
MALKARAM	400	0.43	0.94	0.49	1.33	1.64	2.44	2.76

8.0 Voltage drop with different rating of station transformer.

The available short circuit power at secondary of station transformer should be between 2500-2800 MVA for a 350 MVA short circuit facility. Therefore simulation studies are also carried out for different rating of station transformers by varying their percentage impedance to obtain the required short circuit power at test point. The voltage drop at critical points in side lab. and near substation are listed in Table 10 &Table 11 during testing and test equipment failure for testing of most dominant test case Id -30(35 MVA, %Z=10).

Table. 10 Voltage drop at critical buses during testing

BUS NAME	Vn	Station transformer details							
		80 MVA, Z=6%	100 MVA, Z=6%	100 MVA, Z=8%	120 MVA, Z=8%	120 MVA, Z=10%	150 MVA, Z=8%	150 MVA, Z=10%	150 MVA, Z=12.5%
		SC MVA at station transfprmer secondary side							
		SC MVA	SC MVA	SC MVA	SC MVA	SC MVA	SC MVA	SC MVA	SC MVA
		2595.81	2945.60	2514.49	2797.28	2469.72	3151.53	2815.20	2491.05
		Voltage Drop							
	kV	%	%	%	%	%	%	%	%
Test TF Primary	33	37.21	37.29	37.14	37.21	37.07	37.29	37.17	37
ST TF secondary	33	10.98	9.64	11.35	10.17	11.57	9	10.11	11.63
CPRI220 kV S/S	220	4.35	4.34	4.35	4.35	4.36	4.34	4.35	4.51
Intermediate S/S	220	3.78	3.78	3.79	3.78	3.79	3.78	3.79	4.14
GHANAPUR 220	220	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.18
HAYATHNAGAR	220	3.45	3.45	4.36	3.45	3.46	3.45	3.45	3.50
HYT	33	3.45	3.45	4.36	3.45	3.46	3.45	3.45	3.50

Table.11 Voltage drop at critical buses during test equipment failure

BUS NAME	Vn	Station transformer details							
		80 MVA, Z=6%	100 MVA, Z=6%	100 MVA, Z=8%	120 MVA, Z=8%	120 MVA, Z=10%	150 MVA, Z=8%	150 MVA, Z=10%	150 MVA, Z=12.5%
		SC MVA at station transfprmer secondary side							
		SC MVA	SC MVA	SC MVA	SC MVA	SC MVA	SC MVA	SC MVA	SC MVA
		2595.81	2945.60	2514.49	2797.28	2469.72	3151.53	2815.20	2491.05
		Voltage Drop							
	kV	%	%	%	%	%	%	%	%
Test TF Primary	33	99.93	100	100	100	100	100	100	100
ST TF secondary	33	29.49	25.86	30.57	27.35	31.23	24.14	27.22	31.43
CPRI220 kV S/S	220	11.69	11.66	11.73	11.69	11.77	11.66	11.72	12.19
Intermediate S/S	220	10.17	10.14	10.21	10.17	10.24	10.14	10.19	11.19
GHANAPUR 220	220	5.83	5.82	5.85	5.83	5.87	5.82	5.85	5.89
HAYATHNAGAR	220	9.28	9.26	9.32	9.29	9.35	9.26	9.3	9.47
HYT	33	9.28	9.26	9.32	9.29	9.35	9.26	9.3	9.47

9.0 Observations:

- As per the provided network information, the three phase short circuit MVA is 13226.71 at Ghanapur 220 kV substation TSTRANCO.
- The available short circuit at 220kV CPRI S/S is 6365.31 MVA.
- It is intended to test all 11 and 33kV class three phase distribution transformer upto 30MVA power rating in this laboratory.
- In simulation studies, it is observed that maximum voltage drop at Ghanapur 220 kV substation is 2.18 %, at 220kV Hayathnagar s/s it is 3.50 % during normal testing. However, the voltage drop reaches 9.47 % at 220kV Hayathnagar s/s, 5.89 % at 220kV Ghanapur s/s, when the highest test rating equipment fails during testing in simulation.

10.0 References:

[1] IEC 60076-5, 2006 standard.

Annexure-I

-------- Original Message --------
From: **DESS LTSS** <desststransco@gmail.com>
Date: Mar 4, 2017 11:44:20 AM
Subject: Re: CPRI Hyderabad ONLINE test station
To: Pradeep Nirgude <pmnirgude@cpri.in>

Sir,
We have gone through your report and the following are the observations:

1. In the results at Page No.s 9, 10, 11 132kV Bus at Hayathnagar is mentioned (HYT-132kV) . It is 220/33kV Substation and there is no 132kV Bus at Hayathnagar.

2. In the page No. 4, 400/220kV Ghanapur SS is with 3 No. 315MVA Power Transformers but in the month of February, the Substation is augmented with additional 500MVA Power Transformer.

3. In the page No. 4, 2 No.s 220kV Ghanapur - Malkaram feeders are shown but in the month of December,2016 one circuit of 220kV Ghanapur - Malkaram is made LILO at Moulali SS and line lengths are;
   i. Ghanapur to Moulali - 4.94 km with Single Zebra + 9.5 km (220kV 1000 sq. mm) UG Cable
   ii. Malakaram to Moulali - 11.96 km with Single Zebra + 9.5 km (220kV 1000 sq. mm) UG Cable

In view of the above, it is requested to carry out the revised studies with the above modifications.

For further queries please contact Superintending / Power Systems / TSTRANSCO Mob: 9491063385

With Regards

Divisional Engineer,
System Studies,
TSTRANSCO
Mob: 9440682975.

-------- Original Message --------
From: **DESS LTSS** <desststransco@gmail.com>
Date: Mar 8, 2017 1:15:02 AM
Subject: Re: CPRI Hyderabad ONLINE test station - Ghanapur - Infosys - Moulali line lengths
To: Pradeep Nirgude <pmnirgude@cpri.in>

Sir,
Two circuits of 220kV Ghanapur - Malkaram now modified as follows:

Circuit - 1

i. 220kV Ghanapur to Moulali - 4.94 km with Single Zebra + 9.5 km (220kV 1000 sq. mm) UG Cable

Circuit - 2

i. 220kV Ghanapur to Infosys - 5.2 km with Single Zebra + 0.872 km (220kV 1000 sq. mm) UG Cable

ii. 220kV Infosys to Moulali - 5.14 km with Single Zebra + 10.372 km (220kV 1000 sq. mm) UG Cable

From Malkaram end, 10.49 km 220kV Single Zebra DC lline will be in open condition.

In view of the above, it is requested to carry out the revised studies with the above modifications.

For further queries please contact Superintending / Power Systems / TSTRANSCO Mob: 9491063385

With Regards

Divisional Engineer,
System Studies,
TSTRANSCO
Mob: 9440682975.

Annexure-II

Distribution Transformers to be tested at online testing facility at CPRI-Hyderabad.

Transformers class	Test Transformer details (T2)					
	ID	Rated Power (Three Phase)	Rated Line voltage		% Impedance	Unit Phases
			U1	U2		
		MVA	kV	kV	%	no
11kV class	1	0.315	11	0.433	4	3
	2	0.4	11	0.433	4	3
	3	0.5	11	0.433	4	3
	4	0.63	11	0.433	4	3
	5	0.8	11	0.433	5	3
	6	1	11	0.433	5	3
	7	1.6	11	0.433	6.25	3
	8	2	11	0.433	6.25	3
	9	2.5	11	0.433	6.25	3
	10	3	11	0.433	6.25	3
33kV class	11	0.315	33	0.433	4	3
	12	0.4	33	0.433	4	3
	13	0.5	33	0.433	4	3
	14	0.63	33	0.433	4	3
	15	0.8	33	0.433	5	3
	16	1	33	0.433	5	3
	17	1.6	33	0.433	6.25	3
	18	2	33	0.433	6.25	3
	19	2.5	33	0.433	6.25	3
	20	3	33	0.433	6.25	3
33kV class	21	0.63	33	11	5.3	3
	22	1	33	11	6.25	3
	23	2	33	11	6.53	3
	24	3.15	33	11	6.25	3
	25	5	33	11	7.15	3
	26	6.3	33	11	7.15	3
	27	8	33	11	7.15	3
	28	10	33	11	7.15	3
	29	16	33	11	8	3
	30	35	33	11	10	3

Annexure-III
Test current calculation sheet

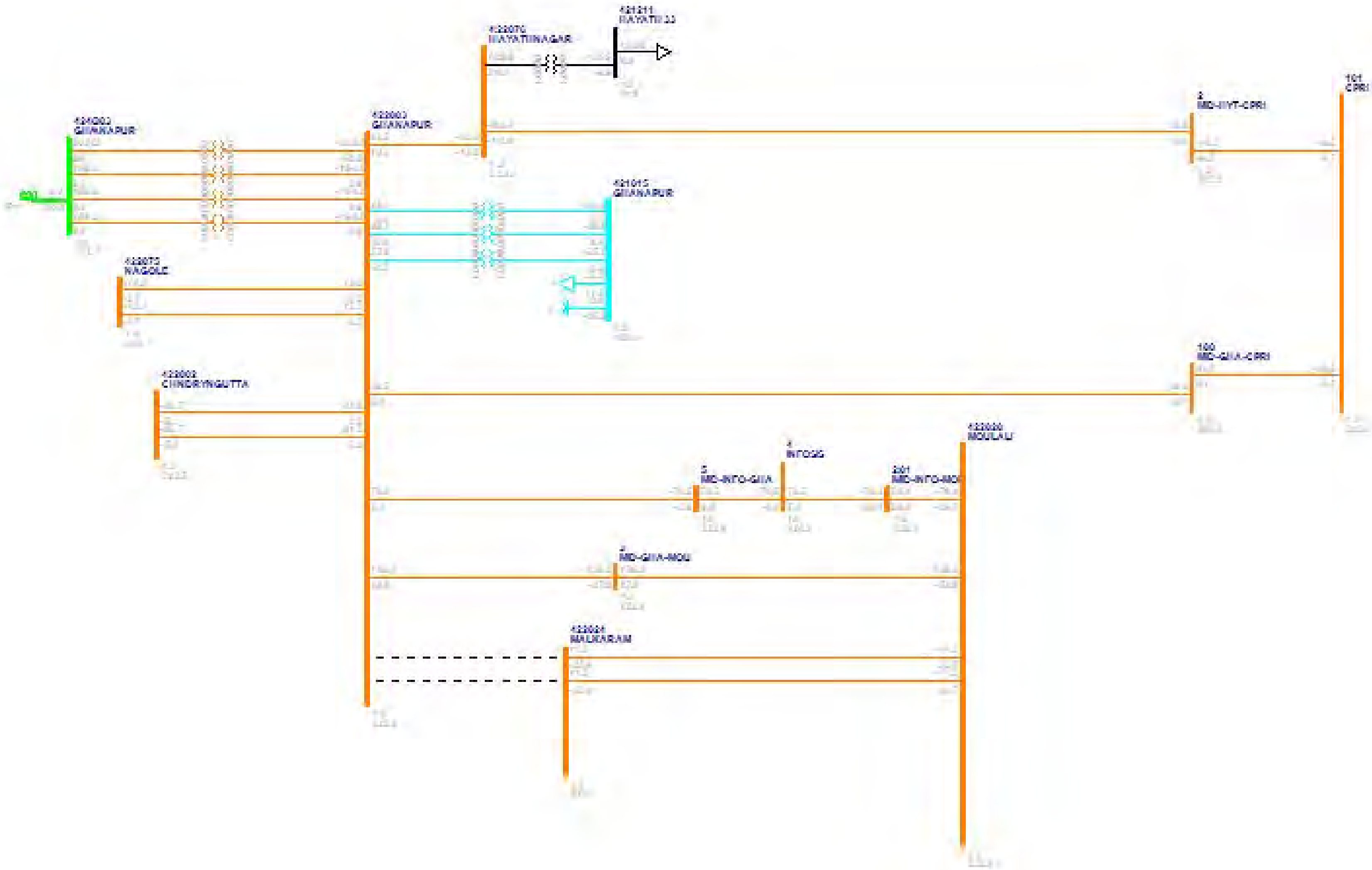
Transformer class	CPRI HYD			I test Calculation									Itest @ Us
	case ID	Network Details					Test Transformer Details						
		Supply Voltage	Standard SC (3-Phase)	Line to ground voltage	Source Impedance (Zsc) refed to no load voltage	No load Voltage (Ut)	MVA Rating (S)	Primary Voltage (U1)	Impedance (Ztr)	Z base	Ztr	Itest @ Ut	
	no.	Us	MVA	kV	ohm	KV	MVA	kV	%	Ohm	Ohm	kA	kA
11kV class distribution transformers	1	220.00	500	127.02	0.29	12.00	0.3150	11.00	4.00	384.13	15.37	0.4057	0.0221
	2	220.00	500	127.02	0.29	12.00	0.4000	11.00	4.00	302.50	12.10	0.5127	0.0280
	3	220.00	500	127.02	0.29	12.00	0.5000	11.00	4.00	242.00	9.68	0.6371	0.0348
	4	220.00	500	127.02	0.29	12.00	0.6300	11.00	4.00	192.06	7.68	0.7968	0.0435
	5	220.00	500	127.02	0.29	12.00	0.8000	11.00	5.00	151.25	7.56	0.8090	0.0441
	6	220.00	500	127.02	0.29	12.00	1.0000	11.00	5.00	121.00	6.05	1.0020	0.0547
	7	220.00	500	127.02	0.29	12.00	1.6000	11.00	6.25	75.63	4.73	1.2665	0.0691
	8	220.00	500	127.02	0.29	12.00	2.0000	11.00	6.25	60.50	3.78	1.5607	0.0851
	9	220.00	500	127.02	0.29	12.00	2.5000	11.00	6.25	48.40	3.03	1.9169	0.1046
	10	220.00	500	127.02	0.29	12.00	3.0000	11.00	6.25	40.33	2.52	2.2610	0.1233
33kV class distribution transformers	11	220.00	1000	127.02	1.30	36.00	0.3150	33.00	4.00	3457.14	138.29	0.1365	0.0223
	12	220.00	1000	127.02	1.30	36.00	0.4000	33.00	4.00	2722.50	108.90	0.1729	0.0283
	13	220.00	1000	127.02	1.30	36.00	0.5000	33.00	4.00	2178.00	87.12	0.2155	0.0353
	14	220.00	1000	127.02	1.30	36.00	0.6300	33.00	4.00	1728.57	69.14	0.2705	0.0443
	15	220.00	1000	127.02	1.30	36.00	0.8000	33.00	5.00	1361.25	68.06	0.2747	0.0450
	16	220.00	1000	127.02	1.30	36.00	1.0000	33.00	5.00	1089.00	54.45	0.3418	0.0559
	17	220.00	1000	127.02	1.30	36.00	1.6000	33.00	6.25	680.63	42.54	0.4346	0.0711
	18	220.00	1000	127.02	1.30	36.00	2.0000	33.00	6.25	544.50	34.03	0.5393	0.0883
	19	220.00	1000	127.02	1.30	36.00	2.5000	33.00	6.25	435.60	27.23	0.6680	0.1093
	20	220.00	1000	127.02	1.30	36.00	3.0000	33.00	6.25	363.00	22.69	0.7944	0.1300
33kV class transformers	21	220.00	1000	127.02	1.30	36.00	0.6300	33.00	5.30	1728.57	91.61	0.2051	0.0336
	22	220.00	1000	127.02	1.30	36.00	1.0000	33.00	6.25	1089.00	68.06	0.2747	0.0450
	23	220.00	1000	127.02	1.30	36.00	2.0000	33.00	6.53	544.50	35.56	0.5170	0.0846
	24	220.00	1000	127.02	1.30	36.00	3.1500	33.00	6.25	345.71	21.61	0.8319	0.1361
	25	220.00	1000	127.02	1.30	36.00	5.0000	33.00	7.15	217.80	15.57	1.1295	0.1848
	26	220.00	1000	127.02	1.30	36.00	6.3000	33.00	7.15	172.86	12.36	1.3953	0.2283
	27	220.00	1000	127.02	1.30	36.00	8.0000	33.00	7.15	136.13	9.73	1.7275	0.2827
	28	220.00	1000	127.02	1.30	36.00	10.000	33.00	7.15	108.90	7.79	2.0978	0.3433
	29	220.00	1000	127.02	1.30	36.00	16.000	33.00	8.00	68.06	5.45	2.8264	0.4625
	30	220.00	1000	127.02	1.30	36.00	35.000	33.00	10.00	31.11	3.11	4.3228	0.7074

Annexure-IV

Series Reactor calculation

Transformer class	Line Impedance From 220kV Ghanapur to CPRI Lab	Series Reactor (XL)calculation															
		case ID	Network Parameters			Source Impedance	SC Transformer (T1)	Test Transformer (T2)					Zts @ Us		Ztr @ 220kV	Itest	XL
			Us	Isc	Per phase voltage	Zsc	ZSC @ Us	Ut	S	U1	Ztr	Z base	Ztr @ Ut	Transformation ratio (Us/Ut)^2		@ Us	@ Ut
	Ohm		kV	KA	kV	ohm	Ohm	kV	MVA	kV	%	ohm	ohm	ohm	Ohm	kA	Ohm
11kV class distribution transformers	3.92	1	220	34.71	127.02	3.66	13.44	12	0.315	11	4.00	384.13	15.37	336.11	5164.37	**0.0221**	1.65
	3.92	2	220	34.71	127.02	3.66	13.44	12	0.400	11	4.00	302.50	12.10	336.11	4066.94	**0.0280**	1.35
	3.92	3	220	34.71	127.02	3.66	13.44	12	0.500	11	4.00	242.00	9.68	336.11	3253.56	**0.0348**	1.13
	3.92	4	220	34.71	127.02	3.66	13.44	12	0.630	11	4.00	192.06	7.68	336.11	2582.19	**0.0435**	0.95
	3.92	5	220	34.71	127.02	3.66	13.44	12	0.800	11	5.00	151.25	7.56	336.11	2541.84	**0.0441**	0.94
	3.92	6	220	34.71	127.02	3.66	13.44	12	1.000	11	5.00	121.00	6.05	336.11	2033.47	**0.0547**	0.80
	3.92	7	220	34.71	127.02	3.66	13.44	12	1.600	11	6.25	75.63	4.73	336.11	1588.65	**0.0691**	0.68
	3.92	8	220	34.71	127.02	3.66	13.44	12	2.000	11	6.25	60.50	3.78	336.11	1270.92	**0.0851**	0.60
	3.92	9	220	34.71	127.02	3.66	13.44	12	2.500	11	6.25	48.40	3.03	336.11	1016.74	**0.1046**	0.53
	3.92	10	220	34.71	127.02	3.66	13.44	12	3.000	11	6.25	40.33	2.52	336.11	847.28	**0.1233**	0.48
33kV class distribution transformers	3.92	11	220	34.71	127.02	3.66	13.44	36	0.315	33	4.00	3457.14	138.29	37.35	5164.37	**0.0223**	13.43
	3.92	12	220	34.71	127.02	3.66	13.44	36	0.400	33	4.00	2722.50	108.90	37.35	4066.94	**0.0283**	10.75
	3.92	13	220	34.71	127.02	3.66	13.44	36	0.500	33	4.00	2178.00	87.12	37.35	3253.56	**0.0353**	8.77
	3.92	14	220	34.71	127.02	3.66	13.44	36	0.630	33	4.00	1728.57	69.14	37.35	2582.19	**0.0443**	7.14
	3.92	15	220	34.71	127.02	3.66	13.44	36	0.800	33	5.00	1361.25	68.06	37.35	2541.84	**0.0450**	7.04
	3.92	16	220	34.71	127.02	3.66	13.44	36	1.000	33	5.00	1089.00	54.45	37.35	2033.47	**0.0559**	5.80
	3.92	17	220	34.71	127.02	3.66	13.44	36	1.600	33	6.25	680.63	42.54	37.35	1588.65	**0.0711**	4.72
	3.92	18	220	34.71	127.02	3.66	13.44	36	2.000	33	6.25	544.50	34.03	37.35	1270.92	**0.0883**	3.95
	3.92	19	220	34.71	127.02	3.66	13.44	36	2.500	33	6.25	435.60	27.23	37.35	1016.74	**0.1093**	3.33
	3.92	20	220	34.71	127.02	3.66	13.44	36	3.000	33	6.25	363.00	22.69	37.35	847.28	**0.1300**	2.91
33kV class transformers	3.92	21	220	34.71	127.02	3.66	13.44	36	0.630	33	5.30	1728.57	91.61	37.35	3421.40	**0.0336**	9.18
	3.92	22	220	34.71	127.02	3.66	13.44	36	1.000	33	6.25	1089.00	68.06	37.35	2541.84	**0.0450**	7.04
	3.92	23	220	34.71	127.02	3.66	13.44	36	2.000	33	6.53	544.50	35.56	37.35	1327.86	**0.0846**	4.08
	3.92	24	220	34.71	127.02	3.66	13.44	36	3.150	33	6.25	345.71	21.61	37.35	806.93	**0.1361**	2.82
	3.92	25	220	34.71	127.02	3.66	13.44	36	5.000	33	7.15	217.80	15.57	37.35	581.57	**0.1848**	2.27
	3.92	26	220	34.71	127.02	3.66	13.44	36	6.300	33	7.15	172.86	12.36	37.35	461.57	**0.2283**	1.97
	3.92	27	220	34.71	127.02	3.66	13.44	36	8.000	33	7.15	136.13	9.73	37.35	363.48	**0.2827**	1.74
	3.92	28	220	34.71	127.02	3.66	13.44	36	10.000	33	7.15	108.90	7.79	37.35	290.79	**0.3433**	1.56
	3.92	29	220	34.71	127.02	3.66	13.44	36	16.000	33	8.00	68.06	5.45	37.35	203.35	**0.4625**	1.35
	3.92	30	220	34.71	127.02	3.66	13.44	36	35.000	33	10.00	31.11	3.11	37.35	116.20	**0.7074**	1.13

Annexure-V


HAYATH 33
HAYATHNAGAR
GHANAPUR
GHANAPUR
GHANAPUR
NAGOLE
CHNDRYNGUTTA
2
MD-HYT-CPRI
101
CPRI
100
MD-GHA-CPRI
MOULALI
4
INTOGIG
5
MD-INTO-GHA
201
MD-INTO-MOU
2
MD-GHA-MOU
MALKARAM

TRANSMISSION CORPORATION OF TELANGANA LIMITED

From
Cheif Engineer/SLDC&Telecom,
TSTRANSCO, Vidyut Soudha,
Hyderabad -500082.

To
Joint Director,
Central Power Research Institute,
UHV Research Laboratory,
Warangal High way,Medipally
Hyderabad,500098

Lr.No. SE(PS)/DE(SS)/ADE3SS/F.CPRI/D. No.500/16, Dt:01.12.2016

Sir,

Sub:- TSTRANSCO –Providing exclusive 220 kV Feeder to Central Power Research Institute, Hyderabad for their on line 350 MVA short circuit test facility – Field Connectivity - Regarding.

Ref: i) Lr No:CPRI/UHV/ SCT/2016,Dt:19.09.2016.
ii) Joint Director/CPRI/Hyderabad email dtd:21-11-2016

* * * *

With reference to correspondence (i) and (ii) cited above and the discussions held during 40th meeting of Standing Committee on Power System Planning of Southern Region on 19th November 2016 at Hyderabad, the connectivity to the proposed 350 MVA short circuit test facility at CPRI is proposed by making one circuit LILO of 220 kV Ghanapur – Hayatnagar line (LILO length is 4 kM) (under construction).

In this regard the particulars of maximum demand reached at 220/132/33 kV Ghanapur SS is also enclosed. Further, the maximum fault MVA at 220 kV bus of TSTransco Ghanapur SS is 10054 MVA (26.38 KA).

The line lengths are:

1. 220 kV Ghanpur SS to CPRI -15.433 kM
2. 220 kV Hayatnagar SS to CPRI- 16.668 kM.

Suitable action may taken at your end.

Encl: (1) Single line diagram
(2) Maximum demand particulars

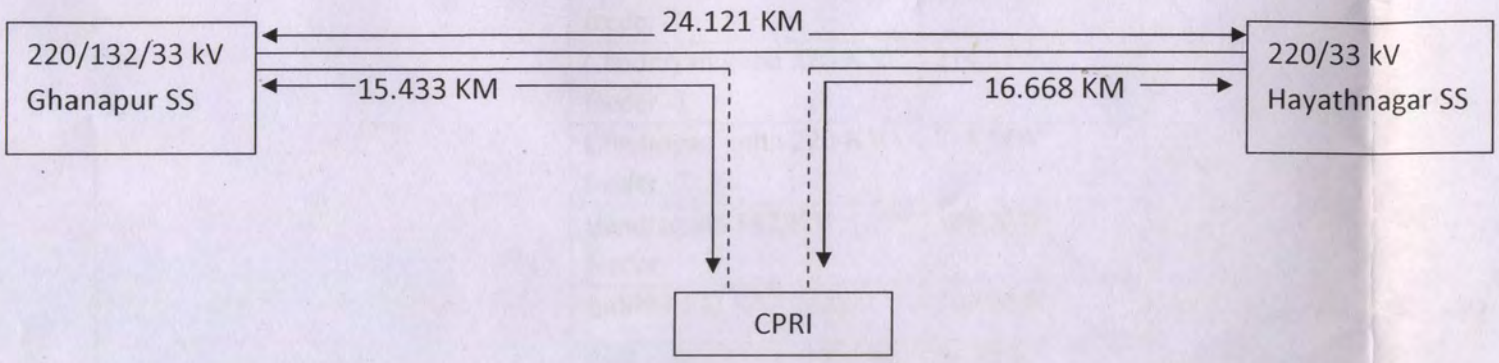
Yours faithfully

Chief Engineer/SLDC&Telecom
TSTRANSCO (FAC)
(Draft approved)

Copy submitted to:
The Member Secretary/SRPC/Bengaluru, 560009
The COO/CTU/ Saudamini, Plot No.2, Sector 29, Near IFFCO Chowk, Gurgaon (Haryana) - 122001
The General Manager/SRLDC/POSOCO/Bengaluru
Copy to :
DE/Tech to Director (Projects and Grid Operation)/TSTRANSCO/VS/Hyd.
AS to Director (Transmission)/TSTRANSCO/VS/Hyd

SINGLE LINE DIAGRAM

Laying of 220 kV XLPE UG DC Cable upto M/s.CPRI by making LILO of 220 kV Ghanapur Haythnagar Circuit - II



---------- Proposed 220 kV Line 4 KM

Load Particulars

Sl.No	Name of SS	PTR capacity/220/132 feeders	Max Demand
i.	220/132/33 KV SS Ghanapur	100 MVA PTR-1	93.1 MW
		160 MVA PTR-2	143.9 MW
		160 MVA PTR-3	112.9 MW
		Malakaram 220 KV feeder-1	260 MW
		Malakaram 220 KV feeder-2	233 MW
		Chndrayan gutta 220 KV feeder -1	214 MW
		Chndrayan gutta 220 KV feeder -2	218 MW
		Bandlaguda 132 KV feeder	106 MW
		Imlibun132 KV feeder	100 MW
		Bibi nagar 132 KV feeder-1	46 MW
		Bibi Nagar 132 KV feeder-2	55 MW
		Sanghi 132 KV feeder	18 MW
		Railway traction 132 KV feeder-1	22 MW
		Railway traction 132 KV feeder -2	23 MW
		31.5 MVA PTR-1	23.47 MW
		31.5 MVA PTR-1	29.29 MW
iv	220/33 kV SS Hayath Nagar	220 KV feeder Ghanapur-I	Under Construction
		220 KV feeder Ghanapur-II	Under Construction
		50 MVA PTR-1	Yet to takeup
		50 MVA PTR-2	Yet to takeup

TRANSMISSION CORPORATION OF TELANGANA LIMITED

From
Cheif Engineer/Power Systems,
TSTRANSCO, Vidyut Soudha,
Hyderabad -500082.

To
Chief Engineer/SP P&A II
Central Electricity Authority,
Sewa Bhavan, Sector 1,
RK Puram,New Delhi-22

Lr.No. CE(PS)/SE(PS)/DE(SS II)/ADE2SS/AE/F.CPRI/D. No.24 /17, Dt: 18 .08.2017

Sir,

Sub:- TSTRANSCO –Draft Report on "Grid Impact Study Due to establishment of 350 MVA Short circuit transformer test facility at CPRI,Uppal Hyderabad" - Remarks -Regarding.

Ref: Director/PSPA-II/CEA mail dtd:13-06-2017

* * * *

Adverting to the correspondence cited above, the remarks/observations of TSTRANSCO regarding the draft report on "Grid impact study due to establishment of 350 MVA short circuit transformer test facility at CPRI, Uppal Hyderabad" are furnished as below for further necessary action :

I. In Page No.(7) of Draft report (Fig.2:CPRI HYD online testing single line diagram), the type of conductor for below mentioned may be modified as

   i. 220 kV Ghanpur SS to CPRI -15.433 kM(11.433 single moose(existing) +3.5 km 1000 sq mm UG Cable(Proposed)+0.5 km single moose(Proposed))

   ii. 220 kV Hayatnagar SS to CPRI- 16.668 kM. (12.668 single moose +3.5 km 1000 sq mm UG Cable(Proposed)+0.5 km single moose(Proposed))

II. It is observed that the details of line loadings and power transformer loadings one layer away from 400/200/132 kV Ghanapur SS in MW,MVAR , MVA, (buses in vicinity of Ghanapur substation) during normal testing and test equipment failure conditions are not furnished , as furnished in Table.2 in page(4) of Draft Report for the pre test conditions.

III. It is also observed that the details of voltage profile of buses in vicinity of Ghanapur substation during normal testing and test equipment failure conditions are not furnished, as furnished in Table.3 in page(5) of Draft Report for the pre test conditions.

Encl: (1) Single line diagram

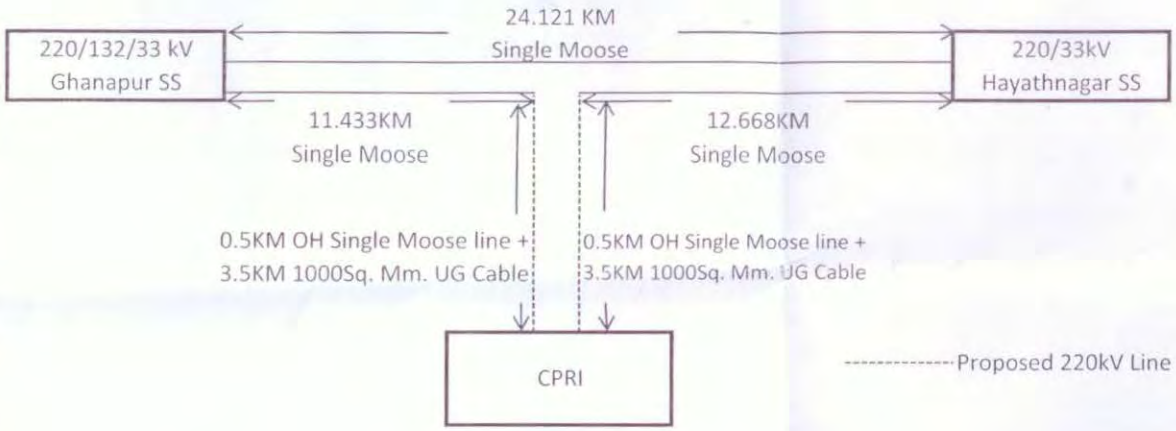
Yours faithfully

Chief Engineer/Power Systems
TSTRANSCO

Copy to:
The Member Secretary/SRPC/Bengaluru, 560009
The COO/CTU/ Saudamini, Plot No.2, Sector 29, Near IFFCO Chowk, Gurgaon Haryana) - 122001
The General Manager/SRLDC/POSOCO/Bengaluru
The Joint Director, Central Power Research Institute, UHV Research Laboratory, Warangal High way, Medipally, Hyderabad - 500098
The Chief Engineer/SLDC/TSTRANSCO/ Vidyut Soudha
DE/Tech to Director (Projects and Grid Operation)/TSTRANSCO/Vidyut Soudha/Hyd
DE/Tech to Director (Transmission)/TSTRANSCO/Vidyut Soudha/Hyd

SINGLE LINE DIAGRAM

Laying of 220kV XLPE UG Cable upto M/s. CPRI by making LILO of 220kV Ghanapur-Hayathnagar Circuit - II



केन्द्रीय विद्युत अनुसंधान संस्थान
CENTRAL POWER RESEARCH INSTITUTE
यू एच वी आर एल / UHVRL हैदराबाद / HYDERABAD - 500 030
Office of the Unit Head एकक प्रधान का कार्यालय
Diary No. UHV - 350 /2017 - 2018
Date : 22.8.17 Time : 1.12 Hrs.
UH: Sign :

Update this report with single moose conductor simulation results

From: MANOHAR SINGH [mailto:manoharsingh@cpri.in]
Sent: Thursday, June 1, 2017 4:17 PM
To: pmnirgude@cpri.in
Cc: meera@cpri.in
Subject: Fwd: CPRI _ONLINE_Hyderabad

Dear Sir
Please find the attached PSSE data file used for the simulation study.

Regards
Manohar Singh

-------- Original Message --------
From: **"Meera K.S."** <meera@cpri.in>
Date: May 29, 2017 5:17:11 PM
Subject: Fwd: CPRI _ONLINE_Hyderabad
To: manoharsingh@cpri.in
-------- Original Message --------
From: **Pradeep Nirgude** <pmnirgude@cpri.in>
Date: May 16, 2017 5:21:29 PM
Subject: Fwd: CPRI _ONLINE_Hyderabad
To: meera k s AD_PS <meera@cpri.in>
Cc: DK Grover <grover@cpri.in>, ramesh babu director <rbabu@cpri.in>, DG CPRI <dgcpri@cpri.in>

Dear Madam

It is desired by Shri S K Ray Mohapatra, CE, CEA who has taken over Power System Planning and Appraisal Division of CEA from Shri Pardeep Jindal to share the data file used for the network study. We have already submitted the report CEA and he has already gone through the report. He was also associated /involved in discussions during the NHPTL, Bina test station. Kindly provide the PSS model and data used for the study to him for their study and expediting the process of approvals for the 200kV feeder required Establishment of 350 MVA Short Circuit Transformer Test Facility at CPRI, Uppal Hyderabad from TSTRANSCO. Shri S K Ray Mohapatra may be contacted on mobile no. is 09818527857 for further clarification, if any.

With best regards
Pradeep Nirgude

-------- Original Message --------
From: **"Pradeep Nirgude"** <pmnirgude@cpri.in>
Date: May 5, 2017 12:32:51 PM
Subject: Fwd: CPRI _ONLINE_Hyderabad
To: skrmohapatra@nic.in, skrmohapatra@rediffmail.com
Cc: DK Grover <grover@cpri.in>, ramesh babu director <rbabu@cpri.in>, kamalakar S <kamal@cpri.in>

Sir

We are happy to learn that that you are going to look after the Power System Planning and Appraisal Division. It is heartening to note that our case of obtaining approvals for 220 kV feeder from TSTRANSCO will be dealt by you. In continuation of my talk, kindly peruse the matter expeditiously as the XII Plan capital project of Establishment of 350 MVA Short Circuit Transformer Test Facility at CPRI, Uppal Hyderabad is fully depended on the 220 kV feeder from TSTRANSCO.

Kind regards

Dr. Pradeep Nirgude
9440114115
Joint Director

CPRI, Hyderabad

-------- Original Message --------
From: **"Pradeep Nirgude"** <pmnirgude@cpri.in>
Date: Apr 17, 2017 12:48:29 PM
Subject: CPRI _ONLINE_Hyderabad
To: Pradeep Jindal <jindal_pardeep@yahoo.co.in>
Cc: Shivani CEA <shivani0004@gmail.com>, Sudhakara S <ssreddy@cpri.in>, ?AnupamAwasthi? ?AnupamAwasthi? <awasthi@cpri.in>, DK Grover <grover@cpri.in>, ramesh babu director <rbabu@cpri.in>

Sir

Please find attached the **REVISED** report, based on the modifications suggested by TSTRANSCO after considering the revised network connectivity, on the Grid Impact Study Due To Establishment of 350 MVA Short Circuit Transformer Test Facility at CPRI, Uppal Hyderabad issued by Power System Division, CPRI, Bangalore.

The report is put up for kind perusal.

Now, it is requested to the matter may kindly be perused at the earliest to facilitate the establishment of Online Short Circuit Test Facility at CPRI, Hyderabad.

Kind regards

Dr. Pradeep Nirgude
9440114115
Joint Director
CPRI, Hyderabad

--
With Regards

Dr. Pradeep Nirgude
Joint Director
9440114115

--
Best Regards,

Smt. Meera K.S

Additional Director
PS DIVISION
Central Power Research Institute
Bangalore 560 080

email:meera@cpri.in

Telefax: 080- 23604465,mobile: 0 9972854950
--
Manohar Singh(Ph.D, IIT Delhi & M.Tech.IIT Roorkee), SMIEEE.
Engineering Officer Grade-3
Power Systems Division
Central Power Research Institute, Bangalore-560080.
Prof.Sir.C.V.Raman Road, Sadashivnagar Post Office 8066.
Bangalore-Karnataka(India)
E-mail-manoharsingh@cpri, manoharsingh33@gmail.com
Mob. 09632940855

From: MANOHAR SINGH [mailto:manoharsingh@cpri.in]
Sent: Wednesday, July 12, 2017 3:15 PM
To: Pradeep Nirgude
Cc: meera@cpri.in; ssreddy@cpri.in
Subject: Reply_ CPRI _ONLINE_Hyderabad

Dear Sir
Please find the below point wise to the comments received from CEA.

1. This value corresponds to the situation when the transformer under test fails very badly so that it offers zero impedance. In such cases, the expected current at primary terminal of the transformer is 2 KA.
2. Max. expected voltage drop is considered to be not more than 10% in any of the test case. Hence dynamic simulation is felt not necessary.
3. Annexure -III is attached and Annexure-IV is not related to the work and may be ignored please.
4. The available short circuit power at secondary of the station transformer is 2500-2800 MVA for the proposed test facility considering techno-economic design of the short circuit transformers. However in order to ensure that voltage drop does not exceed due to the fault power drawn from the network, it is required to have 10 times the faults power of the station transformer.
5. Reactor and resistor are inserted on the primary side of the high current transformer(HCT) in order to control current and power factor. HCT is necessary for the testing of LT switch-gear.
6. Voltage drop at 400 kV Ghanapur is 1.15% and 3.1 % for without and with failure of the test equipment. Since this is not significant/low and was therefore not provided in the report.
7. PSSE file was already submitted.
It would be convenient to call a joint meeting for any other doubt/clarification regarding this study.
I hope all below comments are addressed as appropriately.

Regards
Manohar Singh

On 07/05/17 02:28 PM, **Pradeep Nirgude** <pmnirgude@cpri.in> wrote:

Dear sir/ Madam

Kindly go through the comments point wise in the trailing email by CTU, Power grid to provide a consolidated reply. Soft Copy(Excel) for Test Currents and Sizing of Series reactor and PSS/E model file may be provided as desired.
Kindly send your point wise comments as early as possible for a consolidated reply.

With best regards

Pradeep Nirgude

-------- Original Message --------
From: **Vms Prakash Yerubandi {वी.एम.एस. प्रकाश येरूबंदी}** <yvmsprakash@powergridindia.com>
Date: Jul 5, 2017 11:21:03 AM
Subject: FW: CPRI _ONLINE_Hyderabad
To: Kanchan Chauhan <kanchanchauhan1608@gmail.com>, "rishika_sh@yahoo.com" <rishika_sh@yahoo.com>, "skrmohapatra@rediffmail.com" <skrmohapatra@rediffmail.com>
Cc: Mukesh Khanna {मुकेश खन्ना} <mkhanna@powergridindia.com>, V. Thiagarajan {वी. त्यागराजन} <vthiagarajan@powergridindia.com>, Venkatesh Gorli {वेंकटेश गोर्लि} <venkateshgorli@powergridindia.com>, S M Fahad {S M Fahad} <smfahad@powergridindia.com>, Ajay Dahiya {अजेय दहिया} <ajay.dahiya@powergridindia.com>, "meera@cpri.in" <meera@cpri.in>, "manoharsingh@cpri.in" <manoharsingh@cpri.in>, "pmnirgude@cpri.in" <pmnirgude@cpri.in>

Sir/Madam,

Draft report submitted by CPRI for Grid impact study due to establishment of 350 MVA short circuit transformer test facility at CPRI, Uppal Hyderabad have been reviewed and comments/Clarifications are given below :

1. How did CPRI arrive at I_{test} Value (Page no. 10) during failure (i.e 2 kA for 35 MVA Transformer) is not clear?

2. Dynamic simulations have not been carried out to assess the impact of short circuit test on stability.

3. Soft Copy(Excel) for Test Currents and Sizing of Series reactor(Annexure-III & IV) may be provided by CPRI.

4. It was mentioned that available short circuit power at secondary of station transformer should be between 2500 – 2800 MVA for 350 MVA short circuit facility(page no.8). How do they arrive at this value? Is it based on some standard? If so, the same may be provided.

5. In block diagram(Page no. 7)), why no reactor is provided in series with LV Test Object? Similarly, why no high current transformer is provided in series with HV Test Object?

6. Voltage dip at 400 kV Ghanpur S/s may also be provided during testing and equipment failure.

7. PSS/E file on which simulations are carried out may also be provided

The matter may be taken up suitably with CPRI.

It may also be mentioned that during 40th Standing Committee Meeting on 19.11.2016, it was agreed convene separate meeting to conduct joint studies by CEA,SRPC,CTU,SRLDC and TSTRANSCO.

Thanks & Regards
V M S Prakash
Dy. Manager
CTU-Planning
POWERGRID
M:09560890042

From: Pardeep Jindal [mailto:jindal_pardeep@yahoo.co.in]
Sent: 17-Apr-2017 13:02
To: Mukesh Khanna {मुकेश खन्ना}; Vms Prakash Yerubandi {वी.एम.एस. प्रकाश येरूबंदी}; V. Thiagarajan {वी. त्यागराजन}
Subject: Fw: CPRI _ONLINE_Hyderabad

----- Forwarded Message -----
From: Pradeep Nirgude <pmnirgude@cpri.in>
To: Pradeep Jindal <jindal_pardeep@yahoo.co.in>
Cc: Shivani CEA <shivani0004@gmail.com>; Sudhakara S <ssreddy@cpri.in>; ?AnupamAwasthi? ?AnupamAwasthi? <awasthi@cpri.in>; DK Grover <grover@cpri.in>; ramesh babu director <rbabu@cpri.in>
Sent: Monday, 17 April 2017 12:48 PM
Subject: CPRI _ONLINE_Hyderabad

Sir

Please find attached the **REVISED** report, based on the modifications suggested by TSTRANSCO after considering the revised network connectivity, on the Grid Impact Study Due To Establishment of 350 MVA Short Circuit Transformer Test Facility at CPRI, Uppal Hyderabad issued by Power System Division, CPRI, Bangalore.

The report is put up for kind perusal.

Now, it is requested to the matter may kindly be perused at the earliest to facilitate the establishment of Online Short Circuit Test Facility at CPRI, Hyderabad.

ANNEXURE-10.1

TAMILNADU TRANSMISSION CORPORATION LTD.
(Subsidiary of TNEB Ltd.)

From

Er.S.Shanmugam, B.E.,
Managaing Director,
TANTRANSCO,
144, Anna Salai,
Chennai -2.

To

The Member (Power System),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi 110 066.

Lr.No.CE/Plg.&R.C/SE/SS/EE1/AEE1/F.Stg. committee/D.471 dt.28.12.16

Dear Sir,

Sub: Revised Connectivity for Korattur and Manali 400/230-110kV substation – Modification requested - Reg.

****

1.0 In the 34th Standing Committee meeting on Power System Planning of Southern Region held on 16th April 2012 at Hyderabad, establishment of Korattur and Manali 400/230-110kV substations were approved with the following associated transmission system.

i. Upgradation of the existing Korattur 230/110kV SS to 400/230-110kV GIS SS with 2x315MVA 400/230kV ICTs & 2x200MVA, 400/110kV ICT.
ii. Upgradation of the existing Manali 230/110kV SS to 400/230-110kV GIS SS with 2x315MVA 400/230kV ICTs & 2x200MVA, 400/110kV ICT.
iii. LILO of one of the NCTPS Stage II - Alamathy 400kV DC line at Korattur 400/230kV SS.
iv. Korattur- Manali 400kV D/C line with HTLS conductor.
v. Thervoikandigai - Korattur 400kV SC line.
vi. Thervoikandigai - Manali 400kV SC line.

2.0. Both the Korattur and Manali 400kV Substations are located in a very congested area and there is no Right of Way available for the erection of 400kV OH line up to Korattur 400kV SS. As per CEA approval, connectivity from Korattur to Thervoikandigai, NCTPS II, Alamathy and Manali DC) are to be made for

establishment of Korattur 400kV SS. However, based on the field condition and route survey, it has been propoesd to modify the 400kV connectivity of Manali and Korattur 400kV substations as below.

i. One of the NCTPS Stage II - Alamathy 400kV DC line will get split and the NCTPS II end will be connected to Manali 400kV SS and Alamathy 400kV SS end will be connected to Korattur 400kV SS.

ii. Korattur – Manali 400kV SC line instead of DC line with HTLS conductor.

The erection works for the establishment of Manali 400/230-110kV substation are nearing completion. Hence, it is requested to give in principle approval for the above modification at the earliest, with pending ratification in the next Standing Committee meeting.

Sd/ XXXX
(R.S.Usha)
Chief Engineer/Planning & R.C
For Managing Director/TANTRANSCO

TAMILNADU TRANSMISSION CORPORATION LTD.
(Subsidiary of TNEB Ltd.)

From

Er.T.Senthilvelan, B.E.,
Director/Transmission Projects,
TANTRANSCO,
144, Anna Salai,
Chennai -2.

To

The Member (Power System),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi 110 066.

Lr.No.CE/Plg.&R.C/SE/SS/EE1/AEE1/F.Stg. committee/D. 18 /17 dt.20.01.17

Dear Sir,

Sub: Revised Connectivity for commissioning of Manali 400/230-110kV substation – Modification requested from CEA as an interim arrangement - Reg.

Ref: Lr.No.CE/Plg.&R.C/SE/SS/EE1/AEE1/F.Stg. committee/D.471/17 dt.28.12.16

****

In the letter under reference cited above, it has been requested to accord in principle approval for the modification of the connectivity for Korattur and Manali 400/230-110kV substations.

2.0 In this connection the following are stated

i. The Manali 400 kV Substation is expected to be commissioned within a short period.

ii. The work for establishment of Korattur 400 kV SS, is yet to be awarded. Also, the Thervoikandigai – Korattur and Thervoikandigai – Manali 400kV line erection works are getting delayed due to slow progress and Right of Way issues.

iii. Hence, it has been proposed to modify the connectivity for Manali 400/230-110kV substation as follows as an interim arrangement.

a) To make LILO of one circuit of 400 kV NCTPS – Alamathy (DC) line at the Manali 400 kV SS.

b) With the establishment of Korattur 400 kV SS, the Alamathy – Manali 400kV line shall be modified as Alamathy – Korattur feeder and this will be made as the permanent connectivity for Korattur and Manali 400kV substations.

3.0 The modified single line drawing and the route map is enclosed.

4.0 The above Modification shall be taken up for discussion in the meeting to be held on 23.01.2017 to finalise the ATS of Uppur -2X800MW Thermal Power Project. In principle approval may be accorded for commissioning of Manali 400 kV SS as an interim measure with pending ratification in the next Standing Committee meeting.

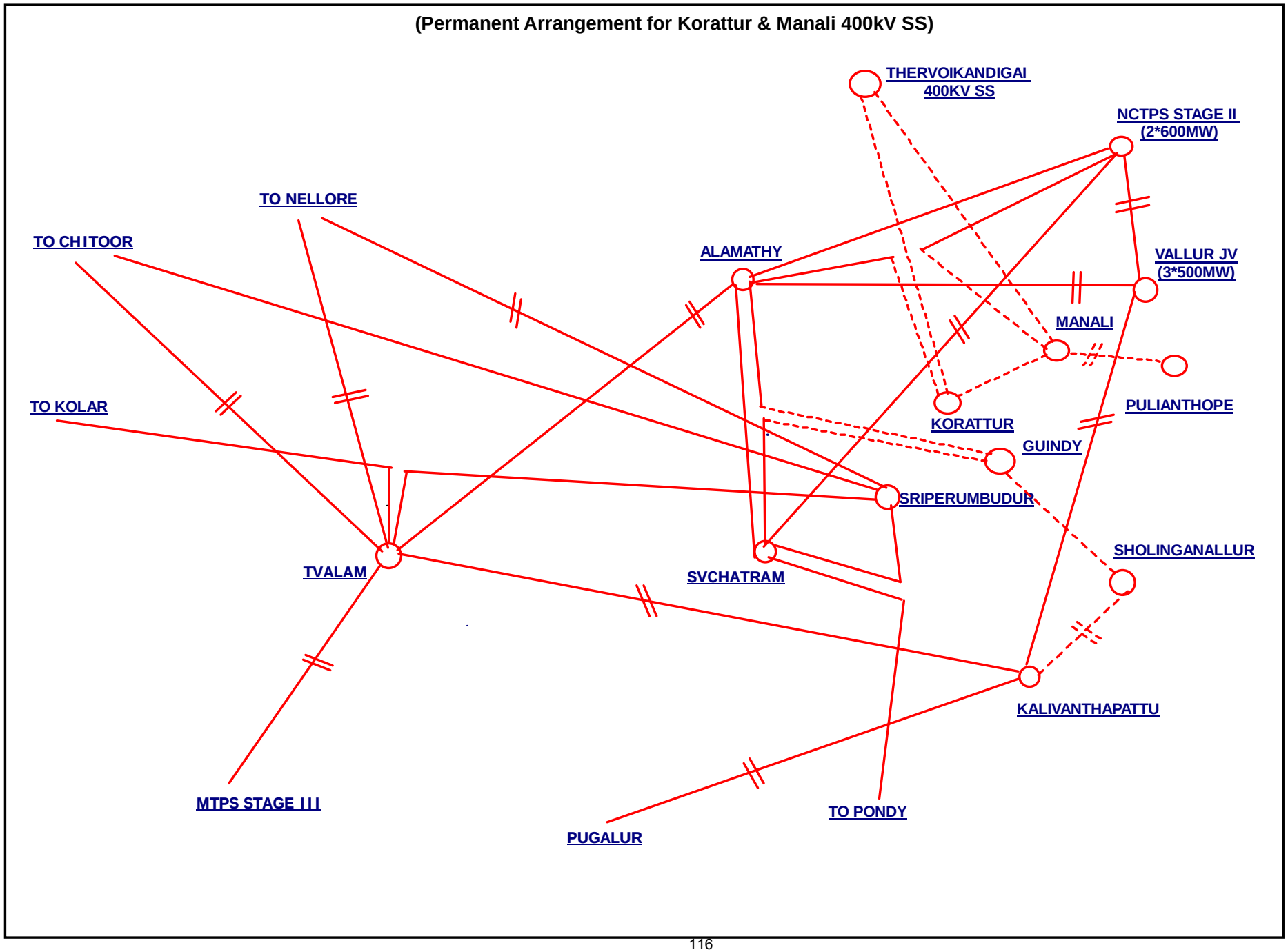
23/01/2017

(R.S.Usha)
Chief Engineer/Planning & R.C
For Director/Transmission Projects

Copy to Executive Director, SRLDC, 29, Race Course Cross Road, Bangalore 560 009

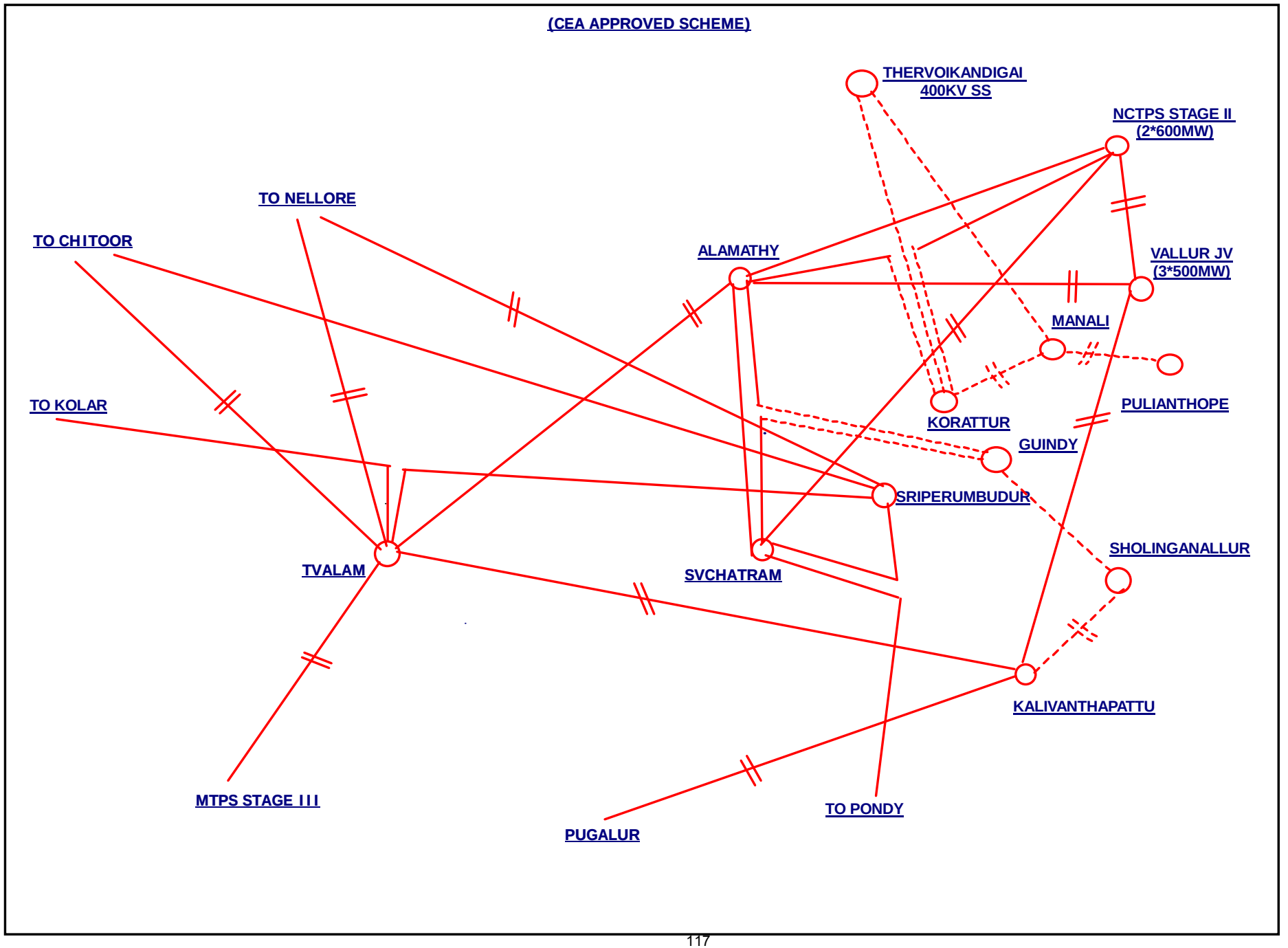
CHENNAI 400KV NETWORK

(Permanent Arrangement for Korattur & Manali 400kV SS)

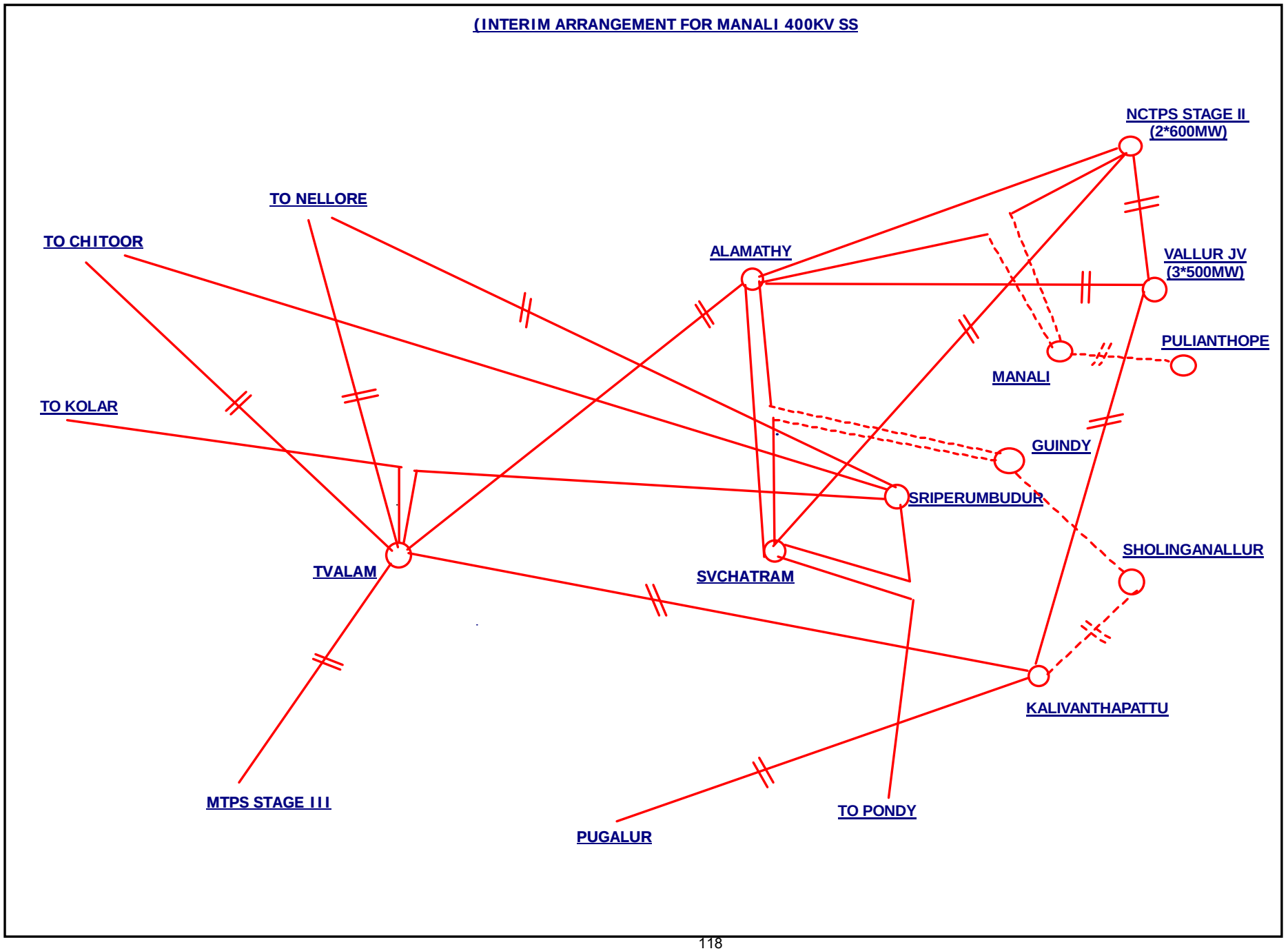


CHENNAI 400KV NETWORK

(CEA APPROVED SCHEME)



CHENNAI 400KV NETWORK



भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केंद्रीय विद्युत प्राधिकरण
Central Electricity Authority
विद्युत प्रणाली योजना एवं परियोजना मूल्यांकन प्रभाग-2 [ISO: 9001:2008]
Power System Planning & Appraisal Division-II
सेवा भवन, रा. कृ. पुरम , नयी दिल्ली -110066
Sewa Bhawan, R. K. Puram, New Delhi-110066

No. 56/1/2017/CEA/ /PSPA-II/ 503 - 504 Dated: 06/07/2017

To
The Director/Transmission Projects,
TANTRANSCO,
144, Anna Salai,
Chennai-2

Subject: Revised connectivity for Korattur and Manali 400/230-110kV substation-modification request-Reg

Reference: TANTRANSCO letter No.CE/Plg.&R.C/SE/SS/EE1/AEE1/F.Stg.committee/D.471/17 dated 28.12.17
TANTRANSCO letter No.CE/Plg.&R.C/SE/SS/EE1/AEE1/F.Stg.committee/D.18/17 dated 20.01.17

Sir,

This has reference to the letters on the above cited subject requesting for in principle approval for revised connectivity for Korattur and Manali 400-230/100kV S/S.

1. The system study carried out by TANTRANSCO and submitted to CEA, incorporating the interim arrangement, has been examined and it is observed that loading on transmission lines are within acceptable limits.
2. Considering the delay in upgradation of Korattur 230kV S/S to 400kV and construction of Thervoikandigai-Korattur and Thervoikandigai –Manali 400kV line, in-principle approval is conveyed for the revised proposal -LILO of one circuit of 400kV NCTPS stage II-Alamathy (DC) line at the Manali 400kV S/S as an interim arrangement

3. The ultimate transmission scheme shall be as follows:

   i) Upgradation of the existing Korattur 230/110kV S/S to 400/230-110kV GIS S/S with 2x315MVA 400/230kV ICTs & 2x200MVA,400/110kV ICT.
   ii) Upgradation of the existing Manali 230/110kV S/S to 400/230-110kV GIS S/S with 2x315 MVA 400/230kV ICTS & 2x200MVA,400/110kV ICT.
   iii) 400kV Alamathy –Korattur S/c line & 400kV NCTPS stage II –Manali S/C line by modifying one of NCTPS Stage II –Alamathy 400kV D/C line
   iv) Korattur –Manali 400kV S/C line with HTLS conductor.
   v) 400kV Thervoikandigai-Korattur S/C line
   vi) 400kV Thervoikandigai –Manali S/C line

   The above transmission scheme was approved in 34th Standing Committee meeting on Power System Planning of Southern Region, except item (iii) which was LILO of one of the NCTPS stage II-Alamathy 400kV DC line at Korattur 400kV/230 S/S. (iv) Korattur –Manali 400kV D/C line with HTLS conductor.

4. It is advised to construct all proposed S/C lines on D/C towers for optimum utilization of the available corridors for future use.

5. The above scheme/modification in the scheme however, would be formalized in next meeting of Standing Committee on Power System Planning of Southern Region.

Yours faithfully,

6/7/2017

(एस.के.रॉय मोहापात्रा /S.K.Roy Mohapatra)
(मुख्य अभियंता वि.प्र.यो.मू-२/Chief Engineer (PSPA-II),

Copy to : COO (CTU-Plg), Power Grid Corp. of India Ltd. "Saudamini", Plot No.2, Sector-29, Gurgaon 122 001, Haryana.

ANNEXURE-11

TAMILNADU TRANSMISSION CORPORATION LTD.
(Subsidiary of TNEB Ltd.)

From

Er.T.Senthilvelan, B.E.,
Director/Transmission Projects,
TANTRANSCO,
144, Anna Salai,
Chennai -2.

To

The Member (Power System),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi 110 066.

Lr.No.CE/Plg.&R.C/SE/SS/EE1/AEE1/F.Stg. committee/D. 12 /17 dt. 12.01.17

Dear Sir,

Sub: Myvady (Udumalpet) 400kV substation. TANTRANSCO 400kV Bus – Modification requested - Reg.

****

1.0 In the 34th Standing Committee meeting on Power System Planning of Southern Region held on 16th April 2012 at Hyderabad, the following associated transmission systems were approved for power evacuation from the wind power projects to be implemented by TNEB/TANTRANSCO:

Transmission system for evacuation of wind power

a) Thappagundu 400/110 KV SS in Theni area
b) Anaikadavu 400/230-110 KV SS in Udumalpet area
c) Rasipalayam 400/230-110 SS in Udumalpet area
d) Anaikadavu- Rasipalayam 400kV DC line.
e) Thappagundu- Anaikadavu 400kV DC line with LILO of one of the DC line at Udumalpet 400/230 kV (PGCIL) substation.

2.0 In this connection, the following are stated,

i. Erection works of above substations and its associated lines are nearing completion.

ii. Further, the bay extension work at Udumalpet PGCIL 400/230kV substation for making LILO of one circuit of the Thappagundu-

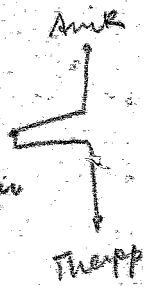
Anaikadavu 400kV DC line has also been taken up by PGCIL, based on the agreement signed between TANTRANSCO and PGCIL.

iii. The amount for execution of the above bays has already been paid by TANTRANSCO to PGCIL on DCW basis.

iv. Due to non availability of land at PGCIL side, TANTRANSCO has consented to give land to PGCIL to erect the above two numbers 400kV bays at Udumalpet (Myvady).

v. It is to be stated that in Udumalpet (Myvady) 400/230kV SS, the 400kV bus with 3x315MVA ICTs are owned by PGCIL and the 230kV bus and its associated 230kV feeders are owned by TANTRANSCO.

vi. It is suggested that in Udumalpet 400kV SS, the extended 400kV bus with the above Thappagundu and Anikadavu 400kV feeders may be kept under the control of TANTRANSCO and PGCIL may be requested to hand over the above bays after completion of the works.



vii. Further, depending on the load growth, in the event of providing 4th 400/230kV ICT or any other 400kV connectivity from Udumalpet 400kV SS, it may be evolved from TANTRANSCO 400kV bus in future.

It is requested that the above modification may be approved in the next Standing Committee meeting.

12/01/2017

(R.S.Usha) (2/2)
Chief Engineer / Planning & R.C
For Director/ Transmission Projects

ANNEXURE-12.1

TAMILNADU GENERATION AND DISTRIBUTION CORPORATION
(Subsidiary of TNEB Ltd.)

From

Er.T.Senthilvelan, B.E.,
Director/Transmission Projects,
TANTRANSCO,
144, Anna Salai,
Chennai -2.

To

The Member (Power System),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi 110 066.

Lr.No.CE/Plg.&R.C/SE/SS/EE1/AEE1/F.Stg.committee/D. 165 dt.22.05.17

Dear Sir,

Sub: Establishment of Konthagai 400/230KV substation at Madurai region – Communication of Load Flow Study results to CEA – reg.

Ref: Lr.No.CE/Plg.&R.C/SE/SS/EE1/AEE1/F.Stg.committee/D.150dt.05.05.17

******

1.0. In the letter under reference cited above, approval has been requested for the establishment of Konthagai 400/230kV substation in Madurai region.

2.0. In this connection, the following are stated,

i. Land has been identified in Sivaganga district i.e., in eastern part of Madurai city for the establishment of Konthagai 400/230kV substation.

ii. The existing Kayathar – Karaikudi 400kV DC line is crossing nearby the above land. Hence, it is proposed to make LILO of one of the above 400kV DC line by erection of 400kV DC line on DC tower for a distance of 25kMs. The proposed Virudhunagar 765/400kV substation will be at a distance of about 50-60kM from Konthagai 400kV substation location. Hence, it is proposed to give connectivity as a third source from the proposed Virudhunagar substation to Konthagai 400kV substation, thereby part of power from Uppur Thermal power Station will be dispersed in Madurai region during nil wind and nil solar period.

3.0. Load Flow study has been conducted for the 2019-2020 year network condition for the establishment of Konthagai 400/230kV substation. Various options

have been explored and the following connectivity has been proposed based on the field feasibility and techno economical analysis.

Establishment of Konthagai 400kV substation with 3x315 MVA, 400/230 KV ICT & 2X80MVAr, 420kV Bus Reactor and following 400kV and 230kV connectivity.

400 KV CONNECTIVITY:

1. LILO of one of the Kayathar – Karaikudi 400kV DC Quad line.
2. 400 KV DC Link line from the proposed Virudhunagar 765/400 KV SS.

230 KV CONNECTIVITY

1. LILO of Pasumalai-Anupankulam 230kV line
2. LILO of Samayanallur- Alagarkoil 230kV line
3. 230 KV SC link line to the sanctioned K.Pudur 230kV SS.
4. 230 KV SC link line to the proposed Thummakundu 230/110kV SS.

Load flow study has been conducted for various options i.e., Full wind, Nil wind, Full solar and Nil solar condition. The study results are enclosed as Annexure 1 - 4.

4.0 Hence, it is requested to take up the above proposal in the next Standing committee meeting as an agenda and approve the scheme.

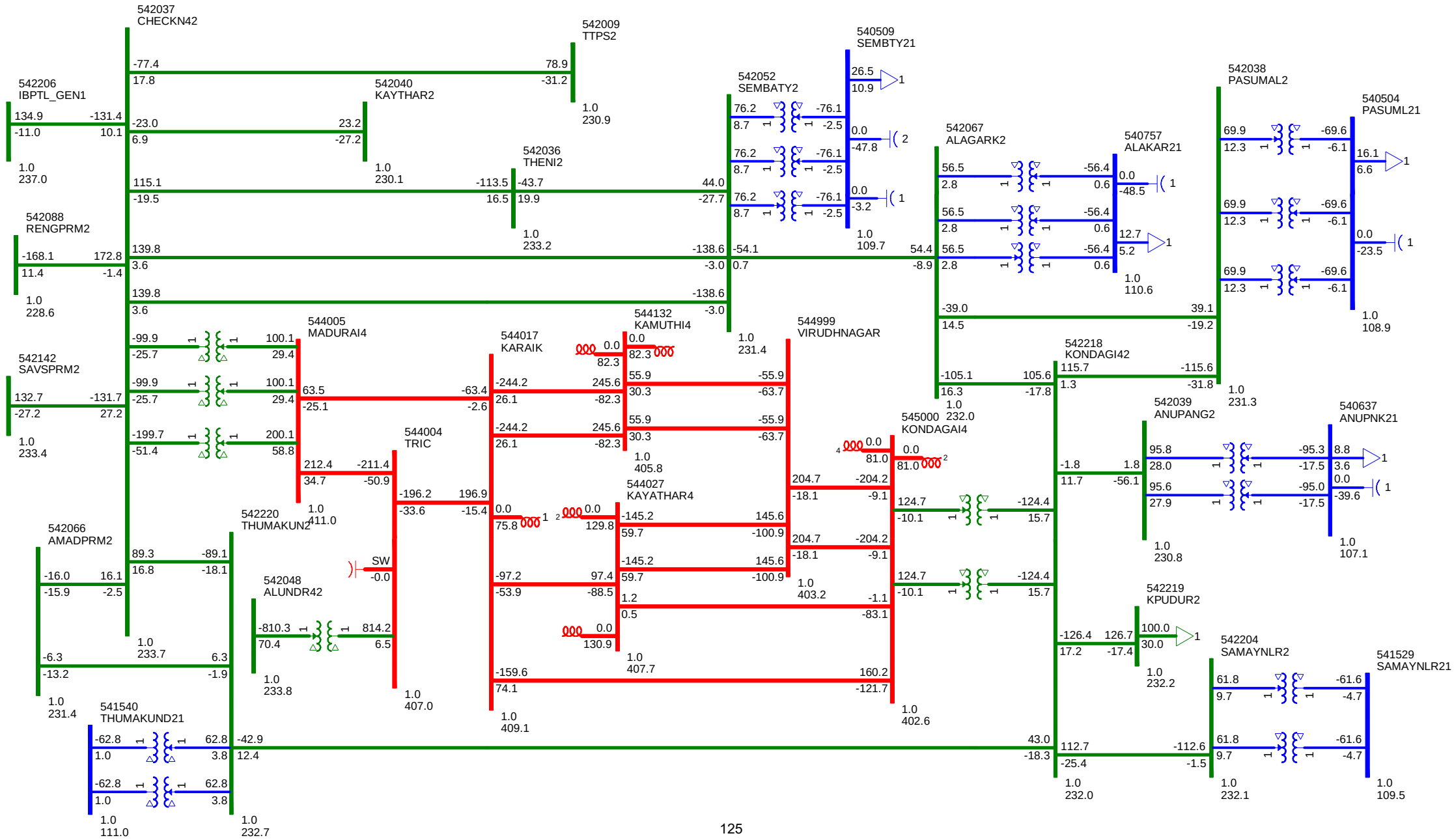
For taking further action please.

Encl: As above

Sd/- XXXX
(D.Ravichandran)
Superintending Engineer / System Studies
For Director/Transmission Projects

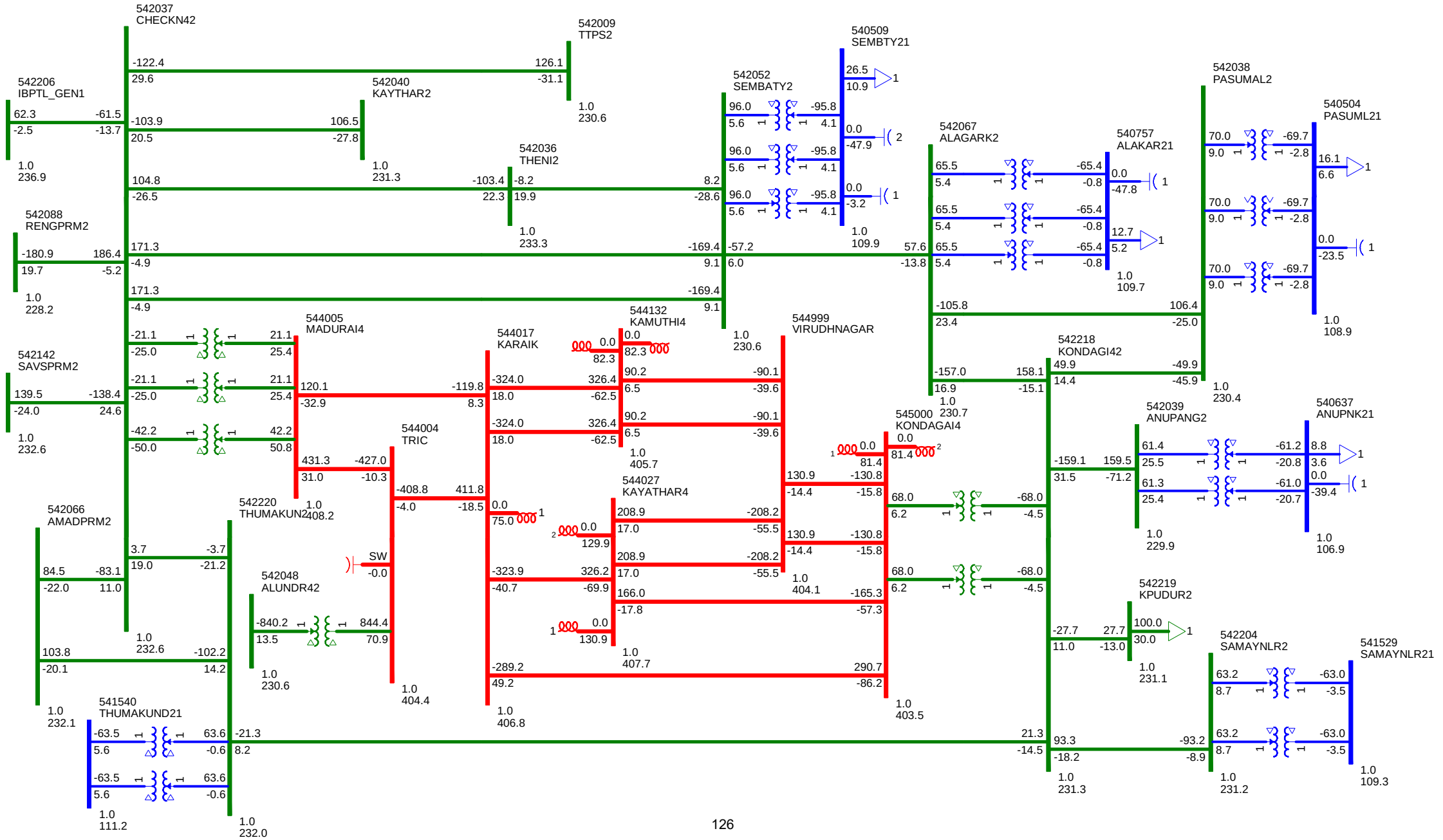
LOAD FLOW STUDY FOR ESTABLISHMENT OF KONDAGAI 400/230KV SUBSTATION

NIL WIND & NIL HYDRO CONDITION



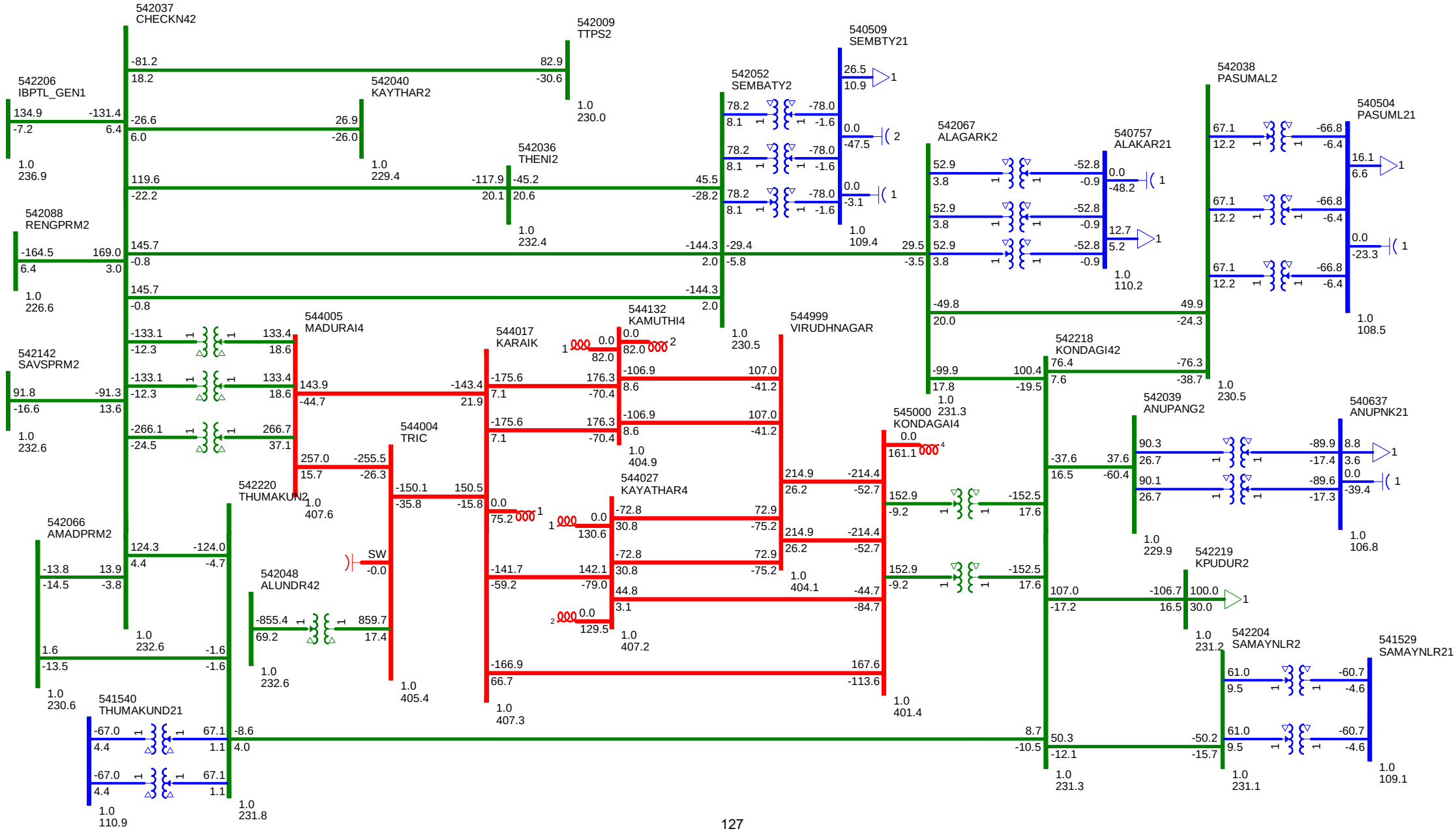
LOAD FLOW STUDY FOR ESTABLISHMENT OF KONDAGAI 400/230KV SUBSTATION

FULL WIND & FULL HYDRO CONDITION



LOAD FLOW STUDY FOR ESTABLISHMENT OF KONDAGAI 400/230KV SUBSTATION

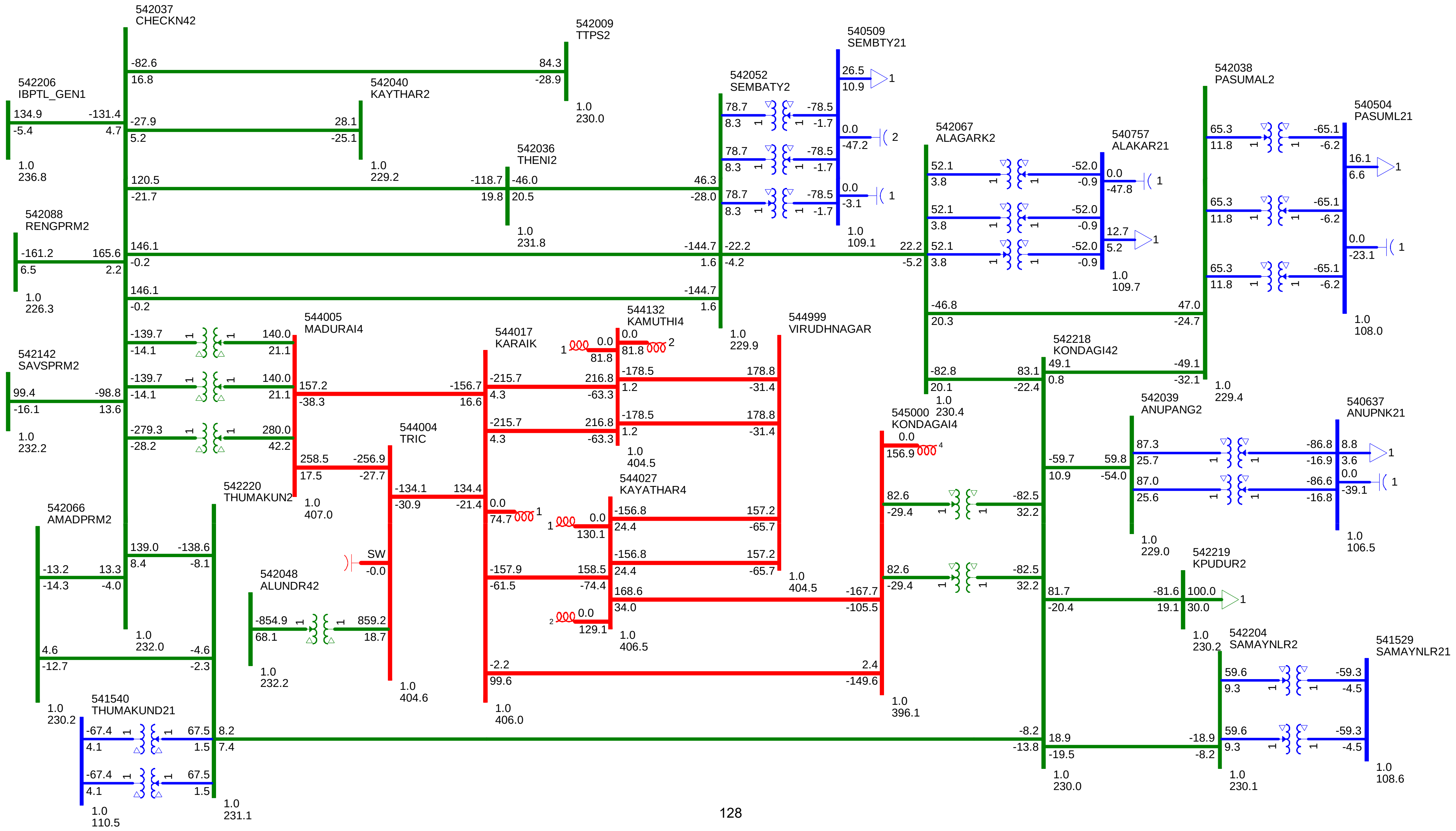
NIL SOLAR & NIL WIND CONDITION



LOAD FLOW STUDY FOR ESTABLISHMENT OF KONDAGAI 400/230KV SUBSTATION

NIL SOLAR & NIL WIND CONDITION

WITHOUT VIRUDHUNAGAR 400 KV (DC) LINE



Ref 5

ANNEXURE-14.1

TAMILNADU GENERATION AND DISTRIBUTION CORPORATION.

(Subsidiary of TNEB Ltd.)

From

Er.T.Senthilvelan, B.E.,
Director/Transmission Projects,
TANTRANSCO,
144, Anna Salai,
Chennai -2.

To

The Member (Power System),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi 110 066.

Lr.No.CE/Plg.&R.C/SE/SS/EE1/AEE1/F.Stg. committee/D. 198 dt. 20 .06.17

Dear Sir,

Sub: Establishment of 500MW Kadaladi Ultra Mega Solar PV Power Project in Narippaiyur of Kadaladi Taluk in Ramnad district under state sector – Power Evacuation Scheme - Approval requested - Reg.

****

1.0. In principle approval for the establishment of 500MW "Kadaladi Ultra Mega Solar Power Project" at Narippaiyur of Kadaladi Taluk in Ramanathapuram District under State sector has been accorded by the TANGEDCO Board. It is expected to be commissioned by May 2019.

2.0. In this connection, the following are stated,

i. Total installed capacity of solar power plants in Tamil Nadu so far is 1698MW.In Ramnad and Virudhunagar districts, the following private solar power projects are commissioned/under execution, apart from the Solar power projects of smaller capacity throughout the state.

a. Trichuli	-	500MW (150MW commissioned)
b. Kamuthi	-	648MW - commissioned
Total injection in Kamuthi	-	**1148MW**

ii. For the power evacuation of the above solar projects, Kamuthi 400/230-110kV substation has been already commissioned.

iii. For the evacuation of 500MW Solar power injection at Kadaladi, 400kV DC connectivity (approximately 40kM distance) has been proposed from Kadaladi 400kV switchyard to Kamuthi 400kV substation

iv. From Kamuthi 400/230-110kV TANTRANSCO substation, 400kV DC line is proposed to the ongoing Thappagundu TANTRANSCO 400kV substation as system strengthening. Further, it is proposed to strengthen the 230kV network from Karaikudi to Trichy region.

v. With the establishment of already proposed Virudhunagar 765/400kV SS, the Kamuthi – Thappagundu 400kV DC line will be LILOed at Virudhunagar substation, thereby the original connectivity of Virudhunagar SS will be established i.e., 400kV DC line to Kamuthi and 400kV DC line to Thappagundu 400kV SS.

3.0 Based on the above, Load Flow study has been conducted for the following cases and options for the power evacuation of Kadaladi 500MW Ultra Mega Solar Power Project for the network condition of the year 2019-2020.

Base Case : Without Kadaladi 500MW Ultra Mega Solar PV Power Project

Case 1 : Base case with Kadaladi 500MW solar project with Kadaladi – Kamuthi – Thappagundu 400kV DC line

Option 1 : Full wind Full solar condition

Option 2 : Nil wind Full solar condition

4.0. It is requested to take up the power evacuation scheme for the Kadaladi - 500MW Ultra Mega Solar PV Power Project in the next Standing committee meeting as an agenda point for approval. The study results are enclosed.

For taking further action please.

20/06/2017

(R.S.Usha)
Chief Engineer / Planning & RC
For Director/Transmission Projects
TANTRANSCO

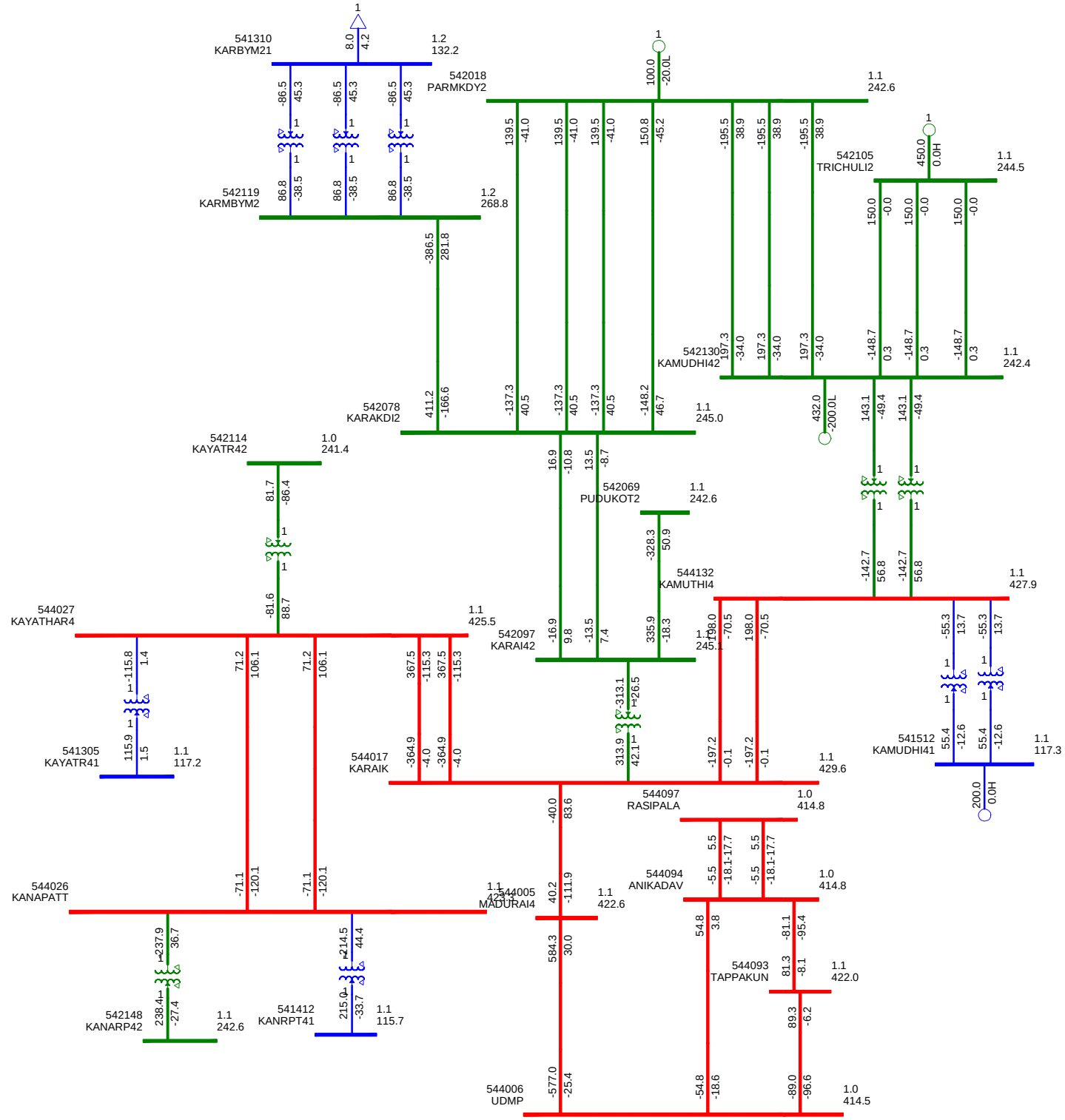
Encl: As above

Copy to CE/Projects –I, Chennai -02.

LOAD FLOW STUDY FOR KADALADI - 1 X 500 MW ULTRA MEGA SOLAR PV POWER PROJECT

BASE CASE : WITH OUT KADALADI 500MW SOLAR PROJECT

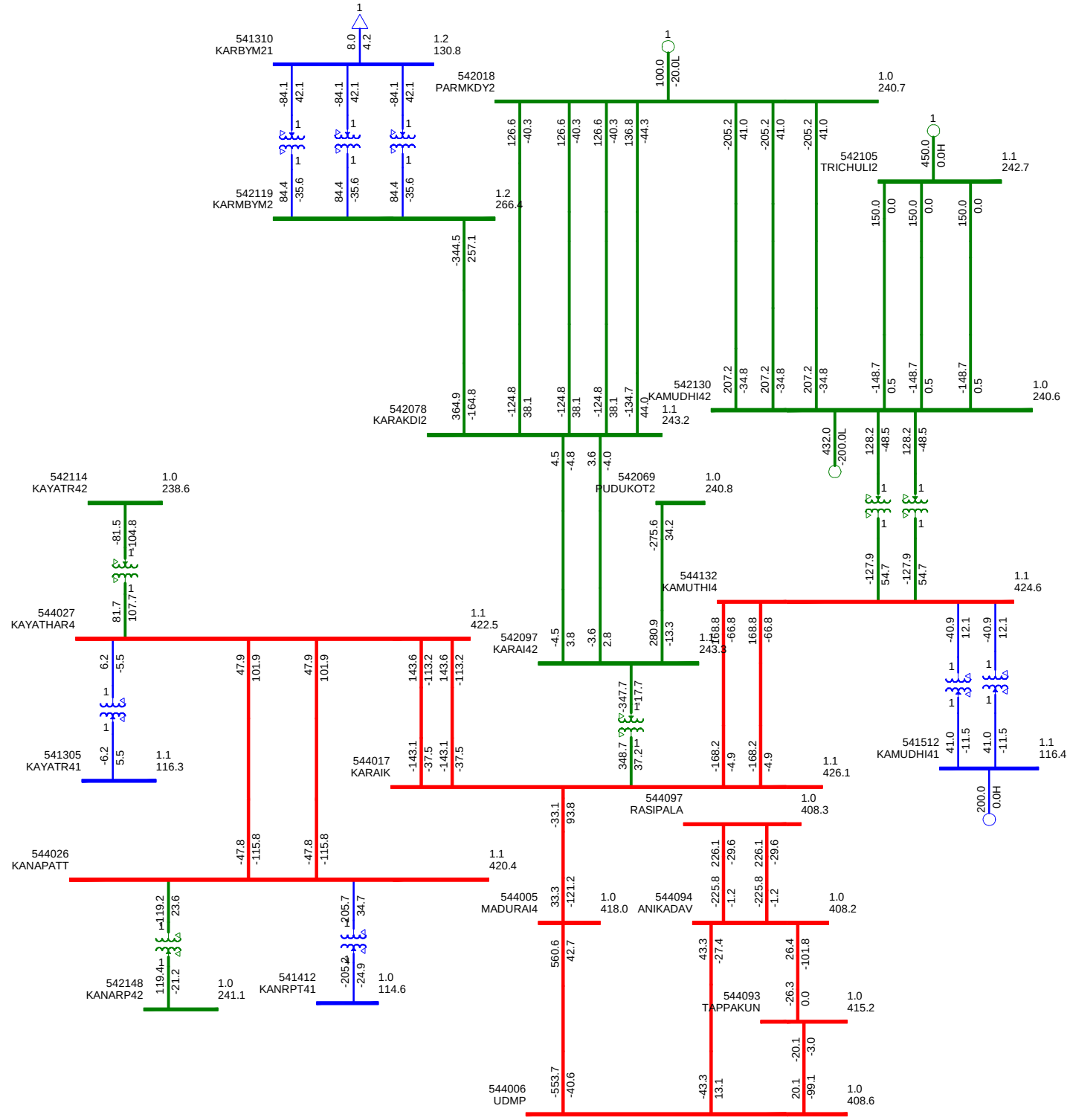
FULL WIND & FULL SOLAR



LOAD FLOW STUDY FOR KADALADI - 1 X 500 MW ULTRA MEGA SOLAR PV POWER PROJECT

BASE CASE : WITH OUT KADALADI 500MW SOLAR PROJECT

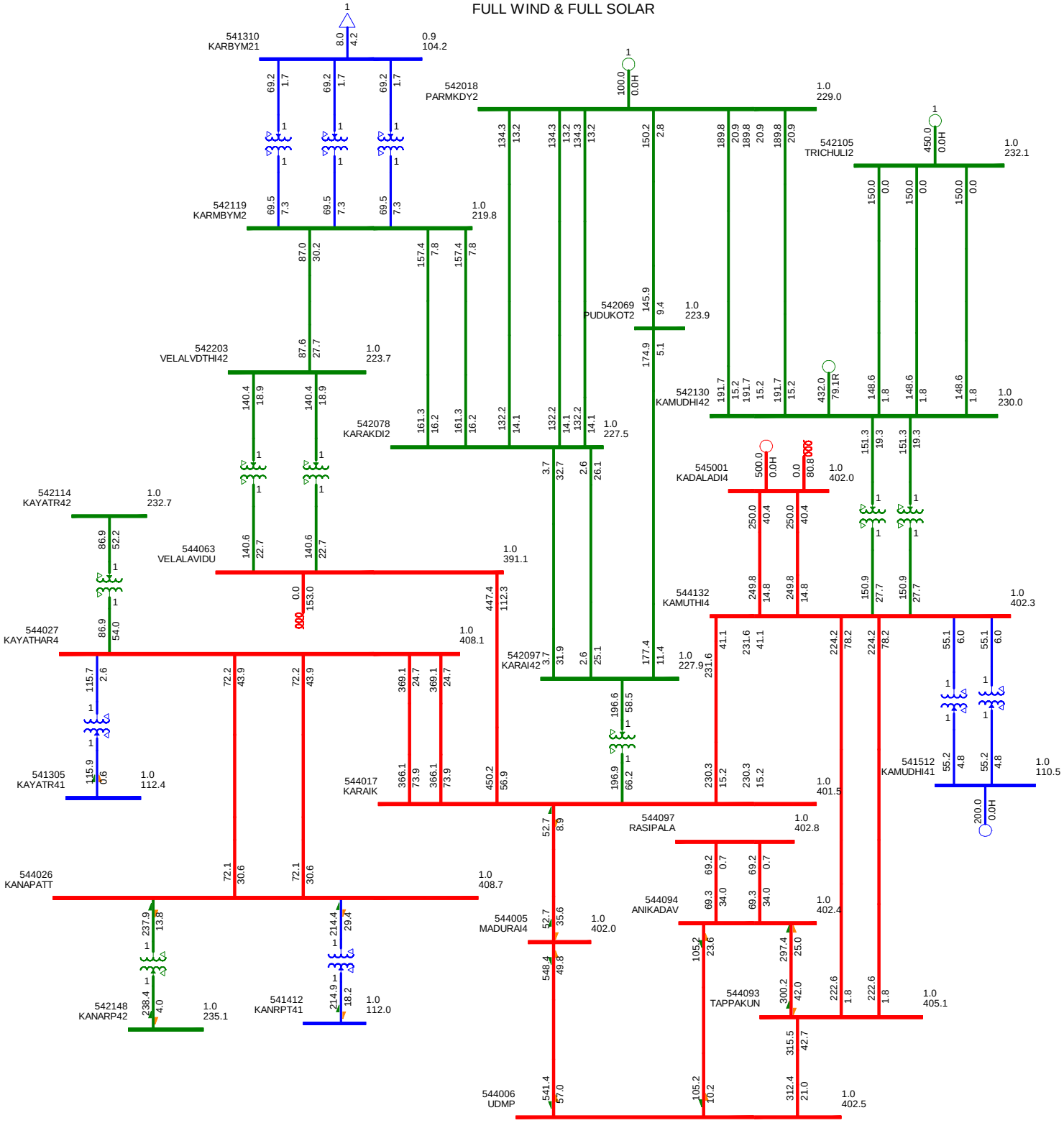
NIL WIND & FULL SOLAR



LOAD FLOW STUDY FOR KADALADI - 1 X 500 MW ULTRA MEGA SOLAR PV POWER PROJECT

CASE 1 : BASE CASE + KADALADI 500MW SOLAR + KADALADI - KAMUTHI - THAPPAGUNDU 400KV DC LINE

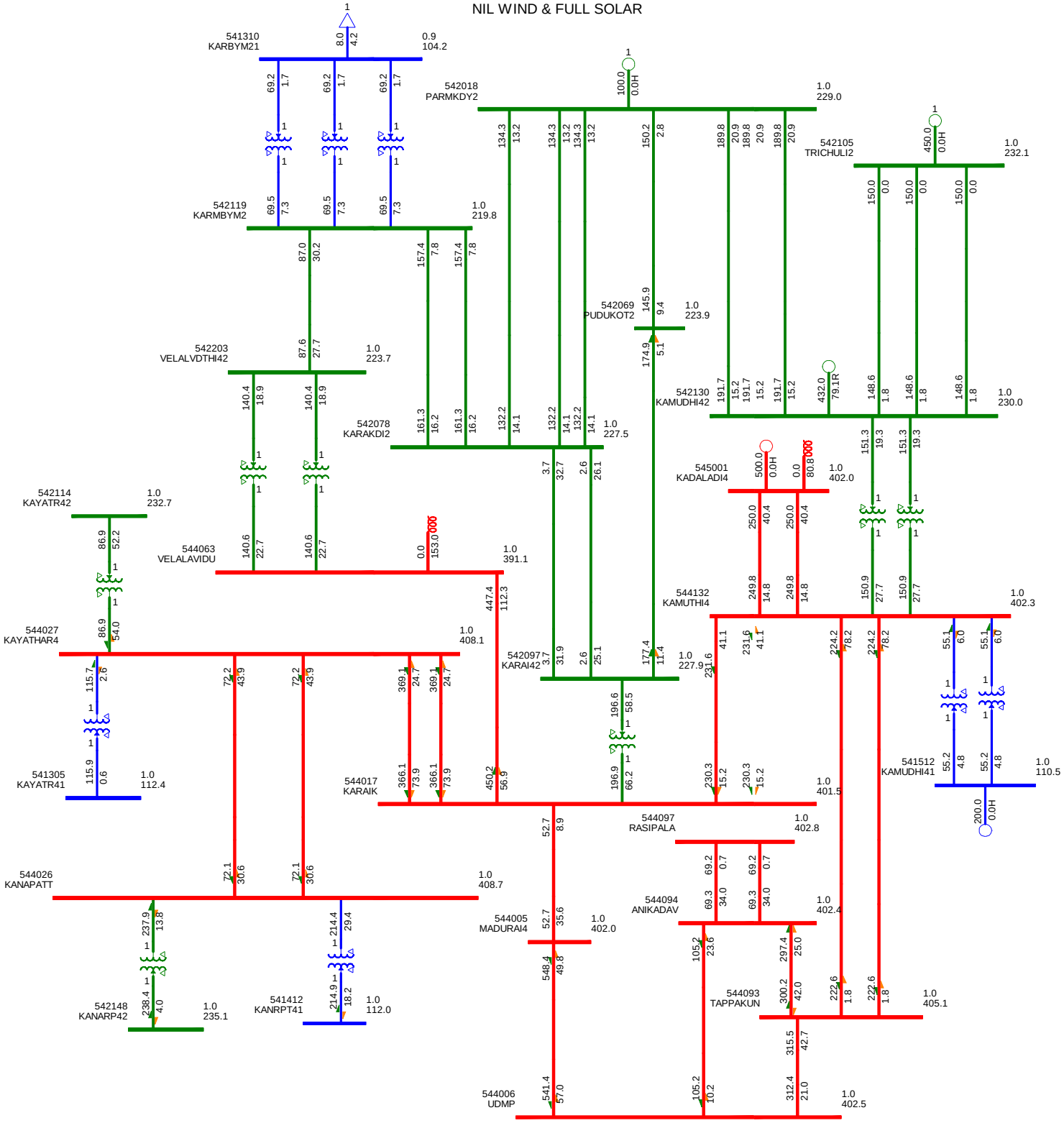
FULL WIND & FULL SOLAR



LOAD FLOW STUDY FOR KADALADI - 1 X 500 MW ULTRA MEGA SOLAR PV POWER PROJECT

CASE 1 : BASE CASE + KADALADI 500MW SOLAR + KADALADI - KAMUTHI - THAPPAGUNDU 400KV DC LINE

NIL WIND & FULL SOLAR



TANTRANSCO
(Subsidiary of TNEB Ltd.)

From

T.Senthilvelan, B.E.,
Director/Transmission Projects,
TANTRANSCO,
144, Anna Salai,
Chennai -2.

To

The Member (Power System),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi 110 066.

Lr.No.CE/Plg&R.C/SE/SS/EE1/AEE1/F.Stg. Committee/D.237/2017 dt.01.08.17

Dear Sir,

Sub: TANGEDCO – Power evacuation scheme for the proposed Kundah PSHEP – 4X125MW & Sillahalla Pumped Storage HEP – 2000MW project in Coimbatore Region – Approval requested for ATS - Reg.

*****

1.0. In Nilgiri District of Coimbatore region, execution works have been started for the establishment of Kundah Pumped Storage Hydro Electric Project (KPSHEP) of 4X125MW capacity. The project is programmed to be commissioned by the year 2020-2021.

1.1. In addition to the above, Sillahalla Pumped Storage Hydro Electric Project (4x500MW) was proposed in Nilgiris District. As suggested by CEA, it has been proposed to execute the Sillahalla project in two stages with 4X250MW in each stage. Execution of the stage –I of the project is in the preliminary stage.

1.2. The power evacuation lines of the above projects are to be erected in reserve forest area. It is difficult to get a new corridor in forest area. Hence, it is decided to evolve a comprehensive proposal taking in to consideration the above two projects, even though the time period for the commissioning of the two projects are different.

2.0. The following proposal has been evolved for power evacuation of Kundah Pumped Storage Hydro Electric Project (KPSHEP) – 4X125MW taking in to account the subsequent addition of Sillahalla Pumped Storage HEP Stage I – 4X250MW.

1. With commissioning of KPSHEP – 4X125MW:

Establishment of 400/230kV substation with 3X315MVA or 2X500MVA ICTs at Parali (near existing Kundah PH III) with the following 400kV and 230kV connectivity.

400kV connectivity:

It has been proposed to erect 400kV DC line with HTLS conductor from Parali 400/230kV SS to Karamadai 400kV substation. The 400kV DC line will be erected utilising the existing Kundah PH III – Karamadai 230kV SC line on SC tower by converting it in to 400kV line as follows.

i. 400kV DC line on DC tower from Parali 400/230kV SS up to location 57 (Hilly terrain area) &

ii. 400kV DC line on MC tower (to accommodate 400kV DC line for Sillahalla project also in future) from location 57 to Karamadai 400/230kV SS (Plains area).

230kV connectivity:

i. From KPSHEP – 4X125MW, 3 numbers of 230kV lines to Parali 400/230kV SS in multi circuit tower in addition to the existing Kundah PH II to Kundah PH III 230kV SC line utilising that 230kV corridor.

ii. From existing Kundah PH III - 3X60MW switchyard, 230kV DC line to Parali 400/230kV SS.

3.0. With commissioning of Sillahalla Pumped Storage - Stage I HEP – 4X250MW:

i. 400kV DC line on DC tower from Sillahalla PSHEP Stage I to Parali 400/230kV SS.

ii. 400kV DC line on DC tower from Parali 400/230kV SS to Karamadai 400/230 kV SS shall be erected by utilising Kundah PH II – Arasur 230kV SC corridor in hilly terrain.

iii. 400kV DC line using the Multi circuit tow er in plains from location 57 to Karamadai 400kV substation to be commissioned matching with commissioning of Sillahalla PSHEP Stage I – (4X250MW).

3.1. During the materialisation of the Sillahalla HEP Stage II (4X250MW), Load flow study will be conducted for further system strengthening at Karamadai 400/230kV substation, if required.

4.0 It is requested that the above scheme may be taken up as an agenda point in the forthcoming meeting of the Standing Committee on Power System Planning for Southern Region for approval. The study results are enclosed.

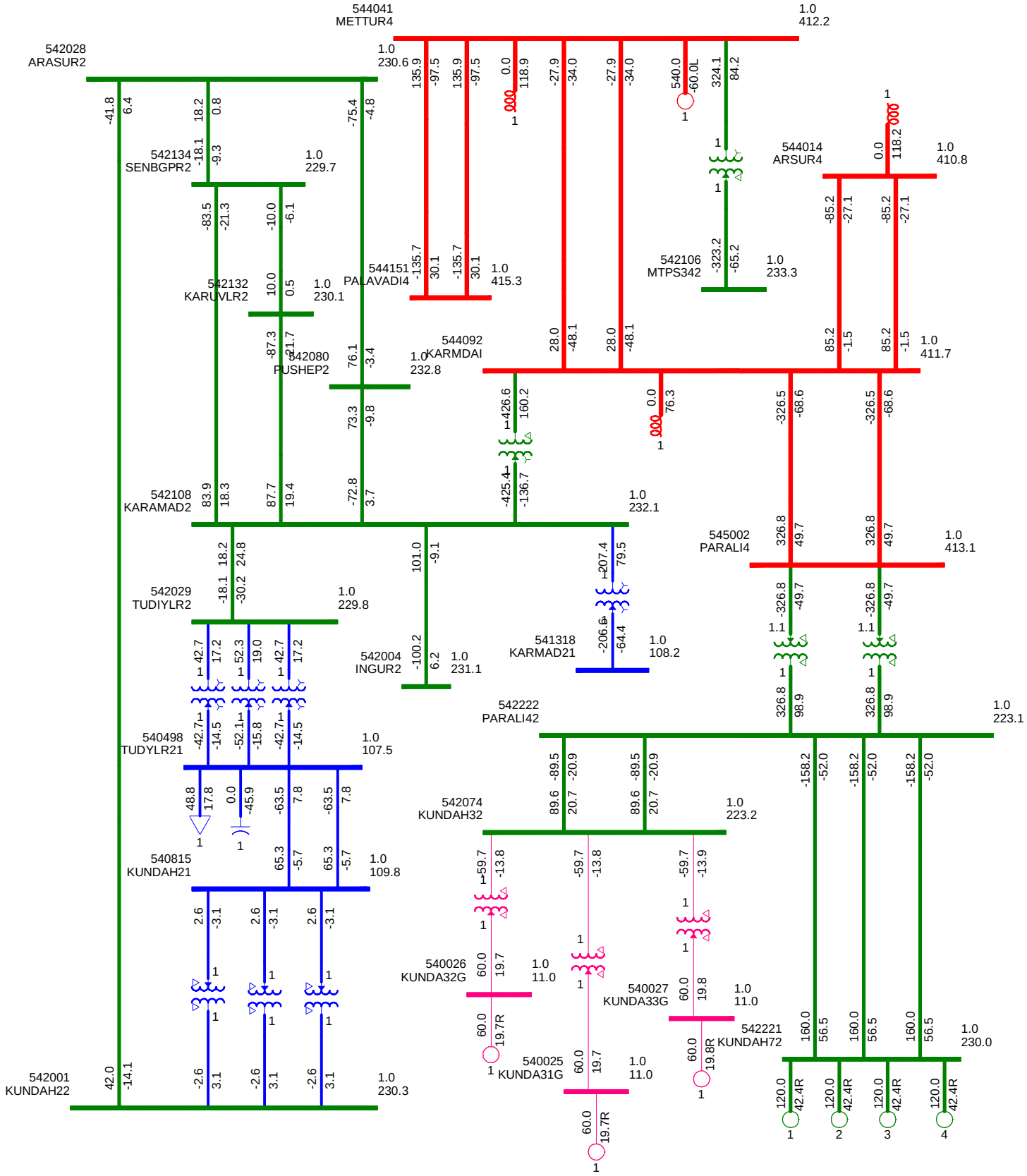
01/8/2017

Chief Engineer/Planning & R.C
For Director/Transmission Projects

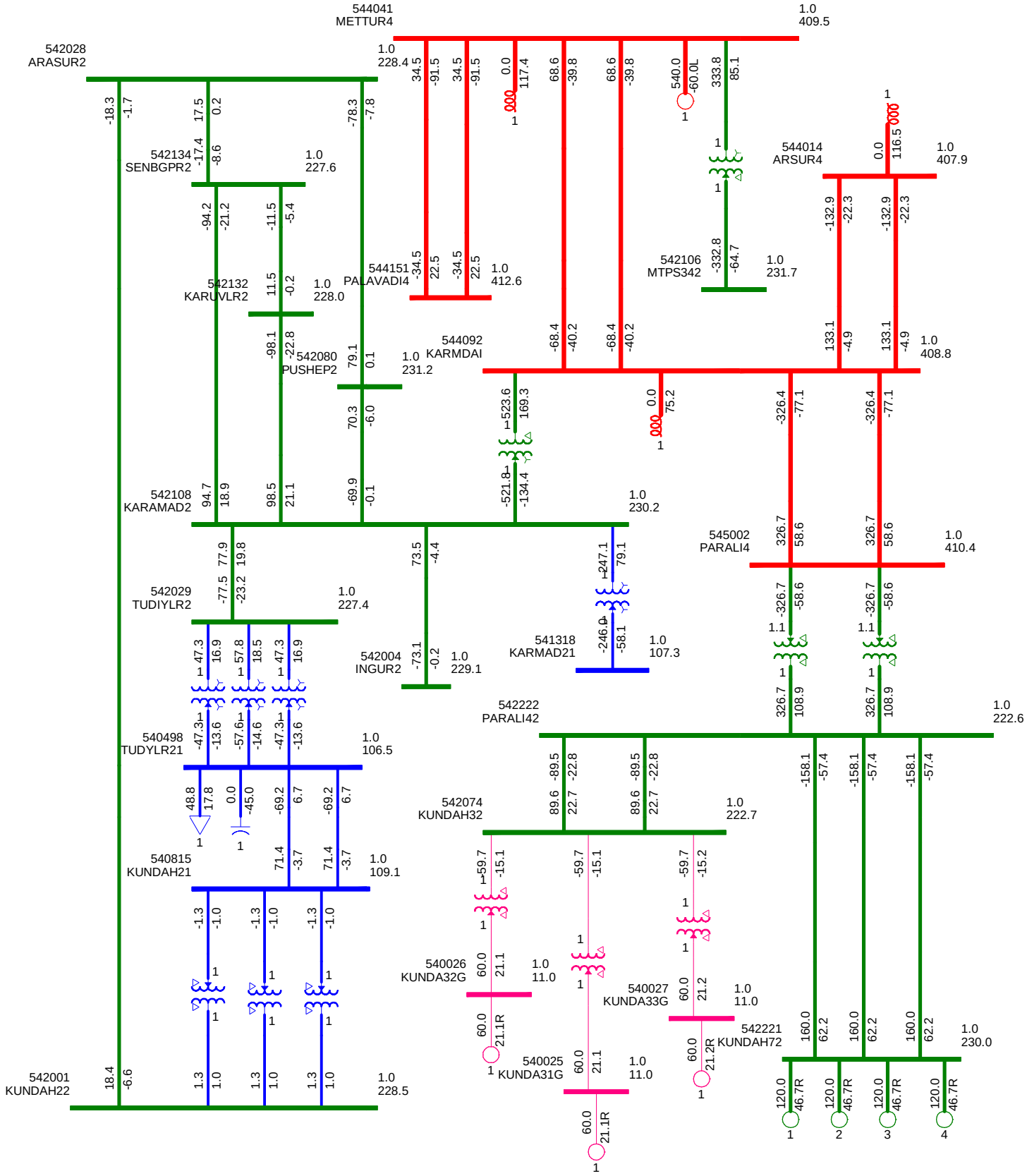
Encl: As above

BY COURIER
DESPATCHED ON
DATE 02.08.2017

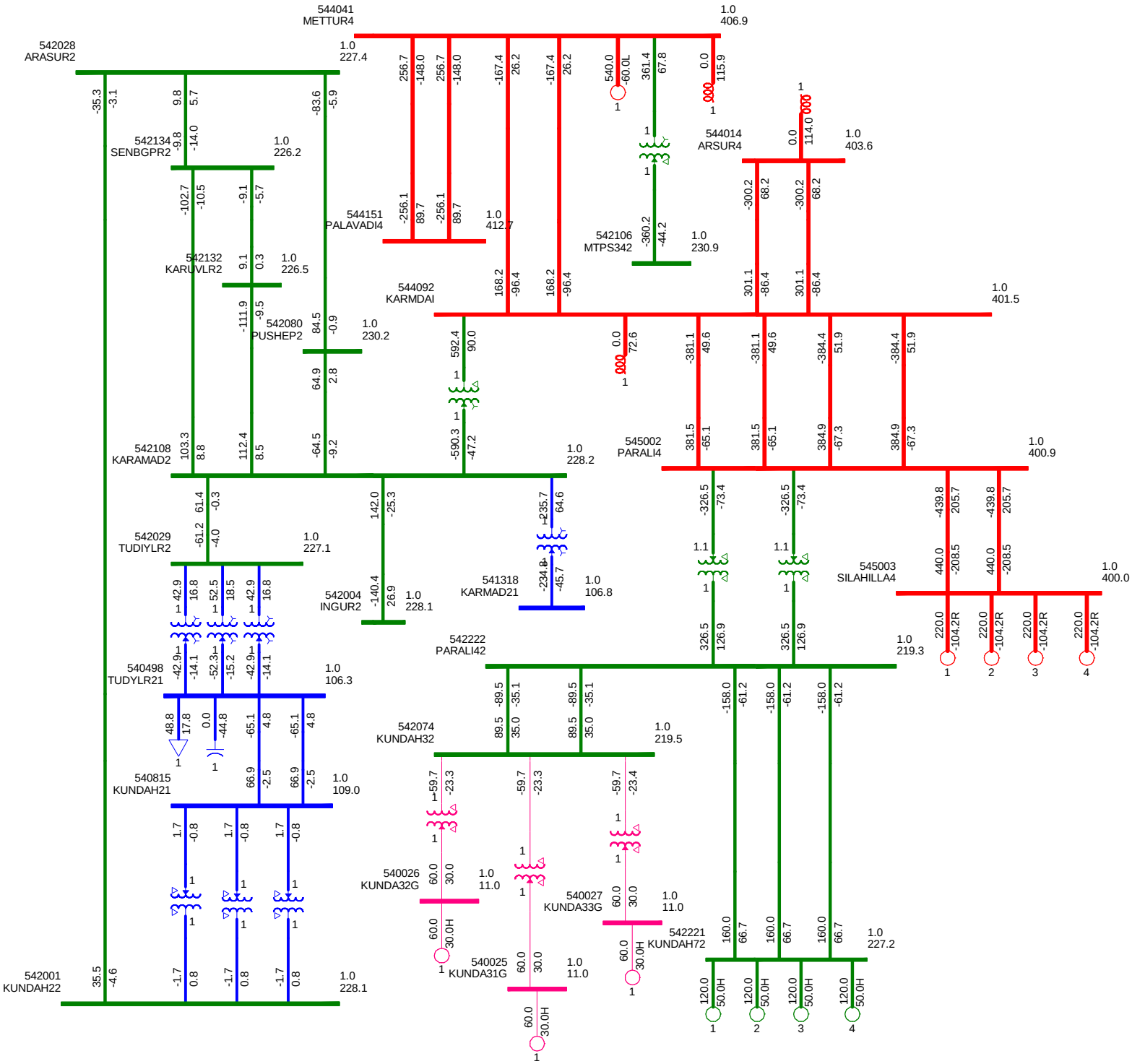
LOAD FLOW STUDY FOR THE PROPOSED KUNDAH PUMPED STORAGE HYDEO ELECTIC PROJECT (4 X 125 MW)
BASE CASE : WITH THE KPSHEP (4 X 125 MW)
FULL WIND & FULL HYDRO CONDITION



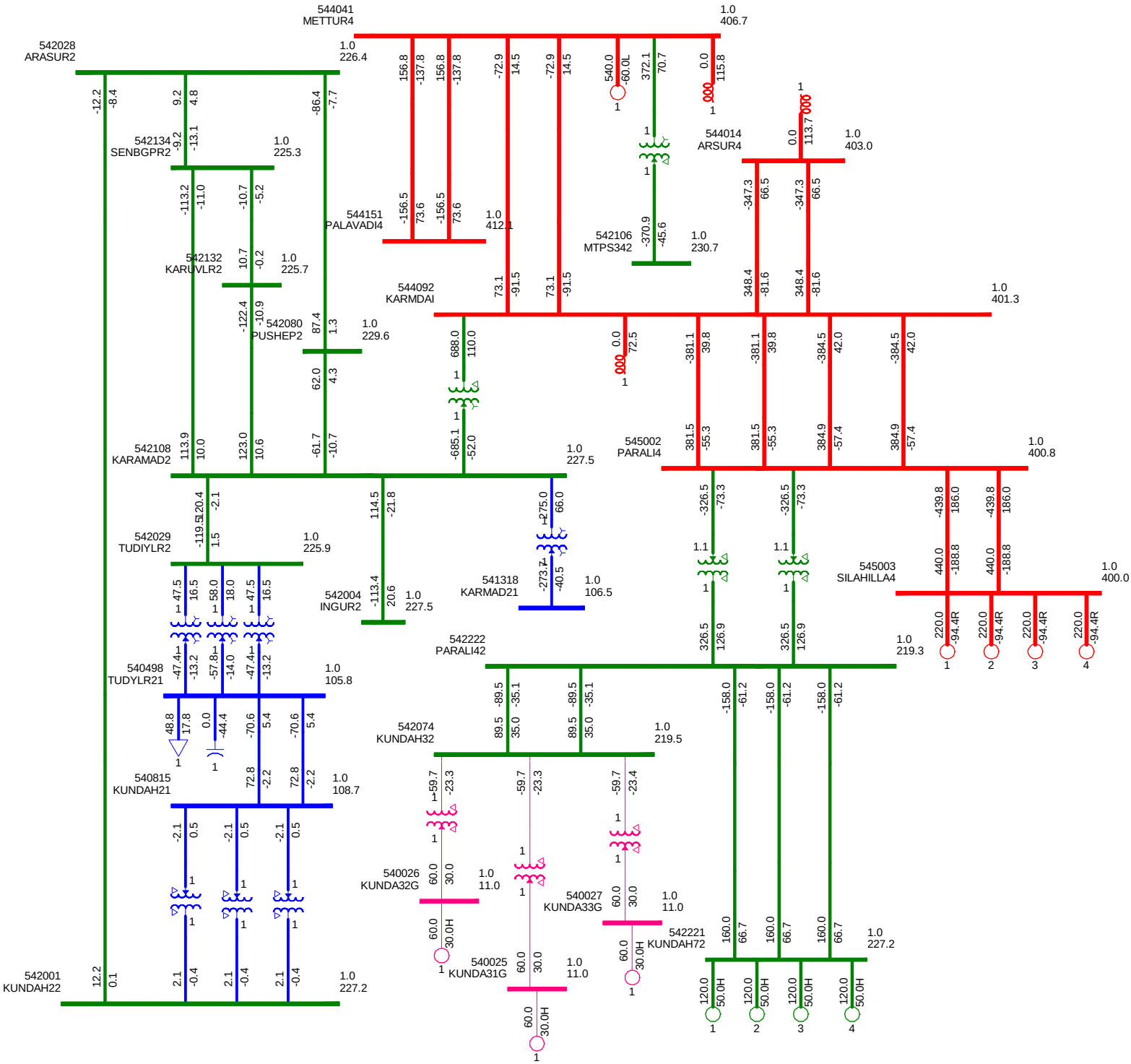
LOAD FLOW STUDY FOR THE PROPOSED KUNDAH PUMPED STORAGE HYDEO ELECTIC PROJECT (4 X 125 MW)
BASE CASE : WITH THE KPSHEP (4 X 125 MW)
NIL WIND & FULL HYDRO CONDITION



LOAD FLOW STUDY FOR THE PROPOSED KUNDAH PUMPED STORAGE HYDEO ELECTIC PROJECT (4 X 125 MW)
CASE 1 : BASE CASE + SILLHALLA STAGE I PROJECT - 4X250MW
FULL WIND & FULL HYDRO CONDITION



LOAD FLOW STUDY FOR THE PROPOSED KUNDAH PUMPED STORAGE HYDEO ELECTIC PROJECT (4 X 125 MW)
CASE 1 : BASE CASE + SILLHALLA STAGE I PROJECT - 4X250MW
NIL WIND & FULL HYDRO CONDITION



ANNEXURE-16.1

TANTRANSCO
(Subsidiary of TNEB Ltd.)

From

T.Senthilvelan, B.E.,
Director/Transmission Projects,
TANTRANSCO,
144, Anna Salai,
Chennai -2.

To

The Member (Power System),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi 110 066.

Lr.No.CE/Plg&R.C/SE/SS/EE1/AEE1/F.Stg. Committee/D.256 /2017 dt.29.08.17

Dear Sir,

Sub: Upgradation of existing Tharamani 230/110/33 kV substation into 400/230-110 kV substation, establishment of Koyambedu 400/230 kV substation and revised 400 kV connectivity for the establishment of Edayarpalayam 400/230-110 kV SS – 765 kV SC line instead of DC line from NCTPS Stage-III to 765KV North Chennai Pooling Station - Approval requested for ATS - Regarding.

Ref: 1. CEA Lr.No.51/4/(41st)/PSPA-II/2017 dt. 16.08.2017
2. Lr.No.CE/Plg&R.C/SE/SS/EE1/AEE1/F.stg.committee/D.167/2017 dt.23.05.17
3. Lr.No.CE/Plg&R.C/SE/SS/EE1/AEE1/F.Kudankulam/D.137/2017 dt.26.04.17
4. Lr.No.CE/Plg&R.C/SE/SS/EE1/AEE1/F. stg.committee /D.249/17 dt.16.08.17
5. Lr.No.CE/Plg&R.C/SE/SS/EE1/AEE1/F. stg.committee /D.198 dt.20.06.17
6. Lr.No.CE/Plg&R.C/SE/SS/EE1/AEE1/F. stg.committee /D.237/2017 dt.1.08.17

*****

1.0 In the letter under reference cited (1), it has been proposed to convene 41st meeting of Standing committee on Power System Planning for Southern Region in the third week of September, 2017.

2.0 The following agenda points may be taken up in the forthcoming meeting in addition to the already furnished agenda points vide our letter cited under references (2),(3),(4),(5),(6) (Copies enclosed):

i. Upgradation of the existing Tharamani 230/110/33 kV substation into 400/230-110 kV substation in the Chennai South Region instead of already approved Mylapore 400/230 kV substation.

ii. Establishment of a new 400/230 kV substation at Koyambedu to meet out the load growth at Koyambedu in Chennai West region.

iii. Revision of ATS by retaining the original 400 kV connectivity for the establishment of Edayarpalayam 400/230-110 kV substation with 3 X 315 MVA, 400/230 kV ICTs instead of 2 X 500 MVA, 400/230 kV ICTs i.e., making LILO of the Myvadi – Anaikadavu 400 kV SC line at the Edayarpalayam 400 kV SS.

iv. Revision of ATS of the NCTPS Stage – III (1 X 800 MW) & ETPS Replacement (1 X 660 MW) generating stations by changing the 765 kV lines to 765 kV North Chennai pooling station and between the generating stations from 765 kV DC line to 765 kV SC line.

3.0 In this regard, the following are stated.

i. Upgradation of Mylapore 230 kV GIS SS into 400 kV SS was sanctioned in the 37th Standing committee on Power system planning for Southern Region. The sanctioned scheme could not be executed due to severe ROW issues in laying of 400kV UG cable.

ii. As an alternate to Mylapore 400/230 kV GIS substation, it has been proposed to upgrade the existing Tharamani 230/110/33 kV substation into 400/230-110 kV substation.

iii. Further, proposal for the establishment of new 400/230 kV substation at Koyambedu has also been evolved to meet out the growing demand of power at Koyambedu in Chennai west region and the surrounding area.

4.0 The following 400 kV and 230 kV connectivities have been considered for conducting load flow study for the above mentioned two nos. substations.

4.1 <u>Tharamani 400/230 – 110 kV substation :</u>

Establishment of 400/230 – 110 kV substation at Tharamani with 2X500MVA,400/230 kV ICTs, 2 X 200 MVA, 400/110 kV ICTs and 2 X 125 MVAr bus

reactors by making LILO of the sanctioned Sholinganallur – Guindy 400 kV SC feeder instead of already approved Mylapore 400 kV SS. All the existing and sanctioned 230kV & 110 kV feeders of Tharamani 230/110 kV substation have been considered to feed the existing and future loads.

4.2 Koyambedu 400/230kV substation:

Establishment of 400/230 kV substation with 2X315MVA,400/230 kV ICTs and 2 X 125 MVAr bus reactor by making LILO of any one of the NCTPS Stage –II – Sunguvarchatram 400 kV feeders.

The following 230 kV connectivities have been considered.

i. LILO of the Koyambedu – Guindy 230 kV feeder.

ii. 230 kV SC UG cable from the proposed Koyambedu 400 kV SS to Koyambedu CMRL 230 kV substation.

iii. 230 kV SC UG cable from the proposed Koyambedu 400 kV SS to Porur 230 kV substation.

5.0 Based on the above, Load flow study has been conducted for various cases for the time frame of 2020-2021 year network condition and the study results are enclosed. From the above study results, the following have been observed.

i. The line loadings are found to be normal.

ii. The loadings of ICTs in both the stations are also found to be normal.

iii. Even during contingency condition, the loadings of the ICTs and lines are found to be within limits.

6.0 Revised 400 kV connectivity for the establishment of Edayarpalayam 400/230-110 kV substation

6.1 In the 38th Standing Committee on Power system planning for Southern Region, CEA has stated that establishment of Edayarpalayam 400/230-110 kV substation with 2x500 MVA, 400/230 kV ICTs and 2x125 MVAr bus reactors will be in the scope of TANTRANSCO (LILO of Udumalpet- Anikadavu 400kV S/c line at Edayarpalyam S/s is dropped for the time being) while Edayarpalayam –Myvady 400 kV DC quad line will be in the scope of PGCIL. TANTRANSCO will commission Edayarpalyam substation in the time frame matching with the requirement of Raigarh- Pugalur HVDC system.

6.2 However, TANTRANSCO vide their letter dated 13.06.2016 has requested that "Edayarpalayam- Myvady 400 kV DC quad line which was in the scope of PGCIL may be dropped and instead of that Edayarpalayam – Anikadavu 400 kV DC quad line shall be taken up by TANTRANSCO". In this way, the wind power injected in the Edayarpalayam 400kV SS will be transmitted to the wind corridor with Thoppakundu, Anikadavu, and Rasipalayam 400kV substations.

6.3 In the 40th Standing Committee Meeting on Power system planning for Southern Region, CEA has suggested that both the lines can be considered i.e., Edayarpalayam- Myvady 400 kV DC quad line and Edayarpalayam – Anikadavu 400 kV DC quad line but after proper load flow studies.

6.4 It is requested to revise the ATS of the 400 kV connectivities for the establishment of Edayarpalayam 400/230-110 kV substation as shown below.

400 kV Connectivity

Under PGCIL's scope :

i. 400 kV DC quad line from PGCIL Myvadi 400 kV SS.

ii. 400 kV DC quad line from Pugalur HVDC station.

Under TANTRANSCO's scope :

i. LILO of Myvady – Anaikadavu 400 kV SC line.

ii. 400 kV DC line from sanctioned Coimbatore 765/400 kV SS.

iii. 3 X 315 MVA, 400/230 kV ICTs instead of 2 X 500 MVA 400/230 kV ICTs and 3 X 200 MVA, 400/110 kV ICTs

7.0 765 kV SC line instead of DC line from NCTPS Stage-III (1 X 800 MW) to 765KV North Chennai Pooling Station, 765 kV SC line instead of DC line from ETPS Replacement (1 X 660 MW) to 765KV North Chennai Pooling Station and 765 kV SC line instead of DC line from NCTPS Stage-III (1 X 800 MW) to ETPS Replacement Power Projects (1 X 660 MW).

7.1 The following are the approved ATS for NCTPS Stage – III (1 X 800 MW) and ETPS Replacement (1X660MW) in the 37th Standing committee on Power system planning in Southern Region.

ATS for NCTPS Stage – III (1 X 800 MW)

i. 765kV DC line from NCTPS Stage III switchyard to the North Chennai Pooling station. (Generation at 765kV level)

ii. 1X240MVAR, 765kV Bus Reactor at generation switchyard

ATS FOR ETPS Replacement (1X660MW) :

i. 765kV DC line from ETPS Replacement switchyard to North Chennai Pooling station. (Generation at 765kV level)

ii. 765kV DC inter link to NCTPS Stage-III for reliability.

iii. 1X240MVAR, 765kV Bus Reactor at generation switchyard.

7.2 The following modifications have been suggested to reduce the cost of investment.

i. The sanctioned 765 kV North Chennai Pooling station is to be connected with North Chennai Stage – III and Ennore Replacement with 765 kV SC lines instead of 765 kV DC lines for power evacuation.

ii. Further North Chennai Stage – III is also to be linked with Ennore replacement with 765 kV SC line instead of 765 kV DC lines for reliability purpose.

7.3 Based on the above, Load flow study has been conducted for the various cases and the study results are enclosed. From the above study results, the following have been observed.

i. The total power generated from the above two generating stations is 1460 MW.

ii. Since the 765 kV SC line with Hexa Zebra conductor is capable of carrying 2000 MW, the evacuation of 1460 MW in SC line is sufficient.

iii. During N-1 condition also, the reliability is ensured.

8.0 Summarizing, approval is requested for the following schemes :

i. It is proposed to upgrade the existing Tharamani 230/110/33 kV substation into 400/230-110 kV substation instead of already approved Mylapore 400/230 kV substation

ii. It is proposed to establish a new 400/230 kV substation at Koyambedu to meet out the growing demand at Koyambedu and the surrounding area.

iii. Revision of the ATS by retaining the original 400 kV connectivity i.e., LILO of Myvady – Anaikadavu 400 kV SC line at the Edayarpalayam 400/230-110 kV substation with 3 X 315 MVA, 400/230 kV ICTs instead of 2 X 500 MVA, 400/230 kV ICTs.

iv. By considering the cost benefit, the ATS of the NCTPS Stage – III (1 X 800 MW) & ETPS Replacement (1 X 660 MW) power projects may be revised. Already approved 765 kV DC lines from North Chennai pooling station and link lines between the power projects may be revised as 765 kV SC line.

9.0 Hence, it is requested that the above four proposals may be taken up as agenda points in the forthcoming 41st meeting of the Standing Committee on Power System Planning for Southern Region in addition to the already furnished eleven agenda points vide letter cited under reference(2),(3),(4),(5) and (6). The abstract of 15 nos. proposals for which Standing Committee approval is requested is also furnished in the Annexure.

24/08/2017

(R.S.Usha)
Chief Engineer/Planning & R.C
For Director/Transmission Projects

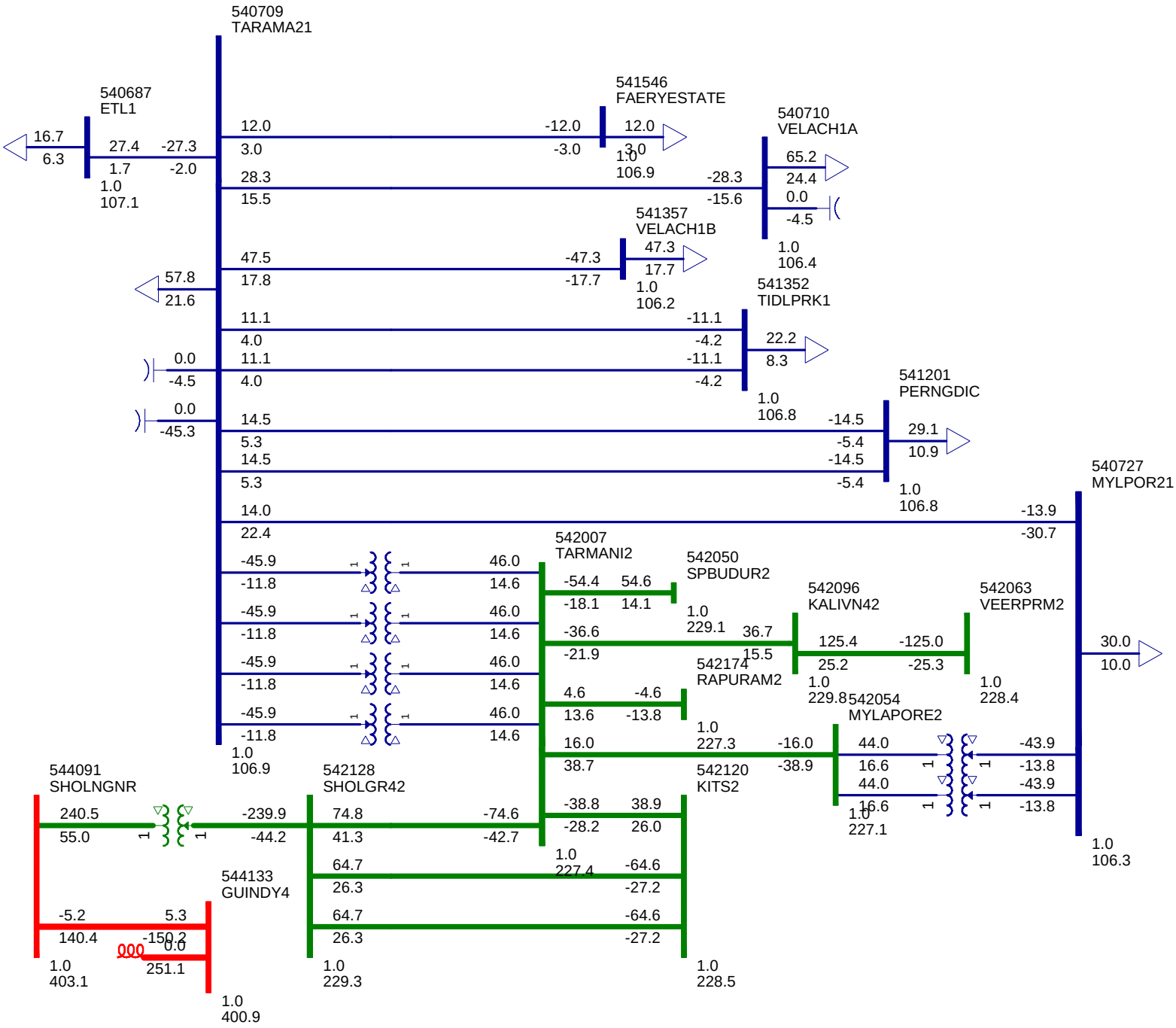
Enclosures:

1. Annexure.
2. Copy of the references 2,3,4,5 and 6.
3. Study results in sav. File - by email.

ANNEXURE-16.2

BASE CASE: WITH THE EXISTING THARAMANI 230/110 KV SS

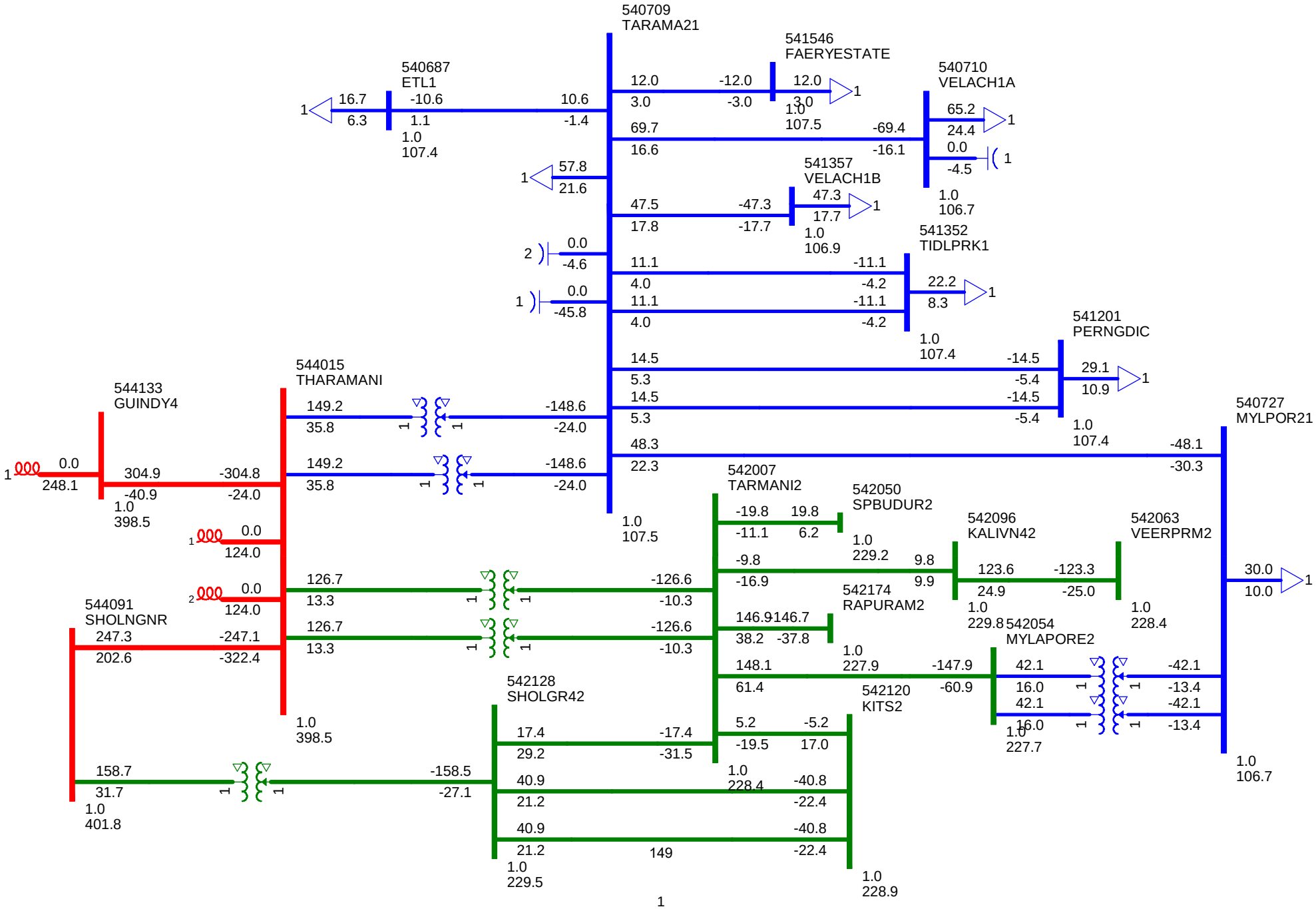
(NETWORK YEAR CONDITION ; 2020-2021)



CASE1 : BASE CASE + UPGRADATION OF THARAMANI 230/110 KV SS INTO 400/230-110 KV SS

WITH 2X500 MVA,400/230 KV ICT AND 2X200 MVA,400/110 KV ICT

(NIL WIND & NIL HYDRO CONDITION NETWORK YEAR CONDITION : 2020-2021)



ANNEXURE-17.1

TAMILNADU TRANSMISSION CORPORATION LTD.

(Subsidiary of TNEB Ltd.)

From
Er.T.Senthilvelan, B.E.,
Director/Transmission Projects,
TANTRANSCO,
144, Anna Salai,
Chennai -2.

To
The Member (Power System),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi 110 066.

Lr.No.CE/Plg.&R.C/SE/SS/EE1/AEE1/F.Stg. committee/D. 98 /17 dt. 01 .04.17

Dear Sir,

Sub: Overloading of NLC TS-II 2X250MVA, 400/230kV existing ICT – Intimation to CEA - Reg.

****

1.0 In the minutes of the special meeting on Neyveli Grid disturbance held on 03.01.2017, the following have been stated regarding 400/230kV, 2X250MVA capacity ICTs in NLC TS-II.

"Severe over loading of NLC TS -II ICT's and consequent tripping of them along with certain transmission elements has been experienced on few occasions in the past. It was felt necessary to have a special Protection Scheme (SPS) in place for the time being that operates to trip the local 300MW load available at 110kV bus level of NLC TS -1 on severe over loading of ICT's at NLC TS-II."

2.0. In this connection, the following are stated,

i. In NLC TS-II power plant, evacuation of power from 3X210MW is at 230kV level and power evacuation from the remaining 4X210MW is at 400kV level totaling 1470MW of generation with 2X250MVA, 400/230kV ICT's.

ii. At present, the above 2X250MVA ICT's are getting over loaded and SRLDC has suggested SPS to avoid over loading of this ICT's.

No/565/CE/PSPA-II 11/4/17

O/o Member (Power System)
Dy. No. : 870
Date : 10/4/17

CE (PSPA II)

Ms Kanchan / Sh. Pranay — ADI
Pl discuss. urgent
11/4/17

iii. Further, SRLDC has stated that this issue would get resolved with the commissioning of 2X500MVA, 400/230kV ICT's at NNTPS.

3.0. To ascertain the ICT's loading at NLC TS-II, Load Flow study has been conducted for the 2020-21 year network condition. NNTPS - 2X500MW generation with 2X500MVA, 400/230kV ICT's at NNTPS and 230kV substation at Neyveli (with the existing 230kV and 110kV connectivity of NLC Ts-1) to be commissioned by TANTRANSCO have been considered in the study. Further, NNTPS to Ariyalur 400kV DC line has also been included in the study. In addition, the existing ILFS – 2X600MW generation is also considered in the study. From the study results, the following have been observed.

Base Case : With NNTPS – 2X500MW Generation (Replacing the existing NLC TS-1)

Case 1 : Base Case + Sankarapuram 230/110kV SS + With Ariyalur 765/400kV SS 230kV Link Lines. (Link lines to Thiruvannamalai, Sankarapuram and Villupuram 230kV substations.)

i. In Base Case even with NNTPS – 2X500MVA ICT's, the two ICT's at NLC TS-II switchyard will be over loaded. NNTPS ICT's are used for the injection of NNTPS -2X500MW generation only. Moreover, NNTPS injection at 400kV level also comes to NLC TS-II 400kV bus.

ii. In the sanctioned Ariyalur 765/400kV substation, 230kV connectivity to the existing Thiruvannamalai, Villupuram and sanctioned Sankarapuram 230/110kV substations are suggested and field feasibility has been requested.

iii. In Case 1, with this 230kV link lines, the loading of ICT's at NLC TS-II is reduced but still the ICT's are in over loaded condition only.

iv. Due to low impedance path, more power from the NLC TS - II 4X210MW generation at 400kV level tries to step down through 400/230kV ICTs. Any other system strengthening works undertaken by TANTRANSCO in this area also will not reduce the over loading of the above ICTs.

Hence, it is suggested to enhance the existing 2X250MVA ICTs capacity at NLC TS –II switchyard to 2X500MVA by NLC so as to avoid the above over loading. The above point may be taken as an agenda point in the forthcoming Standing Committee Meeting on Power System Planning on Southern region for discussion.

For taking further action please.

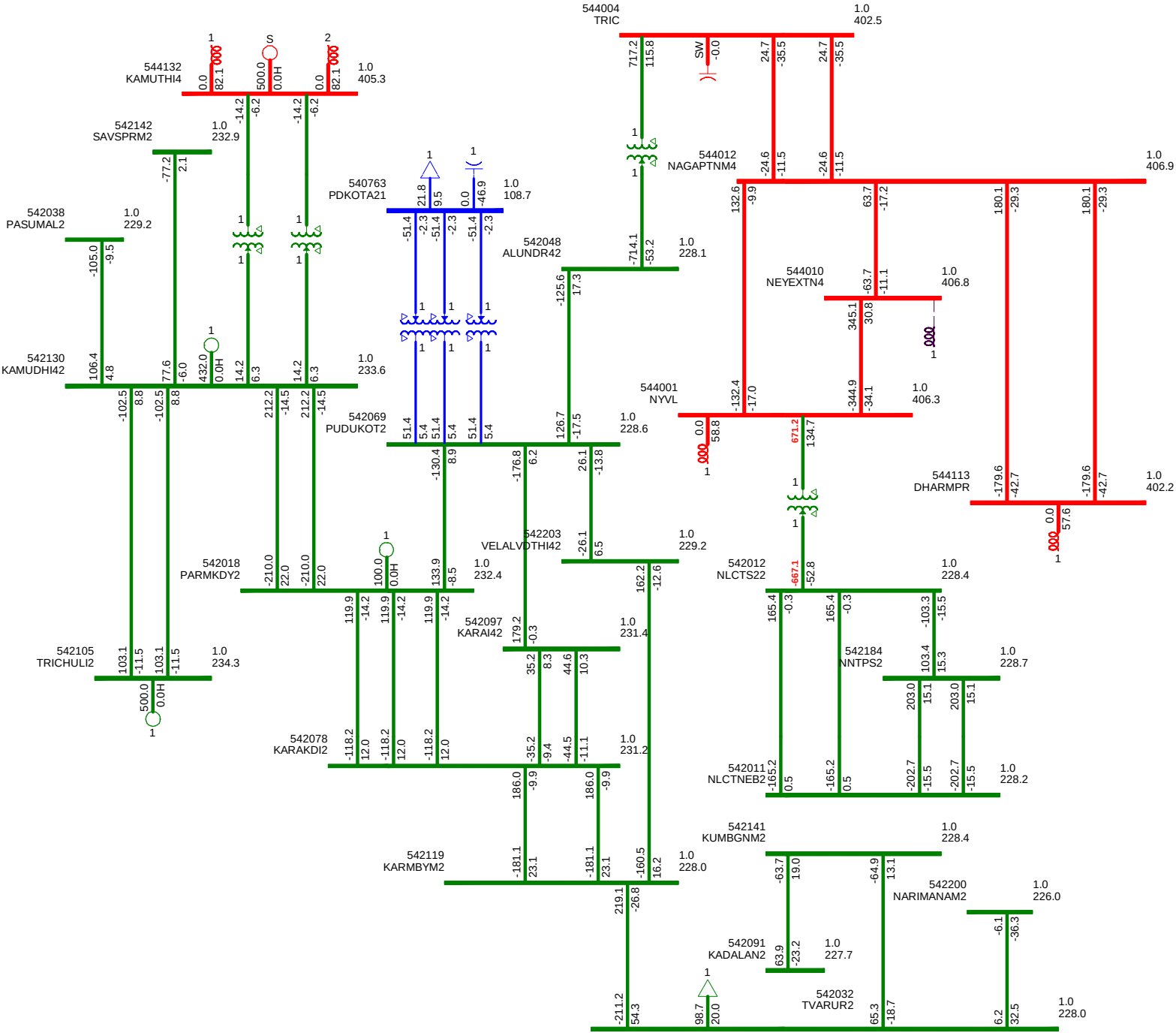
01/04/2017

(R.S.Usha)
Chief Engineer / Planning & R.C
For Director / Transmission Projects

Copy to Chief General Manager, NLC TS-II, NLCIL, Neyveli -607 807.
Copy to Executive Director, Power Grid Corporation of India Limited, Saudamini, Plot No.2, Sector -29, Gurugaon, Haryana – 122 001.
Copy to General Manager, SRLDC, 29, Race Course Cross Road, Bangalore 560 009

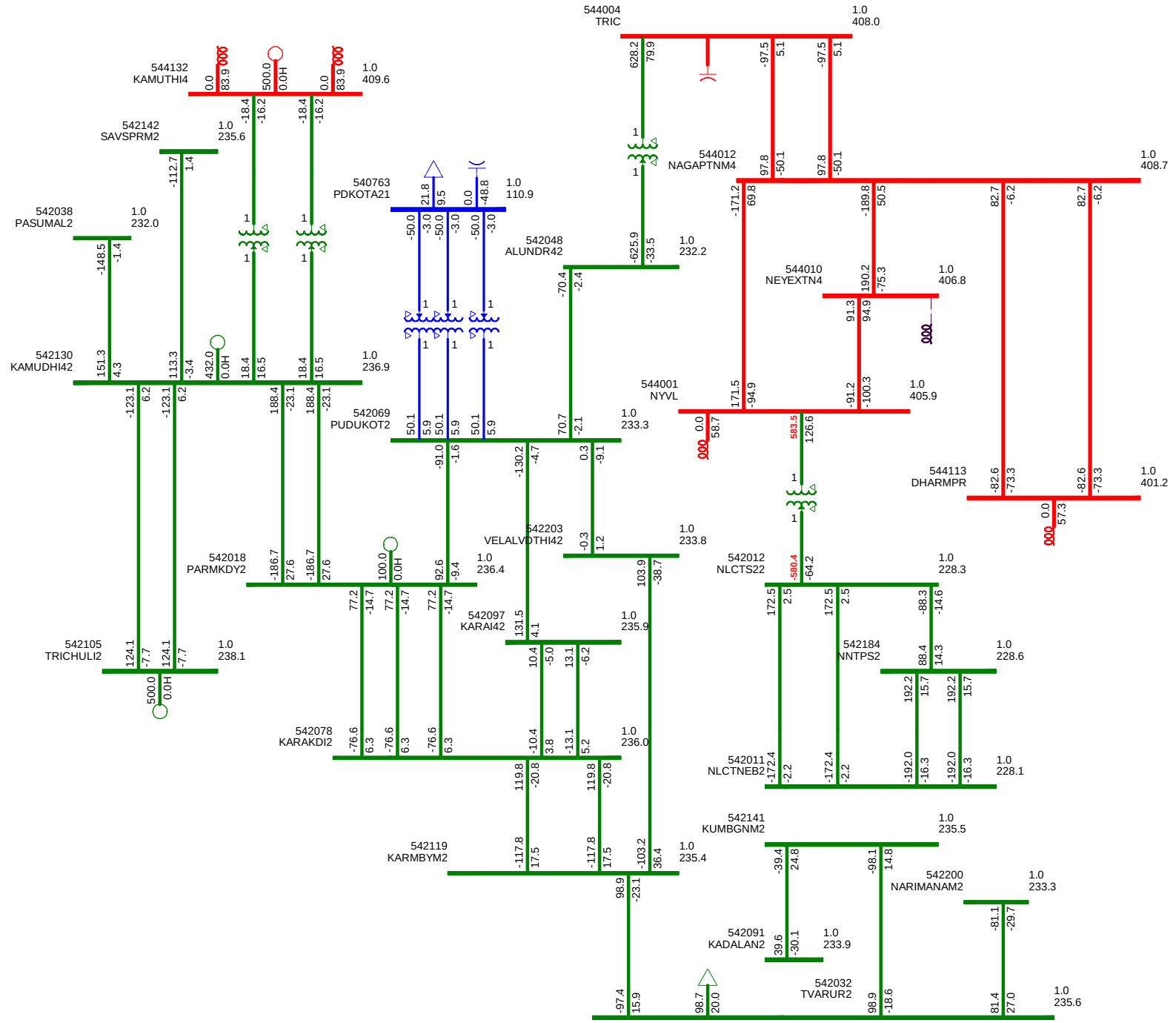
BASECASE : WITH THE EXISTING 2 X 250 MVA, 400/230 KV ICT AT NLC-TS2

FULL WIND FULL HYDRO CONDITION



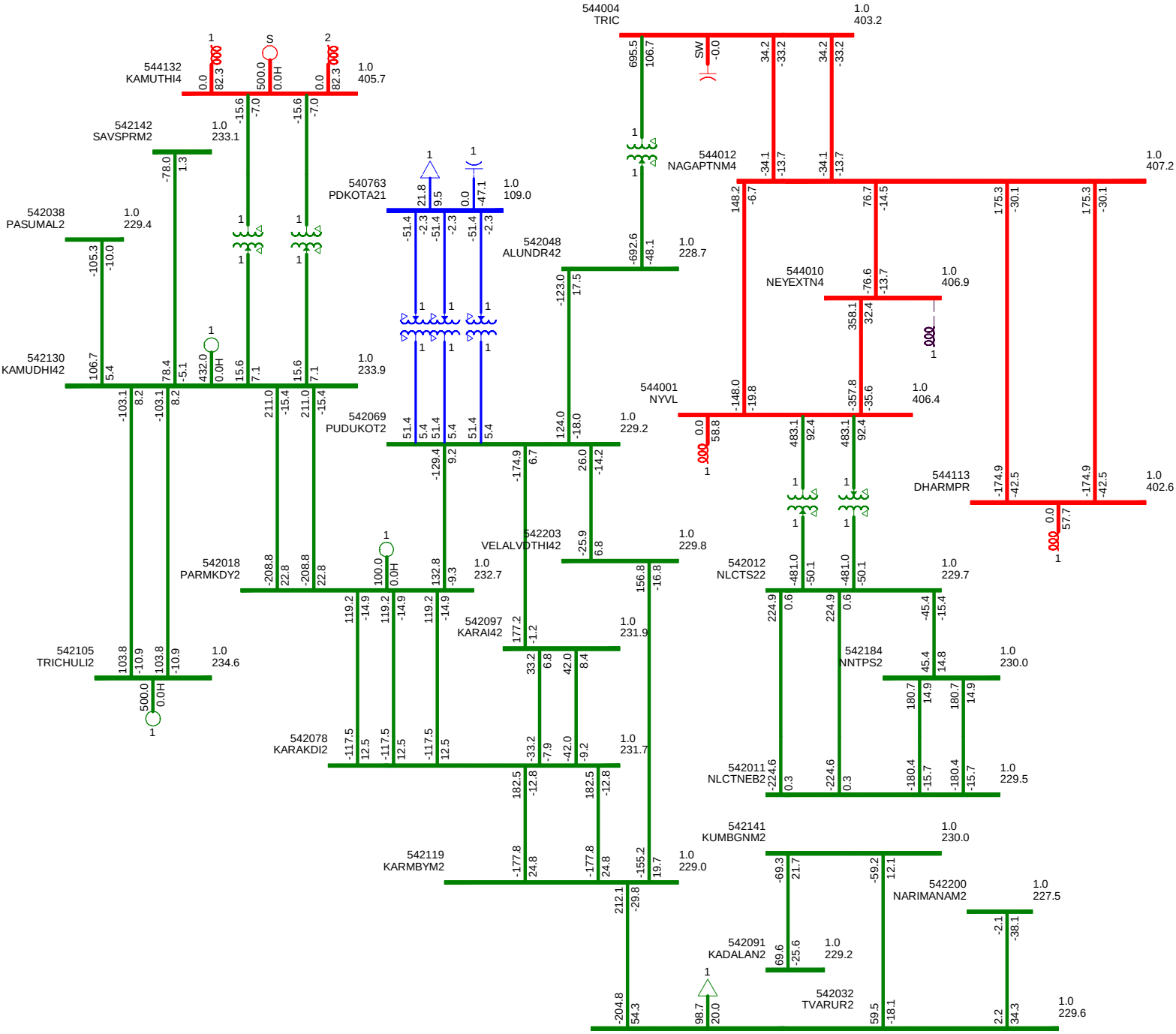
BASECASE : WITH THE EXISTING 2 X 250 MVA, 400/230 KV ICT AT NLC-TS2

FULL WIND FULL HYDRO CONDITION



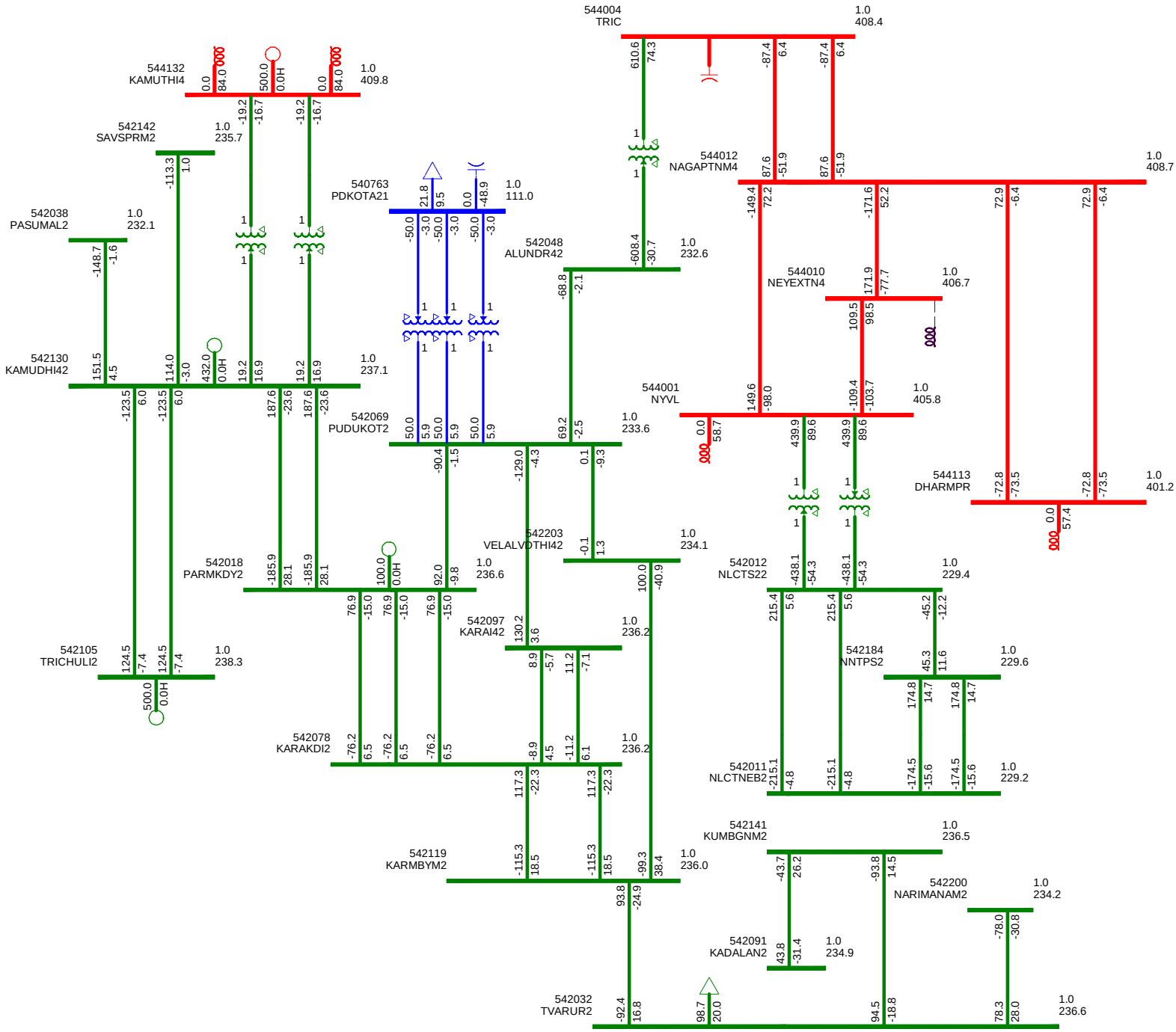
CASE1 : BASECASE + ENHANCEMENT OF 2 X 250 MVA TO 2 X 500 MVA, 400/230 KV ICTs AT NLC-TS2

FULL WIND FULL HYDRO CONDITION



CASE1 : BASECASE + ENHANCEMENT OF 2 X 250 MVA TO 2 X 500 MVA, 400/230 KV ICTs AT NLC-TS2

NIL WIND NIL HYDRO CONDITION



ANNEXURE-18

Ref 4

TAMILNADU TRANSMISSION CORPORATION LTD.
(Subsidiary of TNEB Ltd.)

From

Er.T.Senthilvelan, B.E.,
Director/Transmission Projects,
TANTRANSCO,
144, Anna Salai,
Chennai -2.

To

The Member (Power System),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi 110 066.

Lr.No.CE/Plg.&R.C/SE/SS/EE1/AEE1/F.Stg. committee/D.249/17 dt.16.08.17

Dear Sir,

Sub: Commissioning of 400/110kV 2nd ICT at Alamathy 400/230-110kV substation in Chennai – Ratification requested - Reg.

****

1.0 Establishment of Alamathy 400/230-110kV substation has been approved in the Standing Committee Meeting on Power System Planning of Southern Region in the year 2000-2001. In the 12th, 15th and 16th Standing Committee meeting, the 400kV connectivity for the Alamathy 400kV substation has been discussed. But the 400/230kV and 400/110kV ICT details are not available in the Standing Committee meeting minutes.

2.0 In the Alamathy 400kV substation, 3X315MVA 400/230kV ICT's and 1X200MVA, 400/110kV ICT are available. The existing 400/110kV ICT has reached 190MVA peak on 24.04.2016 and the sustained peak is 180MVA. Hence, 2nd 400/110kV ICT has been sanctioned to meet the load growth and to meet N-1 criteria. It is programmed to commission the above 2nd, 400/110kV ICT at Alamathi on 16.08.2017. Hence, it is requested to give ratification for the commissioning of 400/110kV, 2nd ICT at Alamathy 400/230-110kV substation in the forthcoming Standing Committee meeting on Power system Planning of Southern region.

16/08/2017

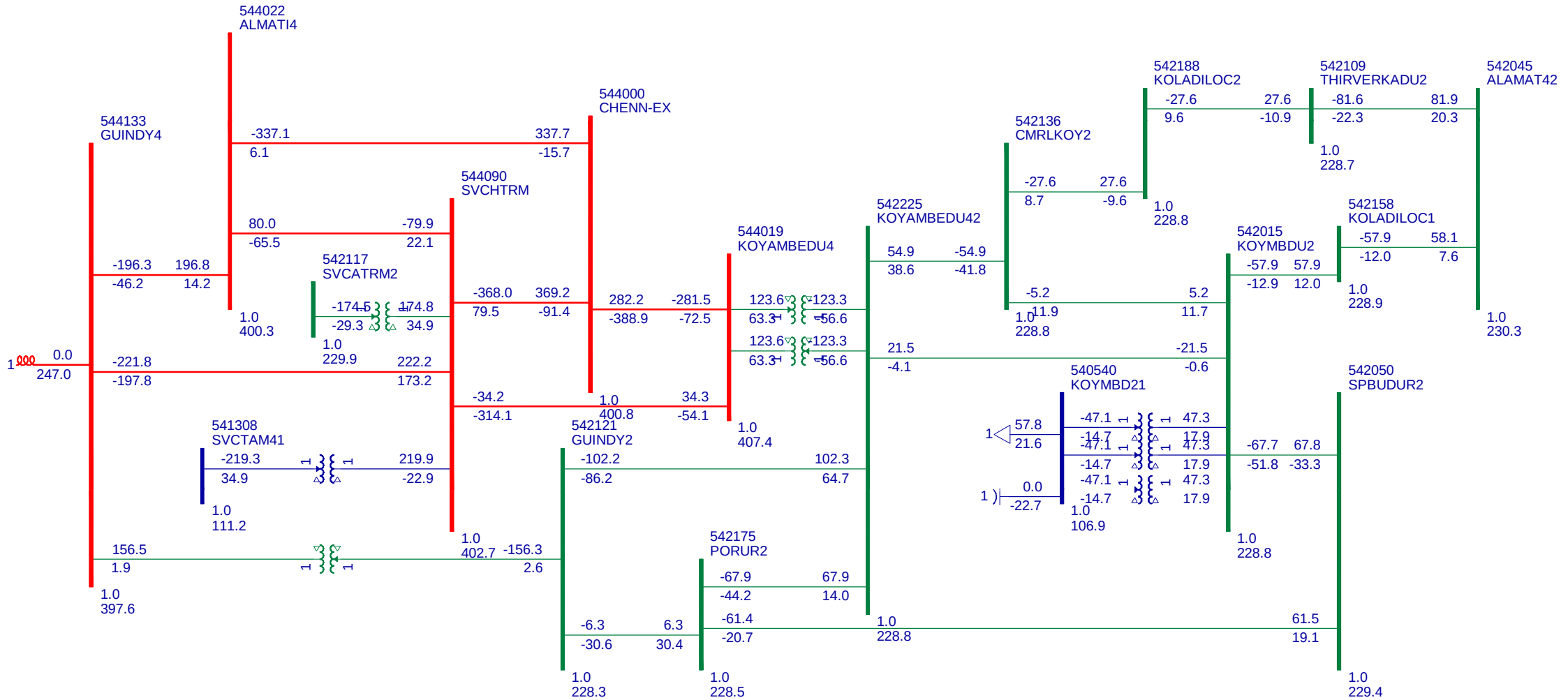
(R.S.Usha)
Chief Engineer/Planning & R.C
For Director/Transmission Projects

BY COURIER
DESPATCHED ON
DATE 16.8.2017.
R.W.

Copy to General Manager/SRLDC.

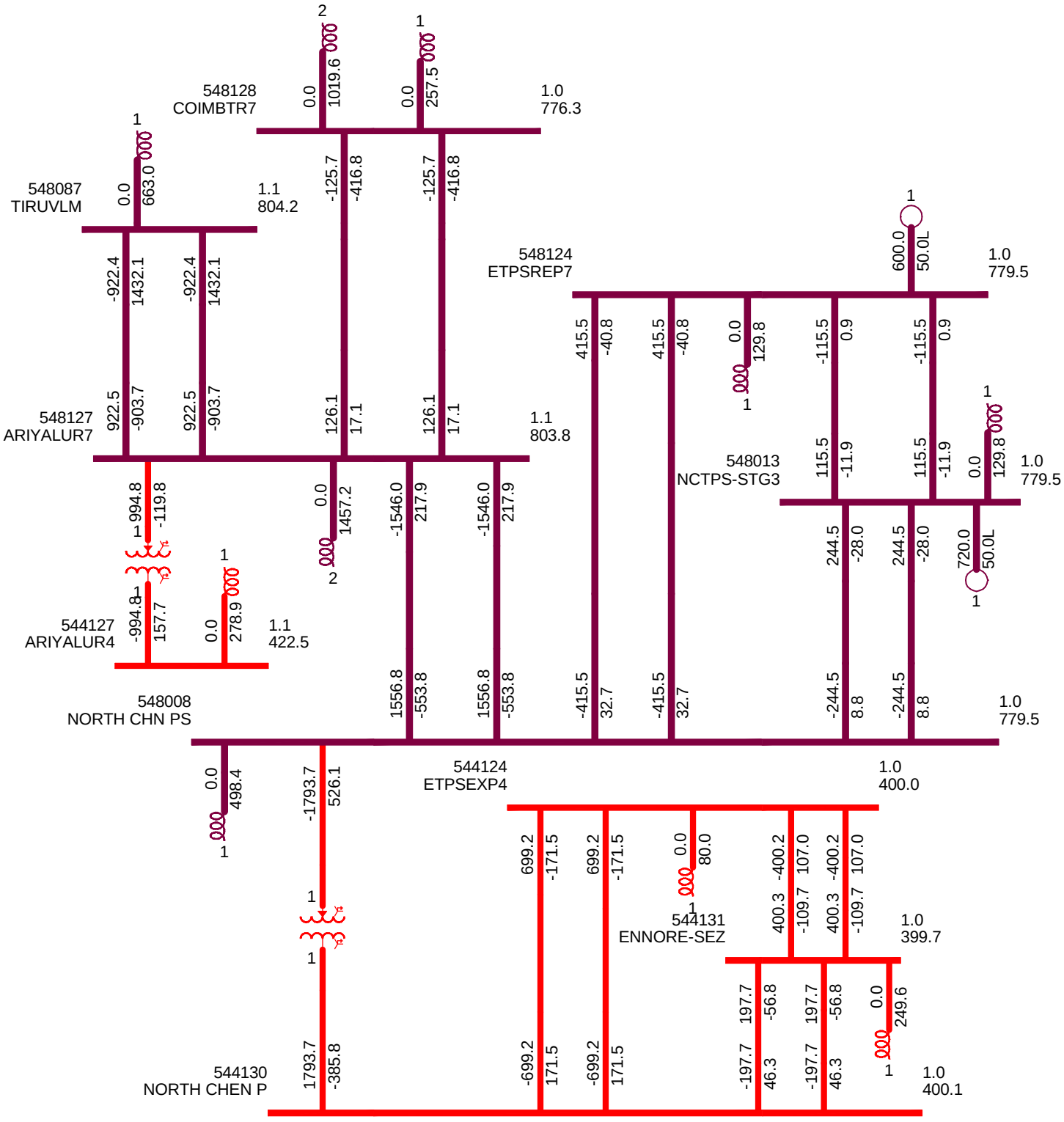
ANNEXURE-19

CASE2 : CASE1 + WITH ESTABLISHMENT OF KOYAMBEDU 400/230KV SUBSTATION

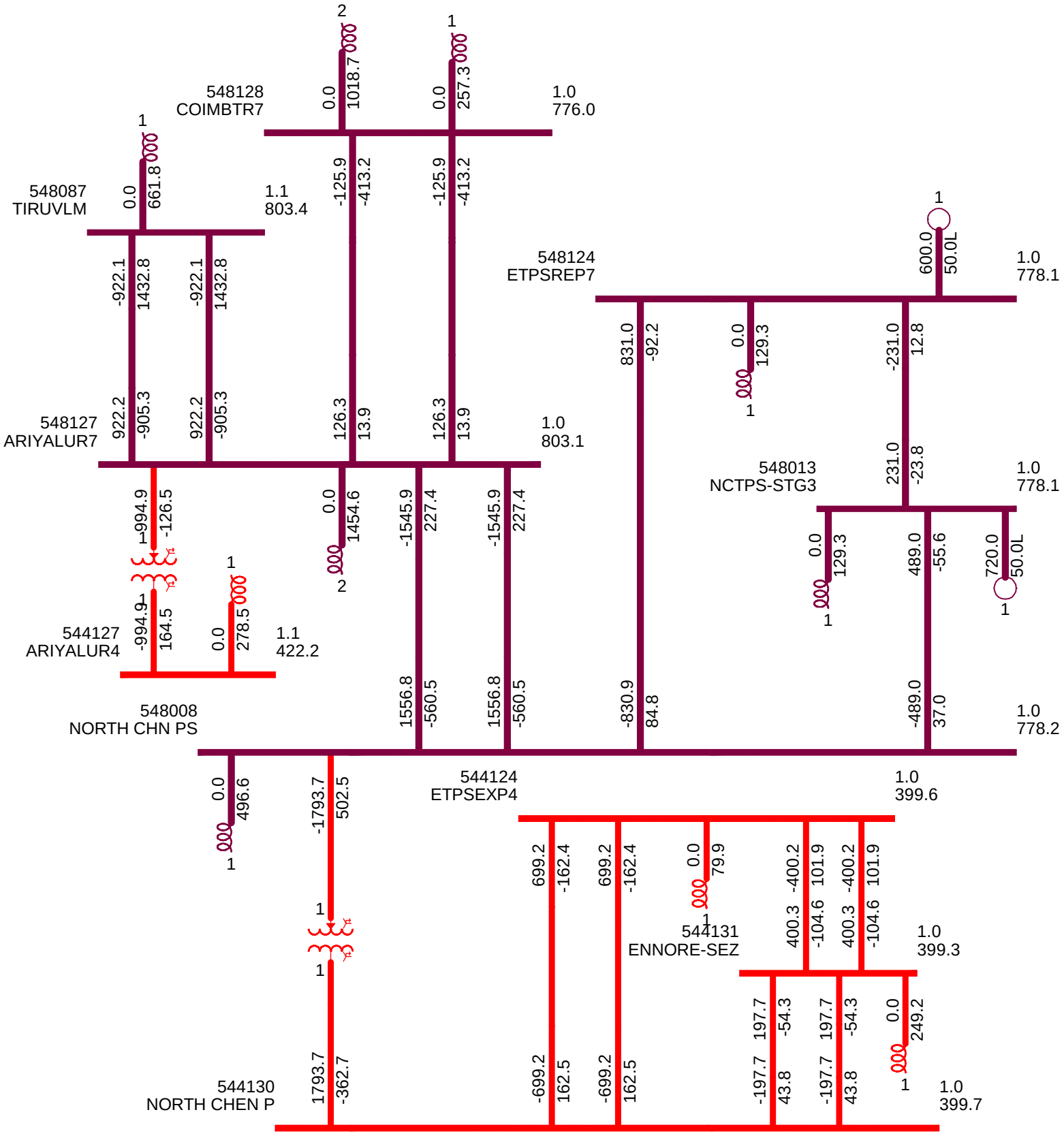


ANNEXURE-20

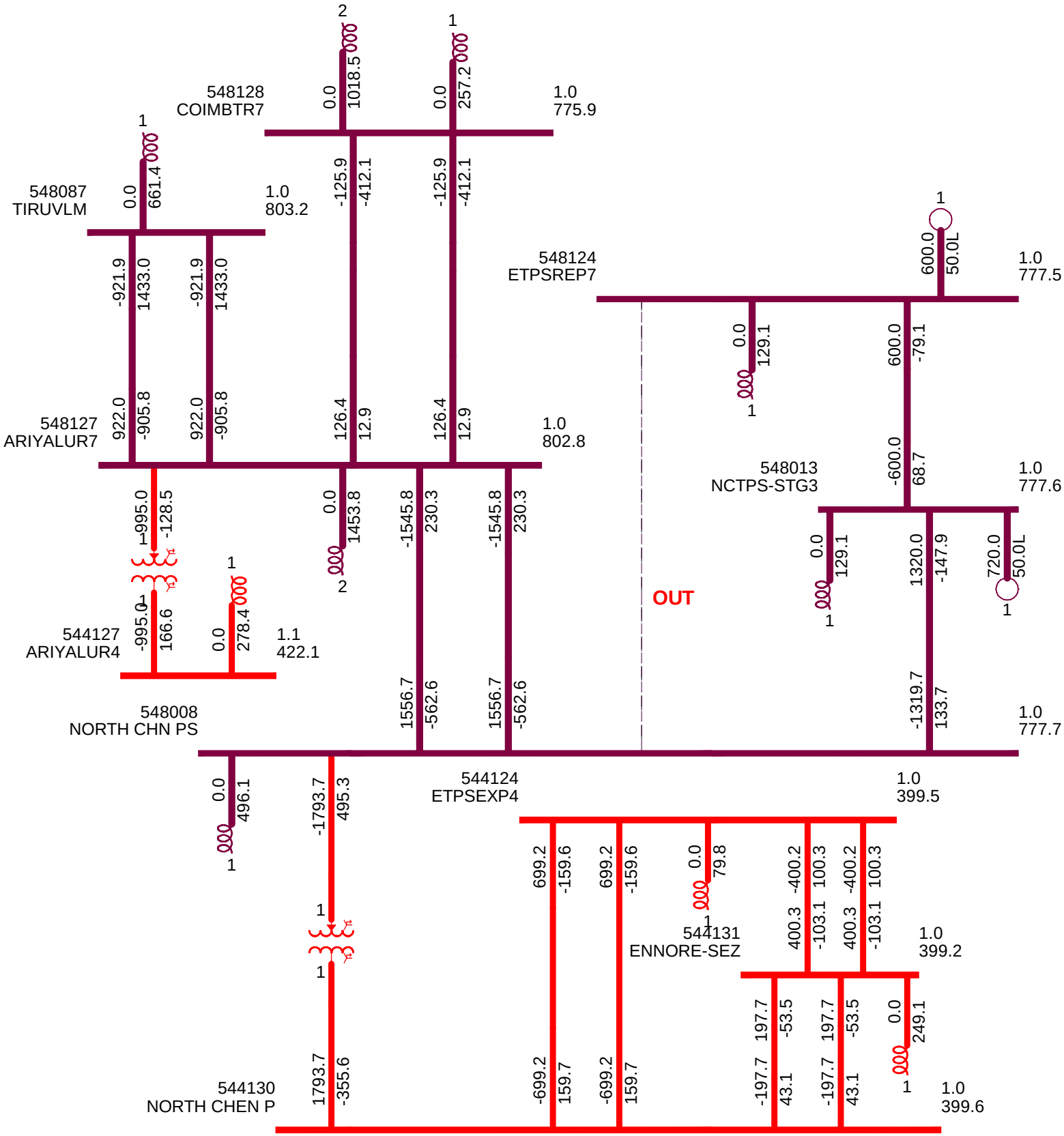
BASE CASE: WITH 765 KV DC LINE CONNECTIVITY BETWEEN NCPS-ETPS REP(1 X 660 MW), NCPS-NCTPS3 (1X 800 MW) & NCTPS3(1X 800 MW)-ETPS REP(1X 660 MW)



CASE1: WITH 765 KV SC LINE CONNECTIVITY BETWEEN NCPS-ETPS REP(1 X 660 MW), NCPS-NCTPS3 (1X 800 MW) & NCTPS3(1X 800 MW)-ETPS REP(1X 660 MW)



CASE 2: CASE 1 + OUTAGE OF 765 KV NCPS-ETPS REP(1 X 660 MW) SC LINE



TAMILNADU GENERATION AND DISTRIBUTION CORPORATION
(Subsidiary of TNEB Ltd.)

From

Er.T.Senthilvelan, B.E.,
Director/Transmission Projects,
TANTRANSCO,
144, Anna Salai,
Chennai -2.

To

The Member (Power System),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi 110 066.

Lr.No.CE/Plg.&R.C/SE/SS/EE1/AEE1/F.Stg.committee/D.258 dt.29.08.17
Dear Sir,

Sub: Additional agenda points – Proposals for the Establishment of Manalmedu 400/230KV SS in Trichy region and Neyveli 400 kV SS by upgrading the ongoing 230 kV Neyveli (TNEB) SS - Enhancement of ICT Capacity at K.R.Thoppur 400/230 kV SS - seeking CEA approval - reg.

Ref: 1.CEA Lr.No.51/4/(41st)/PSPA-II/2017 dt. 16.08.2017
2.Lr.No.CE/Plg.&R.C/SE/SS/EE1/AEE1/F.Stg.committee/D. 256 dt.24.08.17

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1.0 In the letter under reference(1) cited, it has been proposed to convene 41st meeting of the Standing committee on Power System Planning for Southern Region in the third week of September, 2017.

2.0 It has been requested by the TANTRANSCO vide reference (2) cited to include four proposals in addition to the eleven agenda points totaling 15 nos. proposals to be included as agenda points in the forthcoming 41st Standing committee meeting.

3.0 The following additional agenda points may be taken up in the forthcoming meeting in addition to the already furnished 15 nos. agenda points.

1. Establishment of Manalmedu 400/230kV substation in Trichy region
2. Establishment of Neyveli 400/230 kV SS by upgrading the ongoing 230 kV Neyveli (TNEB) SS.
3. Enhancement of ICT Capacity at K.R.Thoppur (Salem-TNEB) 400/230-110 kV SS.

4.0. In this connection, the following are stated,

4.1 Manalmedu 400/230kV substation :

i. The power demand of Trichy region is increasing rapidly.

ii. This substation is planned as a system strengthening measure at 400 kV level in Thiruvarur-Nagapattinam area.

iii. It has been proposed to establish a 400/230 kV SS at Manalmedu with 400 kV connectivity from Ariyalur 765/400 kV substation, thereby part of power generated from thermal power stations at Chennai Region will be utilized in Trichy region.

iv. Land has been identified at Manalmedu in Nagapattinam district in coastal part of Trichy Region for the establishment of Manalmedu 400/230kV substation.

v. Establishment of Manalmedu 400kV substation in Trichy region is very much essential.

4.2 Neyveli 400/230 kV Substation :

i. Overloading of 400/230 kV 250 MVA ICTs at Neyveli TS II has been observed resulting in cascade trippings of nearby substations. Generation from Thermal power stations in Neyveli is the only source for the entire Villupuram and Trichy regions where demand is growing rapidly. Hence the establishment of a 400/230KV SS at Neyveli by upgradation of the proposed 230 KV Neyveli (TNEB) SS into 400 KV substation is essential.

ii. It has been proposed to have 400 kV connectivity to the Neyveli 400 kV SS (TANTRANSCO) from New Neyveli 400 kV SS. It has also been proposed to have 400 KV DC link from Neyveli 400 KV SS to the proposed Manalmedu 400 KV SS.

iii. Chairman / NLC India Ltd. has already been addressed from the Chairman / TANTRANSCO requesting to allot the land for the upgradation of Neyveli 230/110 kV SS into 400/230 kV SS.

4.3 Enhancement of ICT Capacity at K.R.Thoppur (Salem-TNEB) 400/230 kV SS

i. K.R.Thoppur (Salem-TNEB) 400 kV substation was commissioned during the year 1988. The total Interconnecting transformer capacity at K.R.Thoppur 400/230-

110 kV SS is 1030 MVA with 2 nos. of 400/230 kV 315 MVA ICT and 2 nos. 400/110 kV 200 MVA ICT.

ii. The peak reached in the ICTs at K.R.Thoppur are as follows.

315 MVA, 400/230 kV ICT - 1	-	287.09 MVA
315 MVA, 400/230 kV ICT - 2	-	283.26 MVA
200 MVA, 400/110 kV ICT - 3	-	187.32 MVA
200 MVA, 400/110 kV ICT - 4	-	180.05 MVA

iii. The existing ICTs are already in fully loaded condition and it is difficult to carry out the maintenance activities. Hence, it is essential to erect 400/110KV ICT with 1 x 200 MVA capacity in addition to the existing 400/110 kV, 2 X 200 MVA ICTs to reduce the overloading problem at K.R.Thoppur (Salem) 400/230-110 kV SS and the work for the above is under progress.

iv. Further, since the space for erection of additional one number 400/230 kV, 315 MVA ICT is not available, it is proposed to enhance the 400/230 kV ICT capacity from 2 X 315 MVA to 2 X 500 MVA.

5.0. Load Flow study has been conducted for the 2020-2021 year network condition for the above proposals. Various options have been explored and the following connectivity have been considered based on the field feasibility.

5.1 Manalmedu 400/230kV substation

ICT and Bus reactors:

1. 2x500 MVA, 400/230 KV ICT
2. 2 X 80MVAr bus Reactor

400 KV CONNECTIVITY:

1. 400 KV DC Link line from the proposed Ariyalur 765/400 KV SS.
2. 400 KV DC Link line from the proposed Neyveli (TNEB) 400 KV SS.

230 KV CONNECTIVITY

1. LILO of Neyveli TS-II - Kadalangudi 230kV line
2. 230 KV SC link line to Kumbakonam 230kV SS.
3. 230 KV SC link line to the sanctioned Narimanam 230/110kV SS.

5.2 Neyveli 400/230 KV Substation (By Upgradation of the proposed 230 KV Neyveli (TNEB) SS)

ICT and Bus reactors:

1. 2 x315 MVA, 400/230 KV ICT
2. 2 X 80MVAr bus Reactor

400 KV CONNECTIVITY:

1. 400 KV DC Link line from New Neyveli Thermal power station 400 KV SS.
2. 400 KV DC Link line from the proposed Manalmedu 400 kV SS.

5.3 Enhancement of ICT Capacity at K.R.Thoppur (Salem-TNEB) 400/230-110 kV SS

1. Enhancement of 400/230 KV ICT capacity from 2 x 315 MVA, to 2 X 500 MVA.
2. Erection of 1 X 200 MVA, 400/110 KV ICT in addition to the existing 2 X 200 MVA, 400/110 kV ICTs.

From the study results, the following have been observed.

i. The line loadings are found to be normal.

ii. The loadings of ICTs are also found to be normal.

iii. Even during contingency condition, the loadings of the ICTs and lines are found to be within limits.

6.0 Summarizing, approval is requested for the following additional schemes :

i. Establishment of Manalmedu 400/230kV substation in Trichy region

ii. Establishment of Neyveli 400/230 kV SS by upgrading the ongoing 230 kV Neyveli (TNEB) substation.

iii. Enhancement of 400/230 kV ICT capacity from 2X315 MVA to 2 X 500 MVA, and 400/110 kV ICT capacity from 2 X 200 MVA to 3 X 200 MVA at K.R.Thoppur 400/230-110 kV SS.

Hence, it is requested that the above three proposals may be taken up as additional agenda points in the forthcoming 41st meeting of the Standing Committee on Power System Planning for Southern Region in addition to the already furnished fifteen agenda points.

27/8/2017

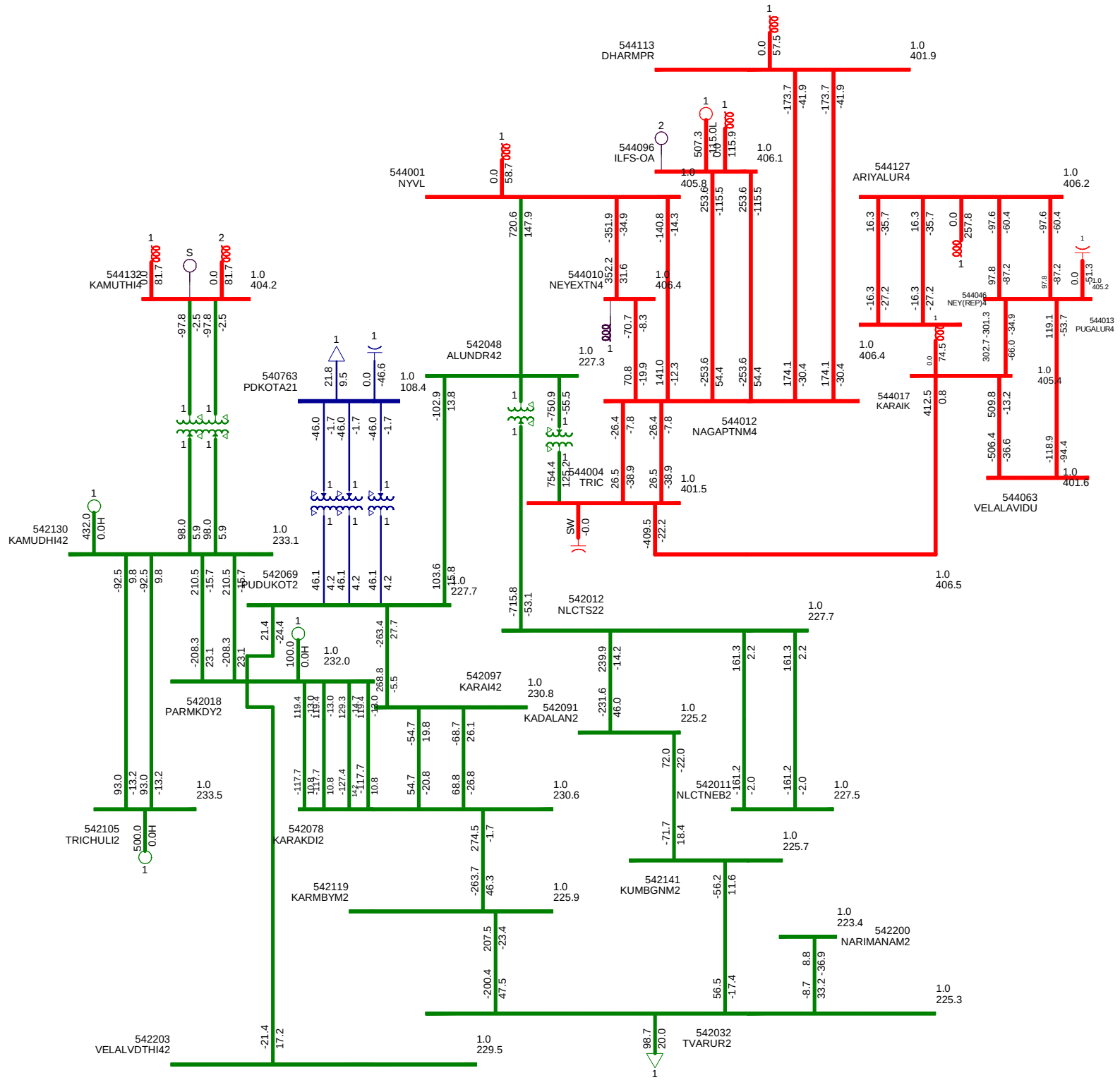
(R.S.Usha)
Chief Engineer/Planning & R.C
For Director/Transmission Projects

Enclosures:

1. Study results in sav. File - by email.

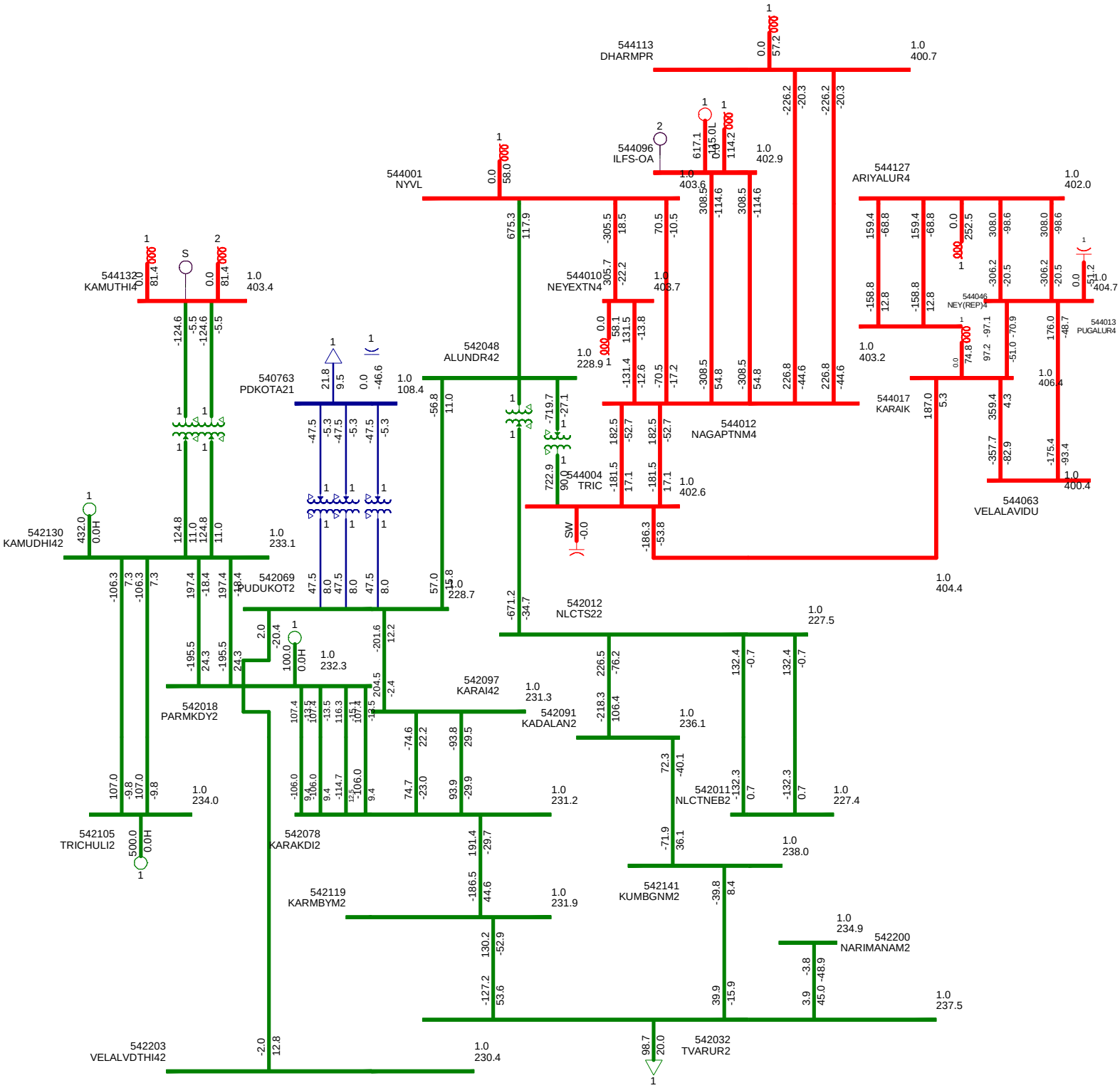
BASECASE : WITH OUT THE PROPOSED MANALMEDU 400/230KV SS & NEYVELI 400/230 kV SS

FULL WIND CONDITION



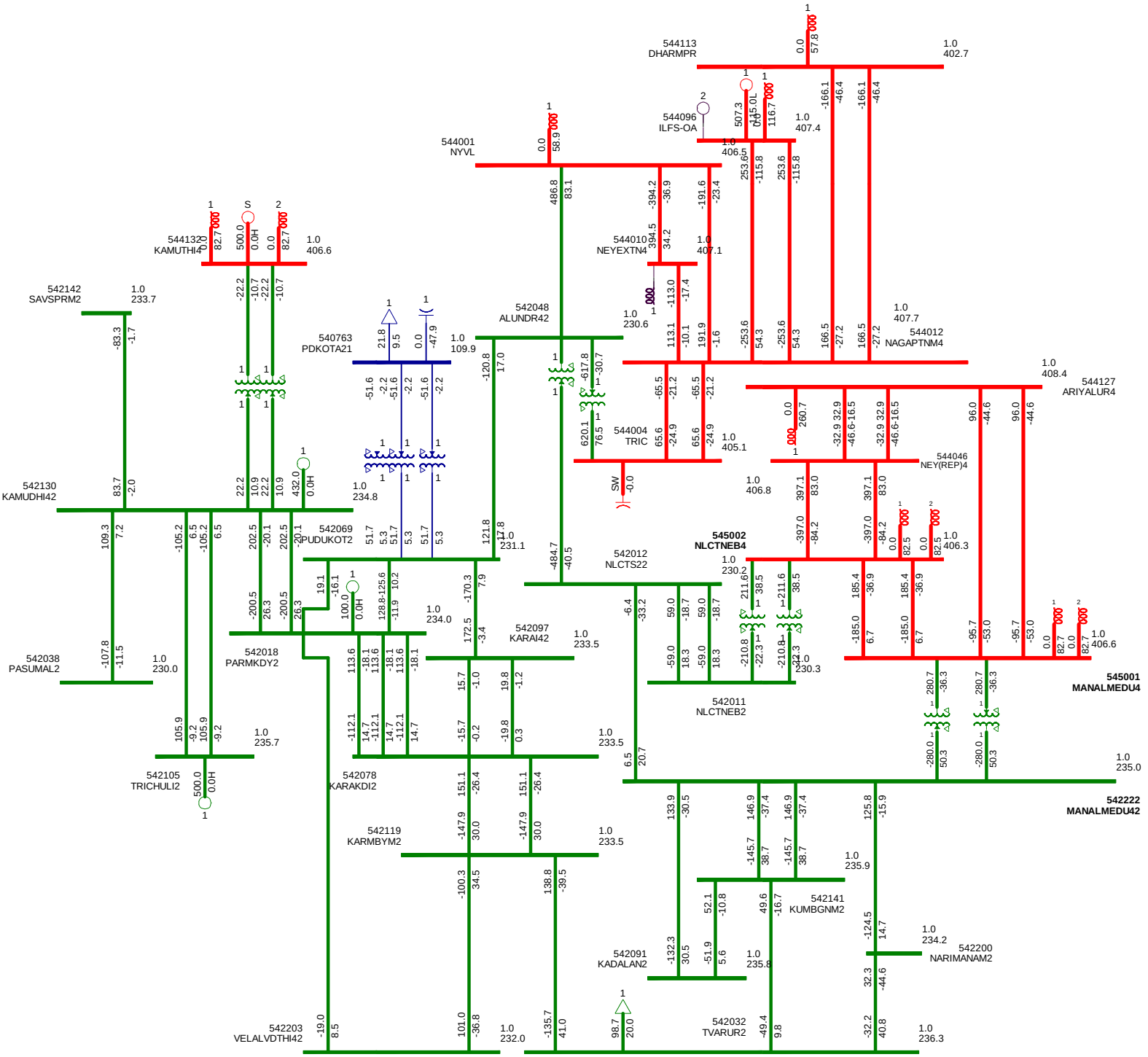
BASECASE : WITH OUT THE PROPOSED MANALMEDU 400/230KV SS & NEYVELI 400/230 kV SS

NIL WIND CONDITION



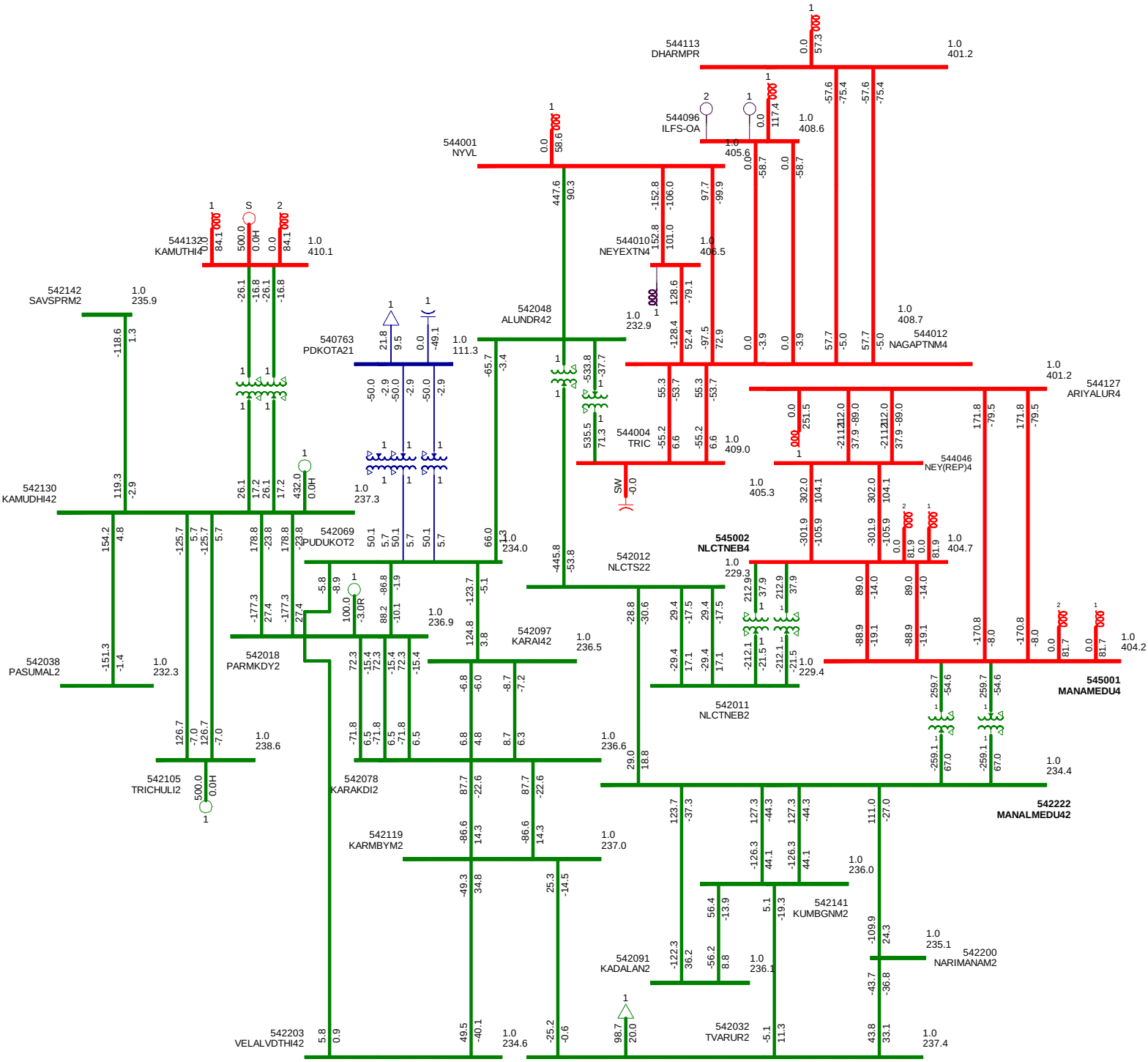
CASE1 : WITH THE PROPOSED MANALMEDU 400/230KV SS & NEYVELI 400/230 kV SS

FULL WIND CONDITION



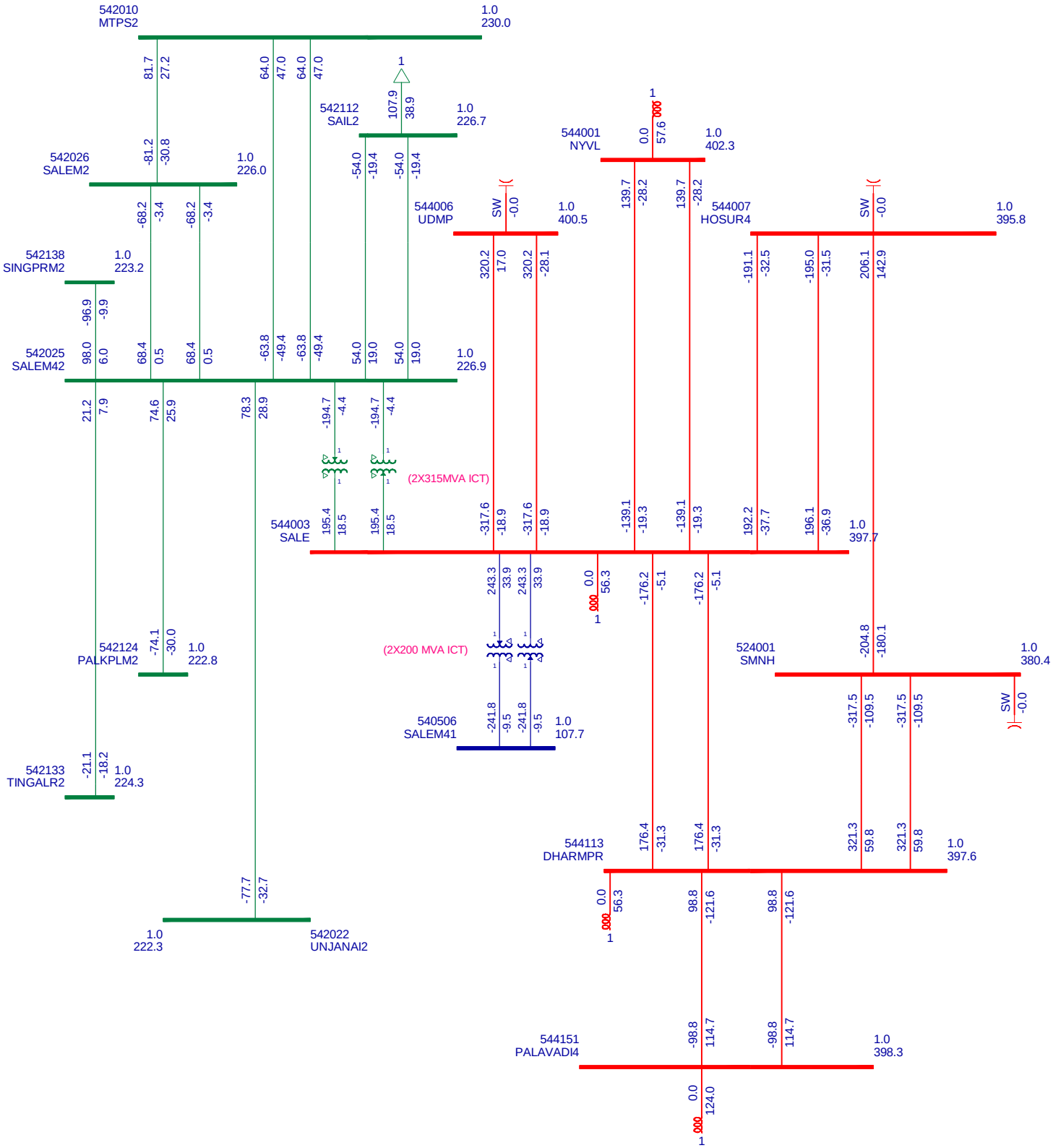
CASE1 : WITH THE PROPOSED MANALMEDU 400/230KV SS & NEYVELI 400/230 kV SS

NIL WIND CONDITION



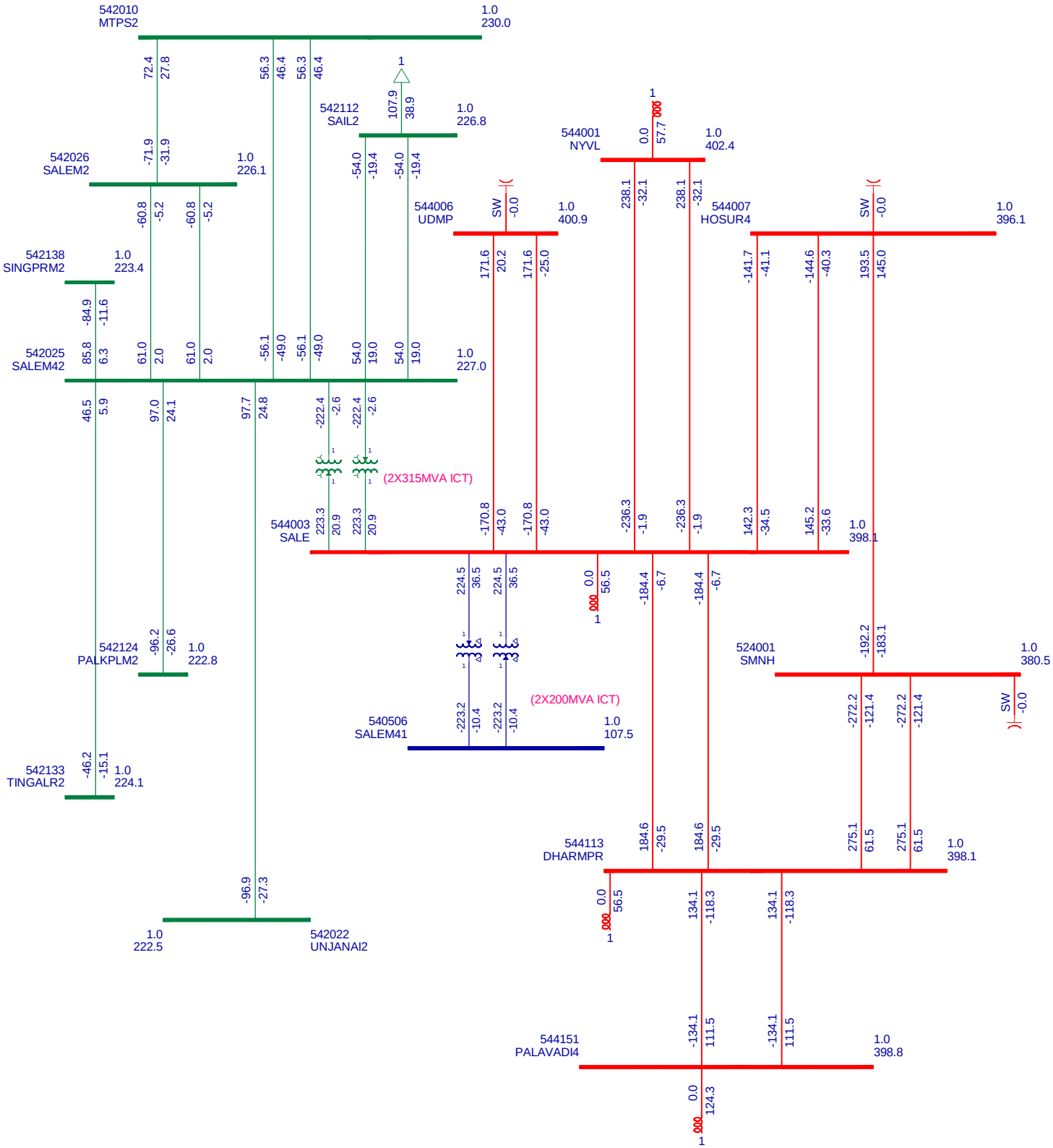
BASECASE : WITH THE EXISTING 2X315MVA 400/230KV ICT & 2X200MVA 400/110KV ICT AT SALEM 400KV SS

FULL WIND CONDITION

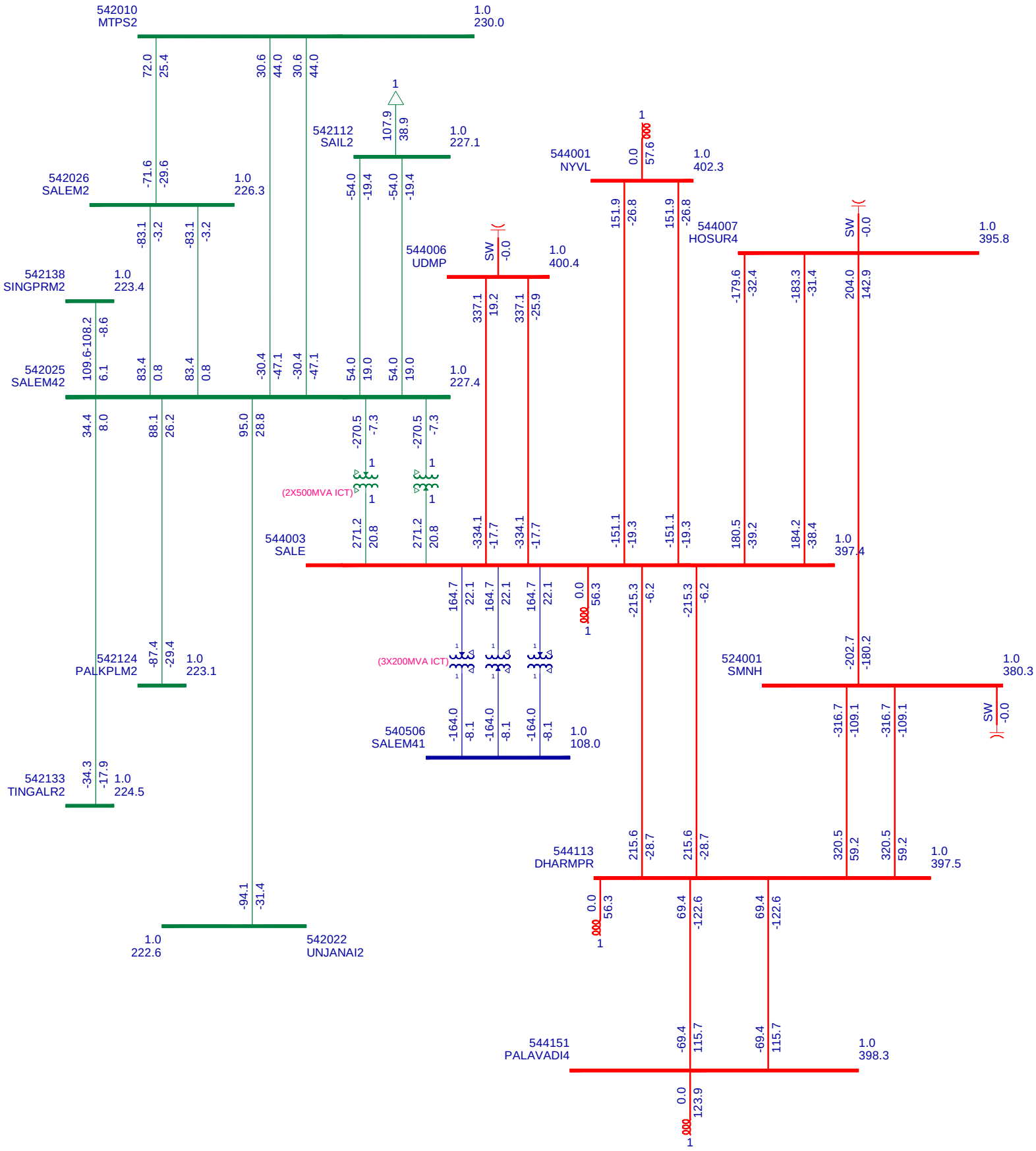


BASECASE : WITH THE EXISTING 2X315MVA 400/230KV ICT & 2X200MVA 400/110KV ICT AT SALEM 400KV SS

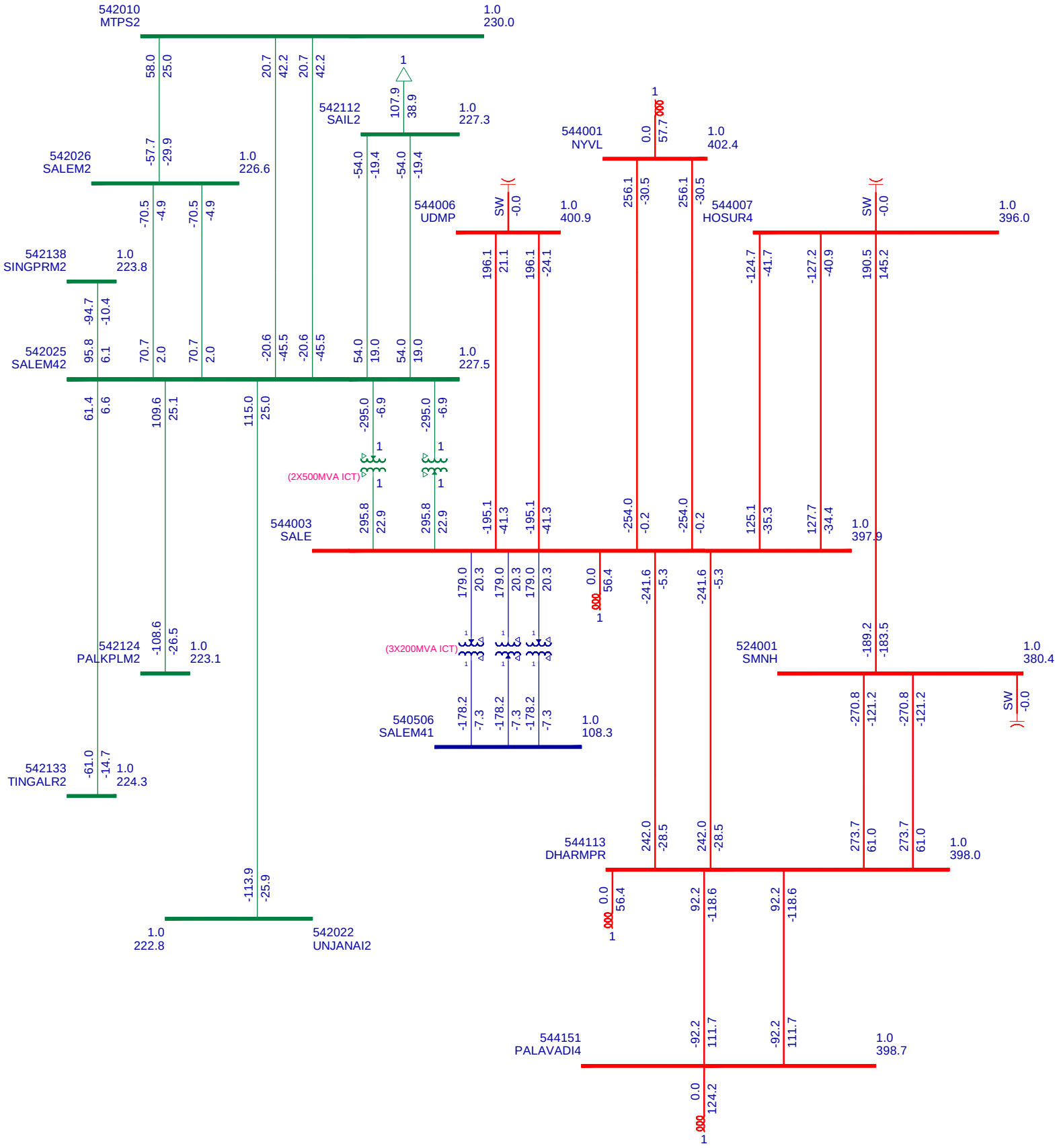
NIL WIND CONDITION



CASE1 : WITH 2X500MVA 400/230KV ICT AND 3X200MVA 400/110KV ICT AT SALEM 400KV SS
FULL WIND CONDITION



CASE1 : WITH 2X500MVA 400/230KV ICT AND 3X200MVA 400/110KV ICT AT SALEM 400KV SS
NIL WIND CONDITION



TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED

From
The Director,
Projects,
APTRANSCO,VidyutSoudha,
Hyderabad – 5000 082.
Tele Fax. No. 040 – 23390018.

To
Sri.Paradeep Jidal
Chief Engineer.
Central Electricity Authority,
New Delhi.

LrNo.Dir (Proj)/CE/400KVConst/SE/PM/400kV/D1A(S)/F.KLP-GRD/D.No. /17, Dt.:30.01.17.

Sir(s),

Sub: APTRANSCO –Supply, Erection, Testing and Commissioning of 400kV Quad Moose DC line from existing Kalpaka 400/220 kV SS to proposed 400/220 kV SS at Maradam,Vijayanagaram - 120kM on Turnkey Basis by making LILO of existing Kalpaka – Vemagiri 400kV TMDC line - Approval - requested - Reg.

*****

APTRANSCO has taken up the execution of the 400kV QMDC Line from the Kalpaka 400/220 kV SS to proposed 400/220 kV SS at Maradam (Garividi), Dattirajeru(M), Vijayanagaram - 120kM (approx.) on Turnkey Basis. The works are under progress.

Due tosevere ROW issues in Vennelapalem and Swayambhuvaram Villages., in Visakhapatnam District where Land Owners/ Farmers are not allowing to do the work,

In view of the above ,APTRANSCO proposed to take up the subject QMDC Line from Kalpaka to the proposed 400/220kV Maradam SS by making LILO of the existing Kalpaka – Vemagiri 400kV TMDC line at Loc.No.14, using Invar Twin Moose Conductor, so that the existing Kalpaka – Vemagiri400kV TMDC line will become Kalpaka (Loc No.14) – Maradam and Vemagiri (Loc No.15) – Simhadri NTPC Power Plant lines.

System studies were conducted for the above proposal and alredy submitted .A copy of the same is enclosed for reference.

.Contd…2

The subject line under construction is a vital line for System strengthening in Visakhapatnam and Vizianagaram District, after A.P.Sate Bifurcation Act June'2014 to meet the load in surrounding areas.

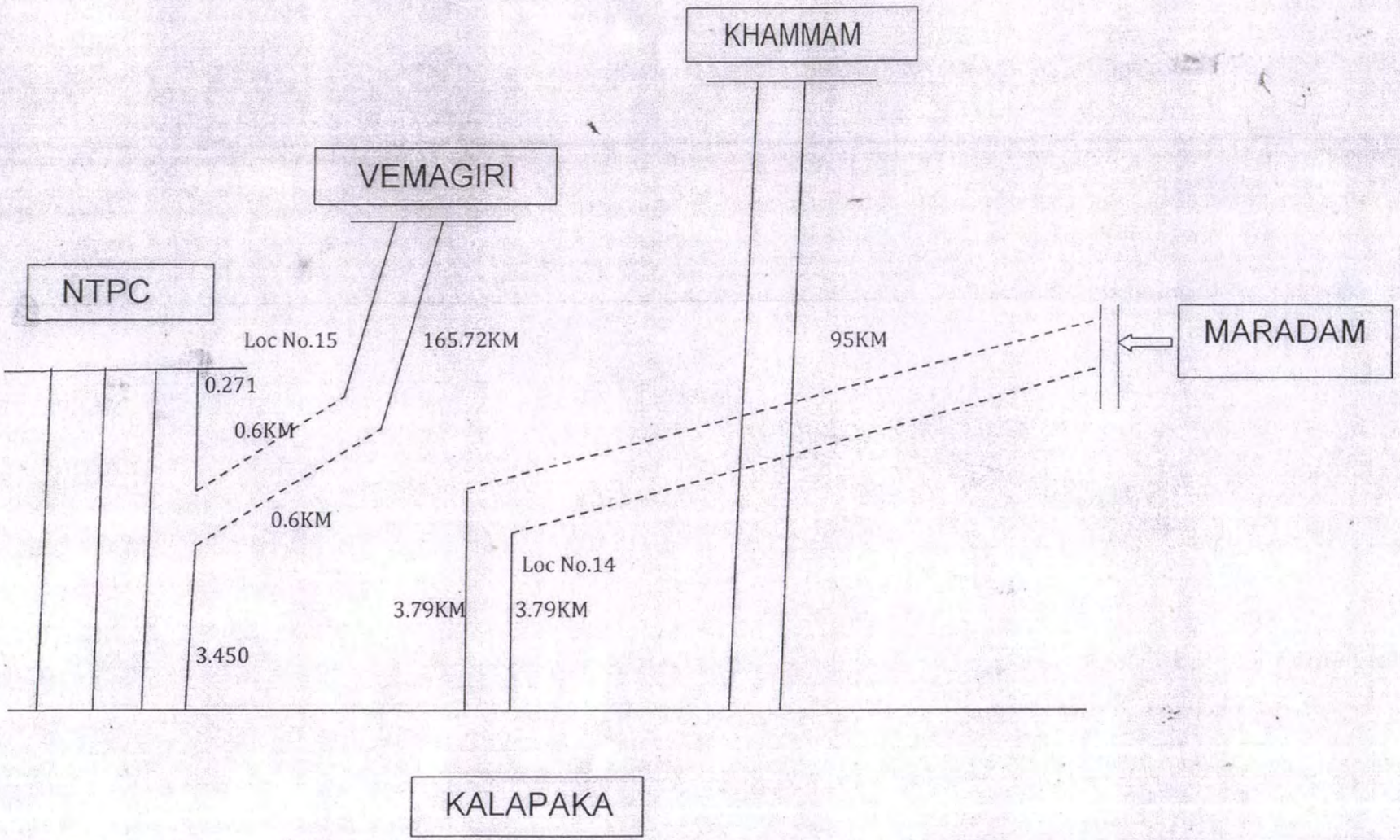
As such, it is requested to issue necessary approval for the said proposal duly conducting a special meeting if necessary (in advance to the original scheduled meeting) to avoid delay as the works to be taken up on top priority for completion of this important 400kV QMDC Tr. Line by June,2017.

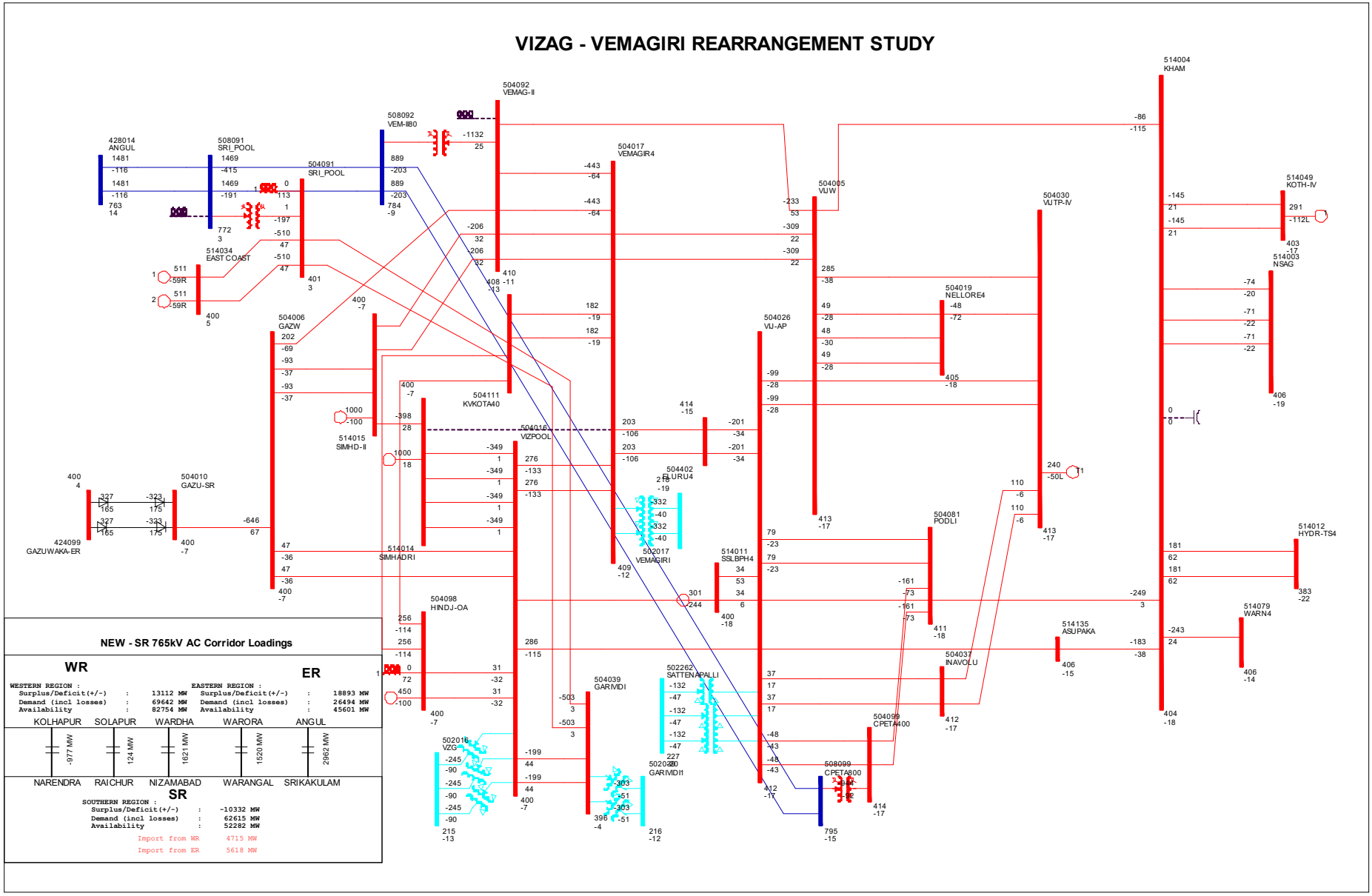
Yours faithfully,

DIRECTOR/PROJECTS

Copy to:

The Chief Engineer/IPC &PS/APTRANSCO/VS/Hyderabad *** to follow up with the CEA and see that the approval is obtained at the earliest duly submitting the relevant documents.


KHAMMAM
VEMAGIRI
NTPC
MARADAM
Loc No.15
165.72KM
95KM
0.271
0.6KM
0.6KM
Loc No.14
3.79KM
3.79KM
3.450
KALAPAKA


VIZAG - VEMAGIRI REARRANGEMENT STUDY
NEW - SR 765kV AC Corridor Loadings
WR
WESTERN REGION :
Surplus/Deficit(+/-) : 13112 MW
Demand (incl losses) : 69642 MW
Availability : 82754 MW
ER
EASTERN REGION :
Surplus/Deficit(+/-) : 18893 MW
Demand (incl losses) : 26494 MW
Availability : 45601 MW
KOLHAPUR
SOLAPUR
WARDHA
WARORA
ANGUL
-977 MW
124 MW
1621 MW
1520 MW
2962 MW
NARENDRA
RAICHUR
NIZAMABAD
WARANGAL
SRIKAKULAM
SR
SOUTHERN REGION :
Surplus/Deficit(+/-) : -10332 MW
Demand (incl losses) : 62615 MW
Availability : 52282 MW
Import from WR 4715 MW
Import from ER 5618 MW
428014 ANGUL
508091 SRI_POOL
504091 SRI_POOL
508092 VEM-II80
504092 VEMAG-II
504017 VEMAGIR4
514004 KHAM
514049 KOTH-IV
514003 NSAG
504030 VIJTP-IV
504005 VIJW
504019 NELLORE4
504026 VIJ-AP
514034 EAST COAST
504006 GAZW
504111 KVKOTA40
504016 VIZPOOL
514015 SIMHD-II
504010 GAZU-SR
424099 GAZUWAKA-ER
514014 SIMHADRI
504098 HINDJ-OA
504402 ELURU4
502017 VEMAGIRI
514011 SSLBPH4
504081 PODLI
514012 HYDR-TS4
514079 WARN4
514135 ASUPAKA
504037 INAVOLU
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502020 GARIMDI1
502016 VZG
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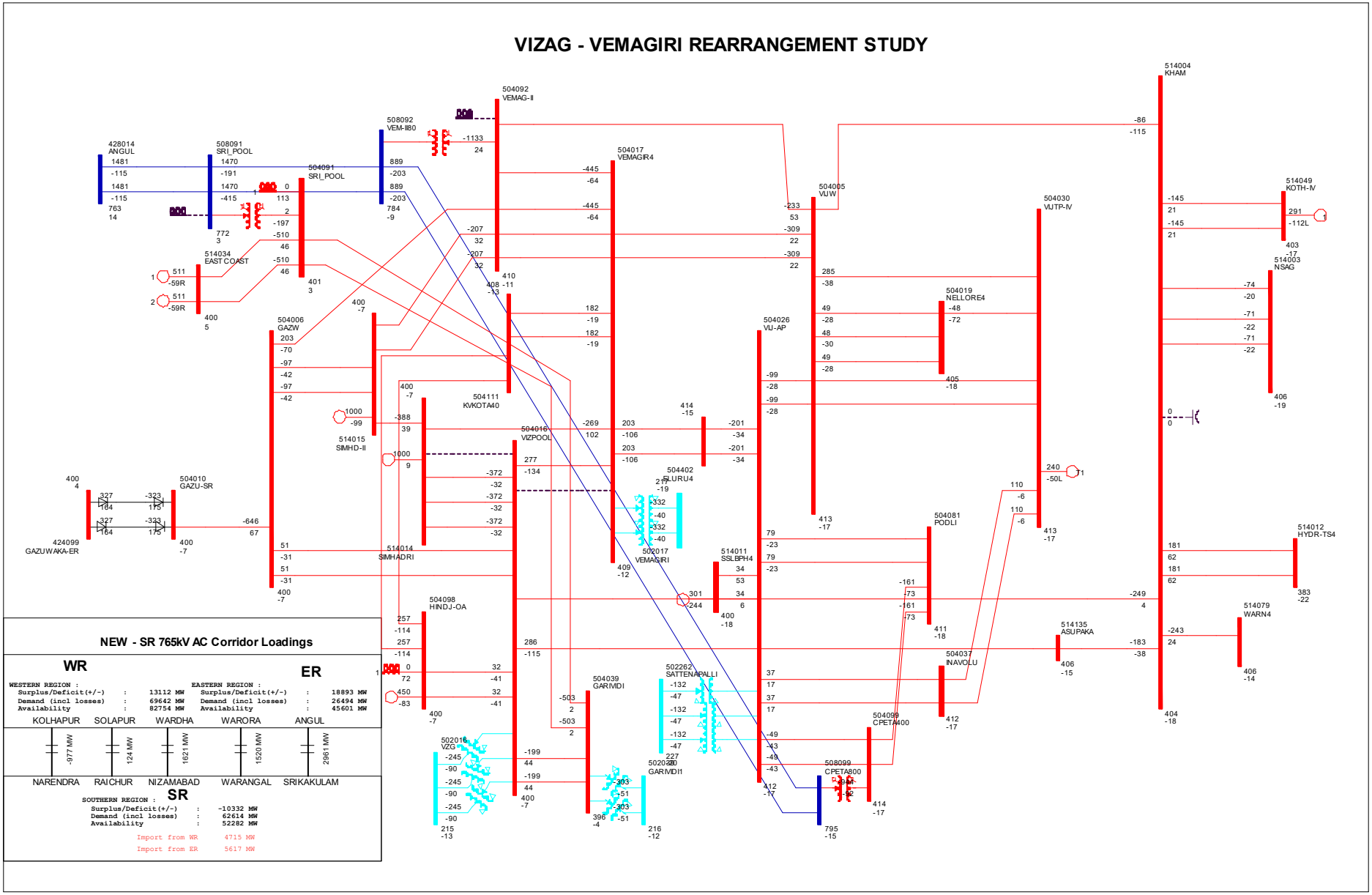
VIZAG - VEMAGIRI REARRANGEMENT STUDY
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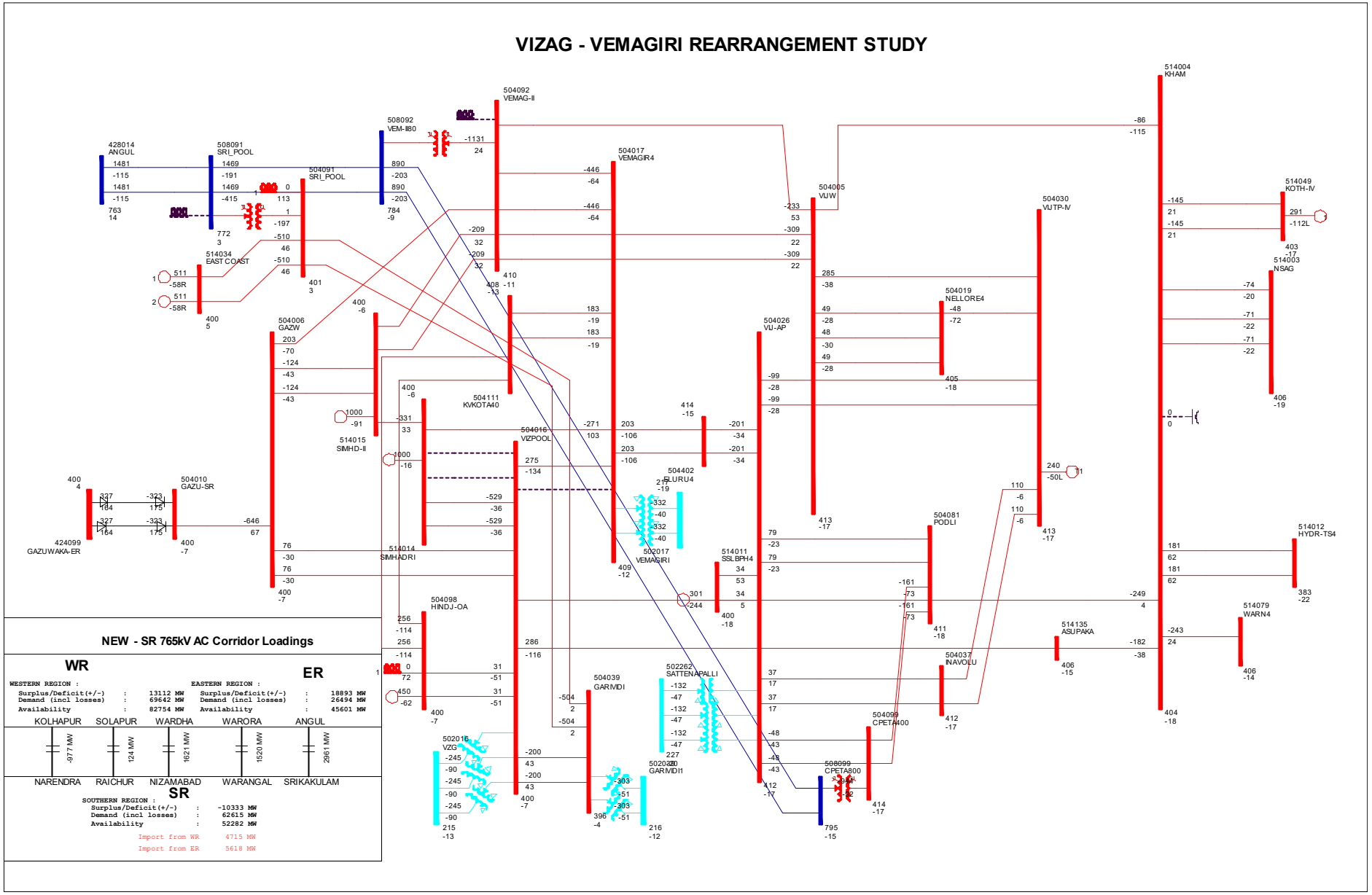
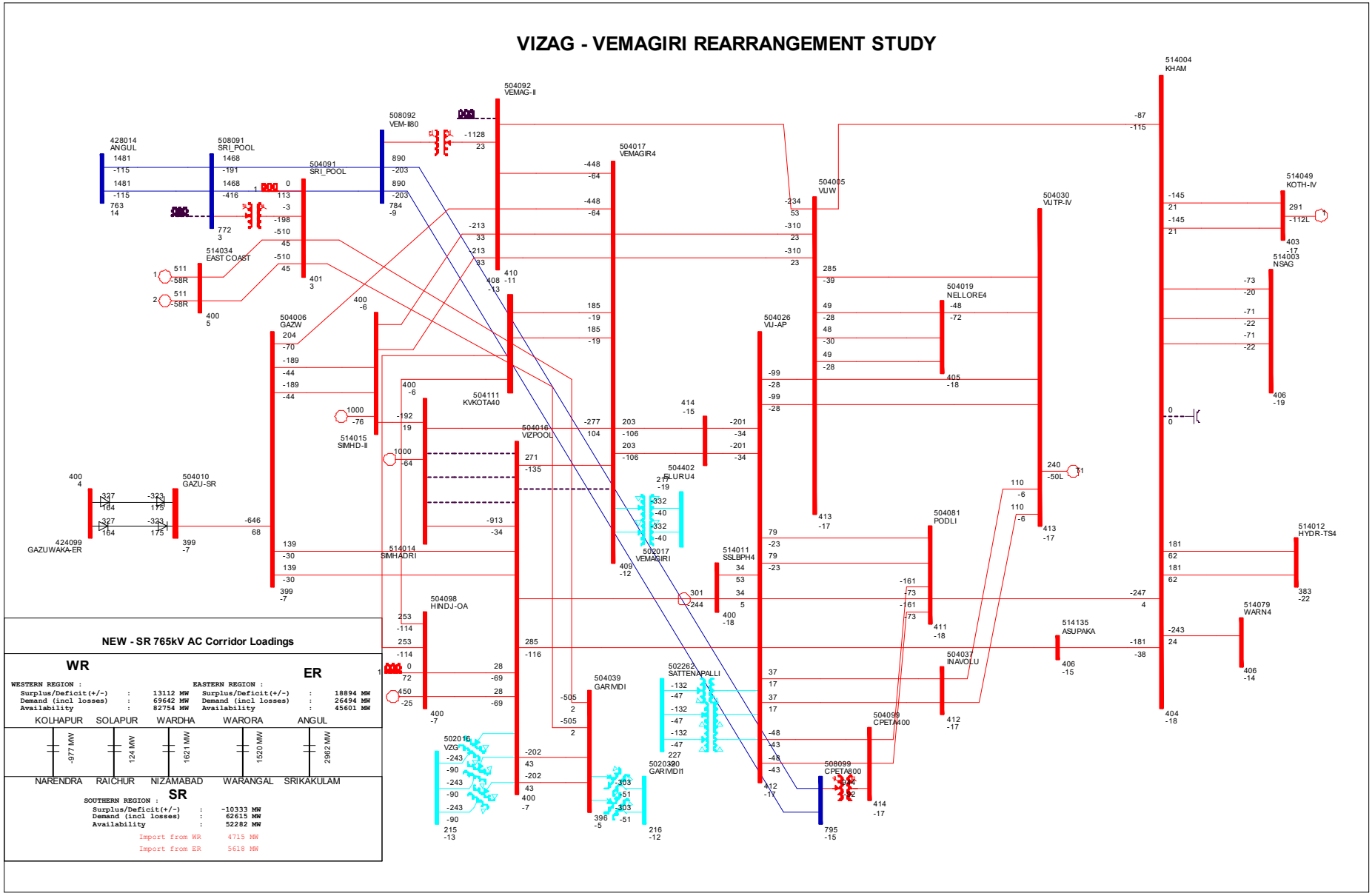
RAICHUR
NIZAMABAD
WARANGAL
SRIKAKULAM
SR
SOUTHERN REGION :
Surplus/Deficit(+/-) : -10332 MW
Demand (incl losses) : 62614 MW
Availability : 52282 MW
Import from WR 4715 MW
Import from ER 5617 MW

N-1 Contingency of Simhadri – Vizpool




VIZAG - VEMAGIRI REARRANGEMENT STUDY
NEW - SR 765kV AC Corridor Loadings
WR
ER
WESTERN REGION :
Surplus/Deficit(+/-) : 13112 MW
Demand (incl losses) : 69642 MW
Availability : 82754 MW
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Surplus/Deficit(+/-) : 18894 MW
Demand (incl losses) : 26494 MW
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KOLHAPUR
SOLAPUR
WARDHA
WARORA
ANGUL
-977 MW
124 MW
1621 MW
1520 MW
2962 MW
NARENDRA
RAICHUR
NIZAMABAD
WARANGAL
SRIKAKULAM
SR
SOUTHERN REGION :
Surplus/Deficit(+/-) : -10333 MW
Demand (incl losses) : 62615 MW
Availability : 52282 MW
Import from WR 4715 MW
Import from ER 5618 MW

सत्यमेव जयते

भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

केन्द्रीय विद्युत प्राधिकरण

Central Electricity Authority

विद्युत प्रणाली योजना एवं मूल्यांकन प्रभाग-II

Power System Planning & Appraisal Division-II

सं.: के.वि.प्रा./पी.एस.पी.ए.-II/2017/53/8/371-73-2 दिनांक :11.05.2017

To

The Director/Projects,
APTRANSCO,
Vidyut Soudha,
Hyderabad-500082

Subject: APTRANSCO –Supply, Erection, Testing and Commissioning of 400kV Quad Moose DC line from existing Kalpaka 400/220 kV SS to proposed 400/220 kV SS at Maradam,Vijayanagaram - 120kM on Turnkey Basis by making LILO of existing Kalpaka – Vemagiri 400kV TMDC line - Approval - requested - Reg

Reference: Lr No.Dir (Proj)/CE/400KVConst/SE/PM/400kV/D1A(S)/F.KLP-GRD/D.No. 50/17, Dt-30.01.17.

Sir,

1. APTRANSCO vide their letter no. dated 31/01/2017 has informed that due to severe ROW issue in Vennelapalem and Swayambhuvaram Villages, APTRANSCO proposed re-arrangement for completion of 400kV Quad Moode DC line from 400kV Kalpalka SS to 400kV Garividi SS (Maradam)
   i. The proposed 400kV QMDC line from Garividi SS (Maradam) is connecting to existing 400kV Kalpaka- Vemagiri DC line at loc No. 14 by disconnecting the 400 kV Kalpaka-Vemagiri DC line between location Nos. 14 & 15.
   ii The Loc No. 15 of 400kV Kalpaka-Vemagiri DC line will be connected to Loc No.2 of 400 kV Kalpaka –Simadhiri Circuit-I

2. The study has been carried out duly incorporating the above proposal and it is observed that loading on transmission line in order during N-1 contingency with rearrangement (study result at Annexure-I).

3. Considering above we convey in-principle approval for following schemes of APTRANSCO:
   i. 400kV Kalpaka –Garividi (Maradam) Twin Moose DC line

सेवा भवन, आर. के. पुरम-I, नई दिल्ली-110066 टेलीफोन : 011-26198092 ईमेल: ceatransplan@gmail.com वेबसाइट: www.cea.nic.in
Sewa Bhawan, R.K Puram-I, New Delhi-110066 Telephone: 011-26198092 Email:ceatransplan@gmail.com Website: www.cea.nic.in

ii. 400kV Vemagiri –Simhadri-I SC line
iii. 400kV Kalpaka-Vemagiri SC line
iv. 400kv Kalpaka- Simhadri-I lines (3 circuits)

4. This issue with the approval of Member (PS), CEA. The above scheme/modification in the scheme however, would be formalized in next meeting of SCPSPSR.

Yours faithfully,

P Jindal
11/09/2017

(प्रदीप जिंदल /Pardeep Jindal)
मुख्य अभियंता (वि प्र यो मू2 -)/ Chief Engineer (PSPA-II),

Copy to :

COO (CTU-Plg),
Power Grid Corp. of India Ltd.
"Saudamini", Plot No.2, Sector-29,
Gurgaon 122 001, Haryana.

TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED

From:
Chief Engineer/IPC & Power Systems
APTRANSCO,
Vidyut Soudha,
Hyderabad – 500 082

To
The Chief Engineer (SP & PA),
Central Electricity Authority,
Seva Bhavan, R.K.Puram,
NEW DELHI – 110 066

Lr. No. CE(IPC&PS)/SE(PS)/DE(SS&LTSS)/ADE-2/F. HNSS LIS/D. No. /2017, Dt. .06.2017

Sir,

Sub: Erection of 220 kV DC/SC line from 400/220 kV Nannur to 220 kV Brahmanakotkur – Alternate proposal to make LILO of 220 kV Nannur – Regumanugadda line to 220/11 kV Brahmanakotkur Substation due to passing of 220kV line in the inner horizontal surface area of the proposed Orvakal Green Field Airport – Request to include as agenda item for discussion in the forth coming Standing Committee Meeting - Reg.

* * *

APTRANSCO has accorded approval for erection of 220kV DC/SC line from 400/220kV Nannur SS to 220/11kV Brahmanakotkur SS for extension of power supply to 220/11kV Munchumari SS in Kurnool district and the subject works were commenced and stopped as this line is passing near to the inner horizontal surface area and may cause obstuction for further expansion of the proposed Orvakal Green Field Airport in Kurnool district.

In this context, APTRNSCO has conducted system studies and approved the alternate proposal to make power supply to 220/11 kV Brahmanakotkur SS by making LILO of 220 kV Nannur – Regumanugadda SC line. The same need the Standing Committee approval from M/s CEA as the proposed LILO line is connected to ISTS line. The load flow results and single line diagram are herewith enclosed. The same is sent through e-mail also. Mail Id: rishika_sh@yahoo.com. kanchanchauhan.cea@gmail.com. sgupta@powergridindia.com

It is requested to include the above proposal as an agenda item for discussion in the forth coming 41st Standing Committee meeting.

Encl: As above.

Yours faithfully,

23/6/17

Chief Engineer (IPC & Power Systems)

Copy to:
Smt Seema Gupta, COO
PGCIL, 'Saudamini' Plot NO.2 Sector-29,
GURGAON - 122001, Haryana.

ANNEXURE-25.2

सत्यमेव जयते

भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

केन्द्रीय विद्युत प्राधिकरण

Central Electricity Authority

विद्युत प्रणाली योजना एवं मूल्यांकन प्रभाग-II

Power System Planning & Appraisal Division-II

No. 51/4/(41[illegible])/2017/PSPA-2/556-558 Dated 27.07.2017

To,

1. Sh Mukesh Khanna,
   AGM(CTU-Plannning)
   Power Grid Corporation of India Ltd.,
   "Saudamini" Plot no-2, Sector-29,
   Gurugram- 122001, Haryana

2. Director/Projects & Grid operation,
   TSTRANSCO,
   Vidyut Soudha,
   Hyderabad-500082

3. Chief Engineer/IPC & Power Systems
   APTRANSCO,
   Vidyut Soudha,
   Hyderabad-500082

Subject: Minutes of the meeting held on 10.07.2017 to discuss the issues relating to Asupaka S/S of the state of Telangana and LILO of Nannur (AP)-Regumanugadda (Telangana) 220kV S/C line at Brahmankotkur (AP).

Sir/Madam,

A meeting was held on 10 July, 2017 (Monday) in Central Electricity Authority to discuss the issues relating to Asupaka S/S of the state of Telangana and LILO of Narnoor(AP)-Regumanugadda (Telangana) 220kV S/C line at Brahmankotkur (AP).

The minutes of the meeting is enclosed herewith.

Yours faithfully,

22.7.17

(B.S.Bairwa)
Director

Minutes of the meeting held in CEA at Delhi on 10.07.2017 to discuss the issues relating to Asupaka S/S of the state of Telangana and LILO of Nannur(AP)-Regumanugadda (Telangana) 220kV S/C line at Brahmankotkur (AP)

The list of participants is enclosed at Annex-I.

1. Chief Engineer (PSPA-II) CEA welcomed the participants. He informed that the meeting was convened to discuss the issues relating to Asupaka S/S and LILO of Nannur(AP)-Regumanugadda (Telangana) 220kV S/c line at Brahmankutkur (AP).

2. Representative of TSTRANSCO stated that APTRANSCO (before bifurcation of states) had planned a 400/220kV Sub-station at Asupaka (2x315 MVA) with LILO of one circuit of 400kV Kalpaka - Khammam D/C Line at Asupaka SS. The downstream connectivity to meet the LI loads under Indira Sagar Rudramakota Lift Irrigation Scheme was as under :

   (i) Asupaka - Medipally 220kV D/C line (12.01km)
   (ii) Asupaka - Bandarugudem 220kV D/C line (14.84km)
   (iii) 220/11kV Medipally Substation (2x25MVA)
   (iv) 220/11kV Asupaka SS (3x50MVA)
   (v) 220/11kV Bandarugudem SS (3x50MVA)

3. TSTRANSCO further informed that after formation of Telangana State, the works in 220kV substations at Medipally and Bandarugudem were stopped as the intake pump house and gravity canal etc came under the geographical limits of Andhra Pradesh. However, work at Asupaka remain in progress.

4. Presently the works of 400/220kV Asupaka Sub- Station and LILO of one circuit of 400kV Kalpaka - Khammam D/C Line have been completed and are ready for charging. The works of 220/132kV Line and associated Sub Stations are under progress.

5. For effective utilization of 400/220kV Asupaka Substation which came under newly created Telangana state, TANTRANSCO proposed to revise 220/132kV downstream connectivity as follows:
   (i) Upgradation of existing 132/33kV Aswaraopet SS to 220kV with 2x100MVA, 220/11kV transformer.
   (ii) Asupaka -Aswarapet 220kV D/C (20km)
   (iii) Stringing of 2nd circuit on the existing Aswaraopet - B.Gangaram 132kV S/C Line on D/C tower (30km).

6. Chief Engineer (PSPA-II), CEA enquired about the earlier discussion regarding of proposed 400/220kV Substation at Asupaka and LILO of 400kV Kalpaka –Khamman line. TSTRANSCO informed that 400kV Kalpaka - Khammam Line and 400/220kV Asupaka substation were intra-state transmission elements and not discussed in any Standing Committee Meeting of Southern Region.

7. Representative of APTRANSCO stated that the LI schemes proposed to be feed from Asupaka 400/220kV Substation (before bifurcation of states) had been scrapped and works related to Meddipply and Bandarugudem had been stopped. She stated that the proposed LILO of one circuit of Kalpaka –Khamman 400kV D/C line at Ashupaka Sub station and the 220/132kV downstream connectivity was agreeable to Andhra Pradesh.

8. CE (PSPA-II) stated that reactive compensation requirement need to be studied for line charging and control of over voltage as the length of Kalpakka – Asupaka 400 kV S/c line (265 kms) was significant. CTU was requested to carry out relevant studies for reactive compensation requirement. Representative of CTU agreed for the same.

9. Representative of TSTRANSCO informed that APTRANSCO has accorded Administrative approval for extension of 220kV power supply for a Contract Maximum Demand of 450 MW to the pumping stations at Regumanugadda (Stage-I), Jonnalaboguda (Stage-II) and Gudipalligattu (Stage-III) under Mahatma Gandhi Kalwakurthy Lift Irrigation (MGKLI) Scheme in Mahaboobnagar District.
   The MGKLI Scheme envisages to get feed from three sources of supply i.e.
   i. Wanaparthy 220kV to Regumanugadda (Stage-I) via Singotam
   ii. Nannur 400kV SS (Andhra Pradesh) to Regumanugadda (Stage-I)
   iii. 400kV Veltoor SS to Gudipalligattu (stage-III).

10. TSTRANSCO added that work relating Nannur SS (AP) - Regumanugadda (Telangana) 220kV S/C line had been completed. As the line is an Inter-state transmission asset after bifurcation of Andhra Pradesh and Telangana States, TSTRANSCO requested for approval to energize the line.

11. Since, APTRANSCO and CTU had no objection in energizing the line, it was agreed in principle that the Nannur SS (AP) - Regumanugadda (Telangana) 220kV S/C line can be charged.

12. Representative of APTRANSCO stated that they had planned Nannur - Brahmankotkur 220kV S/C line for extension of power supply to 220/11kV Munchumari S/S in Kurnool district but the works could not be taken up as the line is passing through the area near to proposed Orvakal Green Field Airport. Therefore, APTRANCO had now proposed to LILO the Nannur-Regumanugadda 220kV S/C line,

which was an ISTS line between Andhra Pradesh and Telangana at 220/11kV Brahmankotkur Substation.

13. The Representative of TSTRANSCO stated that they agree with the proposal for LILO Nannur(AP) –Regumanugadda 220kV S/C line at Brahmankotkur.

After deliberation, following issues were agreed in principle:

A. TSTRANSCO would be allowed to charge 400kV Asupaka S/S (2x315MVA, 400/220kV) and LILO of one circuit of 400kV Kalpaka-Khammam Line to 400kV SS. CTU will carry out the study for reactive compensation requirement at 400kV Asupaka Substation for line charging and over voltage control. The charging of line and energization of Asupaka substation is to be planned properly with the reactors available at Khammam and Kalpaka end.

B. Nannur SS (AP) - Regumanugadda (Telangana) 220kV S/C line can be charged.

C. LILO of Nannur(AP) –Regumanugadda (Telangana) 220kV S/C line at Brahmankotkur (AP) can be carried out by APTRANSCO.

D. These matters will be further discussed in the next Standing Committee meeting on Power System Planning of Southern Region.

Annexure- I

List of participants of the meeting held on 10.07.2017 to discuss the issues relating to Asupaka S/S of the state of Telangana and LILO of Narnoor(AP)-Regumanugadda (Telangana) 220kV S/C line at Brahmankotkur (AP)

S.No.	Name	Designation	Organization
1	S. K. Ray Mohapatra	Chief Engineer (PSPA-II)	CEA
2	B S Bairwa	Director (PSPA-II)	CEA
3	Kanchan Chauhan	AD-I (PSPA-II)	CEA
4	Pranay Garg	AD-I (PSPA-II)	CEA
5	V Thiagarajan	DGM	CTU
6	VMS Prakash Y	Dy. Mgr.	CTU
7	K Nirmala	DE/SS&LTSS	APTRANSCO
8	Y K Ramakrishna	ADE/System studies	APTRANSCO
9	A Sreenivasa Reddy	SE/PS	TSTRANSCO
10	M Sheshagiri	DE/SEII	TSTRANSCO

TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED

From:
Chief Engineer/IPC & Power Systems,
APTRANSCO,
Vidyut Soudha, Gunadala,
Vijayawada – 520008

To
The Chief Engineer (PSP & A-II),
Central Electricity Authority,
Seva Bhavan, R.K.Puram,
NEW DELHI – 110 066

Lr. No. CE(IPC&PS)/SE(PS)/DE(SS&LTSS)/ADE-2/F. SCM/D. No.308 /2017,
Dt.03.08.2017

Sir,

Sub: APTRANSCO – Inclusion of 2 Nos. items in the Agenda discussion in the forthcoming 41st Standing Committee Meeting - Reg.

* * *

APTRANSCO have proposed the following 2 Nos. items to include in the agenda items for discussion in the forthcoming 41st Standing Committee Meeting.

Item:I Proposal for extension of 398.7 MW of power supply to Chintalapudi Lift Irrigation Scheme at 220 kV and 132 kV level at three stages in West Godavari district.

Item:II Proposal for replacement of Moose conductor with Invar conductor on existing 400 kV TMDC line from VTS-IV to Sattenapalli instead of erection of proposed 2nd DC line from VTS-IV to Sattenapalli with Quad Moose.

The details of the schemes proposed are detailed on Annexure – I & II and are herewith enclosed.

Hence, it is requested to include the above proposals in the Agenda Items for discussion in the forth coming Standing Committee meeting.

Transmission Corporation of Andhra Pradesh Ltd. DESPATCHED 8/8/2017

Yours faithfully,

2-8-17

Chief Engineer (IPC & Power Systems)

Copy to:-

Smt Seema Gupta, COO
PGCIL, 'Saudamini' Plot NO.2 Sector-29,
GURGAON - 122001, Haryana.

ANNEXURE - I

Item: I

APTRANSCO proposed the following dedicated scheme for extension of 398.7 MW of power supply to Chintalapudi Lift Irrigation Scheme at 220 kV and 132 kV level in three stages in West Godavari district.

For Stage - I (97.1 MW) & Stage – II (267 MW)

i. Erection of 400/220 kV Substation at Guddigudem with 2 x 315 MVA PTRs
ii. Erection of 220/11 kV Substation at Thadipudi
iii. Making of 400 kV DC LILO (1 KM approx.) of 400 kV HNPCL - KV Kota DC line at proposed 400 kV Guddigudem SS.
iv. Laying 220 kV DC line (18 KM approx.) from 400/220 kV Guddigudem to proposed 220/11 kV Thadipudi SS.

For Stage – III (34.6 MW)

v. Erection of 132/11 kV Reddyganapavaram SS.
vi. Erection of 132/11 kV Routhugudem SS.
vii. Laying 132 kV DC line (30 KM approx.) from 220 /132 kV KV Kota SS to proposed 132/11 kV Reddyganapavaram SS.
viii. Laying 132 kV DC line (4 KM approx.) from Reddyganapavaram SS to proposed 132/11 kV Routhugudem SS.

The load flow results are enclosed herewith. The same is sent through e-mail also.

ANNEXURE - II

Item: II

APTRANSCO has accorded approval for erection of 400 kV Quad Moose DC line from VTS to Sattenapalli SS for evacuation of 1 x 800 MW power plant of APGENCO at Dr. NTTPS, Vijayawada. The same was approved in the 39th Standing Committee Meeting held on 28th & 29th December 2015.

In this regard, it is to inform that due to Right of Way problems and up-coming new Capital Region area, it is not possible to lay the another 400 kV Quad Moose DC line from VTS to Sattenapalli SS for evacuation of evacuation of 1 x 800 MW power plant of APGENCO at Dr. NTTPS, Vijayawada.

Hence, APTRANSCO proposed for replacement of Moose conductor with Invar conductor on existing 400 kV TMDC line from VTS-IV to Sattenapalli SS instead of erection of proposed 2nd DC line from VTS-IV to Sattenapalli with Quad Moose for evacuation of evacuation of 1 x 800 MW power plant of APGENCO at Dr. NTTPS, Vijayawada.

KERALA STATE ELECTRICITY BOARD LIMITED

(Incorporated under the Indian Companies Act,

Office of the Director (Transmission & System Operation)
Reg.Office: Vydyuthi Bhavanam, Pattom, Thiruvananthapuram – 695 004, Kerala
Phone: +91 471 2514528, E-mail: ssgcecp@ksebnet.com, eerplg@ksebnet.com
Website: www.kseb.in.CIN :U40100KL2011SGC027424

No.: D(T&SO)/PSE/SCPSP/2017-18/46 **Date: 09.05.2017**

To,

1) Sri. Pardeep Jindal
Chief Engineer (SP&PA-1)
System Planning & Project Appraisal Committee
Central Electricity Authority
Sewa Bhavan, R.K Puram
New Delhi – 110066.

2) The Chief Operating Officer
Power Grid Corp. of India Ltd
"Saudamini", Plot no.2, Sector – 29
Gurgaon 122001, Haryana.

Sir,

Sub: Implementation of 220kV substation, Aluva by drawing 220kV DC feeder from 400kV substation at Cochin East owned by M/s PGCIL – Request for two additional 220kV bays at 400kV substation at Cochin East – reg.

Ref: Nil.

The power from the 2000MW HVDC station, currently under implementation at Thrissur, is planned to be evacuated by LILO-ing of 400kV Cochin East – Madakathara D/c line at the HVDC Station. At present 220kV downstream connectivity from 400kV Substation Cochin East (Pallikkara) is only towards 220kV Substations of KSEBL at Kalamassery and Bhramapuram. Accordingly for economic and efficient evacuation of power available at 400kV substation, Cochin East, additional 220kV outlets are to be planned. It is reported that 2 nos. of spare feeder bays are available at 400kV substation at Cochin East.

The demand growth of Ernakulam district is considerable and is one of the major industrial hubs of the State. It is also hosting several strategic institutions like Southern Naval Command, Cochin Port, Naval Physical and Oceanographic Laboratory, Cochin Refinery etc. Hence having a strong networked source of 220kV substations will be beneficial for providing a stable and reliable power supply to the area. Accordingly KSEBL has proposed upgrading the 110kV Substation at Aluva to 220kV by constructing a 220kV D/c feeder from 220kV Substation Kalamassery. This work is planned under the Transgrid 2.0 project of KSEBL and was already sanctioned during the 39th meeting of the SCPSP. Aluva is a major load centre of Kerala, now being fed from 220kV substation, Kalamassery at 110kV level and partly supported by 66kV line from Pallivasal hydro electric station. The proposed 220kV

Substation at Aluva was sanctioned with 8 feeder bays, 2 transformer bays and one bus coupler bay.

But considering the difficulty in obtaining a RoW for the proposed 220kV link to Aluva from 220kV S/s Kalamassery and in order to facilitate a 220kV Substation having a source from 400kV Substation, the 220kV connectivity to 220kV Substation Aluva is proposed from 400kV substation Cochin East, by constructing 11.1 km 220kV D/c feeder through multi circuit towers. Feeding Aluva at 220kV level from 400kV substation, Cochin East will provide redundancy and enable KSEBL to efficiently evacuate power from the HVDC node, made available through the above ISTS substation.

Hence it is requested that sanction may kindly be accorded for the construction of a 220kV D/c feeder from 400kV Substation Cochin East to 220kV Substation Aluva in lieu of the already sanctioned 220kV D/c connectivity from 220kV Substation Kalamassery and for sparing two additional bays available at 400kV substation Cochin East of PGCIL for the same.

Yours faithfully,

Sd/-
Director
(Transmission & System Operation)

KARNATAKA POWER TRANSMISSION CORPORATION LIMITED

Telephone: 080-22210416
Fax : 080-22292204

Office of the
Chief Engineer Electy,.
Planning & Co-ordination,
Kaveri Bhavan, Bangalore-9

No. CEE (P&C)/SEE(Plg)/EE(PSS)KCO-97/64345/2016-17 Date: 16 JAN 2017
15436-40

The Member (Power systems),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi-110 066.

Sir,

Sub: Evacuation of proposed additional 2 X 800 MW generation of M/s Udupi Power Corporation Ltd., (subsidiary of Adani Power Ltd.,).

Ref: 1. T.O Ltr no. CEE (P&C)/SEE(Plg)/EE(PSS)KCO-97/34319/2015-16/ 12833-87 dated 2nd March, 2016.

*****

The evacuation scheme for proposed additional 2 X 800 MW generation units Of M/s UPCL to the existing 2 X 600 MW units at their coal based Thermal Power Plant at Yelluru Village in Udupi District of M/s Udupi Power Corporation Ltd., (subsidiary of Adani Power Ltd.,) evolved based on studies conducted in-house was earlier communicated to CEA vide letter under reference (1) and it was requested to arrange for conducting necessary joint studies in consultation with M/s PGCIL in order to finalise the evacuation scheme for proposed additional 2 X 800 MW generation units of M/s UPCL.

During the Joint studies conducted at SRPC, Bangalore from 14th to 17th March, 2016 to resolve/review certain issues raised in the 39th meeting of Standing Committee on Power System Planning of Southern region it was directed by the Chief Engineer, PSPA-II, CEA to conduct further in-house study for evacuation of proposed additional 2 X 800 MW generation units of M/s UPCL by considering a new 400 kV sub-station in-between Bengaluru and Mysore with 400 kV connectivity from Hassan (Shantigrama) in view of relieving loading of 400 kV Hassan - Mysore (Bastipura) line and for reliable evacuation of power from the proposed 2 X 800 MW generation units of M/s UPCL. It was also instructed to examine the voltage angle separation between the adjacent 400 kV buses i.e. UPCL and Hassan (Shantigrama) during single circuit

outage of 400 kV UPCL-Hassan Quad Moose DC line without considering 400 kV UPCL-Kasargod line to be in service.

Accordingly studies have been revised by considering a new 400/220 kV sub-station at TK Halli with 400 kV DC line from M/s UPCL and other 400 kV sub-stations planned by KPTCL. The results of load flow study are enclosed as annexure for further needful. The transmission scheme evolved is as mentioned below.

- **400 kV UPCL – TK Halli Quad Moose DC line**
- **Establishing 400/220, 2 X 500 MVA TK Halli s/s**
- **400 kV TK Halli - Somanahalli Quad Moose DC line**

It is hereby requested to obtain and accord approval of the Standing Committee of Power System Planning of Southern Region for the above evacuation scheme of the proposed additional 2 X 800 MW generation units of M/s UPCL.

Yours faithfully

16/1/17

Chief Engineer Electy.,

(Planning & Co-ordination)

Copy to the:

1. Chief Engineer (SP&PA), Central Electricity Authority, Sewa Bhavan, R.K Puram, New Delhi-110066.
2. Director (SP&PA), Central Electricity Authority, Sewa Bhavan, RK Puram, New Delhi-110066.
3. Chief Operating officer (CTU-planning), PGCIL, Saudamini, Plot No.2, Sector 29, Gurgaon-122001.
4. E.A to Director (Transmission), KPTCL, Kaveri Bhavan, Bangalore to place it before The Director (Transmission).

30.2

KARNATAKA POWER TRANSMISSION CORPORATION LIMITED

Telephone: 080-22210416
Fax : 080-22292204

Office of the
Chief Engineer Electy,.
Planning & Co-ordination,
Kaveri Bhavan, Bangalore-9

No. CEE (P&C)/SEE(Plg)/EE(PSS)KCO-97/81346/2017-18 Date: 5 JUN 2017

4446-50

The Member (Power systems),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi-110 066.

Sir,

Sub: Revised evacuation scheme of proposed additional 2 X 800 MW generation of M/s Udupi Power Corporation Ltd., (subsidiary of Adani Power Ltd.,).

Ref: T.O Ltr no. CEE (P&C)/SEE(Plg)/EE(PSS)KCO-97/64345/2016-17/15436-40 Dated 16th Jan 2017.

*****

The evacuation scheme for proposed additional 2 X 800 MW generation units Of M/s UPCL to the existing 2 X 600 MW units at their coal based Thermal Power Plant at Yelluru Village in Udupi District of M/s Udupi Power Corporation Ltd., (subsidiary of Adani Power Ltd.,) evolved based on studies conducted in-house was communicated to CEA vide letter under reference (1) and it was requested to arrange for conducting necessary joint studies in consultation with M/s PGCIL in order to finalise the evacuation scheme for proposed additional 2 X 800 MW generation units of M/s UPCL. The transmission scheme is as mentioned below.

- Construction of 400 kV UPCL-T.K.Halli DC line with Quad Moose conductor.
- Establishing 2x500 MVA, 400/220 kV sub-station at T.K.Halli.
- Construction of 400 kV T.K.Halli-Somanahalli DC line with Quad Moose conductor.

It may be noted that the above proposed transmission scheme involves construction of 400 kV DC line between UPCL and TK Halli which passes through the Western Ghats comprising of dense forest and eco-sensitive zone for a distance of about 55 km. In view of various environmental and execution related issues and to avoid uncertainties in getting forest clearance and timely completion of the project the proposed evacuation scheme for additional 2 X 800 MW units of M/s UPCL is revised as follows.

CE (PSPA-II)

Ms. Kanchan, AD

Pls discuss

i. Re-conductoring of existing 400 kV UPCL-Hassan (Shantigram) DC line with HTLS conductor from UPCL to proposed 400 kV Hebbanahalli sub-station (400 kV Hebbanahalli s/s as approved in Yethinahole Drinking Water supply Project Scheme).

ii. Establishing 2 X 500 MVA, 400/220 kV sub-station at TK Halli.

iii. 400 kV DC line with Quad Moose conductor from proposed 400 kV Hebbanahalli s/s to proposed TK Halli s/s.

iv. 400 kV DC line with Quad Moose conductor from proposed 400 kV TK Halli s/s to 400 kV Somanahalli s/s.

Load flow study is conducted for 2021-22 time frame for the revised evacuation scheme. Results are enclosed as annexure.

It is hereby requested to obtain and accord approval of the Standing Committee of Power System Planning of Southern Region for the proposed revised evacuation scheme of the additional 2 X 800 MW generation units of M/s UPCL.

Yours faithfully

Chief Engineer Electy.,
(Planning & Co-ordination)

Copy to the:

1. Chief Engineer (SP&PA), Central Electricity Authority, Sewa Bhavan, R.K Puram, New Delhi-110066.
2. Director (SP&PA), Central Electricity Authority, Sewa Bhavan, RK Puram, New Delhi-110066.
3. Chief Operating officer (CTU-planning), PGCIL, Saudamini, Plot No.2, Sector 29, Gurgaon-122001.
4. E.A to Director (Transmission), KPTCL, Kaveri Bhavan, Bangalore to place it before The Director (Transmission).

ANNEXURE-31

41 SP

KARNATAKA POWER TRANSMISSION CORPORATION LIMITED

Telephone: 080-22210416
Fax : 080-22292204

Office of the
Chief Engineer Electy,.
Planning & Co-ordination,
Kaveri Bhavan, Bangalore-9

No. CEE (P&C)/SEE(Plg)/EE(PSS)/KCO-97/64329/2016-17 **Date: 14 DEC 2016**

13038-40

The Member (Power Systems),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi-110 066.

Sir,

Sub: Installation of 2x125 MVAR bus reactor at UPCL Switchyard

Ref: 1. PCKL Letter No: PCKL/A1/12/2005-06/3521-26 Dated: 8th November 2016

2. UPCL letter no: UPCL/B08E/2016/12518 Dated 26th October 2016

*****

M/s Udupi Power Corporation Ltd.,(A Subsidiary of Adani Power Limited) vide letter cited under reference has requested approval for installation of 2x125 MVAR bus reactors at UPCL switchyard. M/s UPCL has mentioned that the installation of bus reactor is essential due to following reasons:

a) To control the prevailing system over voltages.
b) To avoid premature failure of the critical equipment like Generator transformer, Current transformer, voltage transformer due to 400 kV voltages at Udupi switchyard being on higher side.
c) To maintain voltage within limits as per CEA transmission planning criteria.
d) To offer required redundancy.

CEA in 39th meeting of Standing Committee on Power System Planning of the Southern Region held on 28th and 29th Dec, 2015 has recommended the same for power system security.

Further, M/s UPCL has requested Power Company of Karnataka Ltd., (PCKL) to accord approval to take steps for the commissioning at the earliest in order to mitigate the prevailing overvoltage conditions. M/s UPCL has prepared detailed report for studies for overvoltage conditions and submitted the results along with the letter and has also informed that Central Electricity Regulatory Commission (CERC) will be approached for necessary approval under Tariff Regulations.

In this regard, it is requested for suggestion/opinion regarding the necessity of installing 2x125 MVAR bus reactor at 2x600 MW UPCL switchyard. It is also requested to arrange for necessary joint study in consultation with CTU to ensure the necessity of installing bus reactors at UPCL for existing network arrangements with the present loading conditions .

Yours faithfully

12/12/16

Chief Engineer Electy.,
(Planning & Co-ordination)

Copy to the:

1. Chief Engineer, PSP&A-II, Central Electricity Authority, Sewa Bhavan, RK Puram, New Delhi-110066.
2. E.A to Director (Transmission), KPTCL, Kaveri Bhavan, Bangalore to place it before The Director (Transmission).
3. MF/OC.

ANNEXURE-32.1

KARNATAKA POWER TRANSMISSION CORPORATION LIMITED

Telephone: 080-22210416
Fax : 080-22292204

Office of the
Chief Engineer Electy,.
Planning & Co-ordination,
Kaveri Bhavan, Bangalore-9

No. CEE (P&C)/SEE(Plg)/EE(PSS)KCO-97/64345/2016-17 **Date:** 14 FEB 2017

Encl - 1 sheet 17766-70

The Member (Power systems),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi-110 066.

Sir,

Sub: Proposals for 400 kV network strengthening of Karnataka for approval - reg.

Ref: 1. T.O Ltr No. CEE(P&C)/SEE(Plg)/EE(PSS)KCO-97/64329/2016-17 dated 1st August, 2015.
2. T.O Ltr No. CEE(P&C)/SEE(Plg)/EE(PSS)KCO-97/34319/2015-16 dated 24th June, 2015.

*****

KPTCL is planning to establish 2 X 500 MVA, 400/220 kV sub-station at Huliyurdurga in Tumkur district with LILO arrangement of existing 400 kV Nelamangala-Bastipura (Mysore) DC Twin Moose line. The proposed 400 kV sub-station is intended to relieve loads of 400 kV Nelamangala and Bastipura sub-stations and provide reliable power supply to the 220 kV sub-stations in the vicinity.

Load flow is conducted with the following transmission scheme of the proposed 400 kV Huliyurdurga. Results are placed as annexure.

- Double LILO of 400 kV Nelamangala - Bastipura Twin Moose line to Huliyurdurga
- 2 X 500 MVA, 400/220 kV Transformers
- LILO of proposed 220 kV Anchepalya – Nagamangala line to Huliyurdurga with conversion of SC to DC line

It is requested to accord approval of Standing Committee for establishing 400 kV sub-station at Huliyurdurga in Tumkur district .

Also, KPTCL vide letter cited under reference (3) had informed that M/s. Karnataka Neeravari Nigama Ltd., (M/s. KNNL) a Govt. of Karnataka undertaking has requested KPTCL for arranging power supply to an extent of 219.44 MW for "Yethinahole Integrated drinking water supply Project" estimated to cost around Rs. 13,000 crores to provide drinking water supply to Districts of Kolar and Chikkaballapur in Karnataka by diverting water from

Netravati River flowing in the western Ghats of Karnataka.. The said request of M/s. KNNL was examined in detail and approval was accorded by KPTCL granting scheme of connectivity with the Grid for the said project with the proposal to put up a 400/220 KV, 4x167 MVA capacity sub station near Hebbanahally village at a distance of 0.6 KM from the existing 400 kV DC line by double LILO arrangement and to have one no. of 220/66 KV sub-station with 2x50 MVA capacity in the downstream to feed the consumer stations of M/s. KNNL. Since the said arrangement would amount to effecting modification to the existing 400 kV network, the same is brought to the notice of Central Electricity Authority with request to obtain and communicate the approval of Standing committee.

Further, establishing 3 x 500 MVA, 400/220 kV sub-station at Mylasandra (Electronic City) in Bangalore is approved with LILO of 400 kV Somanahalli-Kolar SC Twin Moose line. The land for the proposed 400 kV station is in KPTCL's possession and DPR is under preparation. In this context, KPTCL vide letter dated 24th June, 2015 had requested for strengthening of upstream lines to 3 X 500 MVA, 400/220 kV Mylasandra sub-station in view of substantial load growth in the vicinity by conducting necessary joint studies in consultation with PGCIL.

KPTCL vide letter dated 24th June 2015 had communicated to CEA to accord approval for evacuation of power from 2 X 700 MW gas based combined cycle power plant of M/s M/s Karnataka Power Corporation Ltd.,(KPCL) at Bidadi through extended bus connectivity at 400 kV voltage level with the existing 400/220 kV PGCIL Bidadi sub-station.

M/s KPCL has approached KPTCL for evacuation scheme for evacuation of power from 2 X 700 MW gas based combined cycle power plant at Bidadi. Government of Karnataka has accorded approval to allocate the entire power generated from Bidadi Combined Cycle Power Plant to Bangalore Electricity Supply Company Ltd., (BESCOM). The 400kV switchyard of KPCL generation and 400/220 kV PGCIL sub-station at Bidadi are located adjacent to each other. Hence the possibility of evacuation of power from the proposed generation may be considered through extended bus connectivity at 400 kV voltage level with the existing 400/220 kV PGCIL Bidadi sub-station in order to minimise the issue of space constraint and RoW issues.

It is hereby requested to arrange for placing the above proposals in the ensuing Meeting of Standing Committee on Power System Planning of Southern region for approval.

Yours faithfully

13/2/17

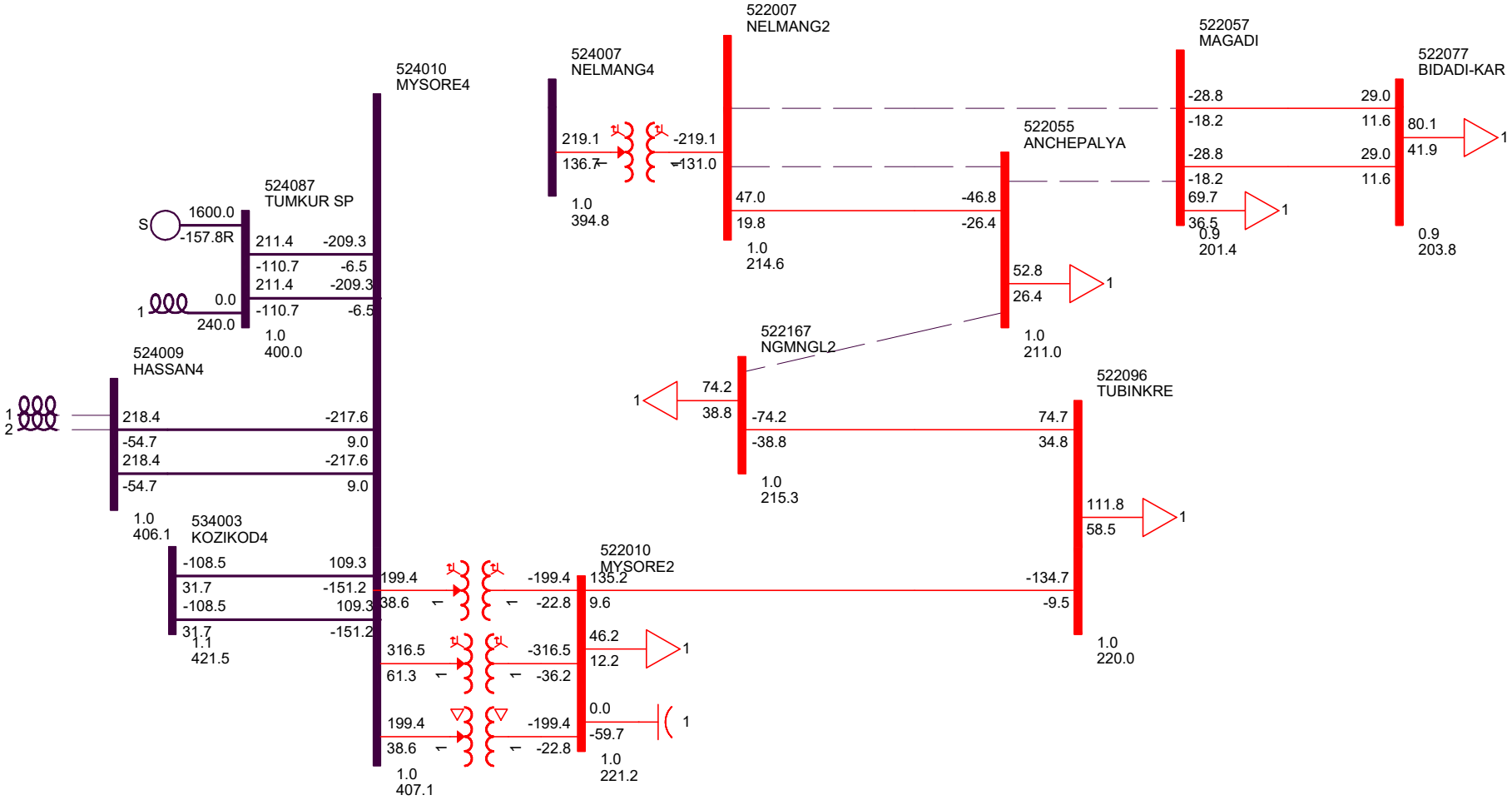
Chief Engineer Electy.,
(Planning & Co-ordination)

Copy to the:

1. Chief Engineer (SP&PA), Central Electricity Authority, Sewa Bhavan, R.K Puram, New Delhi-110066.
2. Director (SP&PA), Central Electricity Authority, Sewa Bhavan, RK Puram, New Delhi-110066.
3. Chief Operating officer (CTU-planning), PGCIL, Saudamini, Plot No.2, Sector 29, Gurgaon-122001.
4. E.A to Director (Transmission), KPTCL, Kaveri Bhavan, Bangalore to place it before The Director (Transmission).

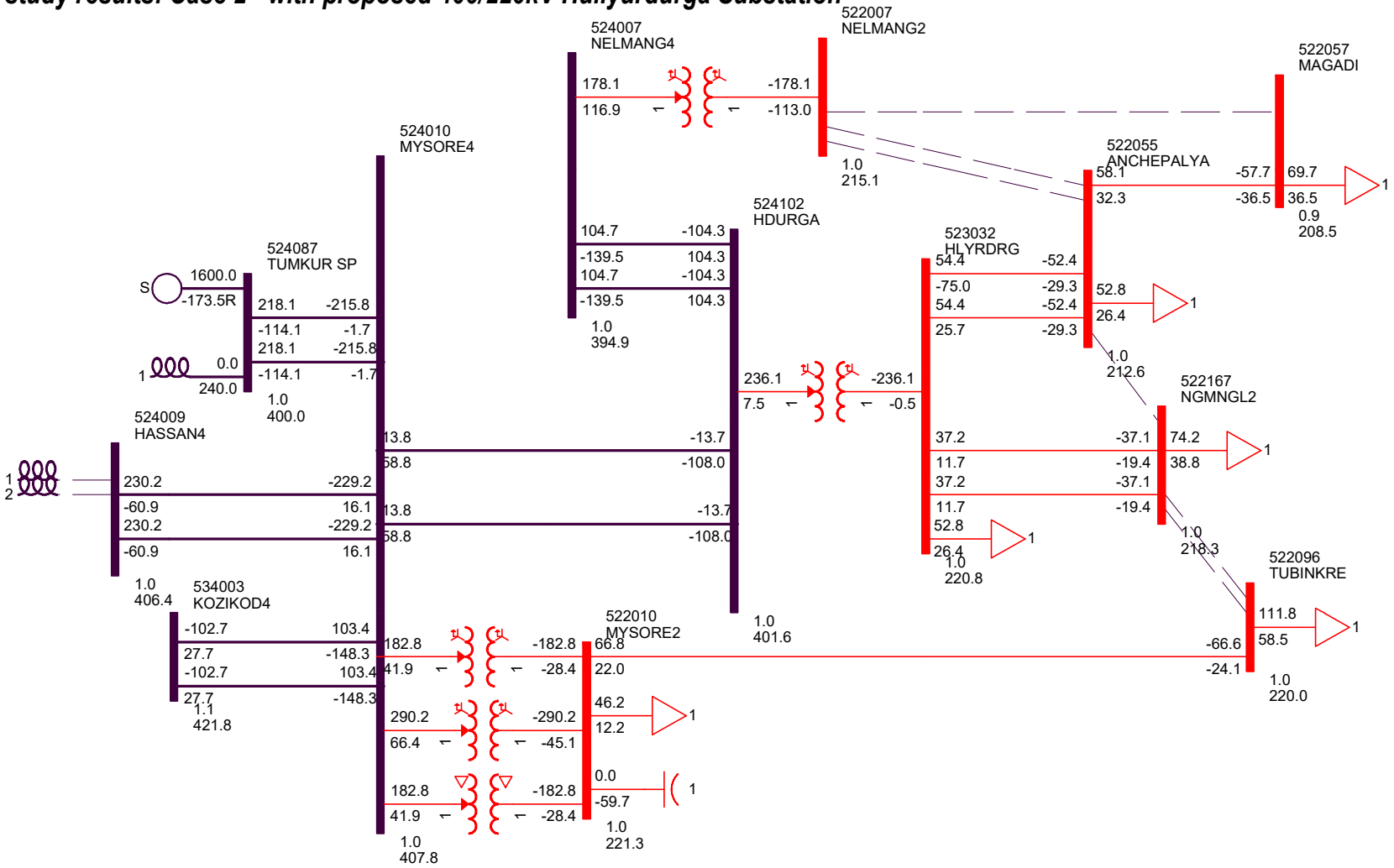
Establishing 2 X 500 MVA, 400/220kV Huliyurdurga sub-station in Tumkur district

Load Flow study results: Case 1 - Basecase



Establishing 2 X 500 MVA, 400/220kV Huliyurdurga sub-station in Tumkur district

Load Flow study results: Case 2 - with proposed 400/220kV Huliyurdurga Substation



KARNATAKA POWER TRANSMISSION CORPORATION LIMITED

Telephone: 080-22210416
Fax : 080-22292204

Office of the
Chief Engineer Electy,.
Planning & Co-ordination,
Kaveri Bhavan, Bangalore-9

No. CEE(P&C)/SEE(Plg)/EE(PSS)KCO-97/64329/2016-17 **Date:** 22 OCT 2016

9510-13

The Member (Power systems),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi-110 066.

Sir,

Sub:- Approval for establishing 400/220/66kV sub-station at Yettinhole in Sakaleshapura taluk, Hassan District-reg.

Ref:- 1) Letter no. EE/YPD-1/Sakl /Req.Power/Tech-1/ 2013-14/205 dated 24th March, 2014 from M/s. KNNL, Sakleshpur addressed to this office.

2) KPTCL approval for APS vide T.O. letter no. CEE(P&C)/SEE(PLG) /EE(PLG-N)/KCO-89/33880/R-67(H4)/2015-16 dated 1st June, 2016.

Anent to the above subject, M/s. Karnataka Neeravari Nigama Ltd., (M/s. KNNL) a Govt. of Karnataka undertaking has embarked in to a huge project named as "Yethinahole Integrated drinking water supply Project" estimated to cost around Rs. 13,000 crores to provide drinking water supply to . Districts of Kolar and Chickballapur in Karnataka by diverting water from Netravati River flowing in the western Ghats of Karnataka. As per the request placed by M/s. KNNL with KPTCL under reference, the said project would require power to an extent of 219.44 MW to energise huge water pumps installed at various locations in the project site to lift water from Netravati River.

The said request of M/s. KNNL was examined in detail and since no 220 KV network is available in the vicinity (as the project site is located in western Ghats of Karnataka), it is proposed to draw power from the 400 KV network by utilising the existing 400 KV DC line running between 400 KV UPCL Thermal Power plant and 400/220 KV Receiving station at Shantigrama (M/s. PGCIL station). The said line is owned, operated and maintained by KPTCL. The proposal in brief is to put up a 400/220 KV, 4x167 MVA capacity sub-station near Hebbanahally village just at a distance of 0.6 KM from the existing 400 KV DC line by double LILO arrangement and to have one no. of 220/66 KV sub-station with 2x50 MVA capacity in the

CE (PSPA-II)

downstream. With this arrangement, it is proposed to feed the consumer stations of M/s. KNNL to an extent of 188.99 MW at 220 KV voltage class and 30.45 MW at 66 KV voltage class. The sketch enclosed herewith depicting the arrangement is self-explanatory.

As the subject project, is to be taken up on priority by the Government of Karnataka, the matter was treated on precedence and approval was accorded by KPTCL granting scheme of connectivity with the Grid for the said project.

Since the said arrangement would amount to effecting modification to the existing 400 KV network, the same is brought to the notice of Central Electricity Authority with request to obtain and communicate the approval of Standing committee on an urgent basis.

Yours faithfully

21/10/16

Chief Engineer Electy.,

(Planning & Co-ordination)

KARNATAKA POWER TRANSMISSION CORPORATION LIMITED

Telephone: 080-22210416
Fax : 080-22292204

Office of the
Chief Engineer Electy,.
Planning & Co-ordination,
Kaveri Bhavan, Bangalore-9

No. CEE (P&C)/SEE(Plg)/EE(PSS)KCO-97/64329/2016-17 **Date:** 20579-21 **20 MAR 2017**

The Member (Power systems),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi-110 066.

Sir,

Sub: Providing reactive compensation at 400 kV sub-stations at Davanagere and Talaguppa-reg.

Ref: Minutes of the 39th Meeting of Standing Committee on Power System Planning of Southern Region dated 18th Feb, 2016.

****

Adverting to the above, during the 39th meeting of Standing Committee on Power System Planning of Southern Region held on 28th-29th December, 2015 at New Delhi, AGM, POSOCO pointed out high voltages at number of 400 kV nodes as given in the POSOCO reports. In this regard, based on the inputs from POSOCO study has been carried by PGCIL to identify the locations where reactive compensation is required. As per study results KPTCL's 400 kV sub-stations at Davanagere (Guttur) and Talaguppa in Karnataka is identified wherein reactive compensation to an extent of 125 MVaR at Talaguppa and Davagere are proposed to mitigate the high voltage problem.

In this context, it is to be informed that recently 63 MVaR bus reactors are commissioned each at 400 kV Talaguppa and Davanagere sub-stations which are not considered for the study conducted by PGCIL.

In the light of the above, it is hereby requested to clarify the reactive compensation required at Davanagere and Talaguppa to initiate necessary steps from our end.

Yours faithfully

Chief Engineer Electy.,
(Planning & Co-ordination)

No 451/CE/PSPA-II 28/3/17

O/o Member (Power System)
Dy. No. : 741
Date : 28/3/17

CE (PSPA II) 28/3/17

Smt. Shivani Dy Dir 28/3/2017

ANNEXURE-37.1

37.1

KARNATAKA POWER TRANSMISSION CORPORATION LIMITED

Telephone: 080-22210416
Fax : 080-22292204

Office of the
Chief Engineer Electy,.
Planning & Co-ordination,
Kaveri Bhavan, Bangalore-9

No. CEE (P&C)/SEE(Plg)/EE(PSS)KCO-97/64345/2016-17 Date: 17 JUL 2017
Encl: Load flow study report 7867-70

The Member (Power systems),
Central Electricity Authority,
Sewa Bhavan, R.K.Puram,
New Delhi-110 066.

Sir,

Sub: Establishing 2 X 500 MVA, 400/220 kV GIS sub-station at Peenya in Bengaluru City - reg.

*****

KPTCL is planning to establish 2 X 500 MVA, 400/220 kV GIS sub-station at Peenya in Bengaluru City with 400 kV DC line using Quad Moose conductor from existing 400/220 kV Nelamangala sub-station.

The proposed 400 kV sub-station is intended to reduce loads of 400 kV Nelamangala and to relieve overloading of 220 kV lines feeding Peenya, NRS and A-Station. With the proposed 400 kV Peenya sub-station there is considerable reduction in system loss with increased reliability in power supply to the 220 kV sub-stations in the ring mains of Bengaluru city.

Load flow is conducted considering 400 kV Peenya sub-station with the following connectivity.

- 400 kV DC Quad Moose line from 400kV Nelamangala sub-station.
- 2 X 500 MVA, 400/220 kV transformers.

The 220 kV lines emanating from the proposed 400/220 kV sub-station are as follows.

- Bus extension to 220kV Peenya (Existing).
- 220 kV DC line with Drake conductor to 220/66 kV NRS.

Results of load flow study is placed as annexure.

It is requested to accord approval of Standing Committee for establishing 400/220 kV sub-station at Peenya in Bengaluru City with the above proposed transmission scheme.

Yours faithfully

15/7/17

Chief Engineer Electy.,
(Planning & Co-ordination)

Mr Kanchan, AD
31.7.17

Shri Bairwa DDr
26/7

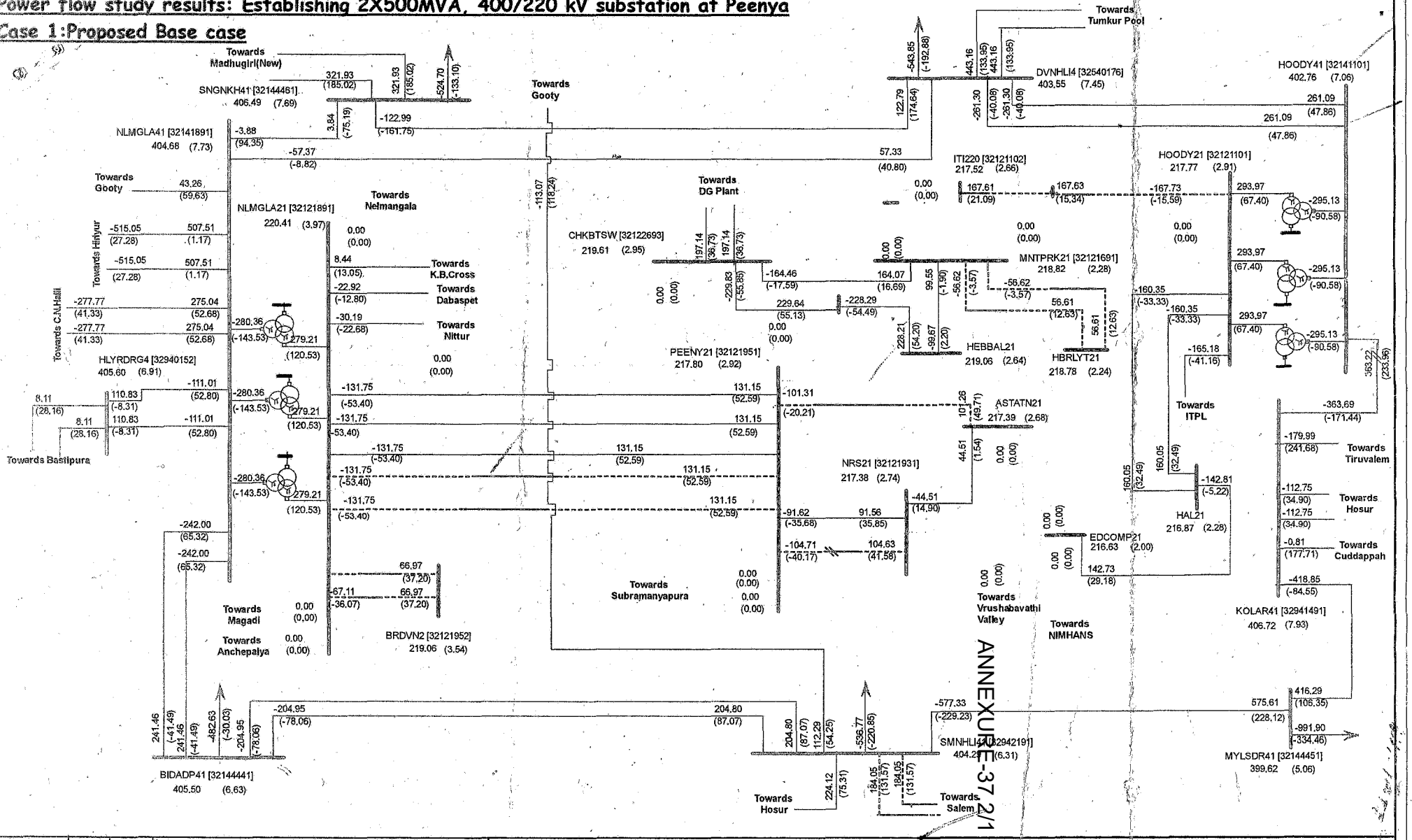
No. - 938/CE/PSPA - II
24/7/2017

Copy to:-

1. Chief Engineer, PSPA-II, Central Electricity Authority, Sewa Bhavan, RK Puram, New Delhi-110066.
2. Chief Operating officer (CTU-planning), PGCIL, Saudamini, Plot No.2, Sector-29, Gurgaon-122001.
3. E.A to Director (Transmission), KPTCL, Kaveri Bhavan, Bangalore to place it before The Director (Transmission).

Power flow study results: Establishing 2X500MVA, 400/220 kV substation at Peenya

Case 1:Proposed Base case

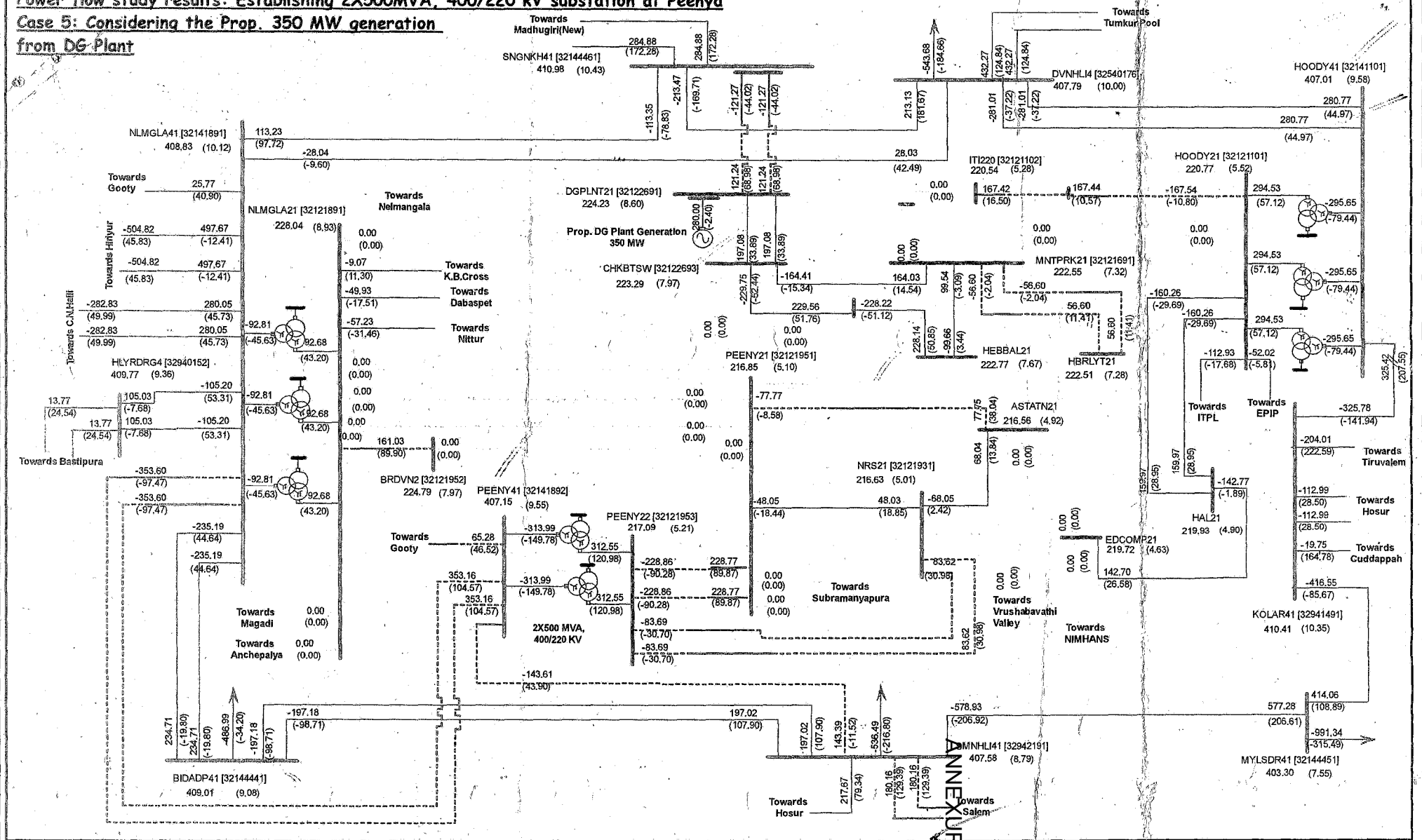


ANNEXURE-37.21

REVIEWED		DESCRIPTION	KARNATAKA POWER TRANSMISSION CORPORATION LIMITED, BANGALORE
CHECKED		With 400/220 kV Peenya with system Peak load for 2018-19	OFFICE OF THE CHIEF ENGINEER (ELECTRY) PLANNING & CO-ORDINATION KPTCL, KAVERI BHAVAN, BANGALORE-09.
PREPARED			System Study for 400/220 kV Peenya
			FILE NO: CEE(P&C)/SEE(PLG)/EE(PSS)/KCO-97
			DWG. NO. PEENYA/Basecase DATE

Power flow study results: Establishing 2X500MVA, 400/220 kV substation at Peenya

Case 5: Considering the Prop. 350 MW generation from DG Plant



REVIEWED		DESCRIPTION	KARNATAKA POWER TRANSMISSION CORPORATION LIMITED, BANGALORE
CHECKED		With 400/220 kV Peenya with system Peak load for 2018-19	OFFICE OF THE CHIEF ENGINEER (ELECTRY) PLANNING & CO-ORDINATION KPTCL, KAVERI BHAVAN, BANGALORE-09.
PREPARED			System Study for 400/220 kV Peenya
			FILE NO: CEE(P&C)/SEE(PLG)/EE(PSS)/CO-97
			DWG. NO. PEENYA/Case 5 — DATE

ANNEXURE-37.2/2

ANNEXURE-38

RNATAKA POWER TRANSMISSION CORPORATION LIMITED

Telephone: 080-22210416
Fax : 080-22292204

Office of the
Chief Engineer Electy,.
Planning & Co-ordination,
Kaveri Bhavan, Bangalore-9

No. CEE (P&C)/SEE(Plg)/KCO-97/64334/2016-17 **Date:** 28 APR 2017

End : 2 Sheets 1701-703

The Member (Power Systems)
Central Electricity Authority
Sewa Bhavan, R.K.Puram,
New Delhi-110066.

Sub:- "Establishing 2 X 500 MVA, 400/220 kV sub-station at Jagalur in Jagalur Taluk, Davanagere district" - reg.

Ref:- CEA letter No 54/1/2014-SP&PA/12-16 dated 28th May, 2015.

O/o Member (Power System)
Dy. No. 1052
Date : 11/5/17

This has reference to the letter cited above wherein the project of "Establishing 2 X 500 MVA, 400/220 kV sub-station at Jagalur in Jagalur Taluk, Davanagere district" is approved with Construction of 400kV Multi circuit Quad Moose ACSR line for a length of 40kms from proposed 400/220kV Jagalur substation to LILO the proposed BPS-C.N.Halli DC Quad Moose ACSR line for total Project Cost of Rs 484.36 Crores. It is to be mentioned here that the land acquisition for establishing 400 kV CN Halli sub-station is under process and commissioning of 400 kV CN Halli s/s may is getting delayed. However, the subject work of establishing 400/220 kV Jagalur sub-station is under fast progress and is expected to be commissioned by December, 2017 with 400 kV DC line from Bellary Pooling Station for a line length of 65 km (Rampura limits-Jagalur).

In this regard, load flow study is conducted for 2018-19 timeframe for system light load conditions considering 400/220 kV Jagalur sub-station with 400 kV DC line from Bellary Pooling Station. 400 kV CN Halli sub-station is not considered for study. Results are enclosed as annexure. As seen from the load flow study results due to large quantum of RE generations in the vicinity of Jagalur, there is step up of power from 220kV to 400 kV voltage level to an extent of 260 MW at Jagalur which is being evacuated to Bellary Pooling station (BPS) through 400 kV DC line between Jagalur and BPS.

No. 633/CE(PS PA-II)/2017 11/5/2017

The actual DPR cost of "Establishing 2 X 500 MVA, 400/220 kV sub-station at Jagalur in Jagalur Taluk, Davanagere district" is Rs 223.28 Crores and the project is awarded to M/s KEC International for Rs 229.55 Crores, the awarded cost as against the project cost of Rs 484.36 Crores approved by CEA which has reduced due to modified LILO distance of 400 kV BPS-CN Halli DC line with Quad Moose conductor to proposed 400 kV Jagalur sub-station from 40 km to 0.88 km.

The 400 kV Rampura limits-Jagalur DC line (from Bellary Pooling station) with Quad Moose conductor for a distance of 65 km with DPR cost of Rs 168.04 Crores is awarded

to M/s KEC for Rs 178.02 Crores and the work is under progress. Since the subject 400 kV DC line is facilitating for reliable evacuation of RE generations in the vicinity of Jagalur and also due to decrease in the actual DPR cost of Jagalur 400 kV sub-station, the 400 kV DC line may be included under the package of "Establishing 2 X 500 MVA, 400/220 kV sub-station at Jagalur in Jagalur Taluk, Davanagere district" which is part of Green Energy Corridor scheme approved by CEA.

Further, the project of establishing 400/220 kV Doni sub-station at Doni in Gadag district with LILO of 400 kV Guttur (Davanagere) - Guddadahalli (Munirabad) Twin Moose SC line to the proposed 400 kV Doni sub-station is approved for total project cost of Rs. 132.49 Crores by CEA under Green Energy Corridor scheme and the project is awarded to M/s KEC International for Rs 176.38 Crores.

The 220 kV connectivity from proposed 400 kV Doni sub-station is approved with LILO of 220 kV DC line with Drake conductor between Gadag and Lingapura to the proposed 400 kV Doni sub-station. Gadag being the wind zone, many upcoming wind generators are proposed to be connected to 220 kV and 110 kV downstream stations of 220/110 kV Gadag sub-station to an extent of about 520 MW (Including existing WPP). As per the load flow study results, during peak wind season, the existing and approved generation from RES meets the load of 220 kV Gadag sub-station and remaining power flows towards 400 kV Gadag through 220 kV Gadag-Dhoni DC line. This leads to the loading of 220 kV Gadag-Dhoni-Lingapura DC line with Drake conductor beyond the permissible limits of the conductor. Load flow plots are placed as annexure. Hence, to accommodate RE generation and for reliable evacuation of power it is necessary to strengthen the 220 kV DC line between Gadag to Lingapura switching station via prop.400/220 kV Dhoni sub-station by **Drake equivalent HTLS conductor.**

Hence it is hereby requested,

a. To include 400 kV Rampura limits-Jagalur DC line (from Bellary Pooling station) with Quad Moose conductor for a distance of 65 km with DPR cost of Rs 168.04 Crores under the package of "Establishing 2 X 500 MVA, 400/220 kV sub-station at Jagalur in Jagalur Taluk, Davanagere district".
b. Approval for the proposal of strengthening the 220 kV DC line with Drake conductor between Gadag to Lingapura switching station via prop.400/220 kV Dhoni sub-station by Drake equivalent HTLS conductor with approximate project cost of Rs 187.50 Crores.

Yours faithfully

27/4/17

Chief Engineer Electy.,
(Planning & Co-ordination)

TRANSMISSION CORPORATION OF TELANGANA LIMITED

(Govt. of Telangana State Undertaking)

Vidyut Soudha, Khairatabad, Hyderabad-500 082., PABX : 23396000

(CIN No: U40102TG2014SGC094248) www.transco.telangana.gov.in

From
Director/Projects & Grid Operation,
TSTRANSCO,
Vidyut Soudha,
Hyderabad - 500 082.

To
The Chief Engineer/PS P&A-II,
Central Electricity Authority (CEA),
R.K. Puram, Sewa Bhawan,
New Delhi - 110 066.

Lr.No. Dir(Proj)/SE(PS)/DE(SS)/ADE-3/AE/F.Revised 400kV Proposals/D.No.92/17,Dt:27/03/2017

Sir,

Sub: - Revised proposal for connectivity of Telangana STPP (2X800 MW), proposal for erection of 400/220/132kV Rayadurg SS, LILO of both circuits of 400kV Mamidipalli - Dindi to the upcoming 400kV Maheshwaram SS and 400kV QMDC line from 400kV Dichpally SS to upcoming 400kV Nirmal SS to meet the requirement of additional outlet for SCCL power plant (2X600 MW)- Reg.

Ref: 1. CEA Letter No. 51/4/(40th)/PSPS-II-2017/-92-103, Dated: 16.02.2017 (Minutes of meeting of 40th Standing Committee on Power System Planning of Southern Region)
2. Lr.No. Dir(Proj)/SE(PS)/DE(SS)/ADE-3/F.4th PTR/D.No.45/17, Dt: 16/02/2017

* * * * *

We are thankful for arranging approval of Transmission evacuation scheme of Kaleshwaram Lift Irrigation Project (Dr. BR Ambedkar Pranihita - Chevella Sujala Sravanthi) & Palamuru - Rangareddy Lift Irrigation Schemes, generation evacuation of proposed 2x800MW Telangana STPP during 40th Standing Committee on Power System Planning of Southern Region.

In this connection, it is to bring to your kind notice that due to constraints in acquiring land at 400kV Nedunuru SS (approved under 2x800 MW Telangana STPP evacuation scheme), certain modifications are proposed duly converting 400kV Ramadugu LI SS (approved under Kaleshwaram Lift Irrigation scheme) into conventional 400/220 kV SS. The proposed modifications are:

i. 400kV QMDC line from Telangana STPP Stage - I (2x800 MW) to 400kV Ramadugu LI SS duly incorporating following 220kV downstream loads.
   a) LILO of both circuits of 220kV Durshed - Sircilla at 400/220 kV Ramadugu SS.
   b) LILO of 220kV Malyalpalli - Bheemgal at 400/220 kV Ramadugu SS.

ii. Proposal for making LILO of 400kV SCCL - Nirmal line at 400kV Yellampalli LI SS instead of making LILO of 400kV SCCL - Ramadugu line at 400kV Yellampalli LI SS.

Contd.....2.

Further the following are also proposed for system improvement

i. Proposal for erection of 400/220/132kV Rayadurg SS (instead of 400/220kV RC Puram) with following downstream connectivities

   a. LILO of 220kV Shapurnagar - Gachibowli at 400/220/132kV Rayadurg SS
   b. LILO of 220kV Erragadda - Gachibowli at 400/220/132kV Rayadurg SS
   c. LILO of 220kV Miyapur - Gachibowli at 400/220/132kV Rayadurg SS
   d. 132kV DC line from Rayadurg SS to 132kV Madhapur SS
   e. 132kV DC line from Rayadurg SS to 132kV Jubilee Hills SS
   f. LILO of 132kV Erragadda - Shivarampally SC line to 400/220/132kV Rayadurg SS

ii. Proposal for erection of 400kV QMDC line from 400kV Dichpally Substation to upcoming 400kV Nirmal Substation (to meet the requirement of additional outlet for SCCL power plant (2X600 MW) as mentioned in minutes of meeting of 40th Standing Committee on Power System Planning of Southern Region at Item No. 23.7(a))

iii. Proposal for making LILO of both circuits of upcoming 400kV Dindi - Mamidipalli to upcoming 400kV Maheshwaram SS.

The load flow study results duly incorporating the above proposals are herewith furnished along with the single line diagram showing the revised connectivities.

In view of the above, it is requested to communicate the approval at the earliest to meet the schedule of 2x800 MW Telangana STPP generation by NTPC.

It is further to bring to your notice that vide letter cited under reference (2), it was requested to accord approval for augmentation of PTR at existing 400/220/132 kV Malkaram SS and 400/220 kV Shankarpally SS with 4th 500 MVA PTR.

Early approval for the above proposals is solicited.

Encl: 1. PSSE converged case through e mail
2. Study results along with block diagram

Yours faithfully,

Director/Projects & Grid Operation

Copy to:

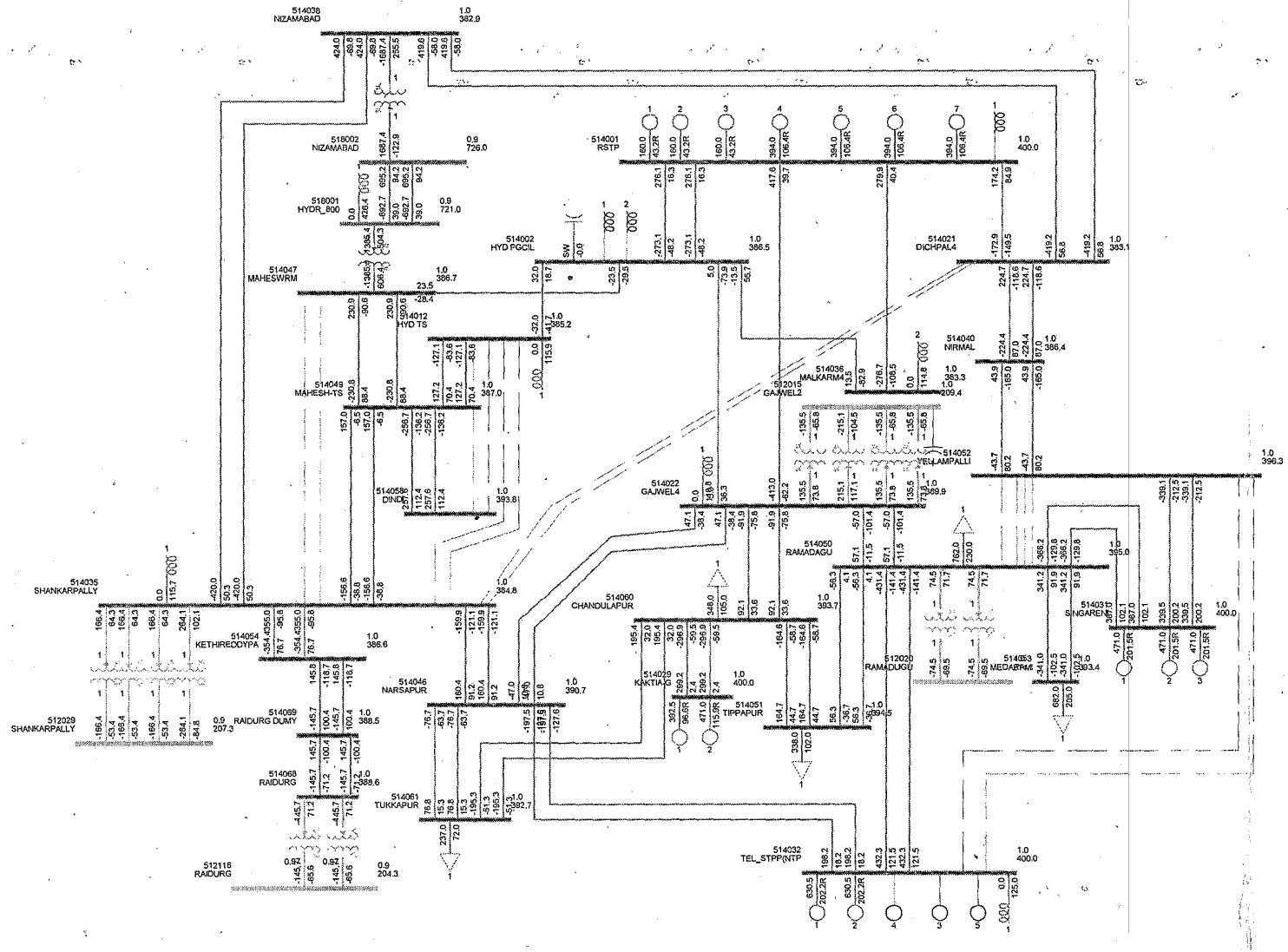
1. Dr. Subir Sen/ COO/CTU, Smart Grid, PGCIL Corporate Office, Saudamini, Plot No.2, Sector 29, Near IFFCO Chowk, Gurgaon (Haryana) - 122001, INDIA
2. Chief Engineer/ Projects - I/ TSTRANSCO/ V.S./Hyd.
3. DE(T) to Chairman and Managing Director/ TSTRANSCO/V.S./Hyd.

ANNEXURE-39.2/1

Annexure-I(b)

MON, APR 10 2017 16:47

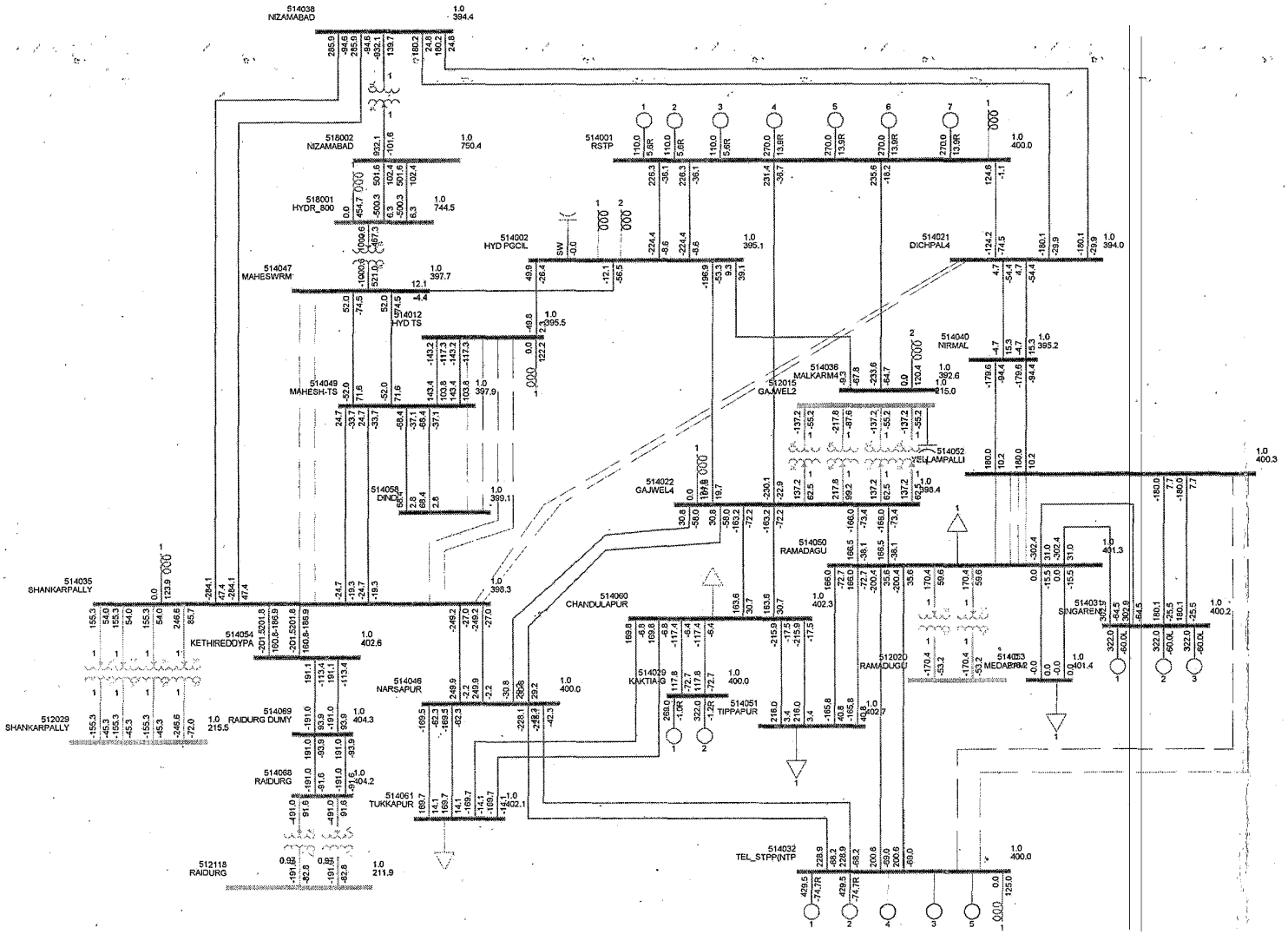
TSTRANSCO - REVISED PROPOSAL FOR TELANGANA STPP (2X800 MW)
LILO OF BOTH CIRCUITS OF 400KV DINDI - MAMIDPALLY (HYD TS) TMDC LINE AT UPCOMING 400KV MAHESHWARAM SS
PROPOSED 400KV RAYADURG SS AND 220KV FEATURES AT UPCOMING 400KV RAMADUGU LISS



Annexure-I(b)

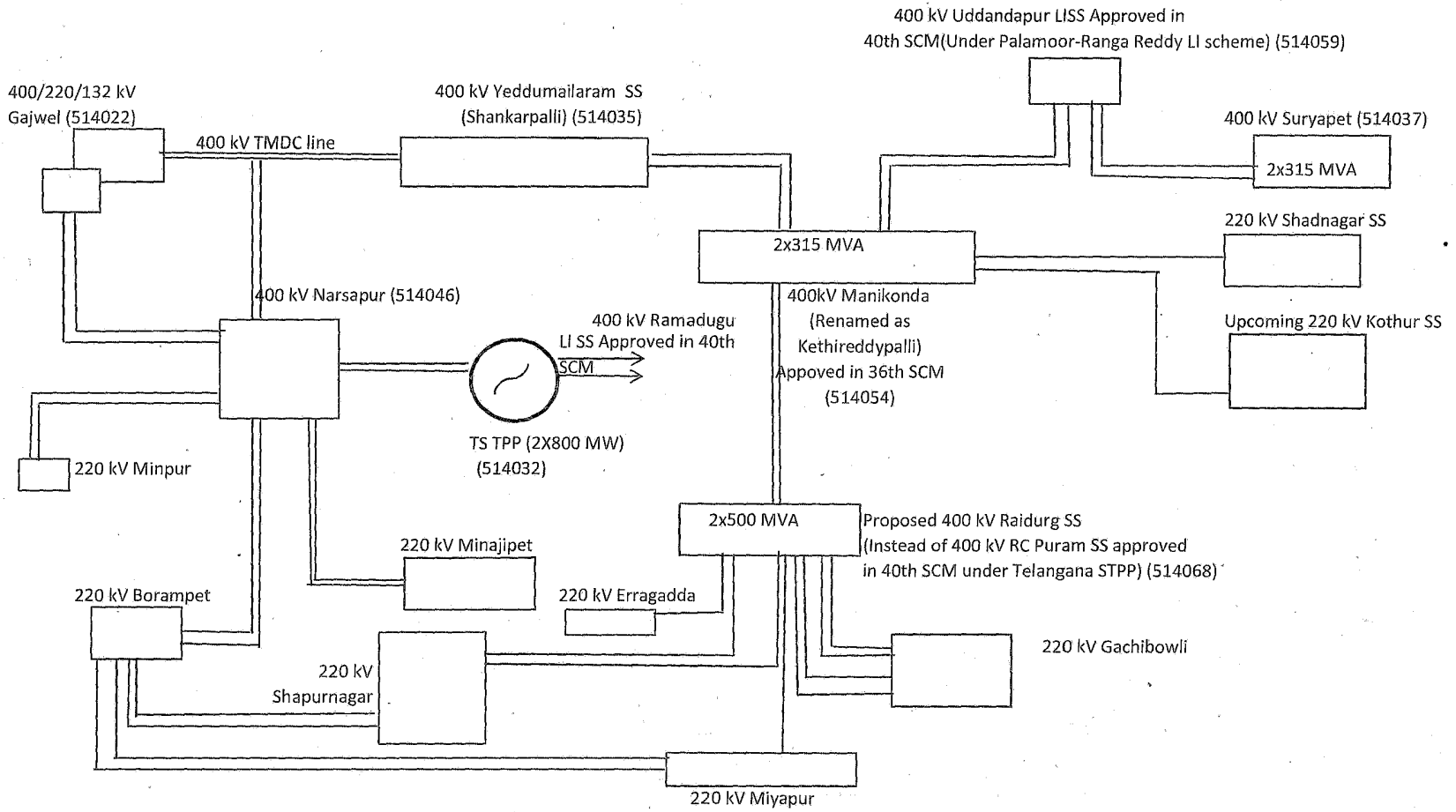
MON, APR 10 2017 16:50

TSTRANSCO - REVISED PROPOSAL FOR TELANGANA STPP (2X800 MW)
LILO OF BOTH CIRCUITS OF 400KV DINDI - MAMIDPALLY (HYD TS) TMDC LINE AT UPCOMING 400KV MAHESHWARAM SS
PROPOSED 400KV RAYADURG SS AND 220KV FEATURES AT UPCOMING 400KV RAMADUGU LISS



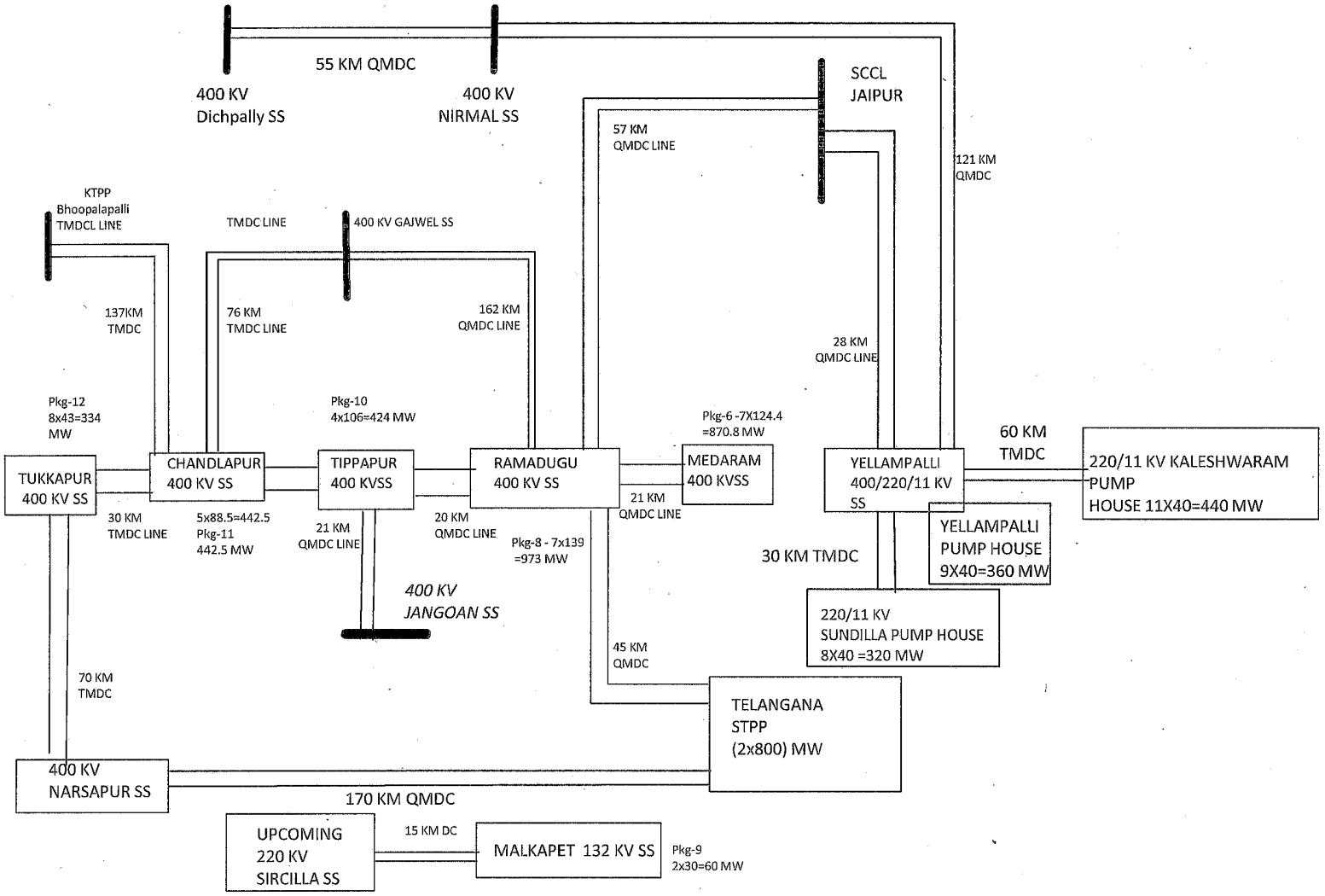
ANNEXURE-39.2/3

PROPOSED 400 KV RAIDURG AND 400 KV MANIKONDA (KETHIREDDYPALLY) CONNECTIVITIES ALONG WITH 220 KV DOWN STREAM



Annex-II

REVISED 400 KV EHT NETWORK FOR TELANGANA STPP (2X800 MW) AND KALESHWARM LI PROJECT



भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केंद्रीय विद्युत प्राधिकरण
Central Electricity Authority
विद्युत प्रणाली योजना एवं परियोजना मूल्यांकन प्रभाग-2 [ISO: 9001:2008]
Power System Planning & Appraisal Division-II
सेवा भवन, रा. कृ. पुरम , नयी दिल्ली -110066
Sewa Bhawan, R. K. Puram, New Delhi-110066

No. 58/1/2017/CEA/ /PSPA-II/354 Dated: 01/05/2017

To
The Director/Projects & Grid operation,
TSTRANSCO,
Vidyut Soudha,
Hyderabad-500082

Subject: Revised proposal for connectivity of Telangana STPP (2x800 MW), proposal for erection of 400/220/132kV Rayadurg SS, LILO of both circuits of 400kV Mamidipalli-Dindi to the upcoming 400kV Maheshwaram SS and 400kV QMDC line from 400kV Dichpally SS to upcoming 400kV Nirmal SS to meet the requirement of additional outlet for SCCL power plant (2x600 MW)-Reg

Reference: TSTRANSCO letter no. Dir(Proj)/SE(PS)/DE (SS)/ADE-3/AE/F.Revised 400kV Proposals/D.No.92/17 dated 27/03/2017.

Sir,

1. TSTRANSCO vide their letter no. dated 27/03/2017 has informed that due to constraints in acquiring land at 400kV Nedunuru SS (approved under 2x800MW Telangana STPP evacuation scheme), certain modifications are proposed duly converting 400kV Ramadugu LI SS (approved under Kaleshwaram Lift irrigation scheme) into conventional 400/220kV SS.
2. The modifications proposed by TSTRANSCO are given below:
   i. 400kV QMDC Line from Telangana STTP Stage-I (2x800 MW) to 400 KV Ramadugu LI SS duty incorporating following 220kV downstream loads.
      a) LILO of both circuits of 220KV Durshed-Sircilla at 400/220 Ramadugu SS.
      b) LILO of 220kV Malyalpalli -Rheemgat at 400/220kV Ramadugu SS
   ii. Proposal for making LILO of 400kV SCCL-Nirmal line at 400kV Yellampalli LI SS instead of making LILO of 400kV SCCL- Ramadugu line at 400kV Yellampalli LI SS
   iii Proposal for erection of 400/220/132kV Rayadurg SS (instead of 400/220kV RC Puram) with following downstream connectivities for system improvement
      a) LILO of 220kV Shapurnagar - Gachibowli at 400/220/132KV Rayadurg SS
      b) LILO of 220kV Erragadda – Gachibowli at 400/220/132kV Rayadurg SS
      c) LILO of 220kV Miyapur – Gachibowli at 400/220/132kV Rayadurg SS
      d) 132kV DC line from Rayadurg SS to 132kV Madhapur SS
      e) 132kV DC line from Rayadurg SS to 132kV Jubilee Hills SS
      f) LILO of 132kV Erragada – Shivarampally SC line to 400/220/132kV Rayadurg SS

iv. Proposal for erection of 400kV QMDC line from 400kV Dichpally Substation to upcoming 400kV Nirmal Substation (to meet the requirement of additional outlet for SCCL power plant (2x600 MW) as mentioned in minutes of meeting of 40th Standing Committee on Power System Planning of Southern Region at Item No. 23.7(a).

v. Proposal for making LILO of both circuits of upcoming 400kV Dindi – Mamdipalli to upcoming 400kV Maheshwaram SS.

vi. Along with these proposals TSTRASCO requested for augmentation of transformer at existing 400/220/132 kV Malkaram SS and 400/220 kV Shankarpally SS with 4th 500 MVA ICT each to meet forthcoming additional agricultural load.

3. In this regard, a meeting was held on 11th April, 2017 in the office of Chief Engineer (PSPA-II), CEA. The meeting was participated by officials from CEA, TSTRANSCO and POWERGRID (The list of participants is enclosed at Annexure-I (a)).

The study has been carried out duly incorporating the above proposal and it is observed that loading on transmission line in order (study result at Annexure-I(b) & I(c)).

4. Considering above, it is conveyed that in-principle, we have no objection for TSTRANSCO to carry out following transmission scheme/work:

New Work:

(1) Augmentation of Transformers:

(i) 4th 500MVA 400/220kV transformer at Malkaram S/S
(ii) 4th 500MVA 400/220kV transformer at Shankarpally S/S

(2) LILO of both circuits of Dindi – Mamdipalli 400kV D/C line at Maheshwaram 400/220kV S/S of TSTRANSCO.

(3) Dichpally - Nirmal 400kV D/C Quad line.

Change in the Scope of earlier agreed schemes:

(4) Transmission system for Telangana STPP (2x800):

(i) 400kV QMDC Line from Telangana STTP Stage-I (2x800 MW) to 400 KV Ramadugu LI SS
(ii) LILO of both circuits of 220KV Durshed-Sircilla at 400/220 Ramadugu SS.
(iii) LILO of 220kV Malyalpalli -Rheemgat at 400/220kV Ramadugu SS
(iv) 400kV Quad Moose line from proposed Telangan STPP 2x800 MW to upcoming 400kV Narsapur SS
(v) Erection of 400/220/132kV Rayadurg
(vi) LILO of 220kV Shapurnagar - Gachibowli at 400/220/132KV Rayadurg SS
(vii) LILO of 220kV Erragadda – Gachibowli at 400/220/132kV Rayadurg SS
(viii) LILO of 220kV Miyapur – Gachibowli at 400/220/132kV Rayadurg SS
(ix) 220 kV Single Moose DC line from upcoming 400 kV Narsapur to proposed 220 kV Borampet SS
(x) 220 kV Single Moose DC line from proposed 220 kV Borampet SS to existing 220 KV Miyapur SS
(xi) 220 kV Single Moose DC line from proposed 220 kV Borampet SS to existing 220 KV Shapurnagar SS.
(xii) 132kV DC line from Rayadurg SS to 132kV Madhapur SS
(xiii) 132kV DC line from Rayadurg SS to 132kV Jubilee Hills SS
(xiv) LILO of 132kV Erragada – Shivarampally SC line to 400/220/132kV Rayadurg SS

(xv) 125 MVAR bus reactor at Telangana STPP (2x800 MW), Ramagundam

(5) Kaleshwaram Lift Irrigation Project:

(i) Erection of 400 KV SS at Ramadugu, Karimnagar Dist Pkg-8
(ii) Erection of 400 KV SS at Medaram, Karimnagar Dist Pkg-6
(iii) Erection of 400 KV SS at Tippapur, Karimnagar Dist Pkg-10
(iv) Erection of 400 KV SS at Tukkapur, Medak Dist Pkg-12
(v) Erection of 400 KV SS at Chandlapur, Medak Dist Pkg-11
(vi) Erection of 400/220 KV SS at Yellampalli, Karimnagar Dist
(vii) Erection of 220 KV SS at Yellampalli Pump House, Karimnagar Dist
(viii) Erection of 220 KV SS at Sundilla Pump House, Karimnagar Dist
(ix) Erection of 220 KV SS at Kaleshwaram Pump House, Karimnagar Dist
(x) Erection of 132 KV SS at Malakpet, Karimnagar Dist Pkg-9
(xi) Erection of LILO of both circutis of 400 KV Quad Moose DC line from SCCL Jaipur - Gajwel at proposed Ramadugu SS
(xii) Erection of 400 KV Quad Moose DC line from 400 KV Ramadugu LI SS to 400 KV Medaram LI SS
(xiii) Erection of 400 KV Quad Moose DC line from 400 KV Ramadugu LI SS to 400 KV Tippapur LI SS
(xiv) Erection of 400 KV Quad Moose DC line from 400 KV Tippapur LI SS to 400 KV Chandlapur LI SS
(xv) Erection of LILO of both circuits of 400 KV Twin Moose DC line from KTPP - Gajwel at Chandlapur LI SS
(xvi) 400 KV Twin Moose DC line from 400 KV Chandlapur LI SS to 400 KV Tukkapur LI SS
(xvii) 400 KV Twin Moose DC line from 400 KV Tukkapur LI SS to 400 KV Narasapur SS
(xviii) LILO of 400kV SCCL-Nirmal line at 400kV Yellampalli LI SS
(xix) Erection of 220 KV DC line from 400/ 220 KV Yellampalli SS to 220/11 KV Sundilla pump house
(xx) Erection of 220 KV Twin Moose DC line from 400/220 KV Yellampalli LI SS to 220/11 KV Kaleshwaram pump house
(xxi) Erection of 132 KV DC line from upcoming 220 KV Sircilla SS to the proposed 132 KV Malakpet SS.
(xxii) 125 MVAR bus reactor at Chadulapur 400kV LI SS

Schematic diagram of 400kV system of above scheme is given at Annexure-II

5. This issue with the approval of Member (PS), CEA. The above scheme/modification in the scheme however, would be finalized in next meeting of SCPSPSR.

Yours faithfully,

01/09/2017

(प्रदीप जिंदल /Pardeep Jindal)
मुख्य अभियंता (वि प्र यो मू2 -)/ Chief Engineer (PSPA-II),

Copy to : COO (CTU-Plg), Power Grid Corp. of India Ltd."Saudamini", Plot No.2, Sector-29, Gurgaon 122 001, Haryana.

Transmission Corporation of Telangana Limited

Vidyut Soudha, Hyderabad-500 082. PABX : 23396000
Website:transco.telangana.gov.in CIN No.U40102TG2014SGC094248

From
Director(Projects & Grid Operation)
TSTRANSCO,
Vidyut Soudha,
Hyderabad.

To
The Chief Engineer/PS P&A -II,
Central Electricity Authority(CEA),
RK Puram, Sewa Bhavan,
New Delhi-110066

Lr.No. Dir(Proj)/SE(PS)/DE(SS)/ADE-3/F.4th PTR/D.No.45 /17, Dt: 16 /02/2017

Sir,

Sub: - TSTransco - Augmentation of Power Transformer at existing 400/220/132 kV Malkaram SS and 400/220 kV Shankarpally SS with 4th 400/220 kV, 500 MVA transformer - Requested - Reg.

* * * * *

It is to bring to your kind notice that the loadings on existing 3x315 MVA Power Transformers (PTRs) at 400/220/132 kV Malkaram SS (85%) and 400/220 kV Shankarpally SS (70%) have crossed 60% of full load value.

As per the CEA planning criteria and as advised during 40th Standing Committee meeting held on 19-11-2016 at Hyderabad, it is proposed to augment the 4th PTR at both 400/220/132 kV Malkaram SS and 400/220 kV Shankarpally SS with 500 MVA PTR. Copy of load flow study results are enclosed.

It is requested to communicate approval for augmentation of PTR at existing 400/220/132 kV Malkaram SS and 400/220 kV Shankarpally SS with 4th 500 MVA PTR to meet the forthcoming additional agricultural load.

Early approval is solicited.

Yours faithfully,

16/2

Director/Projects & Grid Operation

Encl: As above

Copy to:
The Member Secretary/ No. 29 Race Course Cross Road / Southern Region Power Committee/ Bengaluru - 560 009.

The Chief Engineer/Projects-I/TSTransco/Vidyut Soudha/Hyderabad

for 41st SCPSPSR.
Ramchem, AD
22/2/2017

Smt/Shivani, Dy.Do
21/2/2017

No/269/CE/PSPA-II
21-2-17

ANNEXURE-41.1

Transmission Corporation of Telangana Limited

(Govt. of Telangana State Undertaking)
(CIN No. U40102TG2014SGC094248) PABX: 23396000

From
The Director,
Projects & Grid Operation,
TSTRANSCO,
Vidyut Soudha,
Hyderabad.

To
The Chief Engineer/PS P&A -II,
Central Electricity Authority(CEA),
RK Puram, Sewa Bhavan,
New Delhi-110066

Lr.No.Dir(Proj&GO)/SE(PS)/DE(SS)/ADE-3/AE/F.400kV Asupaka/D.No.147/17,Dt:18/05/2017

Sir,

Sub: - 400kV Asupaka SS and LILO of one circuit of 400kV Kalpaka - Khammam Line - works completed and ready for charging - Approval Requested - Regarding.

* * * * *

We are thankful for conveying in-principle approval for the revised proposal for the connectivity of Telangana STPP (2x800 MW), proposal for erection of 400/220/132kV Rayadurg SS, LILO of both circuits of 400kV Mamidipalli-Dindi to the upcoming 400kV Maheshwaram SS and 400kV QMDC line from 400kV Dichpally SS to upcoming 400kV Nirmal SS to met the requirement of additional outlet for SCCL power plant (2x600 MW) as mentioned in the 40th meeting of Standing Committee of Southern Region.

It is to inform that, as per the request of Irrigation Department and G.O.Ms.No. 59 Dtd: 19.09.2011 of erstwhile undivided Andhra Pradesh State, the then APTRANSCO have envisaged Indira Sagar Rudramakota Lift Irrigation Scheme with 400kV Sub-station at Asupaka (2x315 MVA) by making LILO of one circuit of 400kV Kalpaka - Khammam Line to Asupaka SS (17km) with the following 220kV downstream connectivity to meet the LI loads under DC works:

1. Asupaka SS to Medipally 220kV DC line - 12.01km
2. Asupaka SS to Bandarugudem 220kV DC line - 14.84km
3. 220/11kV Medipally SS - 2x25MVA
4. 220/11kV Asupaka SS - 3x50MVA
5. 220/11kV Bandarugudem SS - 3x50MVA

Accordingly the works of 400kV Asupaka SS and LILO of one circuit of 400kV Kalpaka -Khammam Line were taken up and the purchase orders were placed during 2013 & 2014.

Subsequent to formation of Telangana State, the works at Medipally, Asupaka and Bandarugudem were stopped as the intake pump house and gravity canal now fall under the geographical limits of Andhra Pradesh. In order to have immediate and effective utilization of 400kV Asupaka SS, the 220/132kV downstream connectivity was revised as follows:

1. Erection of 220kV features at existing 132/33kV Aswaraopet SS with 2x100MVA
2. 220kV DC line from 400kV Asupaka SS to 220kV Aswarapet SS - 20km
3. Stringing of 132kV 2nd circuit on the existing 132kV DC/SC line from 132/33kV Aswaraopet to 132kV B.Gangaram - 30km

The works of 400kV Asupaka SS and LILO of one circuit of 400kV Kalpaka - Khammam Line are completed and are ready for charging. The works of 220/132kV Line/SS are under progress.

The load flow study results duly incorporating the above proposals are herewith furnished along with the single line diagram showing the above connectivities.

In view of the above, it is requested to communicate the approval at the earliest for the following proposals as the works were already completed and are ready for charging.

i. 400kV Asupaka SS with 2x315MVA
ii. LILO of one circuit of 400kV Kalpaka - Khammam Line to 400kV Asupaka SS
iii. Erection of 220kV features at existing 132/33kV Aswaraopet SS with 2x100MVA
iv. 220kV DC line from 400kV Asupaka SS to 220kV Aswaraopet SS - 20km
v. Stringing of 132kV 2nd circuit on the existing 132kV DC/SC line from 132/33kV Aswaraopet to 132kV B.Gangaram - 30km

Encl: 1. PSSE converged case through e mail
2. Study results

Yours faithfully,

Director/Projects & Grid Operation

Copy to:

1. Dr. Subir Sen/ COO/CTU, Smart Grid, PGCIL Corporate Office, Saudamini, Plot No.2, Sector 29, Near IFFCO Chowk, Gurgaon (Haryana) - 122001, INDIA
2. The Chief Engineer/Projects-I/TSTRANSCO/VS/Hyderabad.
3. AGM(I/C)/ SRLDC/29,Race Course Cross Road,Bangalore-560009
4. DE(T) to Chairman and Managing Director/ TSTRANSCO

सत्यमेव जयते

भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

केन्द्रीय विद्युत प्राधिकरण

Central Electricity Authority

विद्युत प्रणाली योजना एवं मूल्यांकन प्रभाग-II

Power System Planning & Appraisal Division-II

No. 51/4/(41[illegible])/2017/PSPA-2/556-558 Dated 27.07.2017

To,

1. Sh Mukesh Khanna,
   AGM(CTU-Plannning)
   Power Grid Corporation of India Ltd.,
   "Saudamini" Plot no-2, Sector-29,
   Gurugram- 122001, Haryana

2. Director/Projects & Grid operation,
   TSTRANSCO,
   Vidyut Soudha,
   Hyderabad-500082

3. Chief Engineer/IPC & Power Systems
   APTRANSCO,
   Vidyut Soudha,
   Hyderabad-500082

Subject: Minutes of the meeting held on 10.07.2017 to discuss the issues relating to Asupaka S/S of the state of Telangana and LILO of Nannur (AP)-Regumanugadda (Telangana) 220kV S/C line at Brahmankotkur (AP).

Sir/Madam,

A meeting was held on 10 July, 2017 (Monday) in Central Electricity Authority to discuss the issues relating to Asupaka S/S of the state of Telangana and LILO of Narnoor(AP)-Regumanugadda (Telangana) 220kV S/C line at Brahmankotkur (AP).

The minutes of the meeting is enclosed herewith.

Yours faithfully,

22.7.17

(B.S.Bairwa)
Director

Minutes of the meeting held in CEA at Delhi on 10.07.2017 to discuss the issues relating to Asupaka S/S of the state of Telangana and LILO of Nannur(AP)-Regumanugadda (Telangana) 220kV S/C line at Brahmankotkur (AP)

The list of participants is enclosed at Annex-I.

1. Chief Engineer (PSPA-II) CEA welcomed the participants. He informed that the meeting was convened to discuss the issues relating to Asupaka S/S and LILO of Nannur(AP)-Regumanugadda (Telangana) 220kV S/c line at Brahmankutkur (AP).

2. Representative of TSTRANSCO stated that APTRANSCO (before bifurcation of states) had planned a 400/220kV Sub-station at Asupaka (2x315 MVA) with LILO of one circuit of 400kV Kalpaka - Khammam D/C Line at Asupaka SS. The downstream connectivity to meet the LI loads under Indira Sagar Rudramakota Lift Irrigation Scheme was as under :

   (i) Asupaka - Medipally 220kV D/C line (12.01km)
   (ii) Asupaka - Bandarugudem 220kV D/C line (14.84km)
   (iii) 220/11kV Medipally Substation (2x25MVA)
   (iv) 220/11kV Asupaka SS (3x50MVA)
   (v) 220/11kV Bandarugudem SS (3x50MVA)

3. TSTRANSCO further informed that after formation of Telangana State, the works in 220kV substations at Medipally and Bandarugudem were stopped as the intake pump house and gravity canal etc came under the geographical limits of Andhra Pradesh. However, work at Asupaka remain in progress.

4. Presently the works of 400/220kV Asupaka Sub- Station and LILO of one circuit of 400kV Kalpaka - Khammam D/C Line have been completed and are ready for charging. The works of 220/132kV Line and associated Sub Stations are under progress.

5. For effective utilization of 400/220kV Asupaka Substation which came under newly created Telangana state, TANTRANSCO proposed to revise 220/132kV downstream connectivity as follows:
   (i) Upgradation of existing 132/33kV Aswaraopet SS to 220kV with 2x100MVA, 220/11kV transformer.
   (ii) Asupaka -Aswarapet 220kV D/C (20km)
   (iii) Stringing of 2nd circuit on the existing Aswaraopet - B.Gangaram 132kV S/C Line on D/C tower (30km).

6. Chief Engineer (PSPA-II), CEA enquired about the earlier discussion regarding of proposed 400/220kV Substation at Asupaka and LILO of 400kV Kalpaka –Khamman line. TSTRANSCO informed that 400kV Kalpaka - Khammam Line and 400/220kV Asupaka substation were intra-state transmission elements and not discussed in any Standing Committee Meeting of Southern Region.

7. Representative of APTRANSCO stated that the LI schemes proposed to be feed from Asupaka 400/220kV Substation (before bifurcation of states) had been scrapped and works related to Meddipply and Bandarugudem had been stopped. She stated that the proposed LILO of one circuit of Kalpaka –Khamman 400kV D/C line at Ashupaka Sub station and the 220/132kV downstream connectivity was agreeable to Andhra Pradesh.

8. CE (PSPA-II) stated that reactive compensation requirement need to be studied for line charging and control of over voltage as the length of Kalpakka – Asupaka 400 kV S/c line (265 kms) was significant. CTU was requested to carry out relevant studies for reactive compensation requirement. Representative of CTU agreed for the same.

9. Representative of TSTRANSCO informed that APTRANSCO has accorded Administrative approval for extension of 220kV power supply for a Contract Maximum Demand of 450 MW to the pumping stations at Regumanugadda (Stage-I), Jonnalaboguda (Stage-II) and Gudipalligattu (Stage-III) under Mahatma Gandhi Kalwakurthy Lift Irrigation (MGKLI) Scheme in Mahaboobnagar District.
   The MGKLI Scheme envisages to get feed from three sources of supply i.e.
   i. Wanaparthy 220kV to Regumanugadda (Stage-I) via Singotam
   ii. Nannur 400kV SS (Andhra Pradesh) to Regumanugadda (Stage-I)
   iii. 400kV Veltoor SS to Gudipalligattu (stage-III).

10. TSTRANSCO added that work relating Nannur SS (AP) - Regumanugadda (Telangana) 220kV S/C line had been completed. As the line is an Inter-state transmission asset after bifurcation of Andhra Pradesh and Telangana States, TSTRANSCO requested for approval to energize the line.

11. Since, APTRANSCO and CTU had no objection in energizing the line, it was agreed in principle that the Nannur SS (AP) - Regumanugadda (Telangana) 220kV S/C line can be charged.

12. Representative of APTRANSCO stated that they had planned Nannur - Brahmankotkur 220kV S/C line for extension of power supply to 220/11kV Munchumari S/S in Kurnool district but the works could not be taken up as the line is passing through the area near to proposed Orvakal Green Field Airport. Therefore, APTRANCO had now proposed to LILO the Nannur-Regumanugadda 220kV S/C line,

which was an ISTS line between Andhra Pradesh and Telangana at 220/11kV Brahmankotkur Substation.

13. The Representative of TSTRANSCO stated that they agree with the proposal for LILO Nannur(AP) –Regumanugadda 220kV S/C line at Brahmankotkur.

After deliberation, following issues were agreed in principle:

A. TSTRANSCO would be allowed to charge 400kV Asupaka S/S (2x315MVA, 400/220kV) and LILO of one circuit of 400kV Kalpaka-Khammam Line to 400kV SS. CTU will carry out the study for reactive compensation requirement at 400kV Asupaka Substation for line charging and over voltage control. The charging of line and energization of Asupaka substation is to be planned properly with the reactors available at Khammam and Kalpaka end.

B. Nannur SS (AP) - Regumanugadda (Telangana) 220kV S/C line can be charged.

C. LILO of Nannur(AP) –Regumanugadda (Telangana) 220kV S/C line at Brahmankotkur (AP) can be carried out by APTRANSCO.

D. These matters will be further discussed in the next Standing Committee meeting on Power System Planning of Southern Region.

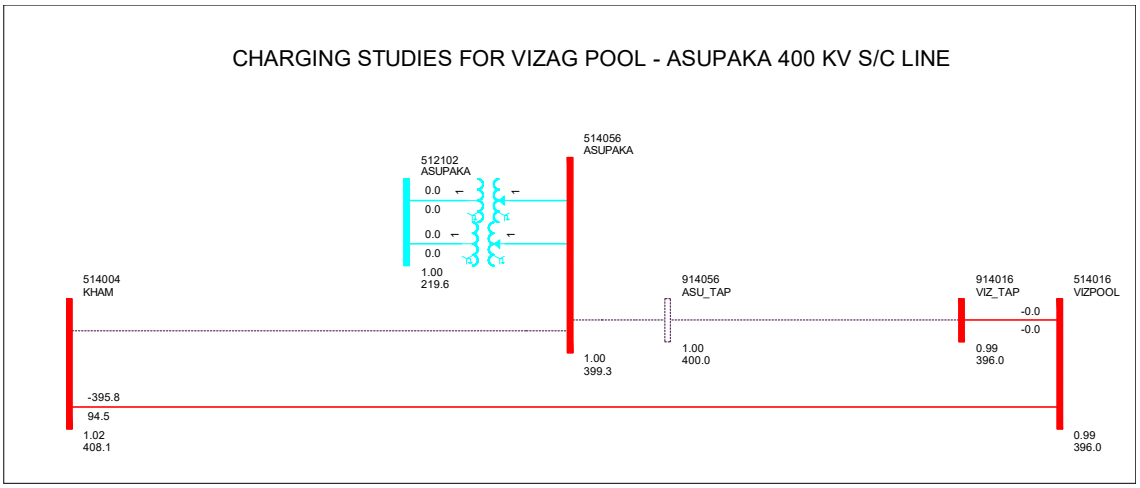
Annexure- I

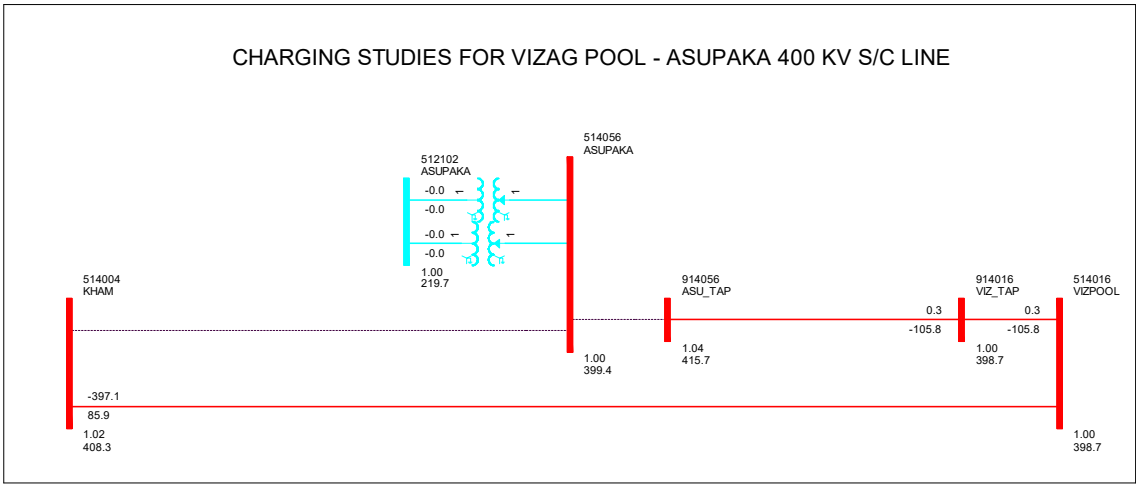
List of participants of the meeting held on 10.07.2017 to discuss the issues relating to Asupaka S/S of the state of Telangana and LILO of Narnoor(AP)-Regumanugadda (Telangana) 220kV S/C line at Brahmankotkur (AP)

S.No.	Name	Designation	Organization
1	S. K. Ray Mohapatra	Chief Engineer (PSPA-II)	CEA
2	B S Bairwa	Director (PSPA-II)	CEA
3	Kanchan Chauhan	AD-I (PSPA-II)	CEA
4	Pranay Garg	AD-I (PSPA-II)	CEA
5	V Thiagarajan	DGM	CTU
6	VMS Prakash Y	Dy. Mgr.	CTU
7	K Nirmala	DE/SS&LTSS	APTRANSCO
8	Y K Ramakrishna	ADE/System studies	APTRANSCO
9	A Sreenivasa Reddy	SE/PS	TSTRANSCO
10	M Sheshagiri	DE/SEII	TSTRANSCO

Charging Studies Without Line Reactor at Asupka 400/220 kV S/S

1.0 Charging from Vizag S/s End

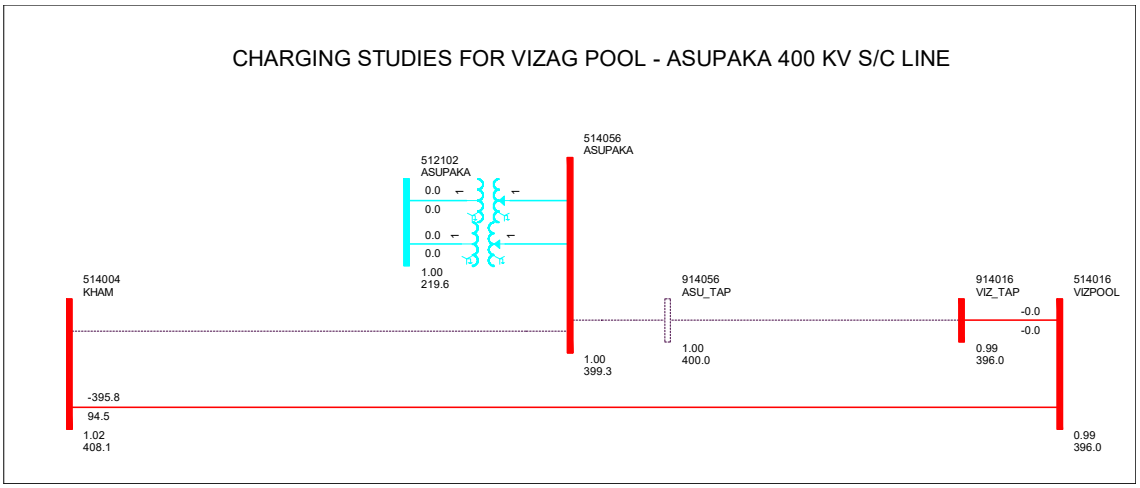


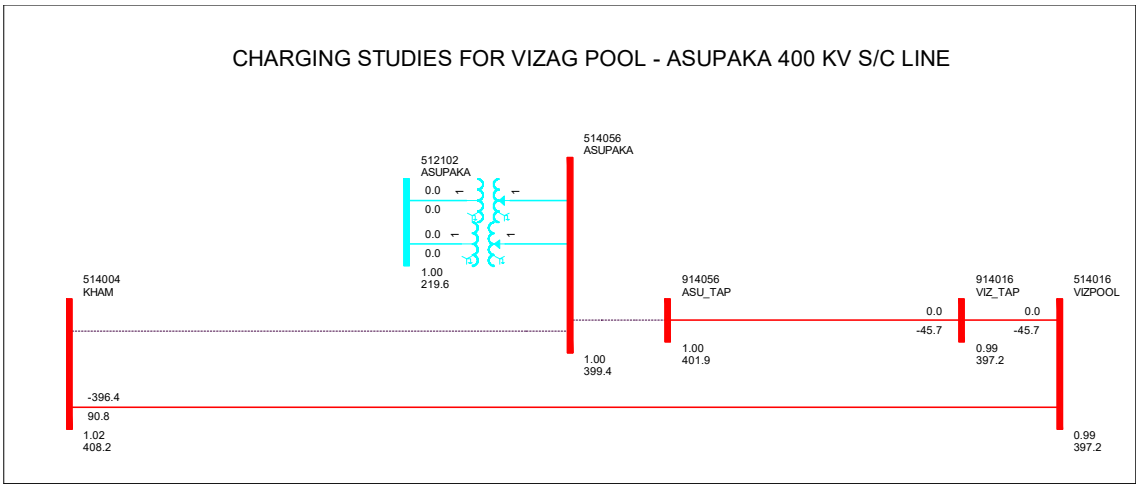


Source Rise : (398.7 – 396) kV = 2.7 kV, Line Rise : (415.7 – 398.7) kV = 17 kV
Total Rise 17+2.7 kV = 19.7 kV

Charging Studies With Line Reactor(63 MVAR) at Asupka 400/220 kV S/S

1.0 Charging from Vizag S/s End





Source Rise : (397.2 – 396) kV = 1.2 kV, Line Rise : (401.9 – 397.2) kV = 4.7 kV
Total Rise 1.2+4.7 kV = 5.9 kV

Transmission Corporation of Telangana Limited

(Govt. of Telangana State Undertaking)
(CIN No. U40102TG2014SGC094248) PABX: 23396000

From
Director (Projects & Grid Operation),
TSTRANSCO,
Vidyut Soudha,
Hyderabad- 500082.

To
The Chief Engineer/PS P&A -II,
Central Electricity Authority(CEA),
RK Puram, Sewa Bhavan,
New Delhi-110066

Lr.No. Dir(Proj&GO)/CE(PS)/SE(PS)/DE(SS II)/F.Sita Rama LIS/D.No.17/17,Dt: 01/08/2017

Sir,

Sub: TSTRANSCO - Sita Rama Lift Irrigation Scheme- Erection of substation for extension of power supply to Pump House - 1 (6x25 MW) at B.G.Kothur(V) Ashwapuram(M), Pump House-2 (6x40 MW) at V.K.Ramavaram(V) Mulakalapally(M) and Pump House-3 (5x40+2x30MW) Kamalapuram(V) Chandrugonda(M) in Bhadradri Kothagudem District - Approval Requested - Regarding.

* * * * *

The Executive Director/ Lift Irrigation Schemes, TSTransco vide U.O. dated: 12.05.2017 & 21.07.2017, has requested to extend the power supply to Pump House - 1 (6x25 MW) at B.G.Kothur(V) Ashwapuram(M), Pump House-2 (6x40 MW) at V.K.Ramavaram(V) Mulakalapally(M) and Pump House-3 (5x40+2x30MW) Kamalapuram(V) Chandrugonda(M) in Bhadradri Kothagudem District under Sita Rama Lift Irrigation Scheme.

In view of the above, the load flow studies for the above Scheme is carried out with following connectivities based on the field feasibility report.

i. 220/11kV SS at Pump House - 1 (6x25 MW) at B.G.Kothur(V) Ashwapuram(M) in Bhadradri Kothagudem District
ii. 220/11kV SS at Pump House-2 (6x40 MW) at V.K.Ramavaram(V) Mulakalapally(M) in Bhadradri Kothagudem District
iii. 400/220/11kV SS (3x315 MVA) at Pump House-3 (5x40+2x30MW) Kamalapuram(V) Chandrugonda(M) in Bhadradri Kothagudem District
iv. LILO of one circuit of 220 kV KTPS - Manuguru Line to Proposed Pump House -1 at B.G.Kothur for a length of 1 km.
v. LILO of 220 kV KTPS V - Lower Sileru II Line to Proposed Pump House -1 at B.G.Kothur for a length of 20 km.
vi. 400kV Twin Moose DC line from 400/220kV Julurupadu SS to Pump House -3 at Kamalapuram for a length of 50 km
vii. 220kV Single Moose DC line from Pump House -3 at Kamalapuram to Pump House -2 at V.K.Ramavaram for a length of 25 km.

Contd.....2

The load flow study results duly incorporating the above Scheme are herewith furnished along with the single line diagrams showing the above connectivities.

In view of the above, it is requested to communicate the approval at the earliest for the above Scheme.

Encl: 1. PSSE converged case through e mail
2. Study results

Yours faithfully,

Director (Projects & Grid Operation)

Copy to:

1. Dr. Subir Sen/ C.O.O./CTU, Smart Grid, PGCIL Corporate Office, Saudamini, Plot No.2, Sector 29, Near IFFCO Chowk, Gurgaon (Haryana) - 122001, INDIA
2. SE(T) to Chairman and Managing Director/ TSTRANSCO
3. ADE(T) to Director/ Lift Irrigation Schemes/ TSTRANSCO
4. Executive Director/ Lift Irrigation Schemes/ TSTRANSCO
5. Chief Engineer/IPC & Power Systems/APTRANSCO/Vidyut Soudha/ Hyderabad

ANNEXURE-43

Transmission Corporation of Telangana Limited

(Govt. of Telangana State Undertaking)
(CIN No. U40102TG2014SGC094248) PABX: 23396000

From
Director (Projects & Grid Operation),
TSTRANSCO,
Vidyut Soudha,
Hyderabad- 500082.

To
The Chief Engineer/PS P&A -II,
Central Electricity Authority(CEA),
RK Puram, Sewa Bhavan,
New Delhi-110066

Lr.No. Dir(Proj&GO)/CE(PS)/SE(PS)/DE(SS II)/F.Devannapet LI SS/D.No.12/17,Dt: 22/07/2017

Sir,

Sub: Extension of Power supply under Phase-III, J.Chokka Rao Devadula Godavari Lift Irrigation Scheme - Construction of 220/11kV Substation Devannapet at Shaft-13 of package-III @ KM 49.060 near Devannapet (V) in Warangal Urban District - 220 KV Single Moose DC line from 400/220KV Oglapur (PGCIL) SS to proposed 220/11kV Devannapet LI SS - Approval Requested - Regarding.

*****

The Chief Engineer, I & CADD, Godavari Lift Irrigation Scheme, Warangal vide letter dated: 30.01.2017, has requested to extend the power supply at 220kV level to shaft 13 near at Devannapet (V) @ km. 49.060 for package-III Pump House in Warangal Rural District under Phase-III of J.Chokka Rao Devadula Godavari Lift Irrigation Scheme.

In view of the above, the load flow studies for the above proposal is carried out proposing a new 220kV Single Moose DC line from 400/220kV Oglapur (PGCIL) SS the proposed 220/11kV Devannapet SS (96MW) for a length of 30kM based on the field feasibility report.

The load flow study results duly incorporating the above proposal are herewith furnished along with the single line diagram showing the above connectivity.

In view of the above, it is requested to communicate the in-principle approval at the earliest for the above proposal.

Encl: 1. PSSE converged case through e mail
2. Study results

Yours faithfully,

Director (Projects & Grid Operation)

Copy to:

1. Dr. Subir Sen/ COO/CTU, Smart Grid, PGCIL Corporate Office, Saudamini, Plot No.2, Sector 29, Near IFFCO Chowk, Gurgaon (Haryana) - 122001, INDIA
2. SE(T) to Chairman and Managing Director/ TSTRANSCO
3. ADE(T) to Director/ Lift Irrigation Schemes/ TSTRANSCO
4. Executive Director/ Lift Irrigation Schemes/ TSTRANSCO

Vidyut Soudha, Khairatabad, Hyderabad – 500 082., Tel: Off: 040-23395325, Fax: 040-23396027
www.transco.telangana.gov.in, e-mail: dir.grid@tstransco.in