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

From

S.Shanmugam,B.E.,
Managing 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.Uppur ATS /D.169 /2016 dt.05.05.16

Sir,

Sub: Agenda to be included in the forthcoming Standing Committee Meeting – Approval for the ATS of the Uppur 2X800MW Project requesting - reg.

****

In the Joint Load Flow Study and during the subsequent meeting held from 14th – 17th March 2016 at SRPC, Bangalore with CEA & PGCIL, the Associated Transmission System (ATS) for the Uppur – 2X800MW Thermal Power Project in Ramanathapuram district has been evolved.

2.0 In the Ramnad district due to high solar penetration, substantial solar power injection is available and further injection of solar power is expected in this district in the near future. Further this area is not a load centre. Hence considering all of the above, it has been decided to evacuate the power from Uppur – 2X800MW power project at 765kV level. The supply, erection and commissioning of BTG package for the Uppur - 2X800MW project has already been awarded.

2.1 The major load centres in Tamilnadu are Chennai, Coimbatore & Erode region. Apart from this load centres, the loads are distributed in other regions i.e.,

Trichy, Madurai, Tirunelveli, Villupuram & Vellore region. Further, there is a huge quantum of wind power injection in southern and western parts of TN during wind season i.e., from May to September.

2.2 Hence, it has been decided to form 765kV ring main network in Tamilnadu so as to have operational flexibility and reliability. Already Ariyalur and Coimbatore 765/400kV substations have been approved under Common Transmission system (CTS) for the generation projects in Chennai area in the 37th Standing Committee Meeting of Southern Region.

2.3. Now it has been proposed to establish a 765/400kV substation in Virudhunagar with pooling of power from Uppur Thermal power station apart from renewable generation of wind & solar projects in Southern part of TN with 765kV DC connectivity to Coimbatore and Ariyalur 765kV substations.

3.0 The Load Flow study has been conducted for the time period of 2020-2021 year condition, for the following cases and options. The ongoing ETPS Expansion 1X660MW, ETPS SEZ – 2X660MW, NCTPS Stage III – 1X800MW projects along with the Ennore Replacement - 1X660MW and Udangudi Stage I 2X660MW, SEPC – 1X525MW projects have been considered in the study. The Pugalur HVDC station along with Raigarh – Pugalur 800kV, 6000MW HVDC line, Pugalur – North Trichur 320kV, 2000MW, HVDC line and its associated 400kV lines from Pugalur are also considered in this study. However 1500MW schedule is considered for Kerala alone from Raigarh HVDC station for this study. During wind season, 6200MW of wind power and 1500MW of solar power has been considered in the study. The study results are enclosed as Annexure .

Base Case: with Uppur 2 X 800 MW with 765kV DC Connectivity to Virudhunagar 765 kV SS.

Case 1: Base case + LILO of Udangudi - Ottapidaram 400kV DC quad line at Virudhunagar 765 / 400 KV SS + 400 KV DC quad line from Kamuthi 400kV SS to Virudhunagar 765/400kV SS + 400 KV DC twin moose line from Thappagundu 400 kV SS to Virudhunagar 765 / 400 KV SS

Case 2: Base case + LILO of Ottapidaram - Kamuthi 400 KV DC quad line at Virudhunagar 765/400 KV SS + 400 KV DC twin moose line from Thappagundu 400kV SS to Virudhunagar 765 / 400 KV SS + 400 kV DC

Quad line from Kayathar 400 KV SS to Virudhunagar 765/400 kV SS

Case 3: Base case + 400 kV DC quad line from Kayathar 400 KV SS to Virudhunagar 765/400 kV SS + 400 kV DC quad line from Kamuthi 400 KV SS to Virudhunagar 765/400 kV SS + 400 kV DC line from Thappagundu 400 KV SS to Virudhunagar 765/400 kV SS

3.1. From the study results, the following have been observed.

i. The power from Udangudi 2X660MW, SEPC -1X525MW and wind & solar power generation are injected to Karaikudi 400/230kV substation via., Kayathar Ottapidaram and Kamuthi 400kV substations and to Tirunelveli (Abisekapatty) 400/230kV substation via., Kayathar & Kanarpatty 400kV substations for load dispersal.

ii. Hence, in the base case, even after considering the Tirunelveli – Cochin 400kV DC line, the Checkanurani - Myvady 400kV SC line is found to be in over loaded condition. Even during present network condition also, in the full wind season, the Checkanurani - Myvady 400kV SC line is over loaded. The Kanarpatty – Tirunelveli 400kV DC line is also found to be in fully loaded condition.

iii. In the 39th Standing committee meeting, it was agreed that the 2nd circuit from Kanarpatty to Tirunelveli 400kV line would be mainly for reliability purpose and not for injection of power into ISTS Grid.

iv. Hence, various options have been explored to avoid the above over loading and it is observed that in case 2 & 3 , the power flow is found to be normal in all the 400kV and 765kV lines.

v. Considering the techno economical condition, case 3 is found to be a better option i.e., with Kayathar – Virudhunagar 400kV DC quad line, Kamuthi – Virudhunagar 400kV DC quad line and Thappagundu – Virudhunagar 400kV DC twin moose line.

3.2. Based on the above, the following scheme has been evolved.

ATS for UPPUR – 2X800MW project:

a. 765kV DC line from Uppur switchyard to Virudhunagar 765/400kV substation.

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

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

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

ii. **765kV Connectivity:**

   a. 765kV DC connectivity to the Coimbatore 765/400kV SS with 240MVAR, 765kV switchable line reactors at each line at both ends.

   b. 765kV DC connectivity to the Ariyalur 765/400kV SS 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).

iii. **400kV Connectivity:**

   i. 400kV DC Quad line from Kayathar 400kV SS.

   ii. 400kV DC Quad line from Kamuthi 400kV SS.

   iii. 400kV DC twin moose line from Thappagundu 400kV SS.

4.0. Hence, it is requested to approve and clear the above scheme in the forthcoming Standing Committee meeting on Power System Planning on Southern Region. The total TN 110kV network has been added in the Database. The .sav file and .raw file will be sent through email.

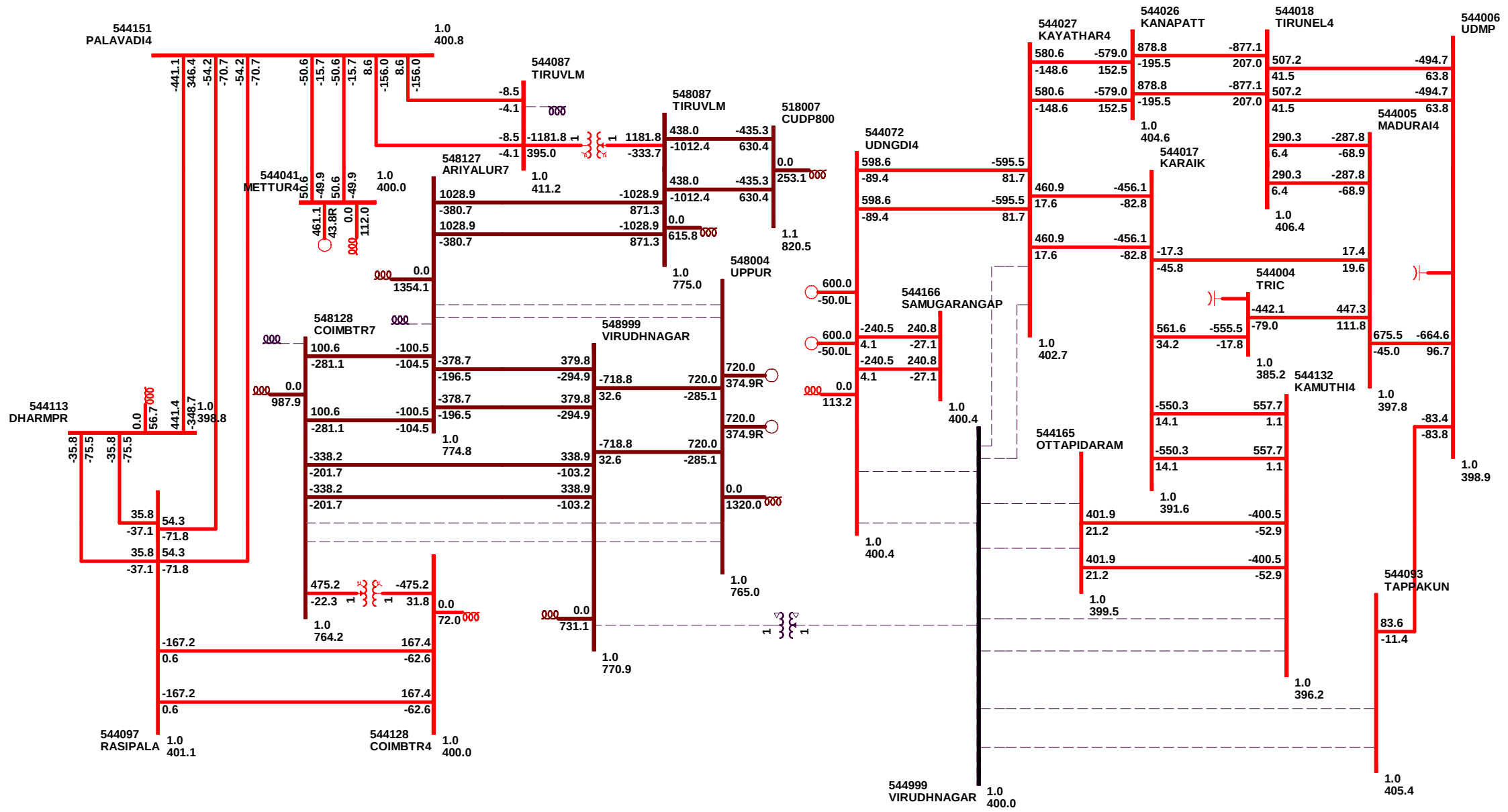
Thanking you,

Yours faithfully,

-sd-
(M.A.Helen)
Chief Engineer/Planning & R.C
For Managing Director/TANTRANSCO

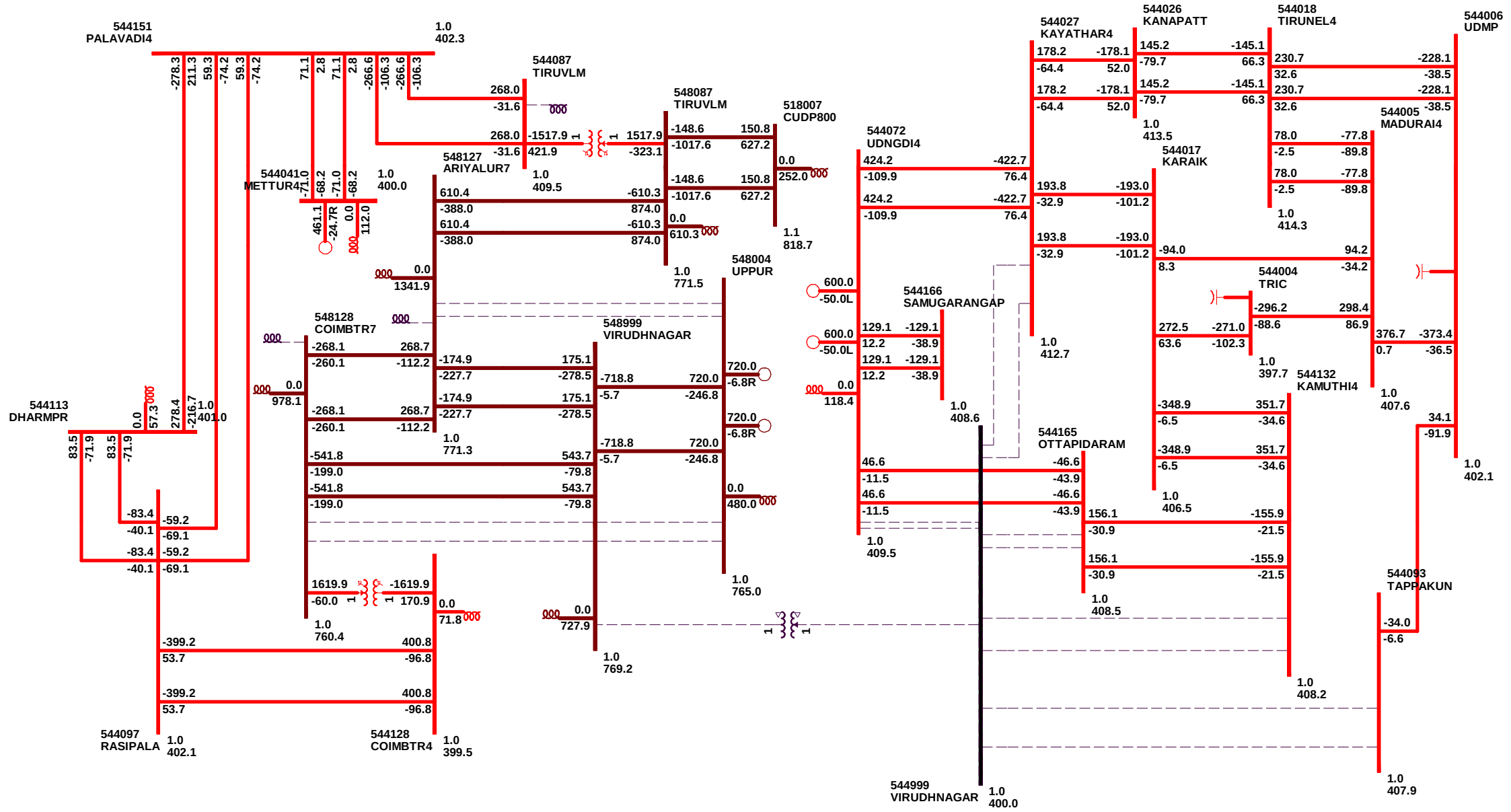
LOAD FLOW STUDY - UPPUR 2X800 MW THERMAL POWER PROJECT

BASE CASE (FW + FH) : WITH UPPUR 2 X 800 MW WITH 765KV DC CONNECTIVITY TO VIRUDHUNAGAR 765 KV SS.



LOAD FLOW STUDY - UPPUR 2X800 MW THERMAL POWER PROJECT

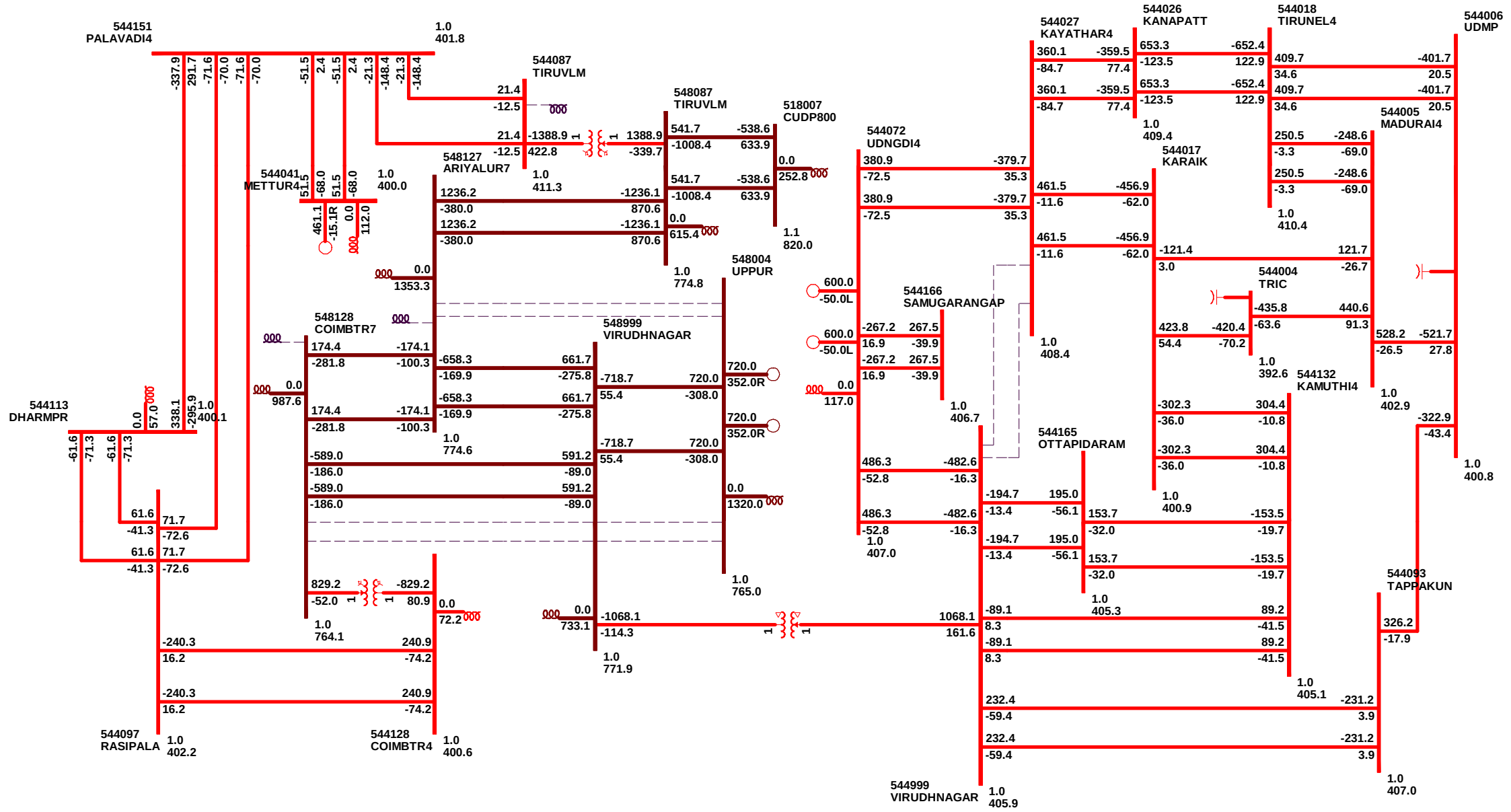
BASE CASE (NW + NH) : WITH UPPUR 2 X 800 MW WITH 765KV DC CONNECTIVITY TO VIRUDHUNAGAR 765 KV SS.



LOAD FLOW STUDY - UPPUR 2X800 MW THERMAL POWER PROJECT

CASE 1 (FW + FH) : BASE CASE + LILO OF UDANGUDI - OTTAPIDARAM 400KV DC QUAD LINE AT VIRUDHUNAGAR 765 / 400 KV SS +

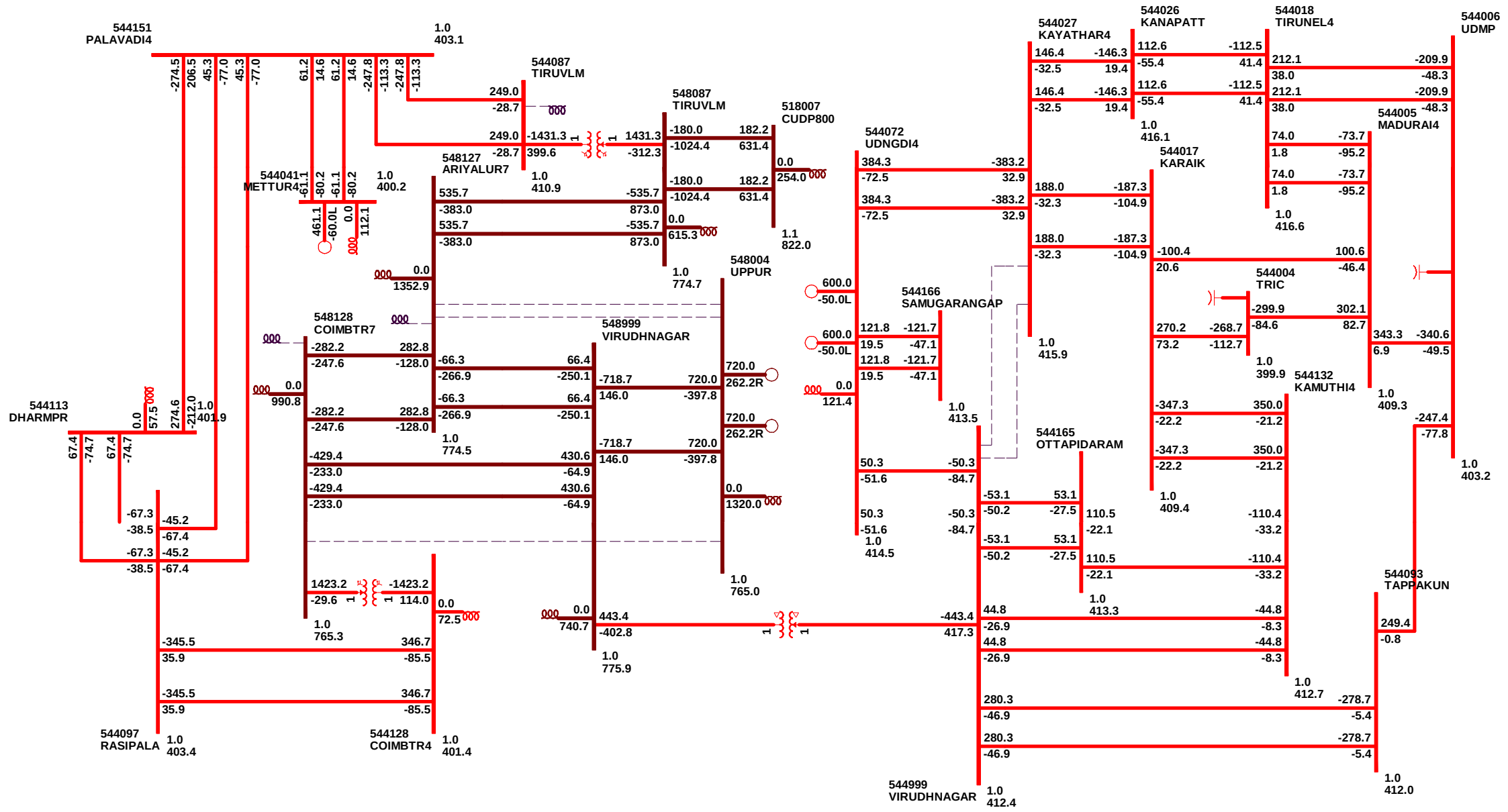
400 KV DC QUAD LINE FROM KAMUTHI 400KV SS TO VIRUDHUNAGAR 400KV SS + 400 KV DC TWIN MOOSE LINE FROM THAPPAGUNDU 400 KV SS TO VIRUDHUNAGAR 765 / 400 KV SS



LOAD FLOW STUDY - UPPUR 2X800 MW THERMAL POWER PROJECT

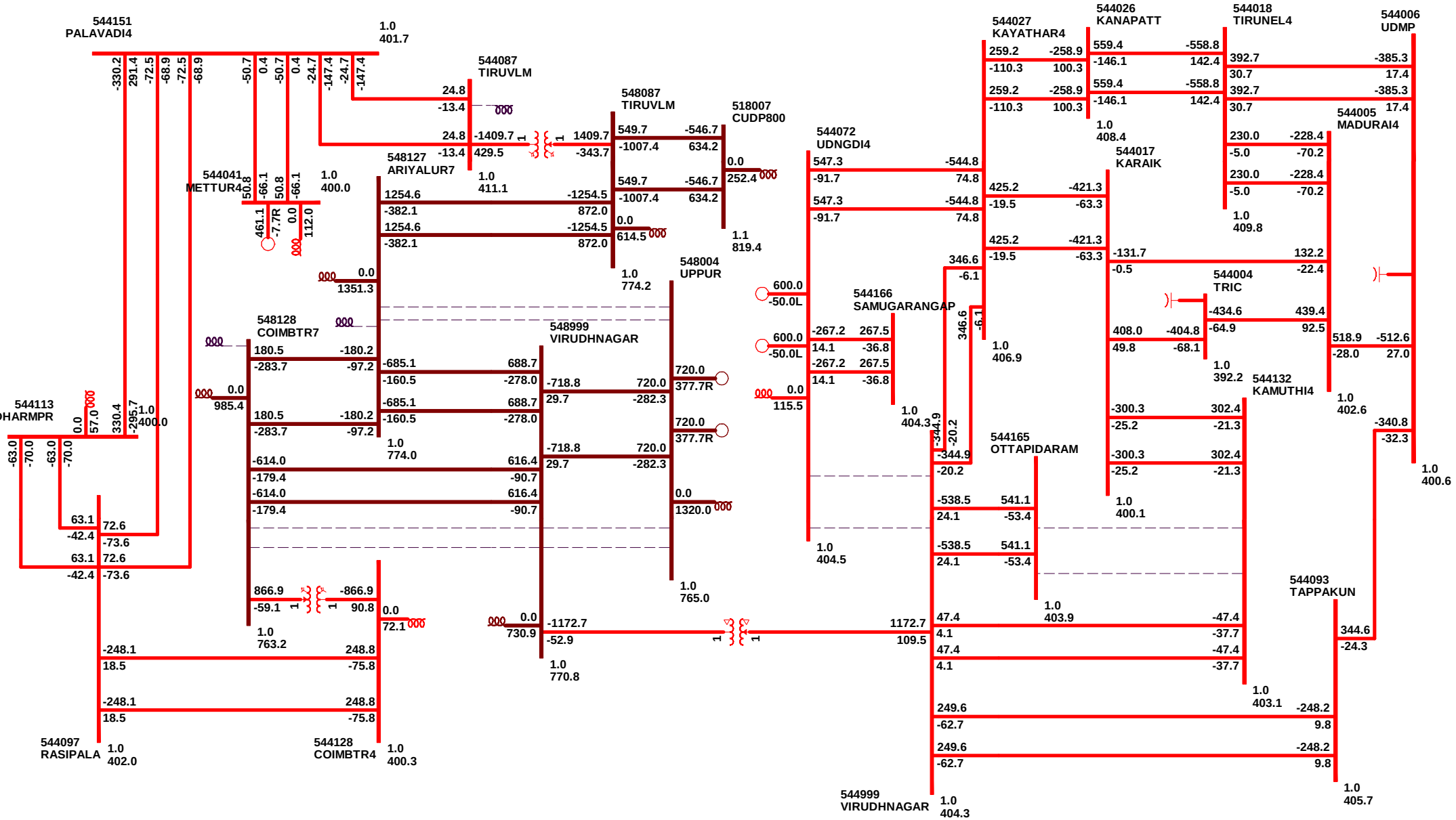
CASE 1 (NW + NH) : BASE CASE + LILO OF UDANGUDI - OTTAPIDARAM 400KV DC QUAD LINE AT VIRUDHUNAGAR 765 / 400 KV SS +

400 KV DC QUAD LINE FROM KAMUTHI 400KV SS TO VIRUDHUNAGAR 400KV SS + 400 KV DC TWIN MOOSE LINE FROM THAPPAGUNDU 400 KV SS TO VIRUDHUNAGAR 765 / 400 KV SS



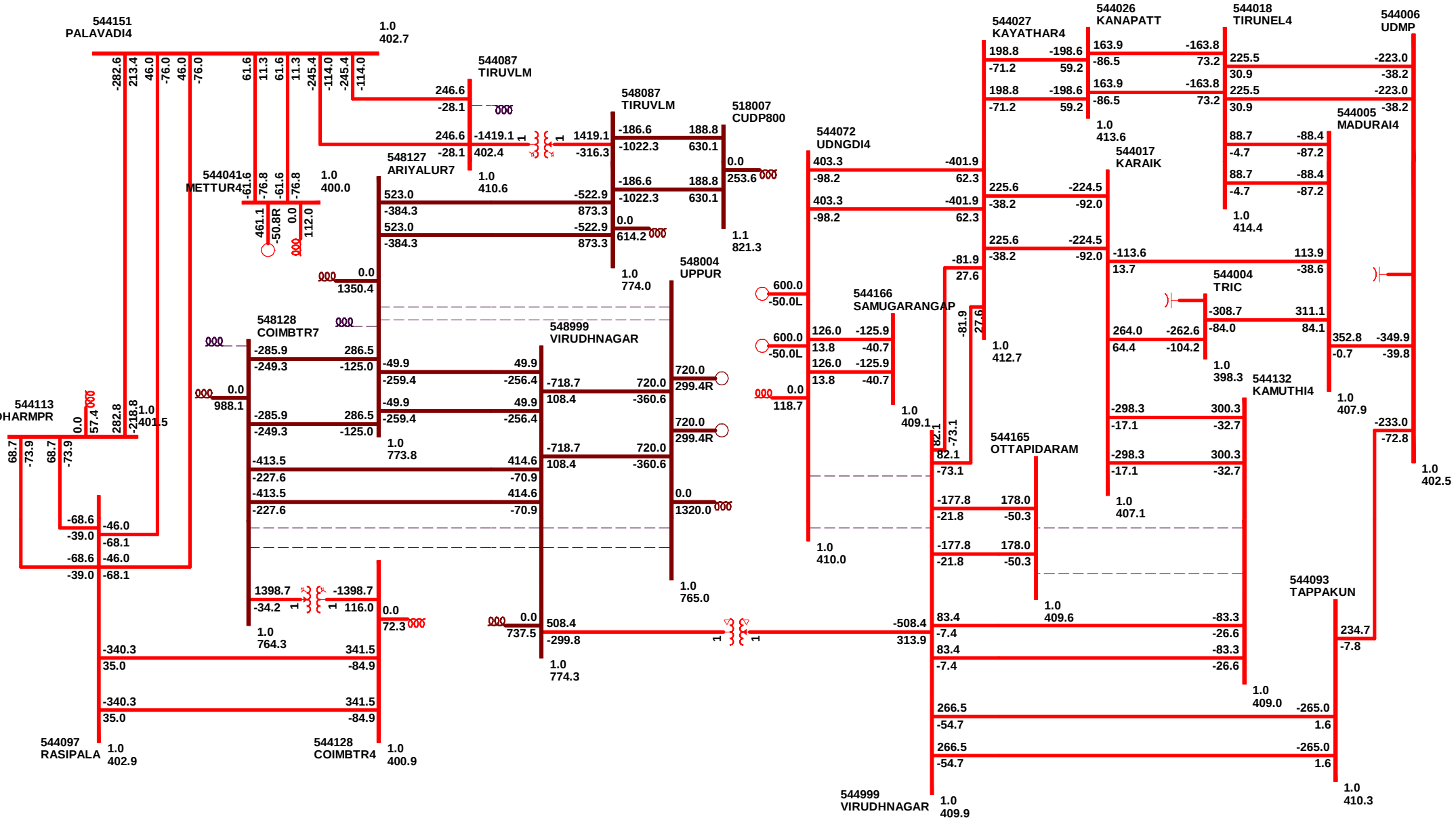
LOAD FLOW STUDY - UPPUR 2X800 MW THERMAL POWER PROJECT

CASE 2 (FW + FH) : BASE CASE + LILO OF OTTAPIDARAM - KAMUTHI 400 KV DC QUAD LINE AT VIRUDHUNAGAR 765/400 KV SS + 400 KV DC TWIN MOOSE LINE FROM THAPPAGUNDU 400KV SS TO VIRUDHUNAGAR 765 / 400 KV SS + 400 KV DC QUAD LINE FROM KAYATHAR 400 KV SS TO VIRUDHUNAGAR 765/400 KV SS



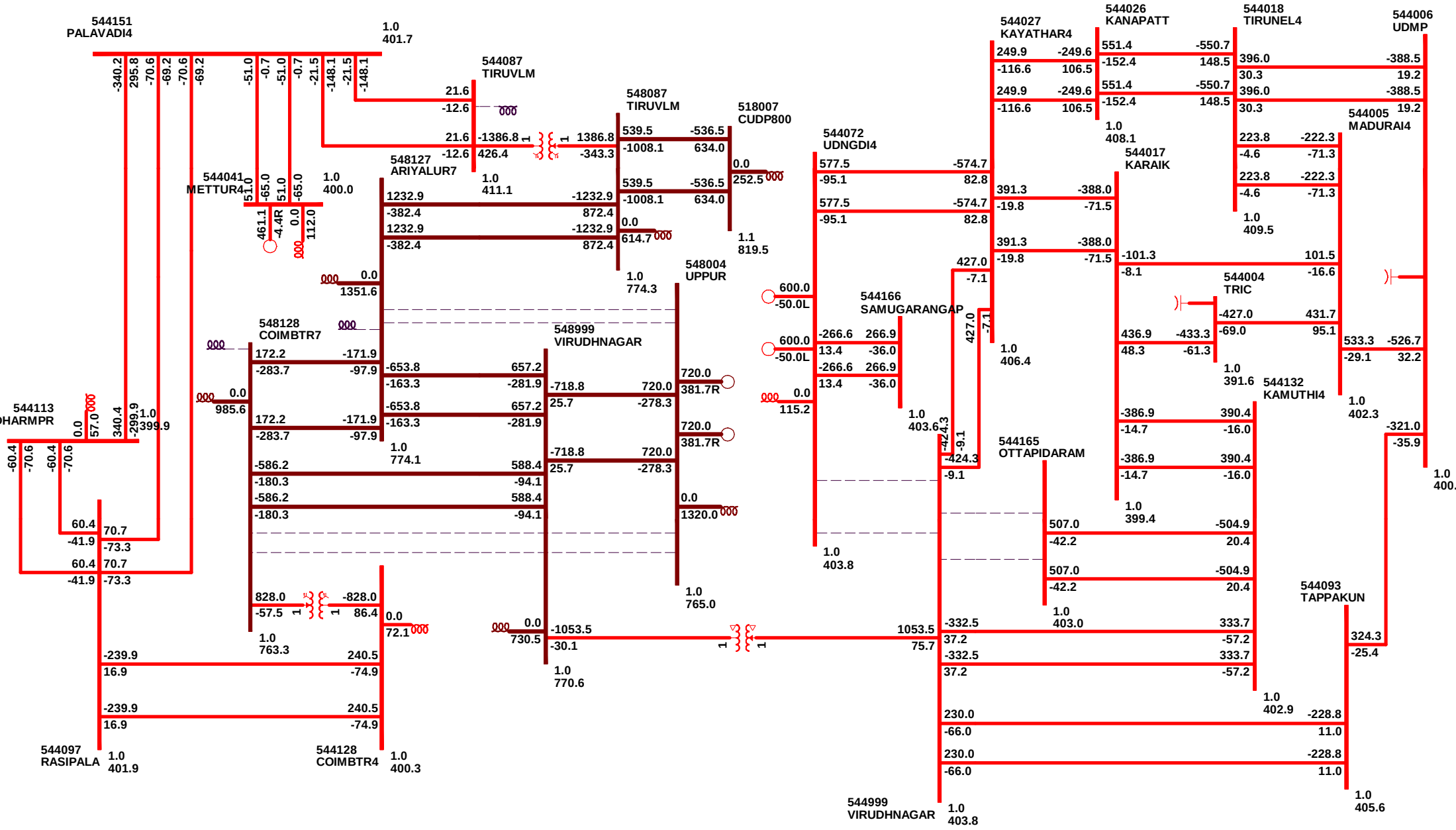
LOAD FLOW STUDY - UPPUR 2X800 MW THERMAL POWER PROJECT

CASE 2 (NW + NH) : BASE CASE + LILO OF OTTAPIDARAM - KAMUTHI 400 KV DC QUAD LINE AT VIRUDHUNAGAR 765/400 KV SS + 400 KV DC TWIN MOOSE LINE FROM THAPPAGUNDU 400KV SS TO VIRUDHUNAGAR 765 / 400 KV SS + 400 KV DC QUAD LINE FROM KAYATHAR 400 KV SS TO VIRUDHUNAGAR 765/400 KV SS



LOAD FLOW STUDY - UPPUR 2X800 MW THERMAL POWER PROJECT

CASE 3 (FW + FH) : BASE CASE + 400 KV DC QUAD LINE FROM KAYATHAR 400 KV SS TO VIRUDHUNAGAR 765/400 KV SS + 400 KV DC QUAD LINE FROM KAMUTHI 400 KV SS TO VIRUDHUNAGAR 765/400 KV SS + 400 KV DC LINE FROM THAPPAGUNDU 400 KV SS TO VIRUDHUNAGAR 765/400 KV SS.



LOAD FLOW STUDY - UPPUR 2X800 MW THERMAL POWER PROJECT

CASE 3 (NW + NH) : BASE CASE + 400 KV DC QUAD LINE FROM KAYATHAR 400 KV SS TO VIRUDHUNAGAR 765/400 KV SS + 400 KV DC QUAD LINE FROM KAMUTHI 400 KV SS TO VIRUDHUNAGAR 765/400 KV SS + 400 KV DC LINE FROM THAPPAGUNDU 400 KV SS TO VIRUDHUNAGAR 765/400 KV SS.