

### Learnings from MTDC HVDC projects

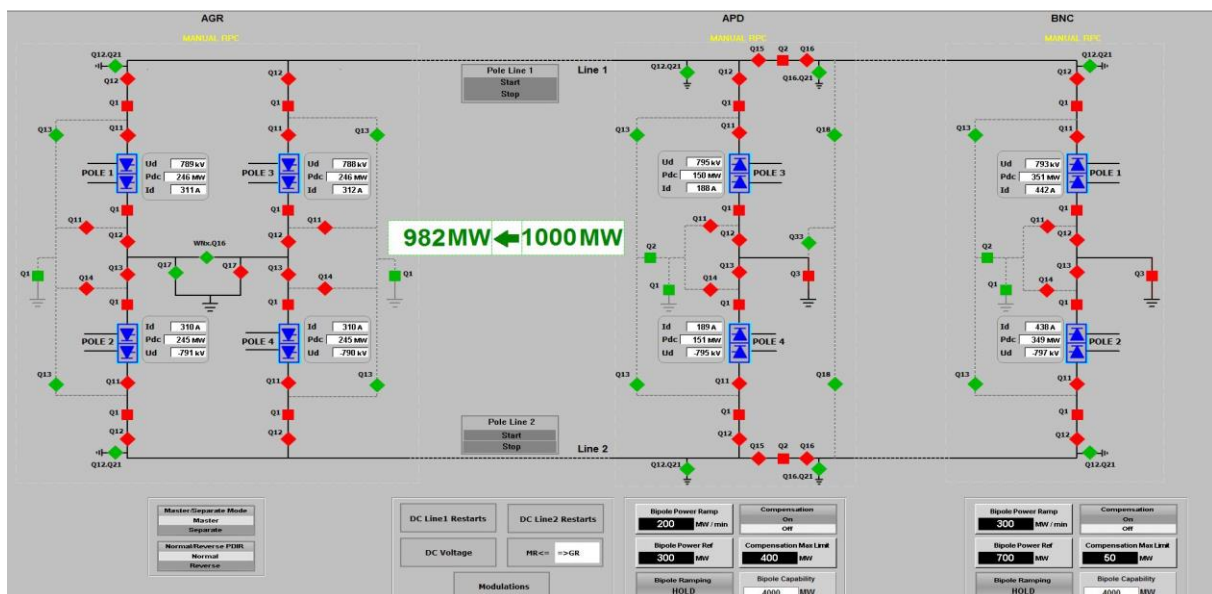
There is only 01 no. of Multiterminal HVDC project in India. It is the  $\pm 800\text{kV}$  North East Agra (NEA800) project owned by Powergrid Corporation of India Limited.

Since there is limited availability of MTDC projects presently, so few unique features from NEA800 project are discussed :

#### Multiterminal HVDC protections:

- The challenge arises due to the necessity to block and disconnect a specific converter with minimum impact on the others.
- The protections remain the same for a multi-terminal transmission as for a normal two terminal transmission. The major deviation is the requirement of a fast disconnection of a faulty converter.
- 2 types of fault – In one type the faulty converter shall get isolated allowing the parallel converter to remain in operation & in other type fault both the parallel converters require to order down to clear the fault.

### NEA800 multiterminal HVDC project



Pre-charging concept :

- During ongoing DC transmission from APD to Agra, if BNC terminal is to be put in service , then pre-charge operation is to be carried out.
- As per pre-charging sequence, it pre-charges the DC line from BNC to APD upto 95 % of DC voltage by building DC voltage in BNC poles via OLT mode without any power flow. Thereafter, the MTDC HSS connecting BNC to APD are closed automatically allowing power flow from BNC to Agra.

DC line fault between parallel rectifier stations :

- In case of dc line fault between BNC & APD, only 01 no. of restart attempt is allowed to prevent any further disturbance in the power flow from APD to Agra. If the single restart attempt fails, BNC pole is isolated. However, for dc line fault between APD & Agra 3 nos. of restart attempts are allowed.