PGCIL, Raipur
TCSC Project on 400kV Raipur-Rourkela Double Circuit Lines

142 MVar TCSC/ 788 MVar FSC (Thyristor controlled series compensation/ Fixed series compensation) solution for facilitating export of surplus energy from Eastern to Western Grid

Customer Benefits

- Grid stabilization with TCSC (Thyristor controlled series compensation) for large power transfers on the 412 Kms inter-regional Raipur-Rourkela 400kV double-circuit tie-line
- Inductive reactance compensation with FSC (Fixed Series Compensator) for improved voltage profile and reduced reactive power loading
- Use of Raipur-Rourkela link for inter-regional power transfer from eastern to southern region under contingency outage of one pole of Talcher-II HVDC system.
- Damping out low frequency inter-area oscillations (typically in the range below 1Hz) by modulations of effective reactance of power lines by Power Oscillation (POD) controllers of TCSC

ABB Solution

- Turnkey TCSC/FSC solution – project designed and executed by ABB Sweden and ABB India
- Equipment supply from ABB, Sweden - Thyristor Valves, Thyristor controlled reactors, Metal oxide Varistors (MOV), Bypass switch, Damping equipment, Spark gap for FSC, Optical transducers, Control and protection systems, Fine water cooling systems
- Equipment supply from ABB, India - Single phase capacitor banks, HV disconnectors, Steel platforms and associated supplies
- Complete civil works including control room building and equipment foundation
- Substation commissioned in 2004
Project highlights
- First commercial TCSC project in India and Asia, commissioned in 2004
- Power Oscillation Damping (POD) controllers in TCSC are provided to counter system disturbances and a special SVR (Synchronous Voltage Reversal-patented ABB technology) feature prevents potential Sub-Synchronous Resonance (SSR) that may be caused by presence of Series Capacitors in the circuit
- Field Testing of the POD controllers successfully carried out by live 400kV single line to ground fault and under other contingencies by PGCIL

ABB’s Grid System offerings for bulk power transmission:

HVDC
- Bulk power transmission
- Long sea transmission
- Asynchronous connections

HVDC Light
- Underground cable transmissions
- Power from shore to platforms and islands
- Connecting wind and solar energy to grid
- Stable connections to weak and passive networks

FACTS - Series Compensation
- Increased transmission capacity

FACTS - Shunt Compensation
- Improved power quality

High voltage cables
- Underground and submarine AC and DC cables

Power semiconductors
- T&D, industrial drives and traction applications with Bipolar and BiMOS technique

Consulting and service
- Transmission system consulting