



HV cable cooling supervision

Underground HV cables generate heat. This heat is dissipated through wet sand which must be cooled. To achieve this, chilled water is pumped through pipes in the sand from pumping stations situated along the cable route. The water is chilled by fan assisted air flow over radiators. In extremes of weather, the external cooling air supply can be regulated by remotely controlled louvres.

Cooling rates are dependent on the heat to be extracted, the water flow-rate and the cooling achieved by the radiator, which depends on the number of fans operating, and the opening position of louvres restricting the external air supplies. The complexity of variables involved in this cooling process creates a need for automatic control. Remote supervision of equipment faults is desirable for rapid response to failures.

By utilising our Talus RTUS in combination with PLCs and monitoring systems we have provided cooling supervisory systems for up to 440kV circuits.

efficient cooling



Solution

The provision of PLC logic at each chiller station allows the heat extraction process to be configured for the most effective operation. The logic is controlled by the temperature of the water as it enters and exits the cable cooling circuit.

The PLC also handles the sequencing required to start and stop the pumps and fans, and can analyse flow rates to assess the presence of leaks.

Remote monitoring of the PLC operation allows automation sequences to be disabled or modified. It also provides a means for early reporting of equipment failures.

Each chiller station can be centrally monitored by a SCADA system covering one or several cooling schemes, and is usually located at a substation. If the substation is not normally manned, this SCADA system can exchange data with a central control room for routine data recording and for alarm annunciation.

For added security, the control and communication equipment may be dual redundant.

Benefits

- Monitoring and control of the cable cooling plant allows cable operation closer to the maximum rated power without degradation
- With the ability to operate closer to the cable rated maximum, one cable in a dual circuit may be able to carry the entire load safely, whilst maintenance takes place on the other
- Cooling plant can be operated in the most cost-efficient mode
- Centralised alarming allows rapid reaction to faults in the cooling systems

Our capability

Schneider Electric has provided cable cooling supervisory systems for 275kV and 440kV circuits. These use our standard Talus remote terminal units (RTUs) with PLC logic capability, coupled with PC based monitoring and control systems. Very high resilience is provided by full redundancy of the automation and communication equipment.

Our expertise in automation and provision of standard components makes Schneider Electric an ideal partner for cable cooling equipment. We offer a full turnkey service, and a range of ongoing maintenance services including 24 x 7 support.