

July 2000

From ABB Power Automation Ltd., Baden, Switzerland
Paul Leimbach/CHPAU/ABB@ABB_CH01, CHPAU/NSV-7

Division Protection and Substation Automation Systems
Phone +41 56 205 42 85, Fax +41 56 205 33 24

ABB Power Automation Ltd Switzerland (CHPAU) Applications/Solutions for Customers success



400 kV Substation Automation Retrofit Under Power Gösgen Nuclear Power Plant, Switzerland

Background

The ATEL (Aare-Tessin Elektrizitätsgesellschaft) is responsible for a large part of the Swiss transmission system. It is the owner of the 380 kV Gösgen substation which is an important part of the transmission network and which is the node for the infeed of the energy from the nuclear power plant Gösgen. The Gösgen substation has been in operation since 1972. The refurbishment of the primary and secondary parts needed to be tackled.

Conditions for refurbishment

- The air-insulated substation (AIS) has a double busbar configuration with 6 bays including bus coupler and transformer
- The retrofit of the switchgear include also an extension by one new bay.
- The substation is unmanned and is normally remote controlled

- The refurbishment of the control and protection will take place at the same time.
- The bay level equipment is located in outdoor kiosks located closely to each bay.
- The commissioning is to be performed while the station remains in operation. No negative impact will be allowed on the power supply. The replacement of the old equipment and the installation of the new system per feeder has to be done in less than one week.
- No negative impact on the operation of the nuclear power plant is acceptable. This means very high requirements for project management, logistics and commissioning.

ABB Power Automation



400kV bus coupler kiosk

Reason for the decision

Most decisive for the success of this retrofit project was the know-how of ABB both in primary and secondary techniques, the high reputation ABB had gained in other ATEL Projects and the knowledge of the existing equipment in the substation.

Realization

- The majority of the required features of the Substation Automation system are standard, e.g. station wide interlocking via the fiber-optical LON interbay bus. The only specialties concerned
 - + Switching sequences implemented in MicroSCADA
 - + Remote I/Os for process data retrieval and control via serial optical process bus to the bay controllers REC316*4.
- All functions for line, transformer and generator protection were provided by RE_316*4 devices offering cost effective benefits for training and stocking of spares.
- The REB 500 busbar protection scheme is numerical and decentralized, which, also provides for line fault recording.
- The Sinaut protocol from Siemens is implemented for communication between the substation automation system and the remote control center.
- The starting point for the retrofit was the study of the old documentation. A detailed protection and control concept had to be worked out in close cooperation with the customer. The engineering implied also a new documentation including also reused old equipment. The



400 kV line feeder kiosk

narrow commissioning window has coped by a very detailed time schedule for this activity.

- The communication by fibre optic cables was not only a system feature but has also facilitated the cabling.
- Operator station in a central room

Summary

- The refurbishment requirements of ATEL could all be satisfied. Of utmost importance were:
- Commissioning of substation in operation.
- The replacement of the old equipment and installation of the new system in less than one week.
- The substation is available for refurbishment only during the shutdown of the nuclear plant for revision works.

And as a further request from the client:

- Station wide interlocking via fiber optical bus (LON)
- Automatic switching sequences

For more information please contact Paul Leimbach or the responsible sales engineer for your country.