Background
Ling AO Nuclear Power Company (LANPC) decided to build a Nuclear Power plant in Ling Ao, a site north of Hong Kong. LANCP asked for the most stringent requirements on availability, flexibility and safety of the nuclear plant. For reliability reasons and for excellence in handling and maintenance LANCP requested to build the 500 kV substation with GIS technology. A further request was that a protection system of Chinese brand protection had to be integrated into the substation automation system. Utmost importance was given to choose a supplier with the highest possible knowledge and experience.

Decision for supplier
High Voltage Technologies Ltd (Oerlikon, Switzerland) was chosen as the supplier for the 500 kV GIS substation in conjunction with ABB Power Automation Ltd (Baden, Switzerland) as the supplier for substation automation system.
**Scope of the 500 kV substation**
The 500 kV GIS 11/2 breaker scheme (9 circuit breakers) supplied by High Voltage Technologies Ltd (Oerlikon, Switzerland) contains 3 diameters. 2 further diameters are planned:
- 2 generator/transformer feeders unit 1 & 2
- 3 line feeders
- 3 spare line feeders
- 2 generator/transformer feeders unit 3 & 4 are planned

**Realization**
Since LANPC demanded:
- full redundancy of all secondary systems &
- full implementation of the Chinese transformer & line protection into the substation automation system
the following functions/devices were used:
- 3 redundant SPIDER systems (main1, main2 and backup)
- 2 redundant COM581 SPIDER frontend communication server for protection and control (main1, main2)
- 2 redundant COM581 frontend communication server to network control center NCC (main 1, main2)
- Redundant control units REC580
- Redundant line and transformer protection from domestic supplier integrated into ABB SA
- ABB busbar- and breaker failure protection systems
- The customers request to implement the Chinese protection parameters in Chinese language into the ABB SA was realized with the generic part of interface IEC 60870-5-103.
- The customers request to integrate a third party protection into our ABB SA system was realized by redundant implementation of serial interface IEC6087-5-103 in the Chinese protection equipment.
Together with Chinese engineers ABB Power Automation Ltd (Switzerland) had the opportunity to successfully carry out a integral test comprising the complete IEC60870-5-103 including the generic part for the first time.

**Summary**
The successful completion of the test with IEC60870-5-103 proves the ability of ABB to provide their Substation Automation System as open system allowing the integration of third parties.
The professional collaboration with:
- Our customer LANPC China
- ABB Highvoltage Technologies China
- the protection manufacturer in China coordinated by ABB Power Automation Ltd as system integrator is another example of a successful joint approach to a complex project.

The completion date for this project is scheduled by April 2001.