

**MARCINELLE 150 kV GIS Substation  
for Enel Marcinelle 400 MW Power plant**



Timing test of GIS circuit breaker



Gas filling activities



Protection cubicles

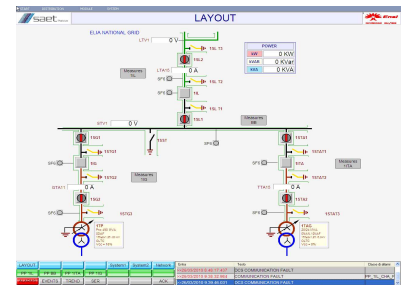
In the new 400MW combined cycle Power Plant of Marcinelle Charleroi, Belgium for the customer ENEL/MARCINELLE ENERGIE there was the requirement of 150kV GIS (Gas Insulated Substation) for the connection of the new Power Plant to the 150kV Elia grid. The three bays GIS manufactured by HYUNDAI HEAVY INDUSTRIES CO., LTD have been integrated by SAET with auxiliaries, protection and control systems on turnkey basis. The GIS assembling activities have been run by SAET and a qualified assembling team with preserving HYUNDAI supervision. The special requirement of 50kA due to the power of the generator connected to the grid needed a specific design with 220kV size and 150kV insulation. This customized connection has been adapted both for oil SF6 power transformer bushing and for the HV cable junction. In particular SAET supplied SCADA (MODBUS TCP-IP) for protection, control and measuring system with a distributed architecture including transformer, differential protections (T60 of General Electric), distance protection (for backup protection of transformer) and bay control units (F650 of General Electric). The SCADA integration to the national grid has been completed with communication protocol for remote control via IEC 60870-5-104 protocol. The complete package has been successfully commissioned into operation by SAET. The entire GIS substation is provided with a fault recorder system with a distributed architecture for each bays. All the fault recorder files are sent to a central oscillo-station.



150kV GIS: the 3 bays and the bus duct towards external transformer



Motor drives of 150kV GIS circuit breaker



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