

Substation Automation System (SAS) 500 kV Janamanjung

In June 2000 VA TECH SAT Malaysia (now **inCONTROL Tech Sdn. Bhd.**) has received the order to deliver the substation automation system (SAS) for its first 500 kV substation.

Janamanjung is a coal fired thermal power plant located in Perak, northwest Peninsula Malaysia. The power plant is build by ALSTOM POWER, consisting of three (3) units designed for 700 MW rated power output each, connected to three (3) step-up transformers with incoming feeders to the extra high voltage substation. The substation itself is designed as a double busbar system employing the 1-1/2 circuit breaker structure. Two outgoing feeders will transfer the power via a double overhead line system to the Air Tawar 500 / 275 kV substation.

VA TECH SAT's scope comprises the automation system, which employs the well-proven AM 1703 components, one (1) per diameter, distributed within three (3) remote control panels. Besides the entire control system, these conventional back-up control panels are also designed and manufactured in VA TECH SAT local workshop. Redundant fiber optic cables connect the AM modules and the redundant station controller AK 1703. Consequently all protection relays, supplied by ALSTOM, are also incorporated to the system by using the standardized IEC 870-5-103 serial interface.



Figure-1: AK 1703



Figure-2: AM 1703



Figure-3: FAT

Further, the AK 1703 is a gateway for special generator and transformer measurements by direct interfacing of the local generating unit field controllers. On the other side most of the signals are transmitted to the national load dispatch center (NLDC) in Kuala Lumpur. This is a double serial link by employing the IEC 870-5 101 and the WISP+ protocol emulation.

The station operation computer is placed in the substation control room and the desktop arrangement consists of three (3) monitors. Communication between the station controller AK 1703 and the MMI is based on TCP/IP and IEC 870-5-104 protocol. Beside this, a second workplace in the same configuration is situated in the power plant control room that is about 400 m apart from the substation. This extended workplace is connected by fiber optic HUBs and operates in client – server configuration.

A special maintenance and engineering workplace is installed at TNB's headquarter in Kuala Lumpur, approximately 200 km away from the site. The communication facilities are routers and TNB's fiber optic backbone network that is mainly based on the high voltage grid overhead line system. This workplace operates in a X-Windows configuration.

Operation of the first generating unit is scheduled to be in autumn 2001.