

## Successful CRP, SAS & SIMS FAT of the LENGGENG 500 / 275 kV Substation

The successful CRP and SIMS FAT for Lenggend was completed on the 17<sup>th</sup> January 2007 at the premises of inCONTROL Tech Sdn. Bhd. (formerly known as VA TECH SAT Sdn. Bhd.)



Figure-1: SAS FAT

inCONTROL Tech Sdn. Bhd. (iTEC) has a proven track record of successful completions of previous 500 / 275 kV substations such as Janamanjung, Air Tawar, Tanjung Bin, Bukit Batu and Kapar. With this confidence in iTEC's capability, Areva T&D France, a multinational with international engineering and manufacturing experience, placed an order in April 2006 on iTEC for SAS, CRP and SIMS for the largest 500 / 275 kV substations to be constructed in Malaysia by Tenaga National.

This order included the complete secondary engineering, that means:

- complete engineering design of the protection scheme,
- defining the CT and VT characteristics,
- manufacturing of Control Relay Panels (CRP),
- design, engineering and manufacturing of Substation Automation System (SAS),
- design and manufacturing of Remote Tap Changer panels,
- design, manufacturing and engineering of Interrogation and Monitoring System for all Intelligent Electronic devices (SIMS),
- testing and commissioning of all systems

The scope included a total of 83 Control-, Relay-, SIMS- and Automation Panels and 35 Marshalling Kiosks. For the customer, Tenaga Nasional Berhad (TNB), iTEC was required to design and engineer a new record number of 28 Bay Control Units.

Most importantly the time schedule from order to FAT was only 8 months. The panels were to be ready for FAT by 5<sup>th</sup> December 2006. The project was daunting. However taking heart from Confucius (A march of a 100 miles start with a single step), iTEC's project team took up the task. The work was "Fast and Furious" and the whole team buzzed with energy. Reams of documents were produced, orders for A4 papers reached new heights and finally iTEC submitted the conceptual design drawings ONE-WEEK BEFORE SCHEDULE. This itself was a major achievement.

iTEC is very proud that customers were quite impressed with the quality and the first version of the CRP and SIMS were approved in ONE sitting. The SAS conceptual design had some comments and was approved in two sittings.

The detailed execution then started to take place. The purchasing department became a hub of activity, quotations taken, negotiations done and orders were placed for more than 150 different items and from 25 different vendors. Getting the materials in time, preparing the store space for

receiving the materials and the manufacturing floor for receiving the panels required a separate project schedule and a new floor plan design.

Work was in full swing from September to December 2006. At one time there were more than 30 wiremen working on the panels simultaneously. Including the testers and iTEC team there were more than 50 people working on Lenggeng project alone. Engineering, manufacture and testing were all proceeding concurrently. The FAT for the 35 MKs were also completed in November 2006, well ahead of schedule. The entire detailed engineering was completed on 30<sup>th</sup> November 2006, the team heaved a sigh of relief and enjoyed a well-deserved break on iTEC's company trip to Thailand.

Manufacturing and testing continued to be in progress for a full month and FINALLY on 30<sup>th</sup> December 2006 the Panels were ready for FAT after full internal testing. This was just 8.5 months after initial order receipt and it became a new record in manufacturing. About 25 additional days were taken up for configuration standardization of new relays being used for the first time in 500 kV one and half breaker system. The panels were now ready even before the civil works of the control room has been completed.



Figure-2: CRP FAT



The CRP and SIMS FAT were held from 10<sup>th</sup> to 17<sup>th</sup> January 2007 and were successfully passed. The SAS FAT was completed on the 9<sup>th</sup> February 2007. For the largest 500/275kV substations with almost 93 km of wiring just within the panels, this was a major feat indeed.

A Challenge Accepted and Completed.

This was only possible with the excellent cooperation received from all our vendors and contractors, AREVA and most importantly TNB. A great big **Thank You** to all.

***"When the going gets tough, the tough gets going"*** --- well, we are really going ...