

DSS Serang Retrofit of Excitation Control Reduces Downtime and Leads to Improved Operations, Monitoring and Maintenance in Indonesian Power Plant



Background

PT. Dian Swastatika Sentosa Tbk. Serang (DSS) is an Indonesian company whose main business activities include power and heat generation, coal mining and telecommunication infrastructure. DSS started its operations in 1998 with four power plants with a total capacity of 300 MW of power and 1,336 tons/hour of steam located in Tangerang, Serang, and Karawang, Indonesia.

In June 2011 the DSS Serang plant decided to retrofit the excitation system on one of its steam turbine generators, referred to as Unit #6. The turbine, previously controlled by a Mitsubishi programmable logic controller and later by a Siemens turbine control, drives one of DSS Serang's larger generators at 70 MW.

The plant uses Woodward digital turbine control systems for three of its smaller Dongfang extraction steam turbine generators, each with a capacity of 35 MW. Over the years PM Control has proven to be a reliable maintenance partner for DSS, solving various issues including DSS Serang's hydraulic to electronics transfer mode issue for the three aforementioned units. Therefore it was a logical step for the company to consult PM Control for the upgrade of the excitation system.

Solutions

- CCM6080 controller
- 3-phase (6-pulse) or single-phase (full wave) thyristor converter
- Power interface (PII) board
- Combined input output (CIO) device
- Local excitation control terminal (ECT)

Results

- A fully redundant control system that reduces the risk of downtime of the plant related to maintenance issues
- Easier system operation, monitoring and maintenance thanks to the user-friendly excitation control terminal (ECT)



Challenge

DSS Serang was using a GEC Alstom 87.5 MVA static excitation system for generator #6, which had already been obsolete for a long time and for which Alstom had been unable to provide spare parts and technical support. To avoid future maintenance problems and - most importantly - reduce the risk of issue-related downtime, DSS decided to retrofit its GEC Alstom excitation system.

The company required a system with 100% redundancy on its automatic voltage regulator (AVR) control and power supply; functionalities that were also present on the original Alstom unit. Furthermore, improvements had to be made to the monitoring system and end-users had to be provided with a solution that was easier to operate.

In short, the objectives of the retrofitting project were to:

- Replace the obsolete system components
- Provide DSS with a better monitoring solution
- Provide end-users with easier operation

Solution

During the bidding PM Control was competing with Alstom, Toshiba, and Sulzer. PM Control is an ABB appointed Regional Technical Centre for excitation systems in South East Asia. For this bid PM Control worked with the local ABB office to offer the ABB UNITROL excitation system. PM also included detailed engineering and commissioning of the UNITROL system in its proposal.

The joint effort proved successful and PM Control, together with the local ABB office PT. ABB Sakti, received the purchase order in June 2012. Not only was DSS pleased with the ABB static excitation system (SES) that PM Control could offer them, they were also confident that PM Control would be a reliable partner in its aftermarket service support.

For this project the UNITROL 6080 D1 Dual Channel SES was selected, a solution designed for small to medium power applications. The scope of work for PM Control included retrofitting the existing redundant GEC Alstom excitation system with the UNITROL 6080. UNITROL is the registered ABB trademark for AVR's and SES's used with synchronous generators and motors of any size. The UNITROL systems are distinguished by their customer-specific system solutions and high quality. Headquartered in Switzerland, ABB has almost 90 years of experience in the field of excitation systems.

Redundancy of the system was one of DSS's main requirements. Thanks to its dual channel the UNITROL 6080 D1 can offer just that: Both channels are identical automatic channels providing 100% redundancy. Only one of the two channels is in operation at any time.

The solution includes the following features:

- A CCM6080 controller in each channel including:
 - AVR (AUTO)
 - Integrated manual field current regulator (MANUAL)
 - 64 bit floating point CPU with a 400 MHz processor



- A 3-phase (6-pulse) or single-phase (full wave) thyristor converter with the required interface board to the controller, providing input, output voltage measurement USYN, UE and current measurement from CTs.
- A power interface (PIN) board, which forms the main interface between the CCM6080 board and the power stage of the system and provides a potential barrier inside the power converter. The PIN board is a fully passive board, implementing measurements of converter current, voltage and temperature as well as the output drivers for thyristor firing pulses.
- A combined input output (CIO) device, used as a general-purpose interface to provide internal and external digital and analog I/O signals to the superimposed control system. The device is based on the PEC80 control platform.
- A local excitation control terminal (ECT), which is a basic service control panel that is very easy to use.

Installation and Commissioning

PM Control worked closely with the Indonesian ABB engineers to install the various components. The UNITROL 6080 D1 excitation control system was shipped, installed and commissioned according to DSS's project schedule. The fact that the UNITROL 6080 uses prefabricated functional modules was very helpful during the installation phase and saved the engineers a lot of time.

As DSS Serang expected a vertical commissioning, there was no room for error during the commissioning phase. The company was however extremely pleased there were no technical issues when the new ABB D1 Excitation was enabled and let PM Control know that it was a job well done.

Results

- A fully redundant control system that reduces the risk of downtime of the plant related to maintenance issues
- Easier system operation, monitoring and maintenance thanks to the user-friendly excitation control terminal (ECT)

DSS has reported that since the installation in April 2013, the new excitation system has run smoothly without any disturbances. The UNITROL Dual Channel system has helped to significantly reduce the unit's risk of downtime due to maintenance issues and obsolescence of parts.

Due to the user-friendly excitation control terminal (ECT), end-users are now able to operate and monitor the system more effectively.

DSS Serang was very satisfied that PM Control and ABB were able to successfully commission the unit without any technical glitches. As a result the company continues to enlist PM Control for their regular products and services updates. Currently, PM Control and DSS Serang are discussing future collaborations on two other retrofitting opportunities.



Before retrofit



After retrofit



UNITROL 1000 Series AVR



UNITROL 6080 Static Excitation System (SES)

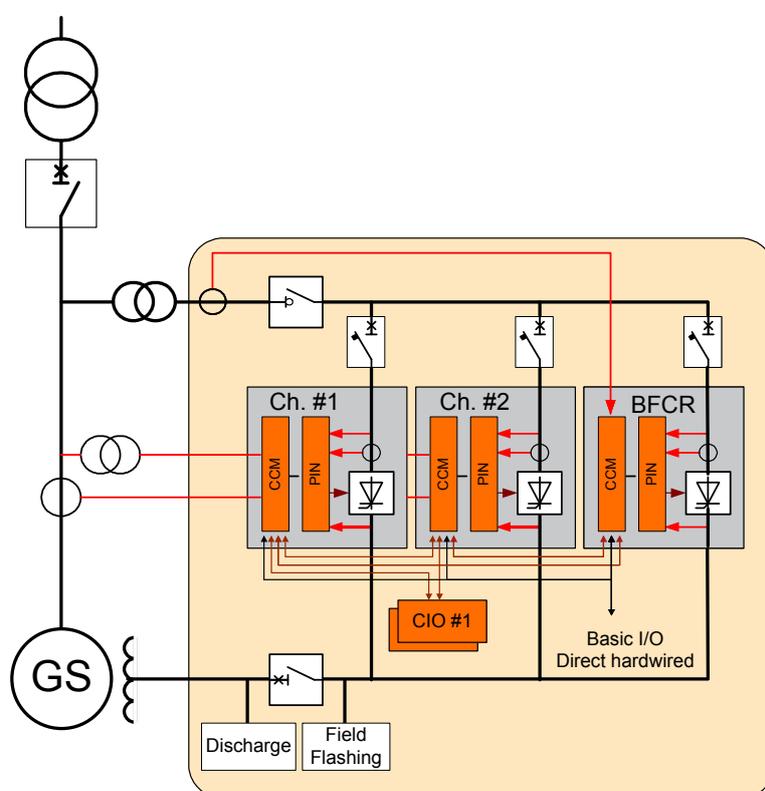
About PM Control

PM Control delivers energy optimisation solutions that increase efficiency while lowering emissions. Serving the energy, process and transportation markets, PM Control is the appointed distributor and recognized retrofit partner for Woodward Inc., Regional Technical Center for ABB Switzerland and Value Added Reseller for L&S Electric. Through our activities PM Control is having a positive impact on the lives of people across SE Asia, Australasia, India and beyond.

As a Regional Technical Center (RTC) for ABB, PM Control is authorized to:

- UNITROL 1000 series - Product sales and retrofit solutions
- UNITROL 6080 (D1, D3, D4 & D5) - Retrofit solutions
- Engineering support for ABB UNITROL 1000 series & UNITROL 6080
- Aftermarket field service and commissioning services

System Overview



Maximum configuration for UNITROL 6080

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