



## CASE STUDY

### INDUSTRY: POWER



**CUSTOMER:** Mindanao Steag Power Station

**LOCATION:** Villanueva, Philippines

**BACKGROUND:** The Mindanao Steag Power Station is a 232 megawatt, coal-fired power plant in the Phividec Industrial Estate Villanueva, Philippines that was first commissioned in 2006. In 2010, Steag Power expanded the plant by adding a third power generation unit; expecting to increase their generating capacity by an additional 150 megawatts. The new unit was built adjacent to the two older original units.

Highlights from Steag Power's expansion:

- The third unit did not realize its full potential.
- Steag Power embarked on a project to increase the power output and optimize the overall general performance of the new unit.
- A large part of this effort required improvement in the overall flow and flow measurement of their flue gases.
- Steag Power decided to replace a large Venturi in their exhaust duct with a more efficient and accurate measurement method.
- Increasing flow measurement accuracy and reducing the back pressure PPL (permanent pressure loss) from the large Venturi would boost their generating efficiency and allow them to provide more energy to the Philippine power grid.
- Steag Power needed triple redundancy on the flow measurement so as to automatically position flow control dampers in the ducts via their DCS.
- The Steag Power Plant unit was limited on straight pipe run.

**SCOPE OF WORK:** Armstrong International - VERIS Flow Measurement Group designed and supplied several VERIS Verabars® with a high-performance coating of Dursan® from SilcoTek to prevent erosion and corrosion. The VERIS Verabars® installed for the Steag Power Plant included a V510 flanged model with opposite-end support to average the entire flow velocity profile for a more accurate flow measurement. Opposite-end support allows the VERIS Verabar® to withstand higher velocities and flow rates.

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**BENEFITS:** Steag Power Plant was supplied an array of sensors allowing triple redundancy and a final sampling velocity profile providing a more accurate reading. Armstrong International - VERIS Flow Measurement Group supplied a Dursan® coating on all sensors to provide a slippery texture known as lubricity. The Dursan® coating helped reduce maintenance and the cost of operation. The triple redundancy flow measurement went into their digital control system to control automatically the combustion gas flow as well as the supply air to the boiler.

The increase in lubricity reduces the risk of any clogging of the VERIS Verabar® sensors from occurring. The loss pressure loss was a benefit Steag Power Plant enjoyed. The VERIS Verabar® resulted in a 2% increase of 150 megawatts. Steag Power Plant gained an additional 3 megawatts of power generation capabilities allowing Steag Power to generate more power, especially during the hot season.



FIG 1 VERIS Verabar® V510-15 sensors in front of duct louvers.



FIG 2 Transmitter installation showing impulse lines and isolation valves coming off the VERIS Verabar sensors.



FIG 3 Three Yokogawa transmitters installation.

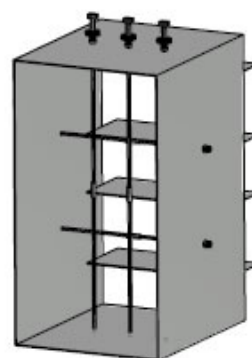
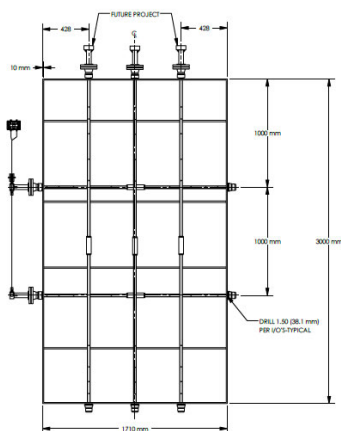


FIG 4 VERIS Verabar® V510-15 Sensor Array in Duct showing vanes and dampers.