



## Oil Production Offshore Platform Power Management and Emissions Treatments

CS7575

### APPLICATION

Power Generation; Emissions Controls

### PRIME MOVERS

6 Waukesha 900 rpm,  
600 kW G7042 gas engines

### CONTROL TECHNOLOGIES

#### Woodward E3 Rich Burn Trim

The Woodward E3 Rich-Burn Trim Integrated Gas Engine Control System analyzes and controls the spark, fuel and air functions of the engine and catalyst, optimizing the amount of time the engine is in compliance. The E3 StableSense™ natural gas O2 sensor is unaffected by engine exhaust methane and hydrogen. Misfire detection, health monitoring, and engine protection are integrated into the E3.

#### Woodward L-Series ITB Valve Position Controller

The L-Series Position Controller is an extremely fast bi-directional actuator that regulates the air-fuel mixture.

#### DCL 3-way Catalysts, Exhaust Silencers, and Heat Blankets

DCL three-way catalysts convert nitrogen (NOx), carbon monoxide (CO), hydrocarbons (HC), formaldehyde (CH2O), and EPA classified Hazardous Air Pollutants (HAPs). DCL QUICK-LID® catalytic silencer reduces engine exhaust noise and emissions in a single integrated unit.

#### HMI Remote Monitoring System

Color touchscreen HMI Operator Panel displays all relevant information available from the E-3, providing the operator with valuable information to monitor and troubleshoot all functions of the entire control system.

### PROJECT OVERVIEW

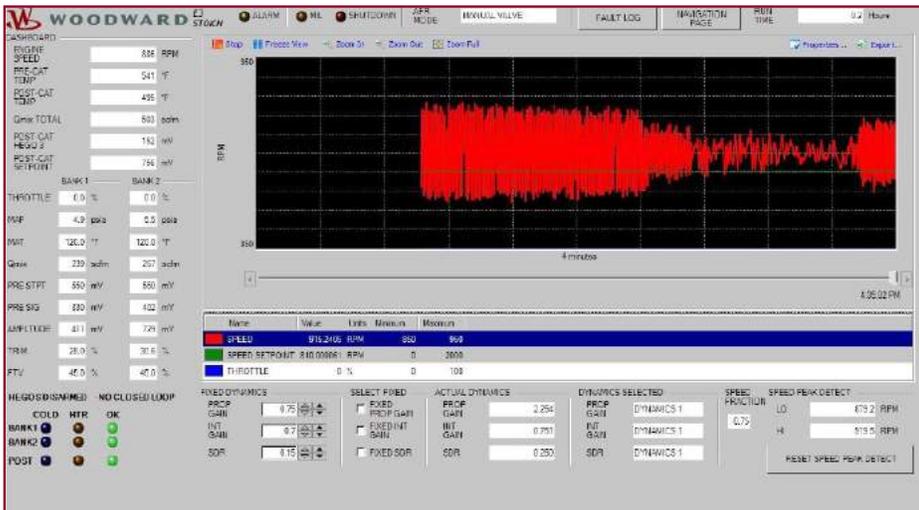
**GCS** was contacted by an offshore operator to install air fuel ratio control systems on six Waukesha generators on an offshore rig. The new system incorporates modern digital speed, air fuel ratio control and exhaust catalysts for improved speed and emissions controls. The original fuel system had Fisher regulators and OEM diaphragm carburetors which were prone to drift with load changes. The Gulf of Mexico offshore platform was experiencing such high CO concentrations that emergency rig evacuation events occurred due to the excessive CO levels in the onboard living quarters.

The structure is three separate platforms which are umbilicalled together. Two of the three platforms have three Waukesha 600 KW generators each which supply power for all three platforms. **GCS** implemented a control system consisting of a customized Woodward E3 Air Fuel Ratio control with Woodward StableSense oxygen sensors, DCL three-way catalyst, exhaust silencers, L-Series ITB fuel valves, MAP / MAT sensors, catalyst differential pressure transmitter, and pre/post catalyst temperature transmitters. The design greatly increases the reliability and availability of the customer's engines, improving reliability. Concurrent with start-up and commissioning, the operators and technicians were given hands-on training by **GCS** personnel.

The largest obstacle for this project was that all components had to be rated for hazardous locations (Class I, Division II) without the use of a purge system or an explosion-proof enclosure. All components were located in a wall mountable enclosure which had lights for diagnostics. The HMI system provides monitoring functions in realtime for all six engines with one terminal on each of the two rigs.

This was a very difficult and complicated job; complex issues had to be resolved on the spot to deliver a very unique project. **GCS** engineers built the E-3 panels and completed the installation successfully, exceeding the customer's expectations. CO emissions were reduced from 30,000 to 10 PPM CO per engine and engine efficiency was also improved on each engine/generator. This successful project has generated interest within the offshore network with requests to apply these systems at other locations.





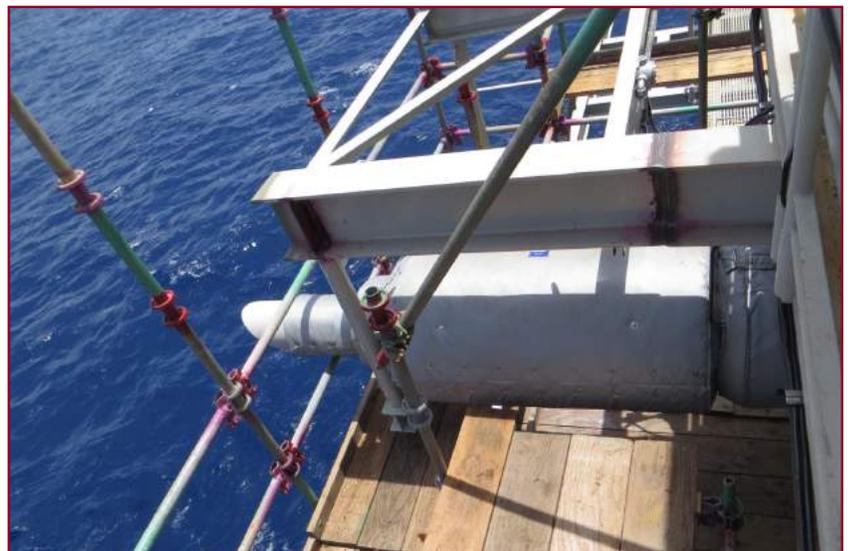
▶ Graph of engine RPM with E3 AFR control cycled OFF-ON-OFF. With correct AFR, the engine runs more efficiently with easier generator synchronization.



▶ L-Series fuel valves installed.



▶ Cabinet installed



▶ Catalyst and silencer installed.

GCS offers comprehensive control system support, from engine and turbine systems integration to turnkey project management for a broad range of marine, power generation and industrial projects. GCS is a member of the MSHS Group. Learn more at [www.govconsys.com](http://www.govconsys.com) or email us at [sales@govconsys.com](mailto:sales@govconsys.com)

**Southeast, Caribbean, Latin America**

3101 SW 3rd Avenue  
Fort Lauderdale, FL 33315  
Phone: 954-462-7404  
Toll Free: 877-659-6328  
Fax: 954-761-8768

**Gulf Coast**

2022 Tamvest Court  
Mandeville, LA 70448  
Phone: 985-626-8707  
Toll Free: 888-427-4853  
Fax: 985-626-8732

**Mid-Atlantic**

3120 Arizona Avenue  
Norfolk, VA 23513  
Phone: 757-852-5808  
Toll Free: 877-659-6328  
Fax: 757-852-5809

**Pacific Northwest**

3425 16th Avenue West  
Seattle, WA 98119  
Phone: 206-297-0300  
Fax: 206-297-0302

