

# Increased reliability for Chambersburg peaking power plant

CASE STUDY:  
BOROUGH OF CHAMBERSBURG



“NOW WE CAN EVEN GET DATA PER CYLINDER, AND THAT GIVES MUCH MORE INSIGHT ON WHAT IS GOING ON.”

When the Borough of Chambersburg (Pennsylvania, USA) decided to update the automation system of their power plant to achieve better reliability, the solution was a step-by-step upgrade of the engine control system.

“We sell all power to the local power grid, which has quite stringent rules for power plants delivering electricity. Having a quicker online time has made us more valuable in the eyes of the regional network operator,” says Assistant Electric Superintendent Jeff Heverley and Supply Supervisor Jerry Howe from the Borough of Chambersburg.

The Borough of Chambersburg (Franklin County) has approximately 21,000 residents and is part of the State of Pennsylvania. Chambersburg is an exceptional municipality in Pennsylvania since they have their own power plant. As a municipal electric utility, the plant is owned and operated by and for the residents of the community. By making and selling power, Chambers-

burg has lower net energy costs than communities that buy all their power.

## LOCAL POWER GRID

In the power market situation described by Mr Heverley, it is important that the plant can reliably start up quickly. All electricity is fed into the local power grid, PJM Interconnection (Pennsylvania, Jersey, Maryland),

## CHALLENGE

- Need for reliable and quick start up of the plant on demand
- Existing control system becoming obsolete
- Tailoring smooth and seamless communication between existing and new control system

## SOLUTION

- Upgrading the engine automation control to Wärtsilä UNIC C3 on 2 out of 4 engines, in two phases (2014 & 2016) - including tailor-made WOIS and plant automation upgrade (2014) to maintain full plant communication

## BENEFIT

- Increased power plant reliability
- Risk management and mitigating obsolescence issues
- Getting online faster, generating revenue sooner

which is the regional transmission organisation (RTO). PJM can schedule the Chambersburg power plant to start up a day in advance or immediately. The new capacity performance market of PJM has made it even more important to be able to start on demand.

– We sell all our power to PJM, and they have quite strict rules for power plants delivering electricity. There are stiff penalties, especially during the peak seasons in the summer and winter, if you are not able to run the plant, says Mr Heverley.

Wärtsilä UNIC enables faster ramp-up times and minimises start failures, which are key features for getting the power plant online quickly. This has made the Chambersburg power plant more valuable in the eyes of the regional grid operator because of the quick response time in emergencies.

– Since we are very reliable for the RTO, they now call us more often to get us online. And of course, the quicker we can be online the sooner we generate revenue, adds Mr Howe.

## RISK MANAGEMENT AND MITIGATING OBSOLESCENCE ISSUES

The 23-megawatt power plant, built in 2003, consists of four Wärtsilä 18V32DF dual-fuel engines. The facility was constructed to lower electricity costs, provide greater system reliability and the opportunity to sell power.

The reasons behind the upgrades were due to challenges with the WOIS (Wärtsilä Operator's Interface System) - that had been updated by a third party - and the old engine control system, WECS 3000, which was facing obsolescence and reliability issues. Wärtsilä offered a step-by-step approach for the upgrade. In 2014, the first engine's control system was upgraded to Wärtsilä UNIC C3, and in addition, the whole plant automation system was also upgraded to maintain full plant communication. The

second engine received its Wärtsilä UNIC C3 upgrade in 2016.

– Wärtsilä had a thorough plan which they followed all the way from the proposals to contract and shipment of hardware. As in any project, things come up, but they were solved, and Wärtsilä's people worked efficiently toward the end goal, says Mr Heverley.

Since only one engine was upgraded with Wärtsilä UNIC C3 in 2014 – and the other engines still had the old WECS 3000 – Wärtsilä developed a solution to allow them to communicate.

– Thanks to this solution, we did not have to shut down the whole plant in 2016. The plant was able to be online as needed and only the engine that was upgraded was out-of-service, says Mr Heverley.

## A GOOD SOLID PRODUCT

When talking about benefits, both Heverley and Howe highlight the importance of the plant's increased reliability. Other positive results are a decrease in NO<sub>x</sub> emissions, a slightly improved heat rate and noticeably less cylinder knocking on both upgraded engines, thanks to a new more proactively functioning control algorithm, which is based on measurements by the cylinder peak pressure sensor.

– Wärtsilä UNIC also makes it possible to trend engine components in much more detail for engine troubleshooting. Now we can even get data per cylinder, and that gives much more insight on what is going on, adds Heverley.

Jerry Howe describes the upgrade project as a positive endeavour.

– As far as we can tell, Wärtsilä UNIC seems to be a very reliable system and the services provided have been good. Especially on the second upgrade, where the site supervisor kept us informed on the different aspects of the project almost

daily, which was great. It was also a significant benefit having a Wärtsilä engineer on site all the time. That ensured an efficient progress.

Wärtsilä customers using the old WECS system will sooner or later have to upgrade the system since it is becoming obsolete. According to both Heverley and Howe, their experiences show that the Wärtsilä UNIC C3 is a good solid product to replace the old WECS system.

– As a matter of fact, we have a customer recommendation request pending at the moment, and we are about to recommend them to upgrade their system to the new Wärtsilä UNIC C3, concludes Jerry Howe.

## WÄRTSILÄ UNIC FUNCTIONALITY

- **Engine control:** start/stop management, including start block handling, load reduction, LT/HT-thermostat, wastegate and by-pass control. Speed, load and ignition control and EFIC (Electronic Fuel Injection Control) technology.
- **Engine safety:** (alarms, shutdowns, emergency stops, load reductions) including fully hardwired safety for engine overspeed (redundant), lube oil pressure, cooling water temperature and external shutdowns.
- **Engine monitoring:** Temperatures, pressures, speed, torsional vibration and load estimation.

## ...AND BENEFITS

- More stable engine operation
- More even and balanced running
- Improved starting behaviour
- Only a few modules used thus the need for spare parts is limited
- Proven system used on over 6000 engines