

# Scandinavian power generator welcomes the future of safety

Dong Energy uses its new communication infrastructure, based on software designed by Zonith A/S, at ten of its biofuel power plants to protect lone workers and automatically dispatch alarms. It has led to an increased efficiency at the plants and heightened levels of safety, which together is giving the Danish energy group a competitive edge in today's market.



DONG Energy's Avedøre power station, which consists of two units, produces 810 MWe of electricity and 900 MWth of heat and is recognized as one of the world's most flexible power plants

Like any other large-scale power generator, Denmark's Dong Energy faces the challenge of balancing the extensive automation of production processes with an obligation to protect employees – including using two people to do a one-man job, solely for the purpose of ensuring the safety of the employees.

Through the process of restructuring the digital communication systems however, Dong Energy has found it could solve this challenge. As a safety conscious utility, it can now protect its employees to the highest standards, while at the same time tightening up the alarm handling procedures, providing clear and efficient communication not only at but also between power plants.

"Not only has this solution given us a much safer working environment, it has given us the time to concentrate on more long-term assignments

because of the heightened efficiency created by the automatic handling of alarms", says Rene Fritzen, project manager at Dong Energy.

## A WELCOMED CHANGE

In 2008, DONG Energy initiated the renovation of its internal plant communication systems because the existing DECT system was failing to provide users with the necessary coverage and services.

The power generator required a communications solution that would not only offer full coverage across ten of its biofuel power plants but one that would enable users to receive system alerts, emergency alarms and lone worker functionality directly to their radio. After thorough discussion, the management team decided on a TETRA infrastructure and Sepura digital



The introduction of the new digital communication system has resulted in lone workers feeling much safer

radios. With the TETRA infrastructure the DONG Energy could take full advantage of the Zonith software, enabling improved on-site coverage, automatic alarm handling with text messaging, and lone worker protection.

According to Fritzen, the security around lone workers has become extremely good following the introduction of the new communication system, which was developed following extensive experience in other power plants; "The installation had one goal; to make employees as safe as humanly possible, and I think we have achieved this goal," adds Fritzen.

This feeling of greater safety has been shown to have had a huge impact on the mood of the employees and their daily motivational levels. This is not least because of the TETRA coverage, which is 100 per cent across the power plants. Employees receive a warning if the system for some reason does not work as it should, for example, if the network is down warning lights will illuminate.

But the system offers much more than just safety. By automatically dispatching technical alarms by TETRA text messages (SDS), and by taking all the existing communication systems and integrating them into one system, the DONG Energy plants have become more efficient places, leaving more time to undertake other long-term projects.

### HIGHER EFFICIENCY THROUGH AUTOMATIC ALARM HANDLING

The digital TETRA infrastructure was chosen because it provides instant call set-up and alarm dispatch, and ensures excellent coverage within the power plant and its surrounding area. Also, TETRA gives Dong Energy the ability to link all ten sites over the internet, enabling the largest plants to take-over alarm handling responsibilities for other smaller plants during the night and at weekends. These interlinked TETRA base stations have resulted in one of the largest private TETRA networks in northern Europe.

The software to support alarm handling and lone worker was designed by, Zonith A/S, based in Denmark's capital, Copenhagen, which has developed multiple value-added solutions providing extra functionality on digital communications platforms such as TETRA and MotoTrbo.

"When entering a safe area, a Bluetooth beacon registers the bluetooth device in the radio and automatically deactivates the lone worker function in the radio. And, in turn, if the user leaves the safe area, full lone worker protection will be turned on"

Dong Energy purchased a complimentary software solution to automatically dispatch alarm messages including technical, critical safety and lone worker. These alerts are automatically directed to the radio of the most qualified employee, ensuring a rapid and accurate response to system and freeing up a considerable amount of time for other tasks. So how does this software make all these important decisions?

### INTELLIGENT, AUTOMATIC DISPATCHER

The complex functioning of this communication system is made possible by a clever piece of control software – the Zonith Alarm Control System. It is a key element in raising the efficiency of plants and channels alarms directly from any alarm source by text messages to the radio of the concerned employee.

At the DONG Energy plants, alarms from the ABB process control system are channeled into the alarm control system along with lone worker alarms – in theory you can channel any alarm you like. The software then performs an analysis to determine how to handle the alarm.

The analysis includes cross-checking alarms with the watch schedule to make sure that they are dispatched to a person who is actually at work. Also, personnel have specific skills registered in the watch schedule, which enables the alarm control system to send the alarm to the most suitable employee. For example, electricians for electrical problems, rescue team for lone worker alarms – as many categories as you like.

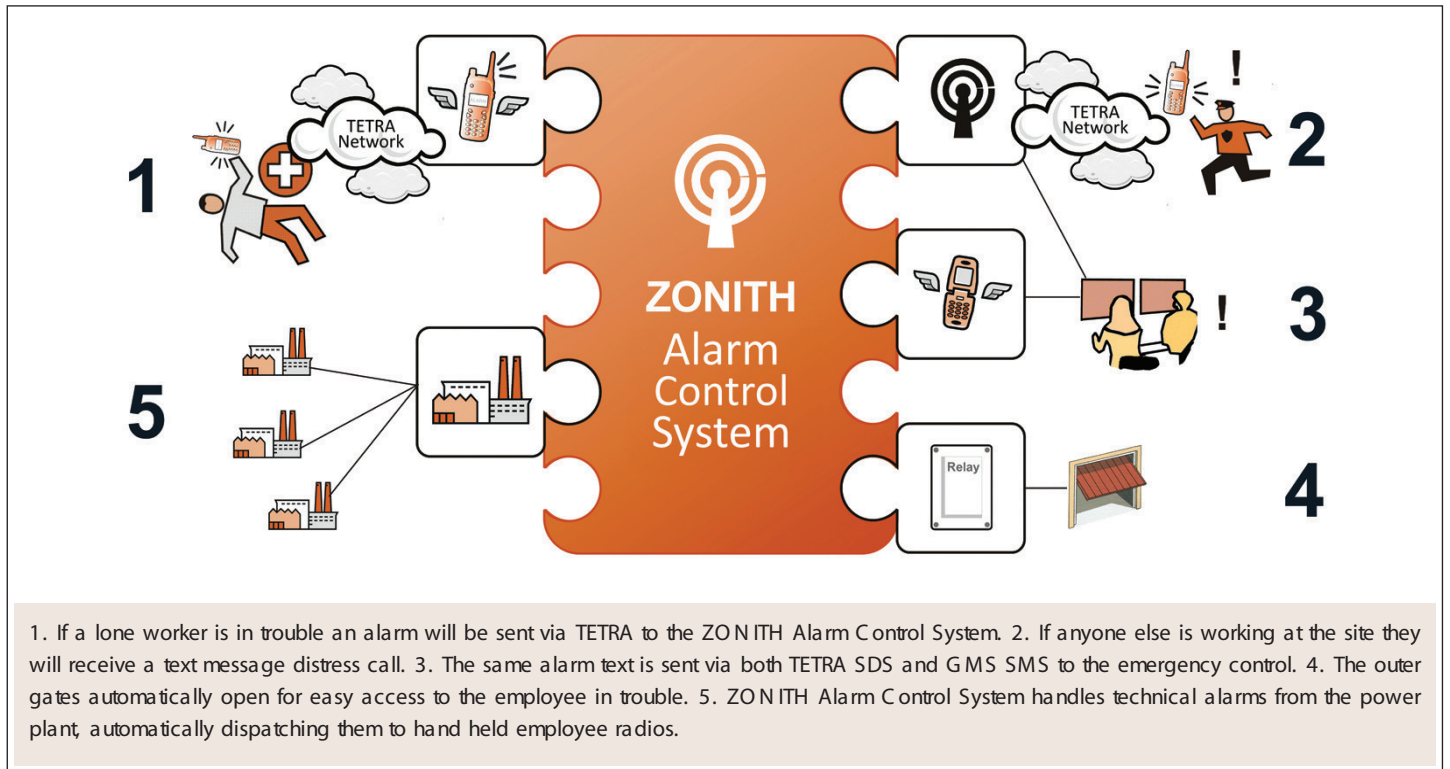
Furthermore, alarms are treated on the basis of how critical they are. Critical alarms are dispatched straight away via a digital radio or another carrier that is specifically designed for critical communication. Non-critical alarms can be delayed until personnel are more readily available, e.g. if a non-critical alarm is activated Saturday night when the number of personnel is at its lowest, it is delayed and sent by email to an administrator on Monday morning.

The Zonith Alarm Control System also operates through 'choice'. That is to say, if an employee decides that an alarm is less important than the task currently in hand he can decline to respond to the alarm. The automatic dispatch software will then find the next person available with the necessary skills and send the alarm to him. The alarm will continue along this chain until someone accepts the task. The Zonith Alarm Control System's automatic dispatcher also provides centralized lone worker protection.

### SAFETY: LONE WORKER PROTECTION

Thanks to the Zonith software, Dong Energy can automatically protect lone workers through the TETRA radio. A lone worker's radio is triggered to emit a loud beep if it has been inactive for a certain period of time. If the lone worker fails to react, a lone worker alarm is raised to his colleagues.

This alarm will be sent while simultaneously being posted to an outside rescue centre over at TETRA and GSM to ensure against possible faults in the system. Rescue personnel will react immediately, and the Zonith system



will automatically trigger the opening of outer gates in the facility, giving the rescuers faster access to a potentially injured employee. All alarm activities and response times are logged and recorded.

The gates are opened by the Remote Telemetry and Control Units (RTC U), and they represent a valuable part of the Dong Energy solution. The RTC U can notify you over either TETRA or GSM if one of its inputs is activated by an alarm source.

In this way the RTC U enables you to use the radio as a tool for monitoring and controlling technical installations from a distance. You receive text alarms on the radio, and if there is any way of handling this alarm without physically being at the trouble spot, you will be offered that option on the radio through a user friendly interface. In these cases you can handle the problems within a few seconds via the radio.

#### SAFE AREAS DEFINED BY INDOOR POSITIONING SYSTEM

Lone worker systems can sometimes be more of a hindrance than a help. The user may be required to activate and deactivate the lone worker function and in some workplaces there is a need for a secondary device or network monitoring system. This challenge was met by Zonith, who provided Dong Energy with a ZONITH Indoor Positioning system based on a network of Bluetooth detection beacons. Dong Energy can now define specific 'safe areas' where the threat to employee safety is very low, for example in the control room or employee rest areas.

When entering a safe area, a Bluetooth beacon registers the Bluetooth device in the radio and automatically deactivates the lone worker function in the radio. And, in turn, if the user leaves the safe area, full lone worker protection is turned on once again. The system also incorporates motion sensors to make sure someone is in the safe area. If there is no motion in

the safe area, even though the positioning system registers the Bluetooth device, lone worker protection will be reactivated.

The protection is always there, but the Zonith safe area function enables the lone worker to concentrate on his role without unnecessary interruptions.

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#### RADIOS’ USER FRIENDLY INTERFACE

Sapura, which is used in the Dong Energy plants, makes alarm handling simple through short data applications (SDA). SDAs offer an easy-to-use interface, similar to mobile phones. The SDAs in the power plant solution are menus specially designed for a specific purpose, like accepting or declining an alarm notification, opening or closing a gate, quickly checking what alarms or tasks you are responsible for and so on.

If for example an alarm is activated, an SDA is automatically displayed on your screen, which conveys all the necessary alarm information, including time, place, or nature of alarm. It also allows you to either accept or decline.

It is an intuitive, user friendly way to operate the radio and will make operations simpler, quicker and more efficient. And when handling alarms where people’s health is at risk, the SDAs are part of the overall safety solution for power plants.