GAS
SECURE
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World's First Full-Scale Wireless SIL2 Gas Detection Equinor's* Kalundborg Refinery, Denmark

The benefits of fixed wireless gas detection versus traditional cabled systems were clearly demonstrated in terms of both safety and cost reduction at the Kalundborg refinery.

TA Foto Scandex ApS / Equinor

- INNOVATIVE TECHNOLOGY SOLUTION VASTLY REDUCED PROJECT COST
- LARGE INSTALLATION OF GASSECURE WIRELESS GAS DETECTORS
- SYSTEM DESIGNED AND CONFIGURED FOR WIRELESS SIL2
- RELIABLE WIRELESS IN A CONGESTED REFINERY WITH MULTIPLE STRUCTURES

INTRODUCTION

Norwegian energy company, Equinor, with cooperation from Yokogawa and GasSecure, a Dräger company, has successfully installed the world's largest SIL2 wireless gas detection system at the Kalundborg refinery, Denmark.

The project's main objective was to improve gas detection coverage in three process areas identified by a risk analysis. The Equinor team faced issues with installation in an already congested plant area, as well as detection in enclosed spaces. It became apparent that a wireless device installation could be easily implemented and would quickly overcome physical and logistical obstacles, with flexibility for later additions or modifications.

The SIL2 certified GS01 detectors were deployed as the world's first complete wireless SIL2 gas detection safety system. This is achieved with safe end-to-end communication between field devices and the control system. This is currently only possible with the ISA100.11a wireless protocol and the SIL3 certified PROFIsafe application layer over PROFINET. PROFIsafe covers the entire communication path between each detector and the control system and integrates both process value and safety function communication parameters. The combination of ISA100.11a and PROFIsafe meets IEC 61784-3 requirements for SIL through various mechanisms including the tunnelling of safe data.

INSTALLATION DETAILS

END USER
Equinor

LOCATION
Kalundborg, Denmark

COMPLETION DATE
June 2017

TYPE OF INSTALLATION
Onshore Refinery

INSTALLATION DETAILS
122 pc GS01
8 pc GS01-EA
3 pc Wireless Gateways
18 pc Wireless Access Points
Siemens S7

COMMUNICATION
PROFIsafe on ISA100 Wireless™

Initially, one hundred twenty-two GS01 wireless gas detectors were spread across the three process areas. This required the installation of several gateways and multiple access points that were placed according to a survey and design for the optimum wireless communication.

The first phase of the installation included areas with heavy machinery and enclosed structures that impacted the wireless signals. To overcome this communication challenge GS01-EA detectors with extended antenna were chosen to transmit data securely past the structures. The remaining devices were all GS01 detectors with standard antennas.

INNOVATIVE THINKING ENHANCES PROTECTION AND REDUCES COST

Initial studies indicated a project with wired devices would require an investment of tens of millions. A more cost-effective solution was needed, and a local team was established at the refinery to work side-by-side with Equinor's safety discipline specialists. Over a three-month period, the team's innovative thinking and economic mindset decided that wireless was the best solution and the project's original estimate was significantly reduced, while also providing the required gas detection coverage.

In addition to reduced costs, the GS01's wireless design also allows for easy expansion and additional device installation by simply adding detectors to the existing wireless network. During the year since successful implementation, Equinor has added an additional 17 pc GS01 to the original 122 devices; without the need for any additional cabling or groundworks.

* Statoil has changed name to Equinor on 16th May 2018.

In addition to being the world's first full-scale wireless SIL2 gas detection system, the experience with the Kalundborg implementation process greatly improved the team's technical and engineering knowledge, paving the way for future Equinor projects. The success of wireless gas detection at the Kalundborg refinery, across wide and occasionally congested areas, is promising for other installations.

"We would have chosen wireless again today. Wireless is the future." said Niels Herløv, Senior Engineer.

"Installation of wireless gas detection is an important contribution to our goal of safe operations"

Jofrid Klokkehaug,
Vice President of Kalundborg

"Wireless is the future"

Niels Herløv,
Senior Engineer Electrical safety and operation

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