Senscient

Laser Technology for Reliable Gas Detection

Case Study

FPSO North Sea

Open Path Gas Detection

Project Overview

Following damage sustained in a severe winter storm in 2011, the Maersk Oil operated Gryphon Alpha FPSO underwent an extensive 2-year refurbishment at the Damen shipyard in Rotterdam. Having been in operation for 20 years, Gryphon Alpha had been the longest operating FPSO in the North Sea, and Maersk took the opportunity during this recovery project to upgrade all aspects of the facility to the industry's highest standards. This included a major upgrade to the gas detection system for the detection of methane in HVAC inlets relating to accommodation areas, temporary refuges and the engine room.

Maersk Oil chose to adopt Senscient's open path laser based gas detectors, which utilise enhanced laser diode spectroscopy (ELDS). This laser based technology provides the fastest speed of response and best in class uptime availability when compared to more traditional gas detection technologies.

Gryphon Alpha has now returned to service and production has been safely resumed. The Senscient ELDS units have proved to be reliable in the severe weather conditions of the North Sea and incorporate a daily autotesting facility, SimuGas™, which reduces the need for routine manual gas testing.

The Challenge

Maersk Oil faced the challenge of engineering a fast and reliable gas detection solution that would operate in foggy and rainy conditions while following the recommendations of the UK Health and Safety Executive research report (RR602, "Assessment of gas detection strategies for offshore HVAC ducts based on CFD modelling," 2007).

This HSE report highlights the challenges for gas detection technologies where the gas concentration prior to or within an HVAC system is considered to be nonuniform. The report goes on to recommend that "Detector alarm levels should be set as low as reasonably practical, e.g. 10% LEL or less. Cross duct beam infrared, extended path or aspirated point detector systems should be based on two approximately orthogonal beams or lines of aspirated point probes."

Previous Solution

The Gryphon Alpha facility had been equipped with long-nose point infrared gas detectors which, whilst conforming to all recommendations of the UK Health and Safety Executive, have a number of limitations when compared to open-path laser based gas detection, including their inability to detect across the full width of larger ducts, lower sensitivity, slower speed of response and unrevealed failure modes.

The Senscient Solution

For HVAC inlets to critical areas such as accommodation, temporary refuges and the engine room, Maersk Oil selected Senscient's range of laser based open area and cross duct methane gas detectors.

Maersk Oil recognised that the Senscient ELDS devices provided a clear indication of gas concentrations across the full width of the duct with a genuine response time (T90) of less than 1 second. In addition the duct-mounted detectors could have reliable alarm thresholds set as low as 5% LEL, if required, without encountering unwanted alarms.

Unlike traditional point IR or long-nose IR devices, Senscient's ELDS devices are methane specific and operate at a wavelength less prone to water vapour interference, giving greater reliability and performance in challenging environments, such as rain and fog.

The Outcome

Senscient supplied 24 ELDS systems of open area and cross duct configurations along with commissioning support services. All were mounted in relation to HVAC inlets, and their output signals voted in a 2 out of 2 (2oo2) and 2 out of n (2oo'n') configurations; the norm for gas detection in safety critical applications. Since these systems were installed in 2012, all units have performed reliably without any interruptions.

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