

Project Overview

Terra Nova is the second largest offshore oilfield in Canada, with recoverable reserves of 419 million barrels. The owners are: Suncor (38%), ExxonMobil (19%), Statoil (15%), Husky (13%), Murphy (10%), Mosbacher (4%), and Chevron (1%). The Terra Nova FPSO faced two major challenges:

1. during adverse weather, infrared gas detection sensors were experiencing fault conditions and triggering false alarms
2. the reservoir was beginning to sour and produce H₂S, a deadly toxic gas.

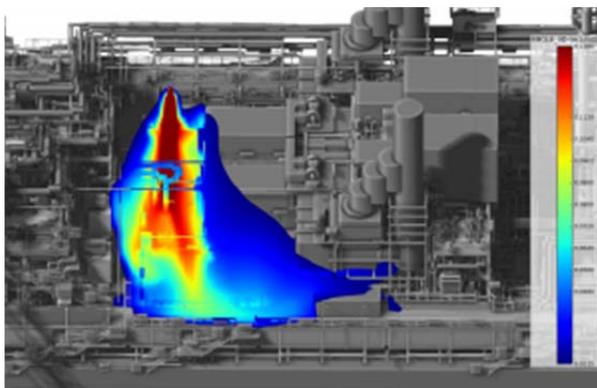


A multi-disciplinary team involving personnel from process safety, risk analysis, operations and instrumentation was tasked with finding a solution.

The Challenge

High false alarm rates, slow detection and poor reliability are problems that have plagued the offshore oil and gas industry when dealing with gas leak detection. The Terra Nova FPSO is a remote facility with limited egress. Therefore, any hazardous gas release in the facility requires complete production shutdown, blow down of inventory and isolation of electrical equipment. Shutting down the plant in this manner has damaging effects on plant equipment such as generators and gas compressors. Prior to the upgrade, false alarms from gas detectors were resulting in prolonged outages, damage to process equipment and production deferrals of 50,000-100,000 barrels per year.

Evaluation of Gas Detection Technologies



A detailed analysis of the facility, based on CFD modeling, was performed. In aggregate, 1,480 gas leak scenarios were simulated and used in the evaluation, detector selection process, optimization and overall design of the upgrade to the gas detection system. In order to verify and optimize performance of the gas detection system, a diverse and challenging set of leak scenarios was simulated. Each simulation took 2-3 days to complete and involved complex mathematical models, incorporating numerous variables such as the geometry of the process modules on the vessel, ventilation conditions and gas leak properties.

In February 2011, a trial laser-based gas detector was tested at the Terra Nova onshore distributed control system (DCS) simulator. Over a period of two weeks, stringent performance tests were conducted on the device, under a variety of conditions that were known to generate problems for the existing IR detectors.

The Solution

Following a successful offshore trial that lasted 24 months (2011-2013), a decision was made by Suncor to replace all existing IR gas detectors with 158 Senscient ELDS™ laser-based open path gas detectors. Retrofitting the FPSO while it was on location, in full operation, required significant planning. A thorough work package was developed which provided a plan for the decommissioning of the existing IR detectors, installation of the new laser-based detectors and training of personnel.

A review of data has documented dramatic improvement in safety, operations and production. On the vital measure of safety performance, Terra Nova was able to achieve:

- an elimination of false alarms
- an increase in gas leak detection coverage
- earlier warning for preventative and remedial action
- a reduction in maintenance requirement
- a reduction in the exposure of operations personnel to hazardous locations and gases
- an improvement in the reliability and robustness of the overall gas detection system.



The Outcome

After the upgrade to the laser-based sensors, there has not been a single instance of false gas detection. The upgrade has resulted in an annual positive financial impact of \$5 to 10 million to production operations just from the increased uptime achieved through eliminating false alarms.

In summary, the upgrade of gas detection technology on the Terra Nova FPSO was able to achieve the following results:

- dramatic improvement in safety
- significant reduction in maintenance requirement
- increase of production by 50,000-100,000 barrels per year through the elimination of down time from false alarms

See for Yourself

Contact your local MSA representative or MSA Customer Service if your company is interested in learning more about the benefits of Senscient ELDS.

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