CASE STUDY

LNG Terminal Leak Detection & Thermal Monitoring

Fos sur Mer, France

Project Overview

An undetected leak in an LNG terminal is a worst-case scenario. It can be a major safety hazard with severe consequences and outcomes including explosions and fire, severe injury and fatalities, vapor cloud formation, cryogenic effects, environmental impacts, and economic losses.

For this particular project, our customer Elengy required an LNG monitoring solution for leak detection and thermal monitoring at the Fos-Tonkin LNG terminal in France. Elengy specializes in the handling and regasification of LNG and plays a crucial role in the LNG supply chain, contributing to the energy transition and ensuring a stable and reliable natural gas supply.

Solution

One AP Sensing Distributed Temperature Sensing (DTS) N4386B unit with a two km measurement range and two sensor channels was selected to monitor the LNG jetty. The system was installed in a closed, dual-ended loop using multimode fiber in a flame retardant, noncorrosive jacket. Additionally, our S2002A steel armored cable was used due to its robustness in harsh and explosive environments. On the end of the cable there are two pre-assembled pigtails with E2000 8°APC Connectors, which are designed to improve signal quality.

A seismic rack was also part of the project scope, which is used in LNG terminals to provide stability and resistance against seismic events such as earthquakes. Fos sur Mer is a seismic area, so the seismic rack offers structural stability and adds another protection layer for the equipment.

Relays were used with the Modbus RTU protocol (serial via RS-485) and connected to the Distributed Control

Background

- Elengy required a leak detection and thermal monitoring solution for Fos sur Mer LNG Terminal
- An undetected leak in an LNG terminal can have catastrophic outcomes

Solution & Benefits

- One DTS device with a two km measurement range and two sensor channels; AP Sensing's steel armored cable
- Seismic rack to provide structural stability and resilience against seismic events
- DTS technology provides a quick and highly accurate solution for LNG leak detection and location that is superior to other monitoring methods

System, enabling effective data exchange and seamless monitoring.

Advantages

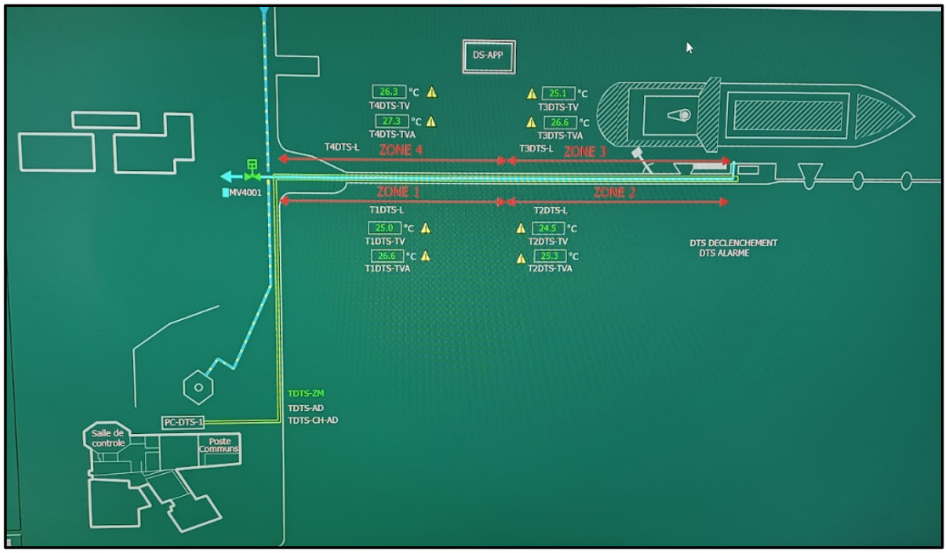
DTS technology has several distinct advantages for LNG monitoring as opposed to other methods such as periodic inspections or spot sensors. First, DTS enables continuous temperature monitoring along the entire length of a fiber optic cable, providing real-time data on temperature changes which helps to identify potential leaks as they occur.

AP Sensing's DTS system also offers a high spatial resolution, meaning it can effectively measure and differentiate temperature variations at multiple points along the cable. This is valuable in applications where one must monitor temperature changes with precision, such as detecting hotspots, leaks, or temperature gradients.

Additionally, DTS can detect subtle changes in temperature caused by leaks before other traditional leak detection methods might indicate a problem, enabling operators to take proactive measures in order to mitigate risks, minimize potential damage, and prevent escalation.

Fiber optic cable installed along terminal pipe

DTS technology is unaffected by electromagnetic interference (EMI) or electrical disturbances. LNG terminals face maritime conditions and fiber optic cables can withstand these conditions, making DTS a reliable choice for temperature monitoring. DTS systems are also known for their low maintenance requirements; in harsh environments such as LNG terminals, minimizing maintenance needs is essential in the reduction of downtime and operational costs.



Elengy's DCS System

Results

Elengy conducted several cooling tests with CO_2 cooling sprays on the fiber in different zones. Temperature changes as well as gradient thresholds were monitored to see if the temperature gradient surpasses the set thresholds and to check if alarms or alerts could be raised by the DTS instrument. Elengy ensured seamless integration between the DTS and the DCS system.

Afterwards, AP Sensing conducted remote training with Elengy in French; the customer was extremely satisfied with the results and we received the certificate of project completion within the same day. Additional AP Sensing LNG projects are also underway.

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