

OIL PORTS POSE SERIOUS ECOLOGICAL THREATS, MITIGATION USING HYDROCARBON SENSORS



PROJECT DETAILS

Client:	Townsville Port Authority
Location:	Townsville, within the Great Barrier Reef, Queensland, Australia
Completion Date:	November 2010
Contract Scope:	Design fuel detection system, supply & install on site
Applications:	Offloading, pipe hydrant system & tank farm in ecologically sensitive area
Technology:	Point and cable sensor systems for hydrocarbon detection

KEY CHALLENGES

At oil ports around the world, tankers unload their cargo of crude oil or refined fuels into small pipe systems that traverse or encroach on ecologically sensitive areas. Where operation is intermittent and pipeline lengths relatively short, traditional SCADA-based leak detection systems, which rely on predictable constant flow rates, are rendered ineffective. Even large leaks during off-loading may go completely undetected, compromising operator's environmental responsibility and devastating the local ecology. Port of Townsville is unique in comparison to many of the world's ports. It is located within the Great Barrier Reef World Heritage Area, adjacent to the Great Barrier Reef Marine Park. The port is situated in close proximity to sensitive natural habitat including the seagrass beds, coral reef, mangrove forests, and protected area of the dugong.

SOLUTION

For environmentally sensitive areas the key is quick detection and accurate location at the source of the leak. The nVent RAYCHEM TraceTek sensor cable and monitoring system offer reliable and accurate fluid leak detection that directly pinpoints the source of the leak, to enable decisive action to be taken long before the spill can create damage.

The entire length of the nVent RAYCHEM TraceTek TT5000 sensor cable, with its conductive polymer technology, is sensitive to liquid hydrocarbons such as gasoline, jet fuel diesel and fuel oils. Once installed, with as many individual one kilometer circuits as necessary, the system can monitor the entire pipeline – detecting and pinpointing the location of a leak to plus or minus one metre.



TT5000 HUV under pipe

The port presented a variety of leak detection challenges, as the diesel transfer piping system is a classic mix of different pipe installation modes. Portions of the 1 km pipeline are aboveground, buried underground and under berth on the wharf.

The challenge for the TraceTek team was to design a customized integrated system for all three modes of pipe installation. The diesel transfer piping system comprises around 556 metres of below ground pipe, 310 metres of aboveground pipe and 275 metres of double contained pipe on the wharf.

PRODUCTS

BELOWGROUND PIPING

For the buried portion of the pipeline, a slotted PVC conduit was placed in the pipe trench. After the heavy pipeline work is completed the TT5000 sensor cable with an over braid of polyethylene rope was drawn into the conduit system while it is being assembled, prior to burial.

ABOVEGROUND PIPING

The TT5000 sensor cable with an external black polyester rope layer was strapped to the bottom side of the above ground single wall fuel pipeline. The densely braided polyester yarn exterior covering provides a very effective ultra violet (UV) shield protection for the sensor cable within. Installation provides allowances for mechanical abrasion and thermal expansion of the fuel pipe.

WHARF UNDER BERTH

Typically for long runs of double wall/containment pipeline under a large wharf the TT5000 sensor cable is installed along the interstitial space between the inner and outer pipe. As the minimum clearance space was not available, an alternative solution was used. A fast fuel sensor probe was installed at the lowest point as the pipeline on the wharf sloped back to the shoreline. Double wall pipe system is used as an effective means of leak containment for an over-the-water installation.

MONITORING

All of the sensor cables and the fast fuel probe are monitored from a single alarm panel, providing an intrinsically safe monitoring circuit, rated for the appropriate hazardous area classification. The alarm panel provides capacity for up to 127 circuits, allowing for future pipeline expansion.



Fast Fuel Sensor

BENEFITS

- TraceTek Leak Detection Systems detect, locate and raise the alarm fast so you can take appropriate action.
- Cable & point sensors provide a variety of possibilities for detecting hydrocarbons in this sensitive area.
- Sensors are insensitive to ground water, sea water or rain, so you can be confident an alarm signal is "real".

DON'T RISK SAFETY, THE ENVIRONMENT OR YOUR REPUTATION

Detect a spill, locate the source of the leak and take corrective action before the incident becomes a news story.

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