



Rail/Truck/Barge Terminal



Laser Based – Open Path Gas Detection is **positioned** on either side of the Rail Loading Terminal and on the cat-walk to protect personnel.

Photo Credit: Carbis Solutions (Original Photo has been edited)

Problem: High Hazard Rank Application

Due to frequency of occurrence & severity of harm

Challenge: Detectors Surviving Exposures

From continuous making/breaking of connections

Opportunity: Warn Adjacent Areas of Leak

Lethal plumes of gas extend beyond area of release

Solution: Achieve Risk Mitigation Targets

Is with Laser Based – Open Path Gas Detection

Transportation via Pumps

Problem: Mechanical Probability of Failure

Centrifugal Pump failure likely 6.20 in 100 times¹

Challenge: Detection of Small Seal Leaks

Most Acid Gas E-Chem's have T90 Res. >30 seconds

Opportunity: Have Early Warning of Failure

Used for passive Leak Detection & Repair (LDAR)

Solution: Find & Fix Leaks While Still Small

With Laser Based – Open Path Gas Detection

Reference¹: DNV GL Failure Frequency Guide



Paths are placed on the **upwind and downwind sides** of the banks of pumps to provide suitable coverage regardless of wind direction.

Product Storage in Tank Farm



Paths oriented around the tank farm have been **proven to be effective to detect fugitive plumes** from pressure relief devices.

Problem: Tank Farm Risk Mitigation Needed

Due to the quantity of product stored

Challenge: Sufficient Detector Coverage

Large perimeter stresses the projects feasibility

Opportunity: Capital and Operational Costs

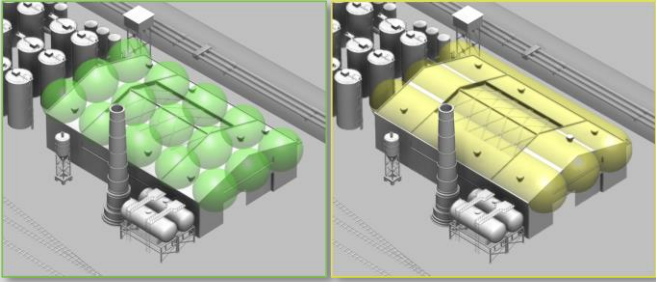
Reduce the device count, infrastructure, & cabling

Solution: Most Economical Option Available

Is with Laser Based – Open Path Gas Detection

Geographic Area Coverage

Traditional – Fixed Point Gas Detectors vs. *Laser Based – Open Path Gas Detectors*



Laser Based – Open Path Gas Detection is the most economically viable option to minimize both the **Total Install Cost + Total Operational Cost (TIC-TOC)** in High Hazard Rank Applications.

Definition: The fraction of the geometric area or volume of a defined monitored process area that would be detected.

Exceed your Area Coverage Requirements
With Laser Based – Open Path Gas Detection

Increasing the Probability of Detection
Offers the greatest Risk Reduction Factor return¹

To Mitigate Risk in a Grade A Hazard Rank
You will need 90% Geographic Area Coverage¹

Laser Based – Open Path Gas Detection
Easiest & most economical way to Mitigate Risk

¹: As stated in ISA-TR84

Safety Availability

Surpass Safety Availability Requirements
With Laser Based – Open Path Gas Detection

Survive & Continue to Detect after a Leak
Lifespan/performance not effected by exposure

Smart Fail-Safe Device + SIL2 Suitable
Only outputs gas concentrations if ‘fully functional’

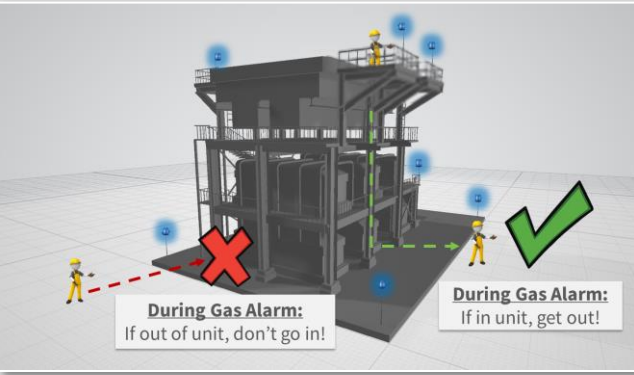
Eliminate your Maintenance Burden
No Calibration and easily perform Functional Tests

Definition: The availability of the FGS function designed to automatically mitigate the consequences of hazards.



To perform **Function Test**, simply hold the **Response Cell** in the Laser Beam to ‘Bump’, ‘Challenge’, or ‘Verify a Response’.

Mitigation Action Effectiveness



During Gas Alarm:
If out of unit, don't go in!

During Gas Alarm:
If in unit, get out!

Definition: The confidence that the final element(s) actions will successfully mitigate the consequence of the hazard.

Alarm Faster and at Lower Concentrations
With Laser Based – Open Path Gas Detection

Confidently Detect Incipient Level Leaks
Lowest Actionable Concentrations clearly stated

Gain an Instantaneous Response to a Leak
New and independent sample every second

Importance of Timely Personnel Evacuation
Rapid recovery actions prevent escalating event

During a Release: Prevent personnel from entering the area or evacuate personnel from that area.