MSA Gas Detection:
Liquefied Natural Gas Fueling Stations

Public and private fleet vehicles continue to migrate to use of liquefied natural gas (LNG) and compressed natural gas (CNG) as this cleaner-burning fuel also offers lower fuel costs and lower emissions. Given the rapid growth of LNG fueling stations needed to fuel these vehicles, use of gas and flame detection products is necessary to manage these facilities safely due to potential methane or gas leakage.

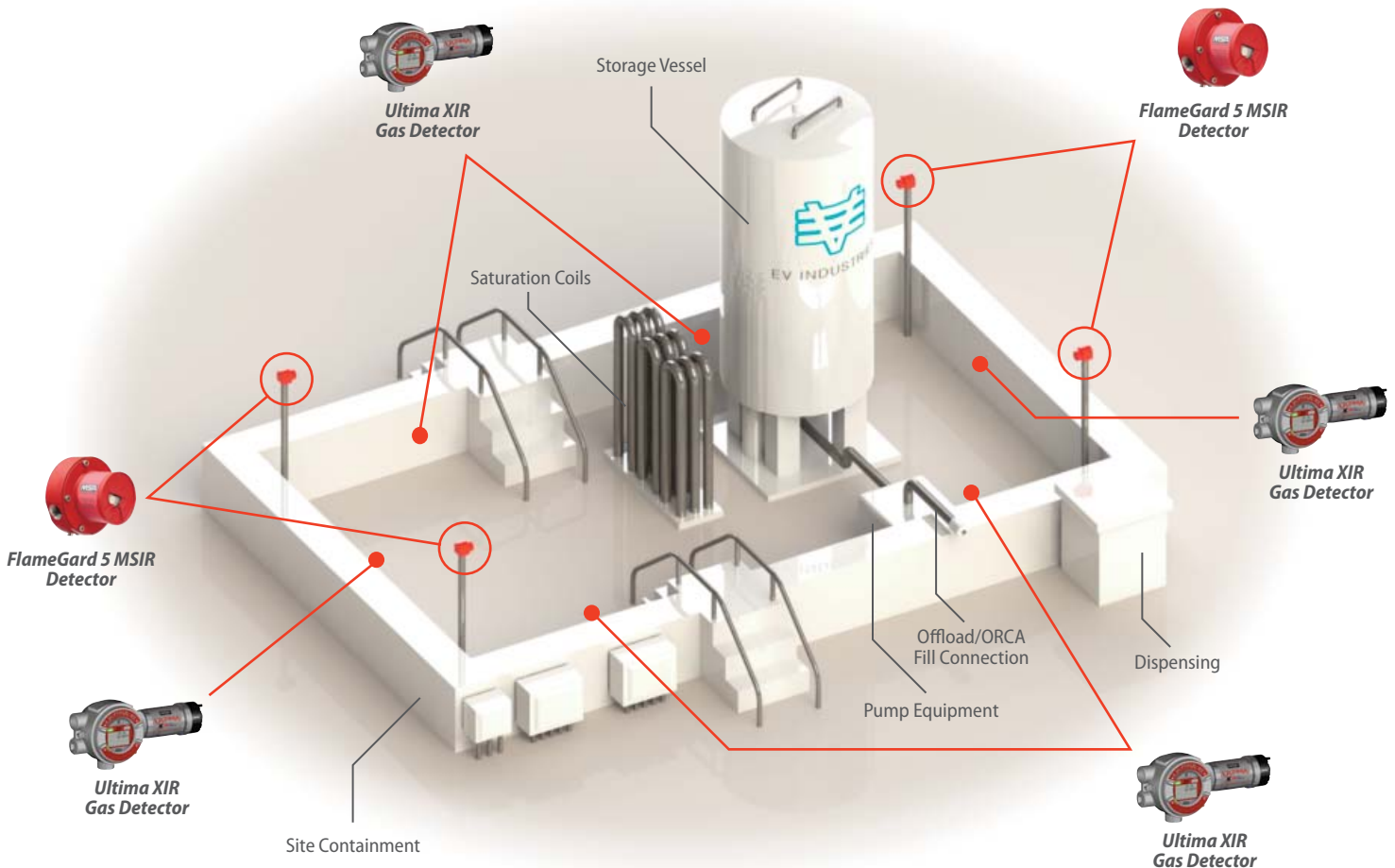*Because every life has a **purpose...***

Application

Natural gas, a mix of hydrocarbons, is converted to a liquefied state through purification and cooling (-260° F) processes. The liquid state is preserved by cold storage within fuel tanks that are located within fueling station containment areas. These tanks are resupplied via tanker trucks periodically, as generally no pipelines service LNG stations. LNG is then directly pumped into individual LNG vehicles.

Natural gas leaks can result in a vapor cloud explosion if the vapor cloud (produced by warmed, dispersed natural gas) is confined and an ignition source is present. A pool fire may also result if a liquid leak ignites.

Many fueling stations are located within public areas; as a result, counties and states require installation of both gas and flame detectors to address public safety concerns. In addition, NFPA (National Fire Protection Association) 52: Vehicular Gaseous Fuel Systems Code 2013 Edition requires gas and flame detectors to be located within filling station containment areas. NFPA 52 Section 15 states that gas leak and fire detection should be an evaluation-based installation and that fire protection should be provided for all LNG fueling facilities. Section 15 also requires analysis of operational conditions and hazards, as well as guidance concerning quantity and placement of sensors and related equipment, site fire protection, training of site personnel, availability of first responders, and additional considerations.*

Average size fueling stations that supply LNG and have on-site containment areas typically employ six gas and four flame detectors to surround those containment areas. Detectors are also typically located within containment areas, with additional gas detectors mounted on each LNG fueling dispenser. Flame and gas detectors used for these applications must be highly durable, reliable and easy to maintain, as in many cases, fueling stations do not have on-site personnel familiar with gas or flame detection; technicians from remote locations must be notified for servicing needs.

Typical Fueling Station Layout

Ultima XIR
Gas Detector

Storage Vessel

FlameGard 5 MSIR
Detector

Saturation Coils

FlameGard 5 MSIR
Detector

Ultima XIR
Gas Detector

Ultima XIR
Gas Detector

Offload/ORCA
Fill Connection

Dispensing

Pump Equipment

Ultima XIR
Gas Detector

Site Containment

Solutions

MSA Ultima® XIR Gas Monitors and FlameGard® 5 MSIR Flame Detectors
meet stringent requirements for LNG fueling station applications.

Ultima XIR Gas Monitors using infrared technology to sense for combustible gases and vapors can quickly and reliably detect LNG gas leaks. DuraSource Technology uses dual-wavelength, heated-optics technology to compensate for temperature, humidity and aging effects. These monitors eliminate the need for gas calibration via simple zero adjustment. Ultima XIR Gas Monitors provide rapid response times and are immune to sensor poisoning.

Stainless steel explosion-proof design and infrared source backed by a 10-year warranty and SIL 2 certification meet requirements for robust design. Ease of maintenance is built into these units through single board design, easy, intuitive calibration process and field-swappable smart sensors.

- HART port provides easy output access.
- Optional mounting bracket enables detectors to be easily mounted within containment areas.
- Patented sensor design offers sensor replacement without declassifying hazardous areas.
- Scrolling LCD screen provides constant flow of information.
- Zero adjustment provides full calibration.
- Optional carbon dioxide detection is provided.

FlameGard 5 MSIR Detectors using four multi-spectrum infrared sensors and Neural Network Technology (NNT) enable these detectors to distinguish between fire and non-fire events from distances of up to 230 feet, providing superior false alarm rejection. Continuous Optical Path Monitoring (COPM) checks optical path integrity and detector's electronic circuitry. Dependability is enhanced by the ability to function at temperatures between -40° F and 185° F.

Longer range, wider of field view means that fewer detectors can cover more territory, reducing the cost of protection. Detectors are housed within rugged stainless steel explosive-proof enclosures. FlameGard 5 MSIR Flame Detectors can be installed at strategic points above LNG storage tanks via optional mounting brackets, potentially covering entire areas around tanks.

- FlameGard 5 MSIR Detectors are SIL 3-certified.
- FlameGard 5 MSIR Detectors can see through dense smoke produced by diesel, rubber, plastics, lube oil and crude oil fires.
- Multiple communication outputs provide versatility for use in a variety of applications.
- Serial communication port allows 128 units (247 using repeaters) to be linked to a host computer using Modbus RTU protocol.
- FlameGard 5 Test Lamp with high-energy broadband radiation source tests FlameGard 5 MSIR Detector operation.

3

MSA controllers *provide intelligent, high performance data acquisition and data logging control for fixed gas and flame detection systems. Web-based open Ethernet connectivity and data monitoring functions allow for a wide range of monitoring and historical logging functions. Integrated measurement, interface to PLC and display and recording platforms, that when equipped with MSA's extensive line of transmitters and sensors, form comprehensive gas detection solutions. Other features include analog and Modbus field device communication, customized layout configuration and more. Controller solutions are offered for facilities large and small. MSA offers controllers to help users meet SIL 2 certification as well as compliance with NFPA 72 and NFPA 59A standards. Controller selection is determined by user communication needs and functionality preferences.*

FlameGard 5 UV/IR Flame Detectors *monitor for both ultraviolet and infrared (UV and IR) spectral ranges and are highly immune to false alarms caused by radiation sources. Continuous Optical Path Monitoring (COPM) checks both optical path integrity and electronic circuitry once per minute; wide field of view enables greater fire detection coverage.*

Ultima XE Gas Monitors *provide thorough, continuous monitoring of combustible gases via catalytic bead technology. Monitors offer NEMA 4X explosion-proof, 316 stainless steel construction, multiple-entry mounting enclosure and IP66 rating.*

Model 10k Integrated Fire and Gas Systems *are modular, scalable and employ Allen-Bradley ControlLogix™ programmable technology for gas and flame detection. Link up to 13 local gas and fire alarm panels over a network up to 25 km long. Systems easily integrate with third-party auxiliary devices and are ideal for many applications.*

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