

# MSA Gas Detection: Liquefied Natural Gas (LNG) Applications



## **Situation:**

LNG, or liquefied natural gas, has been processed to remove impurities and heavy hydrocarbons. It is then condensed into a liquid at atmospheric pressure by cooling it to minus  $-160^{\circ}\text{C}$ . LNG is 1/640 the volume of natural gas at standard temperature and pressure (STP). Special designs are necessary for the transport and storage of liquefied natural gas.

The very high demand for natural gas has created the need for LNG facilities to be constructed along the United States coastline in strategic locations. These locations allow for very large and specially designed ships carrying LNG to unload the product, which then is stored in insulated tanks for future delivery to natural gas consumers. The cleanest-burning of all fuels, natural gas is, of course, widely used for heating homes and offices, and for power plants to generate power.

An LNG terminal which receives LNG from ships comprises the unloading

dock area, piping, storage tanks, vaporizers, liquefiers, maintenance shops, offices, and control rooms.

## **Product solutions:**

A typical LNG facility requires between 40 to 90 single-point infrared gas detectors, 30 to 60 triple infrared flame detectors, 10 to 15 open-path gas detectors, plus CO and O<sub>2</sub> detectors. A controller is also required; it can be used to alarm when necessary, provide shutdown functions, and also turn on a foam or sprinkler fire suppression system.

### ***Effective monitoring for each area is as follows:***

Dock unloading areas should be monitored for flame detection, single-point infrared gas detection, and possibly open-path gas detection.

Storage tanks require flame detectors, single-point infrared combustible gas detectors, and open path gas detection for perimeter monitoring.

Liquefiers used to re-liquefy boil-off gases require flame detection and single-point infrared gas detection.

Vaporizers are used to heat up LNG to convert it back to natural gas before compressing it for the gas pipelines. Single-point infrared gas detection and flame detection are required around these units for protection.

Air ducts into the control room call for single-point infrared gas detection.

Office buildings and the maintenance shops also require single-point infrared gas detection as well as O<sub>2</sub> and CO monitoring.

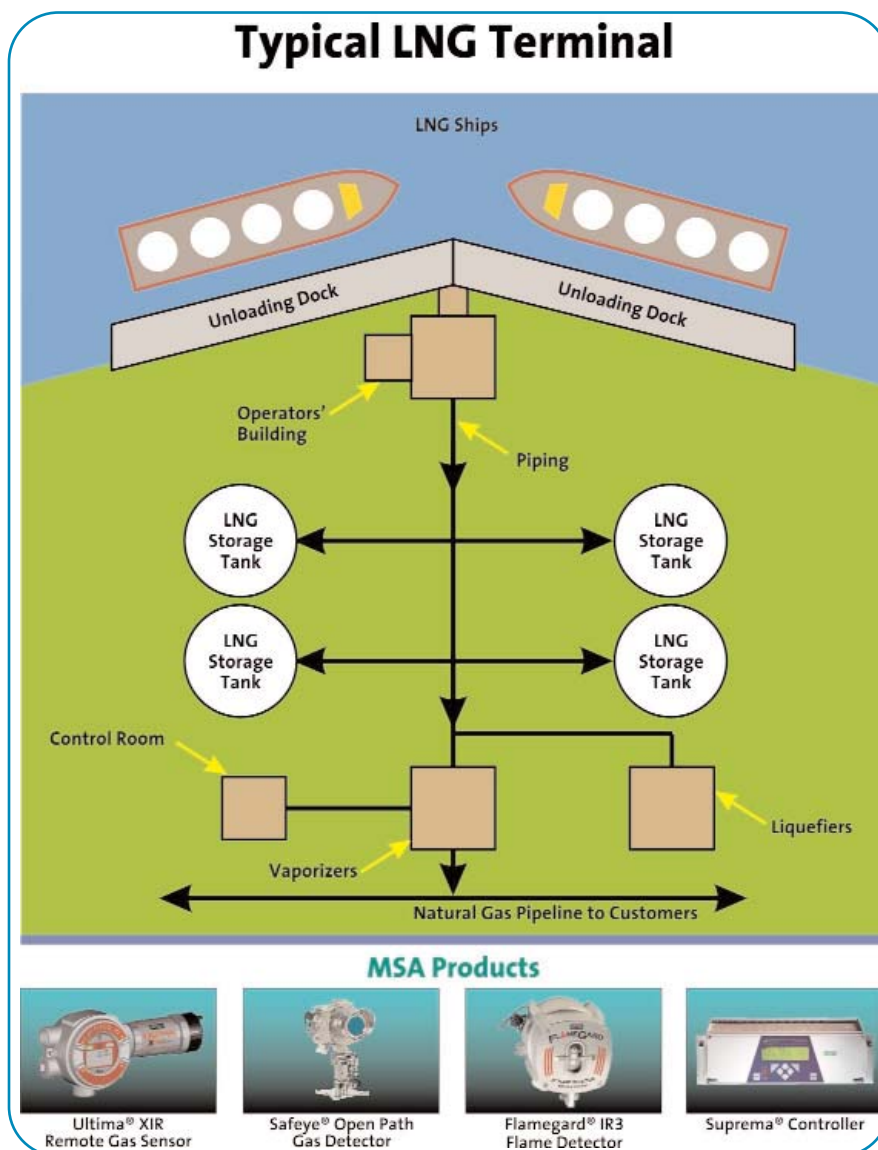
Many LNG facilities use distributed control systems (DCS) as their means of control and shutdown. A secondary fire and gas detection controller is also necessary to monitor the fire, gas, smoke, and thermal detectors. This arrangement provides an excellent application for the Suprema<sup>®</sup> Control System.

Many smaller LNG terminals exist throughout North America and are located near big cities or in more remote locations. These smaller terminals are used as peak loading units when the demand is very high for natural gas, as terminals will ship gas to natural gas pipelines that supply local customers within 10-100 miles.

### Product descriptions:

The Flamegard® IR3 Flame Detector is an extremely sensitive, self-contained instrument that incorporates patented “triple IR” sensor technology. This rugged 316 stainless-steel, stand-alone unit detects virtually any hydrocarbon fire—including natural gas (LNG), town gas, liquefied petroleum gas (LPG) and hydrocarbon gases—with high immunity to false alarms. Other convenient features include onboard relays, sensitivity selection, and built-in-test capabilities. This detector is ATEX-approved (not recognized in North America).

The Ultima® XIR Gas Monitor provides a microprocessor-based, infrared single-point gas detector for continuous monitoring of combustible and carbon dioxide gases and vapors, and functions in both high-gas and low-oxygen environments. Dual-wavelength heated-optics technology offers definitive compensation for temperature, humidity, and aging effects. Infrared technology offers long-term stability, eliminating the need for frequent calibrations and reducing overall cost of ownership. The Ultima XIR Gas Monitor eliminates the need for gas calibration, using a simple zero adjustment. It operates over extended temperature ranges, has a rapid response time, and is immune to sensor poisoning.



The Suprema® Control System offers the new standard in flame- and gas-detection technology through modular redundancy for the monitoring of 4-20mA output sensors, smoke detectors, heat sensors, and manual alarm call points. Offering signal processing for up to 256 inputs and 512 outputs per controller, this intelligent safety system is field-configurable and provides a distributed bus technology

architecture to ensure failsafe internal data transfer. The unit has ATEX safety approvals and TUV approval for up to SIL3 systems.

For more information on these MSA products for LNG applications, go to [www.msanet.com](http://www.msanet.com) for bulletin #07-2078, MSA Flame and Gas Detection for the Oil, Gas and Petrochemical Industries.

**Note:** This Bulletin contains only a general description of the products shown. While uses and performance capabilities are described, under no circumstances shall the products be used by untrained or unqualified individuals and not until the product instructions including any warnings or cautions provided have been thoroughly read and understood. Only they contain the complete and detailed information concerning proper use and care of these products.



**Corporate Headquarters**  
P.O. Box 426, Pittsburgh, PA 15230 USA  
Phone 412-967-3000  
[www.MSAnet.com](http://www.MSAnet.com)

**U.S. Customer Service Center**  
Phone 1-800-MSA-2222  
Fax 1-800-967-0398

**MSA Canada**  
Phone 416-620-4225  
Fax 416-620-9697

**MSA Mexico**  
Phone 52-55 21 22 5770  
Fax 52-55 5359 4330

**MSA International**  
Phone 412-967-3354  
FAX 412-967-3451

**Offices and representatives worldwide**  
For further information:

