



Fire Engineering



Leading fire engineering worldwide

Angus Fire Engineering (AFE) is a leading international fire engineering contractor that specialises in high risk industries such as oil, gas, petrochemical, marine, aviation and power generation. It has unrivalled experience in major fire engineering projects and has secured contracts in over one hundred countries with the world's leading contractors.

AFE offers a total capability approach to fire suppression systems including surveys, consultancy, project management, design and engineering, documentation, procurement, equipment supply, installation, fire testing, commissioning and maintenance. A comprehensive product range includes foam systems, foam induction skids, foam/water monitors, waterspray systems, deluge valve skids and clean agent gaseous suppression systems.



Fully qualified design engineers have a wealth of technical and hands on experience, and all systems are designed in compliance with the latest standards such as NFPA.

The key components for our fire systems are manufactured in the UK at our factory in Bentham, Lancaster. Because Angus Fire Engineering is part of the Angus Fire Ltd business, we have access to world leading foam concentrates and equipment, as well as a fire test site where finished skids and fabrications can be tested in a live fire environment



Angus Fire Engineering offers a wide range of services to ensure your fire protection systems are reliable and deliver the best performance in an emergency.

Commissioning

Onshore and offshore site commissioning, site acceptance testing (SAT), system operation verification, foam testing, repair and refurbishment.

Training

Comprehensive training tailored to your requirements including product training, maintenance, problem solving, resource optimisation and deployment strategies.

Servicing

Customised service packages to comply with the relevant standards and maximise the longevity of your equipment: foam systems, foam equipment, monitors, sprinklers, deluge, hose reels and fire extinguishers.

Testing

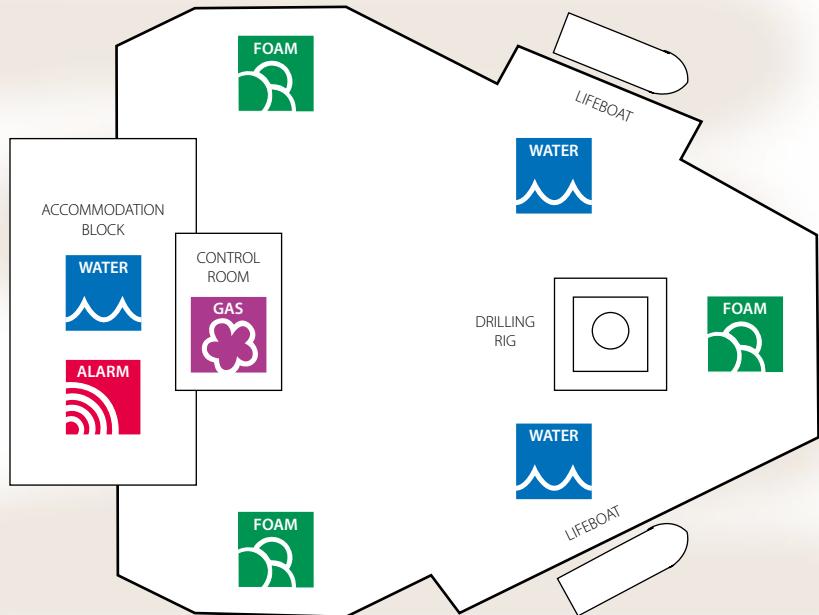
Foam tests, Factory Acceptance Tests (FAT) and Site Acceptance Tests (SAT). All tests are tightly controlled using calibrated flow meters and pressure gauges.



Offshore platforms

The oil and gases present in the offshore oil and gas exploration and production process can create a highly combustible and unstable atmosphere, making it essential that fire detection and extinguishing systems work reliably and are fully automated.

A key requirement of offshore equipment is its capability to cope with the demands of the hottest and coldest climates, and a constant salt-water environment. This makes the use of the highest grade of materials a pre-requisite. Space and weight are always at a premium on offshore facilities, and as such provides a challenge that must be resolved when designing a suitable fire system for an offshore platform. A typical layout of a platform requires areas/zones to be stacked on top of one another in a vertical arrangement, which in turn propagates multiple zone



detection and suppression systems to ensure each area is suitably protected from the risk of fire. AFE has many years' experience providing

fire protection systems for offshore platforms all over the globe including the UK North Sea, Azerbaijan and Canada.

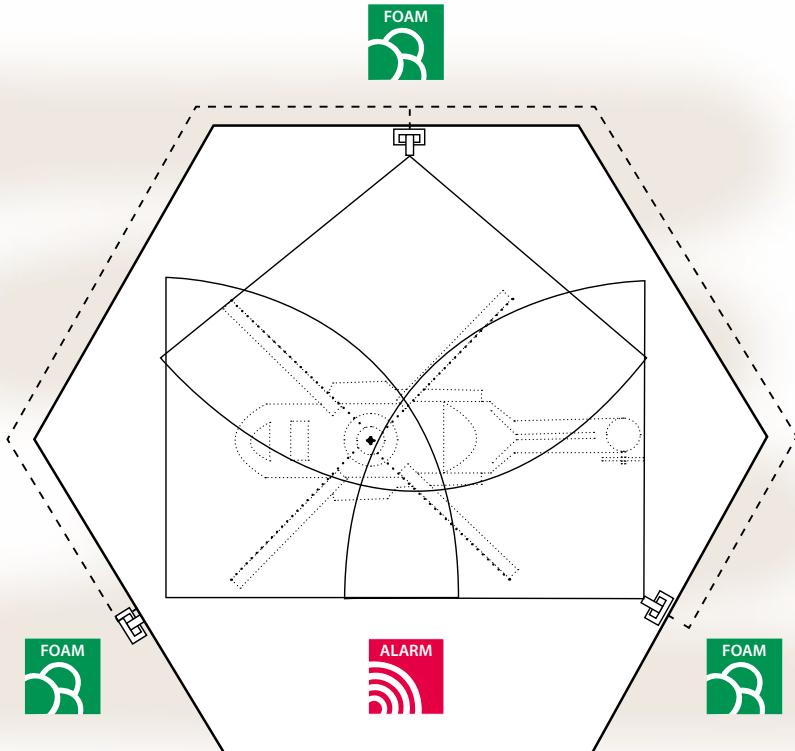


Helidecks, helipads and hangars

Offshore, helideck and helipads can be found on fixed oil platforms, mobile installations, vessels supporting offshore mineral exploitation and other sea-going vessels. Onshore they may be located close to airports/landing strips, hospitals, hotels, conference centres and on the top of high rise buildings.

Wherever they are located, the hazard associated with landing helicopters on these usually small, open areas, often in extreme environmental conditions, demands that the most effective designed fire protection systems are installed.

Angus Fire Engineering's expertise for this application is based on many years' system design experience. By complying with the ICAO (International Civil Aviation Organisation) and CAP437 (Civil Aviation Authority) regulations and



in many cases utilising the industry renowned Angus Fire OM-80 automatic, oscillating monitor fed from a helijector foam skid, Angus

Fire Engineering offers the most reliable and environmentally resistant solutions to these applications.



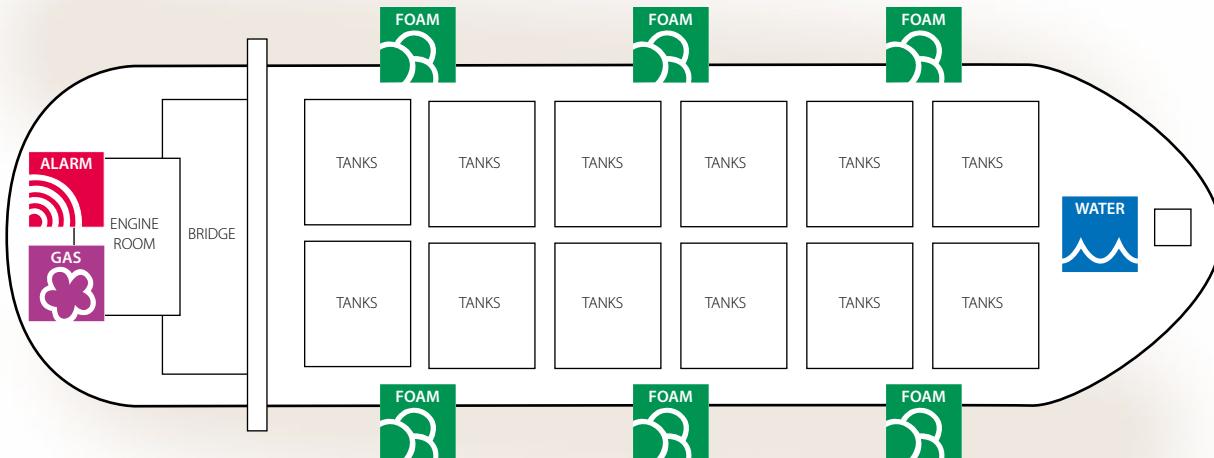
Floating production and transportation (FPSO, FSO & LNG)

The introduction of FPSOs (Floating Production, Storage, and Offloading Unit) brings together traditional process technology with marine expertise. It is essential that fire detection and extinguishing systems are designed to produce optimal safety solutions.

Often converted from ocean-going oil tankers their configurations are varied and many, but always designed to meet local performance

and environmental requirements. In almost all cases, protection is required for process areas, accommodation modules, power generation and product transfer.

Angus Fire Engineering's experience in all these areas makes it an ideal partner for delivering a high quality and technically correct fire safety solution for this application

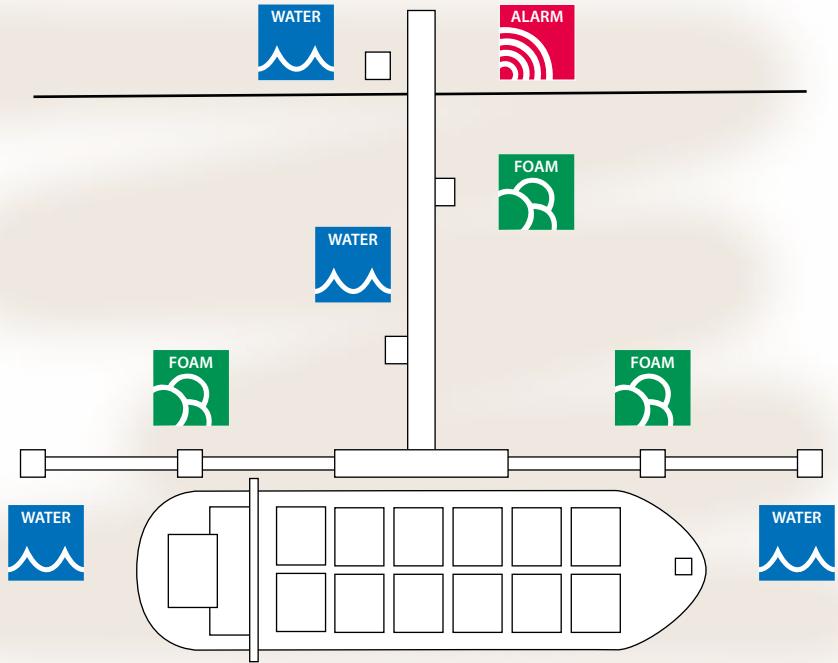




Docks and jetties

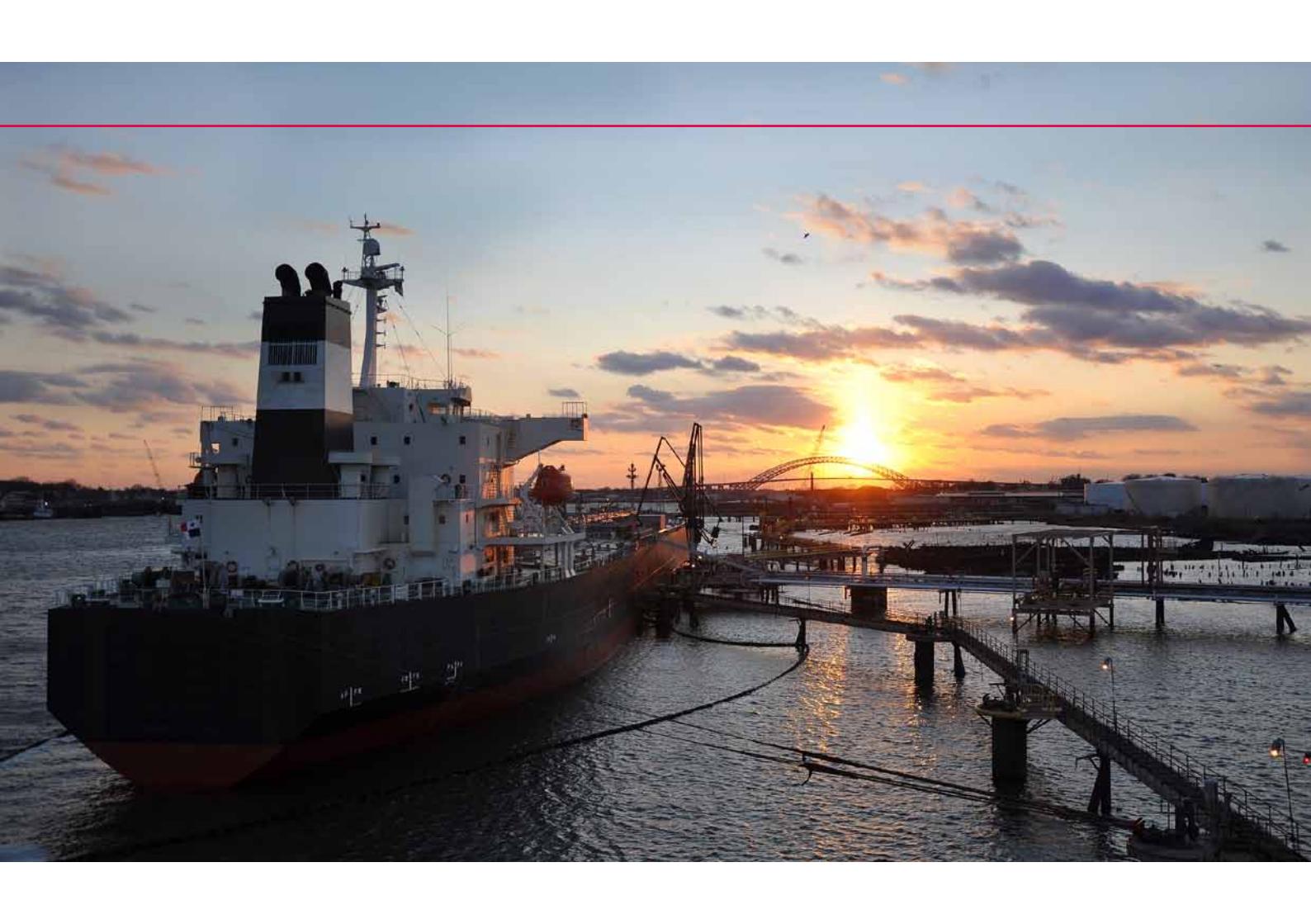
The loading and off-loading of oil tankers and chemical cargo ships is a highly hazardous operation with a potentially high fire risk. The growth in marine transportation of dangerous and flammable products has significantly increased the magnitude of this risk.

The catalogue of hazards involved is many and various. The possibility of ship collisions either with the jetty or with each other, product/ vapour explosions, product spills and improper product transfer are all potential threats. Strategically placed remote controlled foam/ water monitors will protect the means of evacuation for personnel escaping from the jetty. Other key risk areas to be protected include the loading arms, pump and control rooms. Elevated remote control monitors are also well positioned to offer additional fire cover for



the tanker, should a fire occur on deck during the loading or off-loading operations. Angus Fire Engineering has considerable expertise in jetty and dock protection, and can offer the

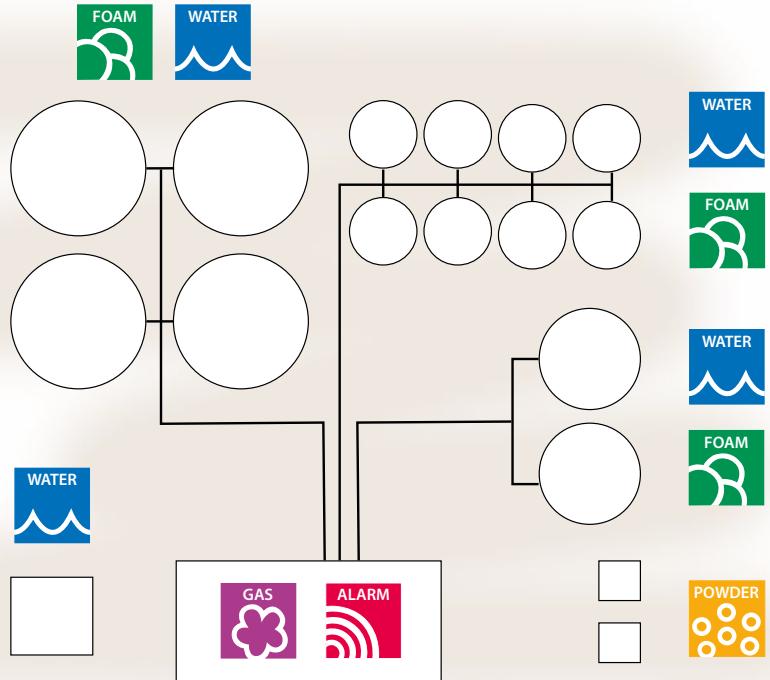
comprehensive range of Angus Fire monitors and associated equipment to protect the risks encountered, including under jetty foam systems.



Petrochemical plants

Angus Fire Engineering offers fire fighting systems for a wide range of production processes in the petrochemical industry. We can design, supply and commission systems entirely according to customer specifications. Once the overall plants and individual hazards have been reviewed by our highly experienced design and engineering team, we can propose the best solution for protecting the risk based on the correct extinguishing agent.

Water is the most widely used extinguishant, but may be unsuitable as an extinguishing agent in some production processes. In those cases, we work with an alternatives, such as Monnex dry powder or medium or high expansion foam. Fire protection systems such as water sprinkler and spray systems are used in the process industries for protection of storage vessels, process plant,



loading installations and warehouses. The duty of the fire protection system may be to extinguish the fire, control the fire, or provide exposure protection to prevent spreading of the

fire to adjacent risks. For some applications foam pourers or fixed water monitors may be a more appropriate method of delivery than sprays or sprinklers.



Tank farms and terminals

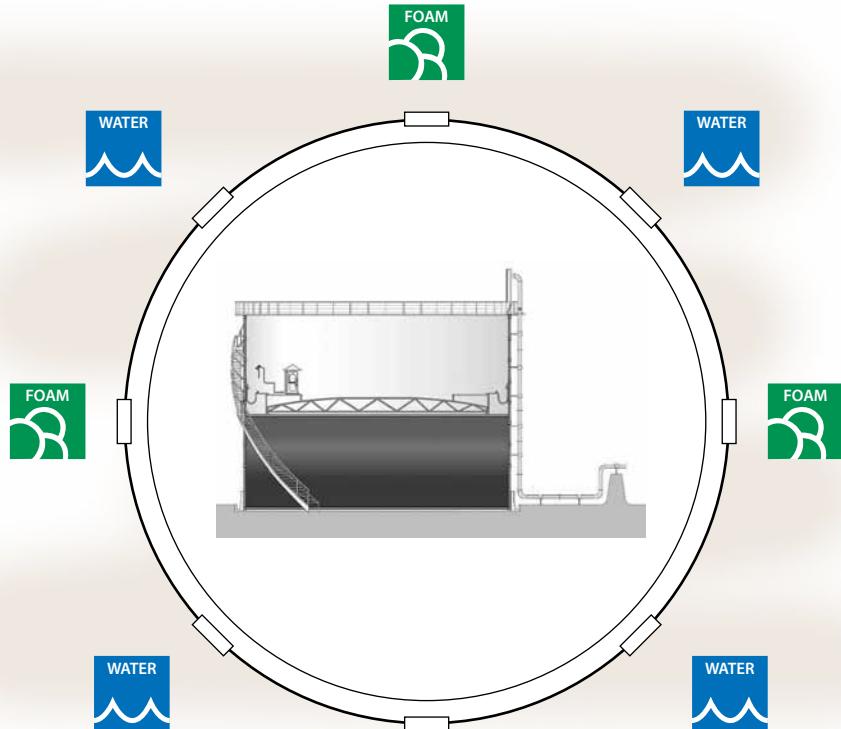
Angus Fire Engineering has vast experience of protecting all types of fuel storage tanks. Fixed foam systems are normally the prime method of fire protection. These can be either base injection, or top pourer systems for fixed roof tanks, and Rimseal systems for floating roof tanks. Water cooling for adjacent tanks or risks can be provided by tankcool nozzle deluge based systems.

In lightning prone environments, the high risk area of the seal between the tank wall and floating roof can be given enhanced early detection and protection, using the automatic, first strike Angus Floatafoam system.

Angus Big Flow monitor packages can also be deployed on full surface tank fires where the floating roof has been damaged or sunk. For all



types of fuel storage tanks, exposure protection can be provided in the form of fixed waterspray systems or fire water monitor systems. Angus leads the development of fixed systems to



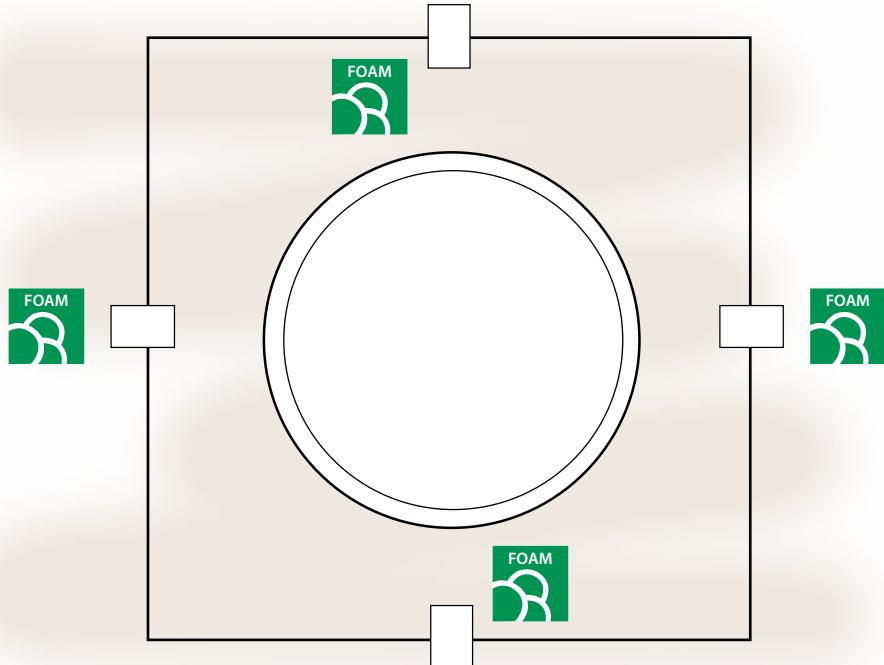
protect floating roof tanks that suffer a disastrous full surface fire using full surface pourers. We also hold emergency foam stocks ready to be airfreighted anywhere in the world.



Liquefied Natural Gas (LNG)

Liquefied Natural Gas (LNG) is a product at the heart of Angus Fire Engineering's expertise. LNG requires a fundamentally different approach to that of other hydrocarbon and natural gas condensate risks. Angus has developed a range of systems using high expansion foam (which have been independently tested in live LNG fire conditions), water cooling and Monnex based dry chemical, to address the risks of both fire and vapour suppression on LNG.

A major potential hazard of LNG is the formation of a vapour cloud from an accidental spill or tank rupture. Angus has developed systems which provide a deep stable foam blanket to suppress these vapours so that a controlled plant shut down can be carried out. Dry chemical and water cooling supplement this activity by aiding dispersion of the vapour cloud.



Whatever the requirement – production, transportation or storage – Angus Fire Engineering has the products, systems expertise,

and experience to meet the safety demands of the Liquefied Natural Gas community.



A responsible corporate outlook

Angus Fire has a long established track-record of incorporating environmental technology into its new product development.

Environment

The company's commitment to minimising the environmental impact of its products is integrated back into managing and monitoring sound environmental practices at all its manufacturing plants. These practices include energy management, waste minimisation, raw materials management and minimising environmental emissions. Angus Fire was the first foam manufacturer in the world to sponsor a seminar programme on the environmental impact of fire fighting foam.

Employees

Many of the company's technical staff are acknowledged experts in their fields and are members of national and international standards committees such as NFPA, CEN and ISO.

Corporate Responsibility and Ethics

Angus Fire is committed to delivering effective solutions that help keep people and property safe, and it is why we work every day on improving our products and developing new technologies. We apply a broad ranging code

of ethics to our business decisions and employ professionals to guide our managers and employees on ethical business practices.

Quality

Angus Fire has third party accreditation to BS EN ISO 9001:2008 Quality Management System. All raw materials, components and finished products are rigorously tested and inspected to ensure consistent reliability and performance.



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