New fuel = new opportunity
Demand is growing for LNG as a marine transport fuel, so what does this mean for storage operators?

Regulatory update
Jane Besch, CPP manager for operational excellence at Vopak Americas, takes a look at the regulatory agenda affecting terminal operators

Developing a safety culture
A terminal manager, who worked at Tosco for many years, discusses how he changed attitudes to safety at four terminals in northern California

REGIONAL FOCUS: TANK STORAGE IN AFRICA
What is an encapsulator agent?

Encapsulator technology is a tool developed during the late 1990s to control hydrocarbon spills. Since its inception, the technology has continued to be enhanced and has diversified in application and use. Encapsulator technology has been identified to be beneficial in applications such as spill control, confined space degassing, fire suppression, environmental remediation and odour control.

Encapsulator agents have a large, amphiphatic molecule with a polar head that is hydrophilic and a non-polar tail that is hydrophobic. As the encapsulator agent mixes with the water, it reduces the surface tension of the water, resulting in smaller droplets. The non-polar tail pulls the polar head to the surface of the water droplet due to its hydrophobic characteristics, allowing the polar heads to form a protective shell around the water droplet.

Encapsulator agent H2O droplet

a spray application of an encapsulator agent could safe the area. Immediately upon applying the encapsulator agent solution onto a spilled fuel, the formation of micelles will rapidly occur and immediately begin to safe the area. Whether conditions present a lateral surface or a saturated spill, the incident can be efficiently and safely mitigated.

Safely mitigated incident: North America, summer 2013

In an industrial refining setting, an aboveground storage tank containing a waste mixture of bulk hydrocarbon liquids overflowed and created a dangerous atmosphere for plant personnel and production activities in the facility. In a direct and quick response, an encapsulator agent was used immediately and effectively to safe the dangerous conditions to ensure the safety of all responding personnel while the cleanup effort was conducted.

Environments where atmospheric monitoring is priority

When the chance of encountering toxic vapours is present, one should ensure the implementation of stringent safety and monitoring protocols, relevant to the hazardous agent can be used to mitigate these environments by encapsulating the vapours and reducing the explosiveness and toxicity of the environment. The technology has been proven to be effective in safely mitigating atmospheric conditions consisting of hydrocarbon, H2S, SO2, iron sulfide, B-Tex compounds (such as benzene, toluene, ethyl benzene) and xylenes.

Confined space mitigation: North America, summer 2013

A tank contractor initially drained and mechanically ventilated a 160° AS 1 for two working days with minimal reduction in its internal hazardous atmosphere produced by the petrol that had been stored in the tank. Due to the age of the tank, some sludge and scale was noted from an external visual inspection of manway one. The decision was then made to use an encapsulator agent and introduce the mixture directly into the tank via a pressurised apparatus to ensure the atmosphere was mitigated for a safe confined space entry. Within 45 minutes of the initial application in manway number one, the LEL reading had dropped to readable levels. As the contractor’s crew moved to the second manway and introduced another application, the readings were...
further reduced within limits. After the initial treatments and subsequent draining of the mixture, the atmosphere readings were measured at zero LEL and volatile organic compounds, greatly increasing the contractor’s productivity while ensuring a safe environment for the entrants on the confined space crew.

Fire suppression

The fire suppression mechanics when using an encapsulator agent are different than using only water or other fire suppression agents. This technology does not rely on a blanket or separation suppression mechanics; rather it dissipates the heat internally providing rapid and permanent heat reduction, encapsulating the combustible vapour molecules, and interrupting the free radicals from coalescence to interrupt the fire tetrahedron. This interruption is occurring on three of the four areas as noted on the modern fire tetrahedron rather than separating oxygen from the fuel or heat and smothering the fire. The molecular encapsulation and permanent heat reduction allows the burning fuel to be cooled beneath its autoignition temperature. While also interrupting the free radicals that are trying to coalesce, the visibility increases and the by-product toxic soot of the combustion cycle reduces. In combating a fire hazard, an encapsulator agent has been shown to be six to 10 times more efficient in cooling, while also using less amounts of solution to extinguish a fire, compared with plain water.

Safety mitigated incident: Italy, 2010

A fire started in a storage building containing tank storage drums of lubrication fluids and eventually reached a massive scale at a petroleum facility in Italy. Evacuations were ordered and fire fighters were deployed to battle the large blaze. Three large asset groups tried to extinguish the fire for several hours using water enhanced by fire suppression foam solution but, due to the extreme heat of the fire, the foam was hampered from forming the required blanket to separate the fuel and oxygen to reduce the heat of the blaze.

For more information, this article was written by Justin Champion, North American market manager, Hazard Control Technologies, jchampion@hct-world.com

Bornemann pumps for tank storage, -terminals and refineries

For the professional and economic storage and transport of mineral oil products

Our expertise for tank storage and -terminals and refineries

- Loading and unloading of barges, tankers and trail trucks
- Circulation from tank to tank
- Stripping of tank and pipes
- Transfer
- Operation with wide range of product viscosity
- Operation at high or low pressure
- Full control in all kind of operation modes
- Reduced installation costs for pipes and valves
- High safety due to variable operation
- Low pulsation
- No fixed duty points
- Wide range of capacity
Tank Storage Magazine

September-October, 2013

The following two pages show an insert that was included in 700 copies destined for NISTM and API conferences.
HydroLock Encapsulator Agent is a versatile formulation that encapsulates and emulsifies hydrocarbon solids, liquids and vapors. This agent is used to efficiently degas a confined space insuring safe atmospheric working conditions for all personnel. HydroLock is also effective in cleaning hydrocarbon deposits and sludge encountered during maintenance or turnaround operations.

- Eliminates LELs, H₂S, SO₂ and Iron Sulfide Hazards
- Controls B-Tex Compound Health Concerns
- Improves Safety
- Increases Production
- Environmentally Safe
- Dissolves Hydrocarbon Accumulations
Traditional methods of fire suppression either eliminate heat through steam conversion (plain water) or eliminate the oxygen leg of the fire tetrahedron by temporarily obstructing vapors through the formation and maintenance of a foam blanket (Class A and B foams). In contrast, F-500 Encapsulator Agent simultaneously attacks the heat, fuel and the free radical legs of the fire tetrahedron providing rapid knockdown and extinguishment, while also providing the additional benefits of minimizing smoke and soot.

- Effective on Class A, Class B (polar and nonpolar) and Class D fires
- Surface tension reduction to better penetrate fuels
- Rapid heat reduction, provides permanent burnback resistance
- Fuel encapsulation and neutralization
- Interrupts free radical chain reaction
- Effective on three-dimensional fires
- Increases life safety and reduces property damage
- Minimizes water usage and subsequent runoff containment

Pinnacle Foam concentrates are designed for use on a broad range of Class A and B hazards. Providing premium performance at an economical price, Pinnacle foams are available in three formulations:

- **Pinnacle Class A Foam** – Effective and economical solution for Class A firefighting. Works with fresh, salt and brackish water and can also be used as training foam on the fire ground. Recommended proportioning rates range from 0.10 to 1% on all Class A fires.
- **Pinnacle 3% AFFF Foam** – Listed for use on Class B fires. It features fast spreading characteristics, forming a film blanket that seals nonpolar fuels and vapors.
- **Pinnacle 3X3 AR-AFFF Foam** – Developed for use in mitigating both polar and non-polar solvent fires, including ethanol and ethanol-blended fuels. Provides more stability and burnback resistance than conventional AFFF.

**Additional Hazard Control Technologies Solutions:**

**Fixed Concentrate Control Systems** – Fixed suppression systems designed to protect facility assets are available with Pinnacle foams or F-500 Encapsulator Agent.

**Portable Fire Suppression Systems** – Portable suppression or spill control equipment is available such as pressurized F-500 EA extinguishers, personnel backpack sprayers, 26 to 40-gallon concentrate response carts and quick attack mobile units.

Email info@hct-world.com or call 770-719-5112 for more information.