Tank Talk

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Welder Testimony Shows the Importance of Industry Standards

Standards and recommended practices exist in many industries and are used by many service organizations. These documents represent best practices through the sharing of experiences and knowledge from an assortment of qualified professionals. Such documents become part of a “body of knowledge” used by producers, distributors, installers, owners, regulators and service providers alike to achieve a certain goal or event in a satisfactory manner.

The petroleum industry has developed a widespread “body of knowledge.” Some documents are applicable to the upstream side of the petroleum business, where oil is extracted from the ground and collected; similarly, some documents apply to the refining portion of the business. Other standards and recommended practices pertain to wholesale and retail operations – or the downstream sector.

Nationally recognized organizations such as the American Petroleum Institute (API), Petroleum Equipment Institute (PEI), Steel Tank Institute (STI) and Underwriters Laboratories (UL) are among groups that have developed documents that guide the downstream sector. Standards and recommended practices can be further classified by their specific function within such a sector. For example, some documents exist only to address how certain pieces of equipment are manufactured, such as pipes and tanks. Other documents focus on the installation of various components into a functional system – or the means to maintain and properly operate such systems.

Regulators and code officials often rely on such a body of knowledge to help develop regulations and fire or building codes. For example, the U.S. Environmental Protection Agency (EPA) references some standards and recommended practices in its regulations for underground storage tanks, 40 CFR Part 280, and the Spill Prevention Control and Countermeasure regulation for aboveground tanks under the Clean Water Act, (40 CFR 112). Fire codes, such as NFPA 30, the Flammable and Combustible Liquids Code, and the International Fire Code use this collection of wisdom and experience to create their own body of knowledge to assure safety. For example, UL 142 is a common reference that standardizes construction of shop-fabricated aboveground storage tanks.

A recent court case – in which an aboveground storage tank (AST) emergency-vent manufacturer was unsuccessfully sued in relation to the death of a fuel-delivery driver when an AST exploded – underscores the consequences of specifying storage tank system equipment or services that don’t meet industry standards.

The vent manufacturer recently defeated a claim in court that an emergency vent contributed to the death of a driver when an AST caught fire and exploded in 2005 at a co-op facility in Missouri.

Testimony from the other defendant in the case – the welder who field retrofitted the AST with a new bottom –

established that bulk tanks or other ASTs rehabbed, retrofitted or otherwise altered in the field without applying the body of knowledge of industry standards posed a risk for failure.

But, in a broader sense, it points out the significance of industry standards when installing, operating, maintaining or designing any storage tank system.

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Follow-Up: Chemical Safety Board Cites Unsafe Practies in Deadly Mississippi Tank Explosion

In a case study of a fatal explosion and fire last year at a Smith County, Mississippi oilfield, the U.S. Chemical Safety Board (CSB) found unsafe work practices and recommended increased inspections by the federal Occupational Safety and Health Administration (OSHA) for oil and gas production facilities.

The report also called on the Mississippi Oil and Gas Board to identify, and refer to OSHA, potentially unsafe conditions observed during field inspections of well sites and drilling operations.

Tank Talk reported on the oil-field deaths in August 2006.

On June 5, 2006, loud explosions and a fire were reported at the Partridge-Raleigh oilfield in Raleigh, Miss. Three contractors died and another suffered serious injuries. Each of the four was an employee of a firm that was relocating three oil production tanks located on the Partridge property.

Workers were completing piping connections between tanks when welding sparks ignited flammable vapors venting from one tank. Four tanks were arrayed in a straight line about four feet apart where workers were planning to make the tank connection. The tanks ranged from 15 to 20 feet (4.6 to 6.1 meters) tall and 12.5 feet (3.8 meters) in diameter. Tank contents included flammable hydrocarbons, ethyl benzene, xylene, toluene, and naphthalene fumes.

Immediately prior to the accident, two workers and a foreman had climbed on top of the tanks. They placed a ladder between two tanks to serve as a makeshift scaffold. A welder attached his safety harness to the top of one tank and positioned himself on a ladder. To connect the piping to the tanks, a welder had to attach a pipe fitting onto the side of one tank before securing a short length of pipe to the fitting and to a nearby, open-ended pipe on an adjacent tank.

Almost immediately after welding began, flammable hydrocarbon vapors venting from the open-ended pipe ignited about four feet from the contractors' activity. The fire flashed back into the tank on which the two workers were holding the ladder and also quickly flashed back into the third tank.

Pressure from burning vapor inside two tanks caused the tops to blow off. The workers were thrown by the force of the explosion, which resulted in blunt-force trauma and fatal injuries. The welder suffered a broken ankle and hip, but survived since he was wearing a safety harness that prevented him from falling to the ground. The investigation found that unsafe work practices directly contributed to the severity of this accident.

The ladder placed between the tanks should not have been used as a makeshift work platform and the open pipe on the adjacent tank was not capped, or isolated with a closed valve to prevent flammable vapor from accumulating near the area where the welding would occur.

Additionally, while not a cause of the accident, the welder inserted a lit oxy-acetylene welding torch into the tank's hatch and then into an open nozzle on the opposite side of the tank to verify that all flammable vapor was removed from the tank instead of using a flammable gas detector.

Lead Investigator Johnnie Banks said, “While recognized to be dangerous, this practice is common in oil field operations and even has a name – ‘flashing.’” Neither the customer nor its contractor required hot-work permits to perform welding on the tanks.

The fatality rate of the oil and gas extraction industry is more than eight and a half times higher than the average for all industries in the United States. CSB Chairman Carolyn W. Merritt said, “Lives cannot be an acceptable added cost of providing fuel to American consumers.”

CSB found that the contractor lacked hot-work safety procedures and did not follow available guidelines from the American Petroleum Institute (API) 2009 standard, “Safe Welding, Cutting, and Hot Work Practices in the Petroleum and Petrochemical Industries” in preparing and conducting the welding operation at the time of the incident. In addition, neither firm adhered to OSHA requirements addressing safe welding practices.

Following the explosion, OSHA cited the contractor for 13 serious safety violations.

For the full report, visit **http://www.csb.gov/index.cfm?folder=completed_investigations&page=info&INV_ID=61**

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California Air Resources Board Regulates Gasoline AST Vapor-Recovery Systems

In a move likely to have implications in many parts of the United States, the California Air Resources Board (CARB) in June approved regulations that cover certification and testing of vapor-recovery systems for aboveground storage tanks (ASTs) that contain gasoline.

Over the last two decades, CARB rules have influenced many air-pollution control measures eventually enacted by the federal government and other states.

The new regulation establishes certification requirements, testing procedures and performance standards for gasoline-dispensing facilities with ASTs, including farm tanks. About two-thirds of ASTs in California are associated with agricultural operation, according to CARB data. Other gasoline AST systems are operated in marinas, fleet operations, governmental agencies and service stations. The new regulation does not affect AST systems that hold diesel.

The regulation will govern emissions linked to the transfer of product from a fuel-delivery truck to the AST, the dispensing of gasoline from the AST into a vehicle and standing-loss emissions, said Michael Werst, air pollution specialist of CARB’s Monitoring and Laboratory Division.

“Standing-loss emissions occur when the evaporated gasoline is vented to the atmosphere either through leaks in the system or when the pressure limits of the pressure vacuum relief valve are exceeded,” Werst told CARB officials prior to their approval of the new regulation.

To address standing-loss emissions, CARB is requiring that:

- New tanks be insulated in accordance with mandates of Underwriters Laboratories’ UL 2085 standard or insulated with polyurethane or another acceptable insulation. New tanks will also need pressure-vacuum vents. Both the insulation system (UL 2085 tank or exterior insulation) plus the pressure-vacuum vent require 30-day certification testing.
- Existing tanks be painted white and equipped with a pressure-vacuum vent. Thirty-day certification testing will be required for the white paint and the pressure-vacuum vent. Also, if an existing tank is replaced with an AST of the same size, then the new tank will continue to be defined as an “existing” tank, which serves as a means to avoid insulation mandates.

Thirty-day certification testing involves determining the gasoline temperature for 30 days during the summer inside a representative tank that is fitted with necessary equipment, while also monitoring for emissions.

Statewide, gasoline AST systems release about 3.31 tons (3 metric tons) per day of reactive organic gases from storage and transfer losses. About 2.95 tons (2.68 metric tons) per day of reactive organic gas emissions are from standing losses and the remaining .36 tons (.33 metric tons) per day are from transfer losses. Those gases in aggregate represent the loss of 1,000 gallons (3,784.3 liters) of gasoline per day. Summertime emissions in California are about 50-percent higher per day due to higher temperatures.

CARB staff conducted a field study in 2005 to measure emissions from gasoline ASTs and evaluate several standing-loss-control technologies such as pressure/vacuum relief valves, carbon canisters, paints, shade and insulation methods.

The regulation also upgrades requirements for gasoline AST Phase I vapor-recovery systems – moving to 98-percent

efficiency. The regulation requires 180-day system certification testing for all Phase I equipment.

Similarly, Phase II system efficiency requirements will climb to 95 percent, as all Phase II equipment must also undergo a separate 180-day system certification testing.

The effective date of the Phase I and Phase II requirements – and the entire regulation – is Jan. 1, 2009 – though existing tanks will have until Jan. 1, 2013, to comply.

More information is available at **www.arb.ca.gov/vapor/ast/ast.htm**.

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New Canadian Tank System Regulations Focus on Lowered Risk Via Secondary Containment

Storage-tank systems that during the last decade have not been touched by provincial or territorial regulation within the year may be the subject of new Canadian federal regulations. In addition, once the regulations are finalized, the national standard for aboveground and underground storage systems increasingly will be moving away from “high risk” systems and closer to secondary containment, as typified by proposed provisions such as:

- Single-wall tanks without corrosion protection or leak detection must be removed within four years, which means all single-wall tanks will be required to have protection against corrosion
- Leaking single-wall tanks and piping must be immediately disabled, and ultimately removed within two years
- Horizontal ASTs without secondary containment must be visually inspected within two years and monthly thereafter
- Vertical ASTs without secondary containment must have tank bottoms inspected with ultrasound, magnetic particle, videography, or by vacuum within two years and every 10 years thereafter

Other high-risk storage-system categories include:

- Tanks designed as ASTs but installed underground
- Tanks designed as USTs but installed aboveground
- Storage systems with partially buried tanks

In each of those cases, high-risk tank system components would have to be removed from service within four years of the regulation’s effective date. The riskiest tank systems need to be taken out of service or replaced because much of Canada has a high water table, susceptible to quick contamination when system leaks occur, regulators said.

The drafting process for the proposed new regulations -- published in April in the Canada Gazette – began in February 2003. Once approved, the new mandates will affect:

- Federal departments, boards and agencies (e.g., Royal Canadian Mounted Police)
- Federal crown corporations (e.g., Canada Post, the national postal service)
- Federal and aboriginal lands
- Federal works and undertakings (e.g., port authorities, railways, airports)

“These proposed regulations are expected to generate a net benefit of approximately $369 million (discounted Canadian 2004 dollars) over 12 years,” the regulatory posting said.

The net benefit contrasts a variety of costs related to compliance and natural-resource protection with a plethora of costs linked to enforcement and environmental remediation. An audit of sites with contaminated groundwater or soil showed compelling evidence of the need for more meaningful regulation on federal or aboriginal lands. Two-thirds of the contaminated sites have been fouled by petroleum products.

The regulatory review process was initiated through the Canadian Council of Ministers of Environment, a group representing top environmental regulators from the federal government, plus each province and territory. Petroleum industry stakeholders also have been involved in the development of regulations.

More information on the proposed regulations is available at:

http://canadagazette.gc.ca/partI/2007/20070407/pdf/g1-14114.pdf

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ICC Enacts Code Changes for Aboveground Storage Tank Requirements

The International Fire Code (IFC) has approved two changes to the 2007 supplement to the 2006 IFC that relate to aboveground storage tanks – outdoors and in buildings.

The proposed changes, which were voted upon during May at the International Code Council (ICC) Final Action Hearings in Rochester, N.Y., modified Sections 603.3.1 and 603.3.2 on fuel storage tanks inside buildings, and added a new Section 3404.2.9.1 on corrective measures for existing noncompliant aboveground tanks.

The two new changes will be published in the fall as part of the 2007 supplement to the IFC.

IFC Code Change F46-06/07:
IFC Code Change F46-06/07 resolved a problem in the IFC involving the apparent conflict between IFC Table 2703.1.1 (1), Footnote “i” and IFC Section 603.3.2. The table implies that fuel oil tanks are subject to the maximum allowable quantities (MAQ)/control area approach, but Section 603.3.2 instead establishes “per building” quantity limits.

A “per building” quantity limit is the maximum permitted for the entire building, regardless of the number of floors, the size of each floor, or the type of construction. “Control areas” are spaces within a building where hazardous materials not exceeding the maximum allowable quantities per control area are stored, dispensed, used or handled.

The latest IFC revision clarifies that fuel oil tanks covered by 603.3.2 are not subject to the MAQ/control area regulatory scheme. The code change also resolved the need for more reasonable size limits for tanks in buildings that serve fuel-burning equipment and generators. The intent of this Section 603.3.2, through its use of the term “fuel oil,” relates to tanks supplying both fuel oil and generators, and this has been clarified.

To address the need for more reasonable quantities, this code change increased permissible quantities when “protected tanks” are used and are located in areas protected by fire sprinklers. The ICC membership understood that protected tanks represent one of the highest levels of tank construction in widespread use. These tanks have extensive regulations in IFC Chapter 34, and the special UL listing requirements further assure their safety.

Included in the special regulations for these tanks are:

- The required ability to survive a two-hour fire test conducted in accordance with the Underwriters Laboratories’ fire-exposure protocol
- A limitation that all penetrations must be made through the top of the tank (to avoid the risk of a gravity-fed leak that might be associated with a connection below liquid level) and that piping connected to the tank must be provided with anti-siphon controls, as needed
- Bullet resistance
- Vehicle-impact resistance, and many others

The added safety features more than compensate for the new permitted quantity allowance of 3,000 gallons (11,353 liters). By having most of these safety features integral to the tank construction, the level of reliability is very high. The code change also correlates the fuel-oil equipment requirements in the IFC with applicable requirements in the International Mechanical Code (IMC) that are probably often overlooked, and it places a reasonable limit on where tanks can be located in basements.

IFC Code Change F188-06/07:
This revision added a new Section 3404.2.9.1, “Existing noncompliant installations,” to address existing aboveground tanks that were not originally installed properly. This new section of code will provide a code official with the ability to mandate correction of an existing aboveground storage tank system installation that was installed in violation of the code requirements at the time of the original installation, regardless of whether such a tank installation had been previously inspected and accepted by mistake.

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UL Expects to Accept Some E85 Dispenser Products for Testing by End of 2007

Underwriters Laboratories (UL) has announced that it will accept requests for certification investigations into gaskets and seals for use with concentrated ethanol-blended fuels such as E85.

To develop certification requirements, UL developed an ethanol-blended fuel compatibility research program for gaskets and seals. The objective was to assess materials in a variety of test conditions with ethanol-blended fuels.

“The results of UL's research indicate that certain commercially available gasket and seal materials formulated for this specific use can be expected to perform acceptably when exposed to motor vehicle fuels blended with high concentrations of ethanol, including those that contain an optional corrosion inhibitor additive,” according to a UL news release. “However, some materials experienced significant deterioration during the research tests. The research results were reviewed by UL's E85 Technical Panel, which includes global experts in ethanol material compatibility.”

"These results confirm the necessity of establishing safety requirements for E85 dispensers that take into account the long-term effects of exposure to ethanol," said John Drengenberg, consumer affairs manager for UL.

UL anticipates completion of the research and development of certification requirements by year-end. After that, UL will accept product submissions for E85 dispensers.

For more information on UL's E85 safety testing, visit: **http://www.ul.com/regulators/e85.cfm**.

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Iowa Checklist Covers Tank-Conversion Issues for Ethanol Blends Above 10 Percent

The Iowa Department of Natural Resources (DNR) has created a four-page checklist that helps underground storage tank (UST) system owners and managers prepare for conversion of an existing tank system to the storage of ethanol blends such as E85.

The Iowa General Assembly last year extended the date to July 1, 2009 by which listed equipment will be required for dispensing E85. All UST systems that store and dispense ethanol-blend (E-blend) fuel after that date must be fully compatible with the fuel.

Here is an excerpt from the checklist:

Before E-Blend is Transferred to the Tank
Once equipment compatibility has been established, the items below must be completed before E-blend fuel can be transferred to the tank. Items that are the responsibility of the UST owner are indicated. The remaining items are the responsibility of the Iowa licensed installer or professional engineer.

- Inform the facility’s UST insurance carrier of plans to convert to an E-blend fuel. The UST insurance carrier may have additional requirements other than what the DNR requires. (Responsibility of owner).
- Obtain an amended certificate of insurance indicating UST coverage for the E-blend stored and dispensed. (Responsibility of owner).
- Check for water in the tank. No level of water is acceptable for E-blend fuels due to the phase separation problems.
- All visible fittings and connections at the top of the tank are tight (no vapors escape and no water enters).
- Sump and spill containment covers prevent water from entering.
- Water infiltration problems fixed if necessary.
- The tank has been cleaned of all water and sediment.
- Clean tank certificate obtained or comparable documentation (e.g., see API Publication 2015, Cleaning Petroleum Storage Tanks and NFPA 326, Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair, 1999 Edition). (Responsibility of owner)
- Labeling: identify the fill port and paint access covers according to API RP 1637. Make sure transport driver cannot make the mistake of delivering E-blend fuel to the wrong fill pipe. Label dispenser.

The entire Iowa checklist can be viewed at
http://www.iowadnr.com/land/ust/technicalresources/documents/ethanolCklist.pdf.

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Water-in-Tank Woes Lead to Desperate Times for Service-Station Owners

Two states, two stories, one common theme – water during the spring was tainting gasoline at service stations. In one case, a California station owner wanted to stay out of jail. In the other, a Missouri owner simply wanted to stay in business.

The operator of a Camarillo, Calif. gas station pleaded no contest in June to misdemeanor charges that he sold gasoline contaminated with water.

The owner of a service station and car wash told the Ventura County Star newspaper that he made his decision after a judge told him in April that he faced misdemeanor charges of selling "nonconforming gasoline" and a possibility of jail time.

The station owner said he was amazed that he could face criminal charges. He chose to make a no-contest plea rather than hire an attorney and fight the charges.

The case was the first of its kind in Ventura County in at least seven years, according to an official with the county's Weights & Measures Division, which referred the case to the district attorney's office for prosecution. The Weights and Measures Division is responsible for ensuring that gasoline conforms to standards for specific octane and remains free of contamination.

According to two complaints filed with the division, motorists filled up at the service station and immediately had problems with their vehicles.

In one case, a customer couldn't drive the vehicle off the property. In the other, a driver put $50 of gasoline into a truck, which stopped running. A mechanic found water in the truck's fuel.

The contamination was isolated to the medium grade fuel, and happened inadvertently, the station owner said. The medium-grade storage tank had been emptied of fuel by a company that would siphon water from the tank. After that, the station was waiting for an inspection. But the inspection was contingent on the presence of fuel in the tank.

The owner authorized filling the 10,000-gallon (37,843-liter) tank with 89 octane fuel and waited for the inspection. During that time the owner said he posted signs saying that the station was out of medium-grade gasoline, but customers pumped the fuel anyway at night when the station was unattended.

The owner said he has inspection results showing no water in the tank after the fuel was siphoned out. So, he told the newspaper he believes the water arrived via the fuel delivery.

Despite covering the repair costs of the vehicles, the owner was told by a deputy district attorney that he is responsible under the law. To read the full story, visit **http://www.venturacountystar.com/news/2007/jun/12/melinda-working/**.

The water-in-tanks drama featured a unique turn of events during June in Raytown, Mo., about 12 miles southeast of Kansas City.

A gas station operator told a local television station in June that he could prove he wasn't at fault for bad gasoline that damaged customers' engines. In May, water was found in car engines from customers who bought fuel at his Raytown facility. Enraged, some victims carried placards and protested the station.

The owner blamed his fuel supplier. He showed the TV station tank-gauging readouts of what was in the underground tank. One day before delivery, there was no water found in the fuel. A readout taken 21 minutes after the supplier's fuel was pumped in, showed 3.1 inches (7.9 centimeters) of water.

To no avail, the owner said he has tried to get the fuel distributor to remedy the customers' issues. In the meantime, the protests and a recent robbery have ruined the station. The owner said cash and merchandise such as liquor, cigarettes and cigars were taken by thieves. For more details, visit **http://www.thekansascitychannel.com/news/13521378/detail.html**.

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Hock Brings Unique Viewpoint to Industry and Business Transformation

Ask Jeff Hock about the most significant changes that he has witnessed during the last three decades in the steel fabrication industry, and he'll provide an answer with a unique professional and personal perspective.

"There has been massive consolidation – from the steel companies to the distribution firms to the fabricators," said Hock, president of Enerfab Inc., based in Cincinnati, Ohio.

Hock, named earlier this year to the STI/SPFA Hall of Fame, has been on both sides of the consolidation trend. He is now in this 17th year with Enerfab, but Hock started his career at Brighton Corp., which was founded by his grandfather.

After 11 years with Brighton, Hock saw the family business sold to Trinity Industries of Dallas, Texas. After four years with Trinity, he moved on to Enerfab. During the last five years, however, the consolidation trend took a different turn for Hock. In 2002, Enerfab added capabilities and capacity by buying Brighton's tank-head business from Trinity. In addition, about two years ago, Enerfab acquired the Hamilton Kettles unit that had been part of Brighton for many years.

Did the opportunity to reconnect with Brighton's business units through Enerfab bring a smile to Hock's face?

"As a career achievement, that ranks right up there," he said. "It was satisfying to bring these businesses full circle."

Hock also has served in several leadership capacities with the Steel Plate Fabricators Association (SPFA) and the current STI/SPFA. He spent a combined 21 years on the SPFA and STI/SPFA Board of Directors – including SPFA leadership posts such as president, past president, vice president and treasurer. Hock also is widely recognized as a leader in envisioning and working toward the 2004 merger between Steel Tank Institute and SPFA.

As both an industry leader and a top corporate executive, Hock has encountered the challenges of maintaining stability during the upheaval that occurs with periodic peaks and valleys of demand for fabricated products.

"That's probably been the biggest challenge I've faced," Hock said. "As an industry, we've seen wonderful markets like now where everyone has enough work, but there have also been significant dips where there wasn't enough. In a particularly bad period, I've seen employment in the shop go from 100 guys to about 40. I've seen three significant upticks, and three very significant downturns, since the late 1970s."

Other substantial changes that Hock recalled were the:

- Emergence of demand during the last 10 years from American firms for products built in fast-growth fabrication markets such as Korea, China and India
- Industry's recurring shortage of skilled welders during a time of considerable innovation in welding technology
- Recent development by European companies of new materials, particularly low-cost, high-strength, corrosion-resistant specialty alloys

As a corporate leader, he also noted a greater emphasis today on sharing information that enables all employees to understand a company's direction and competitive position.

"People want to have a clear vision of where they're going and how they're doing," he said. "We are much more open in sharing business information than when I first got into the business."

Hock maintains a sense of wonder about his experience to date and the opportunities still on the horizon. "Overall, it's been a very rewarding experience," he said. "It's like an Erector set – a new project everyday."

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Alternative Fuel Auto Sales Show Major Increase in Early 2007; Buyers Want Fuel Availability

Higher energy prices, incentives and growing availability of alternative fuel vehicles added up to major gains in the sale of autos that can run on E85 or other non-traditional energy sources.

Sales figures from R.L. Polk showed a record number of alternative fuel automobiles (AFAs) sold in the first quarter of 2007. During that span, more than 434,000 alternative fuel autos were sold nationwide, a 27-percent increase over the same period in 2006. The Alliance of Automobile Manufacturers said the new sales increased the total number of alternative fuel autos in the United States to 11 million.

Sales of E85-capable vehicles were up 40 percent from 159,882 to 266,859. Sales of hybrid vehicles rose 31 percent from 51,285 to 74,056. Sales of clean-diesel vehicles fell slightly from 108,100 to 93,012.

Gas prices, consumer incentives, and increased production of alternative fuel autos “all play a role in the rising popularity of these vehicles,” said Dave McCurdy, president and CEO for the Alliance of Automobile Manufacturers. “However, while interest in AFAs continues to grow, we still need more gas stations to offer biofuels like ethanol and biodiesel.”

Sixty models of alternative fuel automobiles are available to American consumers and more are in development, including hybrid-electric, clean-diesel, ethanol-capable and others. Advanced vehicles need advanced fuels, including ultra-low-sulfur diesel, E85, biodiesel, hydrogen and electricity, the alliance said.

A recent study by R.L. Polk and the Alliance of Automobile Manufacturers found that while more than 74 percent of consumers were familiar with alternative fuel vehicles, the availability of fuels still served as an important consideration in the purchase decision.

Additionally, the study found that consumers believe government should fund research and development into alternative fuel autos and that government should provide incentives to promote the development of adequate infrastructure.

Of the more than 170,000 refueling stations in the United States, almost 1,260 offer E85, according to the National Ethanol Vehicle Coalition. As of early August, the 10 leading states in offering E85 fueling stations were Minnesota (318), Illinois (150), Indiana (90), Wisconsin (79), Missouri (77), Iowa (68), South Dakota (62), Michigan (49), South Carolina (43) and Ohio (42).

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New, Robust Analytical Tool Helps to Determine Total Cost of Water Tank Ownership

STI/SPFA has released a comprehensive, new analytical tool for water storage tank decision-makers. The Total Cost of Ownership tool quantifies the net present value of storage tank ownership. The tool synthesizes the concepts of initial cost, replacement costs, significant renovation costs and routine maintenance costs for welded steel, bolted steel and concrete tanks.

“The life expectancy of a properly cared for steel water storage tank is truly unlimited,” says Kevin J. Gallagher, P.E., vice president of sales for Caldwell Tanks, Inc. and chairman of the STI/SPFA Field Erected Tank Section. “In fact, STI/SPFA honors tanks that have been in service for more than 100 years through its Century Club. Attempting to quantify the total cost of ownership, in present value, and evaluate water storage tank options is a major undertaking. We have compiled available industry information and the expert opinions of industry professionals to assist owners and engineers in this critical task.”

“We have compiled coating system life expectancies for the commonly used American Water Works Association D102 systems,” says Tony Ippoliti, senior corrosion engineer for The Sherwin-Williams Company. “Documents presented at the NACE International Corrosion 06 and Corrosion 98 Conferences, along with industry experience, provide the source material. Further, advances in coatings system technologies make it probable that the systems will provide an even longer service life.”

"If tank owners and their consultants are truly honest with themselves and use industry-average costs and other reasonable factors in their evaluations, the lowest total cost of ownership for a long-term water storage tank solution will be a welded steel storage tank for most cases,” says Richard Horn, P.E., manager of sales for CB&I. “Despite some of the marketing propaganda for other materials, there is no such thing as a

‘maintenance free’ water storage tank – regardless of construction materials. With periodic inspection and some maintenance, welded steel water storage tanks can and have operated for well over 100 years under normal operating conditions. Welded steel should be the material of choice for most water storage tank solutions."

The Total Cost of Ownership program is available at http://www.steeltank.com/WaterTankTCOExcelDownload/tabid/188/Default.aspx.
A brochure of Century Club members – steel water tanks in service for at least 100 years – is available at http://www.steeltank.com/Awards/CenturyClub/tabid/91/Default.aspx

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Facts of Steel

Based in Atlanta, Ga., the Georgia Dome, the largest cable-supported domed stadium in the world, opened for sports, entertainment and other special events in 1992 after a construction effort that used 8,300 tons (7,530 metric tons) of reinforced steel. That amount of steel surpasses the weight of iron and steel used in the Eiffel Tower. http://www.gadome.com/about/index.html

The Gateway Arch is the tallest national monument in the United States at 630 feet (192 meters); it is the best-known landmark in St. Louis, Mo. and a popular tourist attraction. Construction began Feb. 12, 1963 and the last section of the Arch was put into place on Oct. 28, 1965. The Arch is a structure known as a catenary curve, the shape a free-hanging chain takes when held at both ends, and considered the most structurally sound arch shape. The span of the Arch legs at ground level is 630 feet (192 meters), the same as its height. Each year, about a million visitors ride trams to the top of the Arch. The trams have been in operation for more than 30 years, traveling a total of 250,000 miles (402,336 kilometers) and carrying more than 25 million passengers. The Arch weighs 17,246 tons (15,645 metric tons). Nine hundred tons (816.5 metric tons) of stainless steel was used to build the Arch, more than any other project in history. The Arch was built at a cost of $13 million. The transportation system was built at a cost of $3.5 million. To ensure that the constructed legs would meet, the margin of error for failure was 1/64th of an inch (.397 millimeters). All survey work was done at night to eliminate distortion caused by the sun's rays. Since the Arch was constructed before the advent of computer technology, relatively crude instruments were used for these measurements. The Arch sways a maximum of 18 inches (45.7 centimeters) -- 9 inches or 22.86 centimeters each way – in a 150 mph (241.4 kilometers per hour) wind. The usual sway is one-half inch (12.7 millimeters). http://www.gatewayarch.com/Arch/info/arch.fact.aspx

The Akashi-Kaikyo Bridge connects Maiko in Kobe and Iwaya on Awaji Island in Japan as the longest suspension bridge in the world to date, as measured by the length of its center span – 6,532 feet (1,991 meters). The bridge has three spans supported by enormous steel cables, including two other sections that each measure 3,150 feet (960 meters). The bridge was designed with a two-hinged stiffening girder system, allowing the structure to withstand winds of 178 mph (286 kilometers per hour), earthquakes measuring up to 8.5 on the Richter scale, and harsh sea currents. The two main supporting towers are 978 feet (298 meters) above sea level, and the bridge can expand up to two meters in one day. http://en.wikipedia.org/wiki/Akashi-Kaikyo_Bridge

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Online Sources of UST & AST News and Information

Online Publications
2006 Biodiesel Handling and Use Guidelines http://www.nrel.gov/docs/fy06osti/39451.pdf

Buncefield Fire http://www.buncefieldinvestigation.gov.uk/

Energy Tomorrow, American Petroleum Institute www.energytomorrow.org

California Air Resources Board, Enhanced Vapor Recovery Phase II Advisory:
http://www.arb.ca.gov/vapor/advisories/adv359.pdf

California State Water Resources Control Board, Marina Fueling Facility Project Report
http://www.waterboards.ca.gov/ust/leak_prevention/marina/docs/mff_projectreport.pdf

California State Water Resources Control Board, Results of Secondary Containment Survey

http://www.waterboards.ca.gov/ust/leak_prevention/secondary_containment/survey.html

Fuel Oil News http://www.fueloilnews.com/

International Code Council http://www.ecodes.biz/

National Biodiesel Board Fuel Quality Policy
http://www.biodiesel.org/pdf_files/fuelfactsheets/20060621_TAB_11_Fuel_Quality_Policy.pdf

National Ethanol Vehicle Coalition E85 Compatible Products and Manufacturers List
http://www.e85fuel.com/pdf/E85_Equipment_and_manufacturers.xls

National Petroleum News http://www.npnweb.com/

The PEI Journal Online http://www.thepeijournal.org/content/1q07/index.php

Recommended Practices for Overfill Prevention for Shop-Fabricated Aboveground Tanks (PEI RP 600)
www.pei.org/RP600

Renewable Fuels Association Industry Statistics http://www.ethanolrfa.org/industry/statistics/

Steel Tank Institute Water in Fuel Tanks Research https://www.steeltank.com/LinkClick.aspx?fileticket=SmQZA0POL4E%3d&tabid=108&mid=502

TulsaLetter http://www.pei.org/TulsaLetter

Wisconsin Department of Commerce Ethanol Storage and Dispensing Conversion Policy
http://commerce.wi.gov/ERpdf/bst/ProgramLetters_PL/ER-BST-PL-EthanolConversionPolicyMemo.pdf

Associations

American Iron & Steel Institute http://www.steel.org

American Petroleum Institute http://api-ep.api.org/

American Water Works Association http://awwa.org/

Clean Diesel Fuel Alliance http://www.clean-diesel.org/index.htm

National Association of Convenience Stores http://www.nacsonline.com/NACS/News/

National Biodiesel Board http://www.biodiesel.org

National Ethanol Vehicle Coalition http://www.e85fuel.com

National Leak Prevention Association http://www.nlpa-online.org/standards.html

National Oilheat Research Alliance http://www.nora-oilheat.org

Petroleum Equipment Institute Learning Center http://learn.pei.org/home.php

Petroleum Marketers Association of America http://www.pmaa.org/

Safe Tank Alliance http://www.osha.gov/dcsp/alliances/api_nfpa/api_nfpa.html#api

Society of Independent Gasoline Marketers of America http://www.sigma.org/

Steel Plate Fabricators Association http://www.spfa.org/

Steel Tank Institute http://www.steeltank.com

Strategic Alliance for Steel Fuel Tanks
http://www.sasft.org/AM/Template.cfm?Section=Media_Center1&CONTENTID=17744&TEMPLATE=/CM/ContentDisplay.cfm

Federal Regulatory Agencies (United States)

U.S. Chemical Safety and Hazard Investigation Board, Methanol Fire Report
http://www.csb.gov/completed_investigations/docs/CSBBethuneFinalReport.pdf

U.S. Department of Energy Alternative Fuels Data Center Related Industry Links
http://www.eere.energy.gov/afdc/progs/related2.cgi?afdc||0

NEW U.S. Department of Energy Alternative Fuel Station Locator
http://afdcmap2.nrel.gov/locator/

U.S. Department of Energy E85 Fleet Toolkit Equipment Requirements and Specifications
http://www.eere.energy.gov/afdc/e85toolkit/

U.S. Department of Energy Equipment Conversions http://www.eere.energy.gov/afdc/e85toolkit/conversions.html

NEW U.S. Department of Labor, Occupational Safety & Health Administration, Storage Tanks
http://www.osha.gov/dcsp/products/topics/storagetank/index.html

U.S. Environmental Protection Agency, Laws and Regulations http://www.epa.gov/epahome/laws.htm

U.S. Environmental Protection Agency, Office of Underground Storage Tanks
http://www.epa.gov/swerust1/

U. S. Environmental Protection Agency, Office of Underground Storage Tanks, Energy Act Guidelines for Secondary Containment and Financial Responsibility http://www.epa.gov/oust/fedlaws/epact_05.htm#Final

NEW U.S. Environmental Protection Agency, Office of Underground Storage Tanks. Final Operator Training Grant Guidelines
http://www.epa.gov/oust/fedlaws/epact_05.htm#Final

U.S. Environmental Protection Agency, Office of Underground Storage Tanks, MTBE and Underground Storage Tanks
http://www.epa.gov/swerust1/mtbe/index.htm

U.S. Environmental Protection Agency, Oil Program, Spill Prevention Control and Countermeasure
http://www.epa.gov/oilspill/spcc.htm

U. S. Environmental Protection Agency, Region III, UST Inspectors Workshop
http://www.epa.gov/reg3wcmd/inspector_workshop/Compatibility.pdf

NEW U.S. Environmental Protection Agency, SPCC Interpretation of Navigable Waters
http://www.epa.gov/owow/wetlands/guidance/CWAwaters.html

State Regulatory Agencies (United States)

California Air Resources Board http://www.arb.ca.gov/homepage.htm

California Air Resources Board, Vapor Recovery Information http://www.arb.ca.gov/vapor/vapor.htm

Florida Department of Environmental Protection, Leak Autopsy and Program Data Presentation
http://www.dep.state.fl.us/waste/categories/tanks/default.htm

U.S. Environmental Protection Agency database of state UST program websites
http://www.epa.gov/swerust1/states/stateurl.htm

Regulatory Agencies (Australia)

Department of Environment and Conservation, New South Wales (new UST secondary containment requirements)
http://www.environment.nsw.gov.au/resources/upssris067.pdf

Model Codes and Testing Organizations

American National Standards Institute http://www.ansi.org

ASTM International http://www.astm.org/

International Code Council http://www.iccsafe.org/

International Code Council jurisdictions http://www.iccsafe.org/government/jurisdictionadoptions.xls

International Fire Code Institute http://www.ifci.org/

National Fire Protection Association http://www.nfpa.org/

Southwest Research Institute http://www.swri.edu/

Underwriters Laboratories http://www.ul.com/

Underwriters Laboratories Canada http://www.ulc.ca

Underwriters Laboratories Collaborative Standards Development System http://csds.ul.com/Home/Default.aspx

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Conferences and Meetings

Sept. 9 to 11, 2007
OPIS Fleet Fueling Conference & Exhibition, Dallas, Texas
http://www.opisnet.com/fleetfueling/index.html

Sept. 9 to 12, 2007
2007 APWA Congress, American Public Works Association, San Antonio, Texas
http://www.apwa.net/Events/eventdetail.asp?ID=88

Sept. 17 to 19, 2007
2007 API Fall Refining and Equipment Standards Meeting, San Antonio, Texas
http://www.api.org/meetings/topics/refining/index.cfm

Sept. 17 to 20, 2007
Pacific Oil Conference, Reno, Nev.
http://www.petroshow.com

Sept. 23 to 26, 2007
AWWA Conference & Exposition for Distribution, Engineering, and Operations Professionals, Cleveland, Ohio
http://www.awwa.org/conferences/dss/

Sept. 30 to Oct. 3, 2007
ICC Annual Conference and Education Program, Reno, Nev.
www.iccsafe.org/expo

Oct. 2, 2007
STI/SPFA Water Storage Tank Seminar, Phoenix, Arizona
http://www.steeltank.com/EducationEvents/SeminarsEvents/tabid/106/ctl/Detail/mid/501/EventID/28/Default.aspx

Oct. 3, 2007
STI/SPFA Cathodic Protection Tester Training Course, Fall Creek Falls, Ten.
http://www.steeltank.com/EducationEvents/SeminarsEvents/tabid/106/ctl/Detail/mid/501/EventID/30/Default.aspx

Oct. 9 to 11, 2007
BBI Biofuels Workshop and Trade Show Western Region, Portland, Ore.
http://www.biofuelsworkshop.com/DisplayPage.aspx?pageId=1

Oct. 10, 2007
STI/SPFA Cathodic Protection Tester Training Course, Richmond, Virginia
http://www.steeltank.com/EducationEvents/SeminarsEvents/tabid/106/ctl/Detail/mid/501/EventID/30/Default.aspx

Oct. 11, 2007
APEA 2007 Conference, Town Centre, Telford, U.K. http://www.apea.org.uk/index.cfm?objectid=2D06F6C9-11D8-A53C-B8FAC88A7AE545E5&CFID=800430&CFTOKEN=54a87e9eb7d95335-8D502FE8-11D8-A53C-B855F3C22BD02FFE

Oct. 12 to 14, 2007
SIGMA Annual Meeting, Boston, Mass.
http://www.sigma.org/meetings/index.html

Oct. 13 to 17, 2007
WEFTEC, San Diego, Calif.
http://www.weftec.org/home.htm

Oct. 15 to 16, 2007
Platts Refined Products Storage and Transportation Conference, Houston, Texas
http://www.platts.com/Events/pc738/

Oct. 15 to 17, 2007
Hart's World Refining Fuels & Conference, Washington, D.C.
http://www.hartenergyconferences.com/index.php?area=details&confID=37

Oct. 18, 2007
South Shore Clean Cities/Indiana Soybean Alliance Fuel Quality Workshop, Merrillville, Ind.
http://www.southshorecleancities.org/

Oct. 23, 2007
STI/SPFA Water Storage Tank Seminar, Seattle, Washington
http://www.steeltank.com/EducationEvents/SeminarsEvents/tabid/106/ctl/Detail/mid/501/EventID/28/Default.aspx

Oct. 29 to 30, 2007
STI/SPFA Pressure Vessel Conference, Houston, Texas
http://www.steeltank.com/EducationEvents/SeminarsEvents/tabid/106/Default.aspx

Oct. 29 - Nov 2, 2007
STI/SPFA SP001 Aboveground Storage Tank Inspection Training Course, Anchorage, AK
http://www.steeltank.com/EducationEvents/SeminarsEvents/tabid/106/ctl/Detail/mid/501/EventID/29/Default.aspx

Nov. 5 to 6, 2007
National Institute of Storage Tank Management, UST Conference, Atlanta, Ga.
http://www.nistm.org/USTov.html

Nov. 5 to 7, 2007

International Congress on Biodiesel, The Science and the Technologies, AOCS, Vienna, Austria
http://www.aocs.org/meetings/biodiesel/

Nov. 6 to 8, 2007
Stainless Steel World 2007, Maastricht, the Netherlands
http://www.stainless-steel-world.net/ssw2007main/ShowPage.aspx?pageID=662

Nov. 7 to 9, 2007
2007 PEI Convention at the NACS Show, Atlanta, Ga.
http://www.peinet.org/show/

Nov. 13 to 16, 2007
American Petroleum Institute Storage Tank Conference, Albuquerque, N.M.
http://www.api.org/meetings/topics/tanks/index.cfm

Nov. 15 to 16, 2007
Clean Gulf 2007: Focused on Solutions Conference and Exhibition, Tampa, Fla.
http://www.cleangulf.org/

Nov. 28 to 30, 2007
BBI Biofuels Workshop and Trade Show Eastern Region, Philadelphia, Pa.
http://www.biofuelsworkshop.com/DisplayPage.aspx?pageId=1

Dec. 11 to 13, 2007
2007 Power-Gen International Conference, New Orleans, La.
http://pgi06.events.pennnet.com/fl/content.cfm?NavId=4681&Language=Engl

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