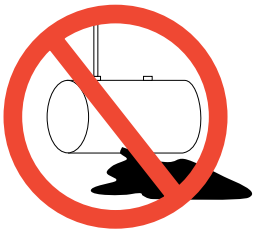
New England Interstate Water Pollution Control Commission

**Boott Mills South
100 Foot of John Street
Lowell, Massachusetts
01852-1124**

**Bulletin 39
November
2001**

L.U.S.T.LINE



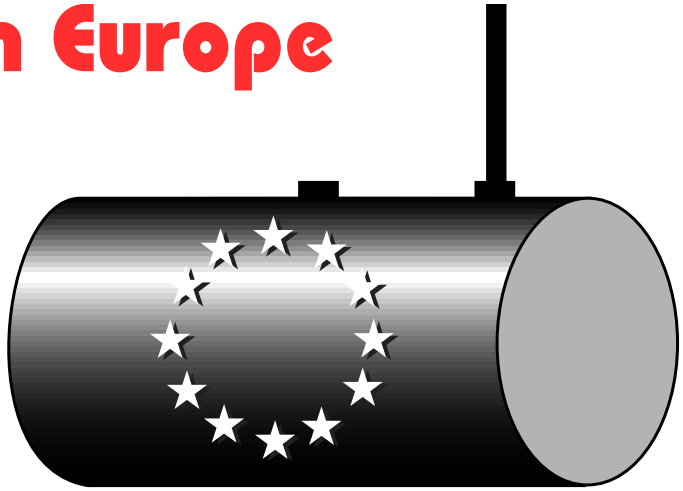
A Report On Federal & State Programs To Control Leaking Underground Storage Tanks

USTs—A View from Europe

by Jamie Thompson

For some 60 years, fuel storage systems remained virtually unchanged. During those years, the oil industry made vast progress aboveground in modernizing their retail gasoline sites. But below ground, where the fuel storage system is buried, it was quite another story. In Europe, we estimate that a mere 5 to 7 percent of the total development cost of a gasoline station was spent on underground tanks and pipes—"out of sight, out of mind." More recently, however, spurred on by regulators and public opinion, the oil industry has recognised the need to safeguard the environment.

In the 1980s it appeared that the UST situation in the U.S. was far worse than in Europe—U.S. standards of construction and installation were such that leaks were relatively common. Federal UST legislation and the resulting regulations enabled manufacturers to provide some unique solutions to the industry, some of which we were also able to consider in Europe. We found ourselves "cherry picking" the best solutions from the U.S., using them along with some of the tried and tested systems developed in Europe.



The European Union

In the late 1980s, many of us in the U.K. were taking our first tentative steps into Europe. Although we had some knowledge of what was going on in the U.S., we knew far less of what was happening right on our doorstep. The fact that each country in Europe had completely different standards of installation came as a surprise to some of us. Others in the industry who'd been trying to build the same filling station design across national boundaries had suffered with this issue for many years.

Perhaps the most important unifying catalyst in the early 1990s was the issuing of a number of Directives (the same as federal law in the U.S.) from the European Union (EU). In addition, there was the formation of Central European Norm (CEN), the largest regional standards body in the world, which was given the task of developing standards for the effective international operation of the industrial and service sectors, breaking down trade barriers, and stimulating competitiveness in the largest emerging trading block in the world—Europe.

In addition to this harmonization of standards, the industry itself was also changing. Oil companies were becoming more European (rather than national) in their outlook. Many began forming European operations in which common standards of construction, purchasing, and operations were to help in the harmonization process.

■ *continued on page 2*

Inside

■ USTs—A View from Europe

from page 1

In my opinion, Germany had one of the more advanced systems as far as tank standards were concerned. They have required double-walled steel tanks with proactive leak detection since 1968, although they later inherited many single-walled installations in the East following reunification.

Reflecting on Change

No matter how odd some might appear, each of the varying standards and methods of construction and installation of tanks and pipes among European countries had been developed for a seemingly good reason…or other. One such oddity was the U.K.'s insistence that all underground tanks and pipes be surrounded by concrete. Research now confirms that although the concrete surround did delay corrosion, it was only a delay, and eventually the tanks and steel pipes leaked.

As in the U.S., galvanized pipe used to be standard. These pipes acted as a sacrificial anode to the unprotected steel tanks. Hence, leaking pipe work systems were the norm. It was not until the late 1980s that regulators and industry started to look seriously at the problems we were creating and asked the reasons for such specifications.

No doubt, the largest influence for change and the uniting of construction methods across the 19 EU countries involved in CEN has been the development of common European standards for gas station equipment. This work started 10 years ago and is now coming to fruition.

No doubt, the largest influence for change and the uniting of construction methods across the 19 EU countries involved in CEN has been the development of common European standards for gas station equipment.

There is now a European standard on underground gasoline tanks, both fiberglass reinforced plastic (FRP) and steel. Equipment standards are being written on overfill prevention devices, dispensers, fuelling nozzles, leak detection equipment, submersible pumps, tank gauges, oil separators and underground pipe work. All of these, when completed, will replace all the national standards.

U.S.A. Versus Europe

I'll discuss the European experience with UST systems in a future issue of *LUSTLine*. In fact, if you have any questions that you'd like me to address, please send them on, and I'll include them in my discussion. For now, to whet your interest, I'll provide a brief comparison between European and U.S. UST systems.

■ Tanks

The development of European standards for both FRP and steel USTs effectively provided a choice for the industry. It is a fact, however, that FRP tanks, though widely used in the U.S. without much problem, have not succeeded in Europe. In the U.K., 2,000 FRP tanks were installed over a 15-year period. Now, no major oil company or user is installing these tanks. I can give no reason as to why the technology has not transferred across the Atlantic, as the manufacturers made tanks under licence from U.S. manufacturers.

The preferred UST is a double-walled steel tank that has dished ends, unlike the flat-ends standard on U.S. counterparts. These tanks have a corrosion-protective coating that is applied to the outside, and they are installed with a backfill of gravel or sand. Leak detection in double-walled tanks is accomplished by filling the interstitial space with liquid and monitoring the level of this liquid over time or by establishing a pressure or vacuum in the interstitial space and watching to see whether the pressure or vacuum can be maintained over time.

These types of leak detection systems have the advantage of monitoring both walls of the tank rather than just the inner wall, as is often the case in the U.S. I am not aware of any incident where a leak from such a storage tank has found its way into the environment, and this technology has been in use for over 30 years in parts of Europe.

One area where the U.S. is more advanced is the development of aboveground storage tank technology. At present, the demand for such tanks in Europe is quite small, but I do envisage a growth in this market, and no doubt the technology will be imported from the U.S.

■ Pipe Work

With the exception of Germany, underground steel pipe work is no longer used in Europe. German officials appear to have an aversion to anything plastic, but they will be compelled to look at the alternatives once the standard on underground pipe work is completed.

The use of FRP pipe was popular 15 years ago as the alternative to steel. This was followed by the import of U.S.-produced flexible piping systems, some more successful than others. The first flexible piping systems coming out of Europe were a

LUSTLine

Ellen Frye, *Editor*
Ricki Pappo, *Layout*
Marcel Moreau, *Technical Advisor*
Patricia Ellis, Ph.D., *Technical Advisor*
Ronald Poltak, *NEIWPCC Executive Director*
Lynn DePont, *EPA Project Officer*

LUSTLine is a product of the New England Interstate Water Pollution Control Commission (NEIWPCC). It is produced through a cooperative agreement (#CT825782-01-0) between NEIWPCC and the U.S. Environmental Protection Agency.

LUSTLine is issued as a communication service for the Subtitle I RCRA Hazardous & Solid Waste Amendments rule promulgation process.

LUSTLine is produced to promote information exchange on UST/LUST issues. The opinions and information stated herein are those of the authors and do not necessarily reflect the opinions of NEIWPCC.

NEIWPCC was established by an Act of Congress in 1947 and remains the oldest agency in the Northeast United States concerned with coordination of the multimedia environmental activities of the states of Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont.

NEIWPCC
Boott Mills South, 100 Foot of John Street
Lowell, MA 01852-1124
Telephone: (978) 323-7929
Fax: (978) 323-7919
lustline@neiwpcc.org

LUSTLine is printed on Recycled Paper

polyethylene type with fuel-resistant linings. At present, European industry has found these to be the most cost-effective way of meeting their own requirements and those of the environment and safety agencies. I believe that these pipe types will be seen in the U.S. market in the future; they have proven to be robust and liquid-tight over a 20-year period.

■ Dispensing Systems

The most significant difference between the U.S. and European UST technologies is that the U.S. almost exclusively uses pressurized pumping systems, whereas in Europe the vast majority of fuel dispensing is accomplished with suction systems.

The suction system is seen in Europe as a better safeguard against product loss into the environment. If a breach appears in a pipe, and the nonreturn valve is positioned under the dispenser, then the dispenser will fail to work and the product will drain back to the tank.

When first used in Europe some decades ago, the pressure system was not well understood, and some large product releases caused their popularity to drop. In 1987, a site in Denmark with pressurized piping systems leaked, resulting in an explosion that killed the manager and injured eight customers. Earlier this year, a pressurized system in Spain pumped 200,000 liters into the ground as a result of poor installation.

There is, however, a trend by some of the major oil companies to move in the direction of pressure systems. These systems are more popular in some European countries than others. The use of double-walled piping is the norm for pressurized systems, while suction systems may still use single-walled piping.

■ Drainage

In Europe, drainage requirements for gas stations have been in force for many years. All sites must provide drainage, and all areas such as the refueling area and the road tanker delivery stand must be effectively drained to a separator. These separators must be sized to accept a 7,600-liter spill. An independent test house, in accordance with the European Standard, must test the efficiency of operation of the separator. These separators must be cleaned regularly to ensure that no pollution enters the sewer or water systems. In some European countries the use of gasoline-resistant paving systems are an additional requirement.

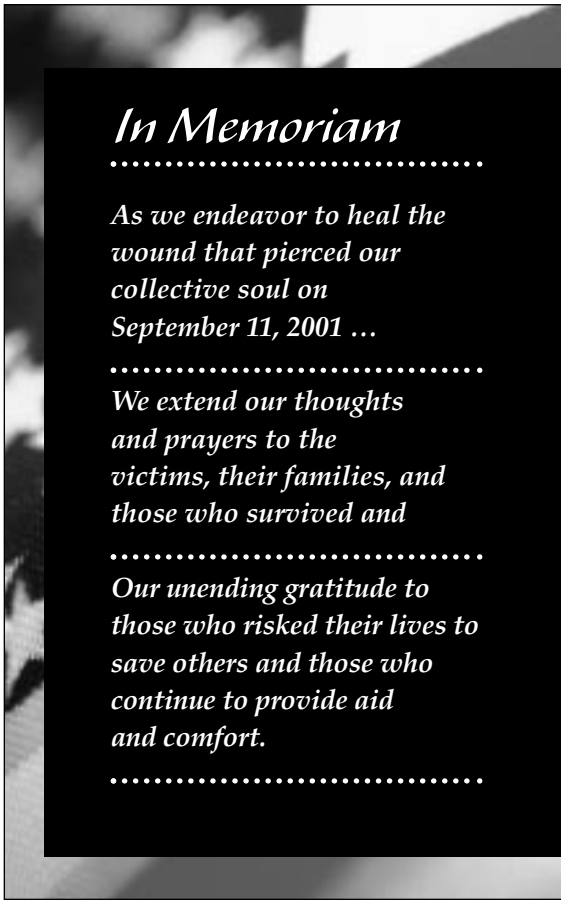
The Future?

In most developed countries, the number of gasoline stations has been shrinking. Within the U.K., for example, there were 50,000 gas stations in the 1950s. By 2000 that number had fallen to 13,043. This reduction is also reflected across Europe.

I believe the trend will be toward larger, more efficient sites where the investment in the underground facilities can be better justified. We are still left with concerns about the operation of the site. From the information I have learned, both across Europe and the U.S., this is frequently where we share the common problem of people not understanding the facility for which they are responsible.

One thing for sure, the world is much smaller and the exchange of information provides us all with the opportunity to examine alternatives so that we can try to make petroleum storage and dispensing as safe as possible.

For more information about the CEN standards, go to www.cenorm.be. *The Web site does not allow you to view the standards, but it shows what is standardized, what work is in progress, and how the standards can be purchased.* ■



CEN PARTICIPATING COUNTRIES

Jamie Thompson was the Principal Petroleum Inspector for the London Fire Brigade from 1961 to 1999. He is now a consultant to the petroleum industry. He has been involved in writing the European Guidance on Petrol Filling Station Installations. *He sits on various British standards committees and European technical committees, and is chairman of a number of European Standards (CEN) committees that are writing standards for Europe on equipment to be used at petrol stations. Jamie can be reached at* **jamiethompson@msn.com**