Got Integrity?

Impacts of the Proposed Integrity Testing Requirements for Underground Petroleum Storage Tank System Double-walled Piping

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INTRODUCTION

On November 18, 2011, the United States Environmental Protection Agency (EPA) published proposed rules (EPA, 2011) to amend 40 CFR 280, the Federal underground petroleum storage tank system regulations. A seemingly minor component of those changes can be found in §280.36, Periodic Testing of Secondary Containment. §280.36(2) of the proposed revisions to this sub-section, is the requirement for periodic integrity testing of the interstitial space of double-walled underground piping systems. Piping systems that are continuously monitored with either pressure, vacuum or liquid filled interstice will not be subject to these requirements. However; this leaves over 110,000 piping systems that will be required to perform integrity testing every three years (EPA, 2009). Many of these piping systems are existing systems that perform leak detection by continuously monitoring the interstitial space of double-walled piping with the use of sensors in the lowest portion of the piping containment, the piping-sumps. In section IV*(4) Secondary Containment Tests*, of the Proposed Revisions to the Requirements for Owners and Operators of Underground Storage Tanks, EPA stated, "For example, owners and operators who choose to use sensors in containment sumps for piping interstitial monitoring must also perform three-year interstitial integrity tests of the piping interstitial space.". Many tank owners are not choosing this method of leak detection now, but did as a proactive measure, before secondary containment was a requirement. Double-walled piping systems were not required for tank systems subject to the 1988 federal regulations, but systems of this type were installed, by pro-active tank owners, in response to the 1998 deadline of the original version of 40 CFR 280, promulgated in 1988. Because these systems were not designed or manufactured with the intention of testing, there will be many thousands of systems that will not easily be tested, or tested at all, in a manner that will be in compliance with the proposed regulation. If the proposed regulations are promulgated, tank owners will then need to determine how they will meet the regulations and if they will need to replace their existing secondary containment piping systems, that may be tight, with systems that can be tested. Or will be required to replace their double-walled piping systems with systems that are not required to be tested.

BACKGROUND

As early as the 1970's, double-walled piping systems were used by owners of chemical storage tank systems as a means to prevent leaks from getting into groundwater supply. And without a

means to detect leaks, the additional protection provided by a double-walled system is compromised (Foszcz, 2005). Venture Engineering & Construction (Venture) defined a containment failure of a pipeline system as "… the loss of product containment integrity, that is product loss to the environment. Hence a breach of either the inner or outer wall of a double wall pipe is considered as a functional failure, provided the other pipe retains its integrity or containment." Venture also stated that a leak of any size in a single walled pipe will release product into the environment, and that the advantages of double-walled pipe are that the interstitial space offers containment and it can be monitored for leaks, and that double-walled piping systems "… offer moderate-to-significant operating advantages over single wall pipelines because of the ability for secondary containment of hydrocarbon in the event of an inner pipe failure." (Minoit, unk.).

In 1984, Congress added Subtitle I to the Solid Waste Disposal Act, to further strengthen the Conservation and Recovery Act (RCRA) of 1976. Subtitle I required the EPA to protect the environment and human health from underground storage tank (UST) releases by developing a comprehensive regulatory program for USTs storing petroleum, and other hazardous materials. On September 23, 1988, by the authority provided in: Title 42, The Public Health and Welfare; Chapter 82, Solid Waste Disposal; Sub-chapter IX, Regulations for Underground Storage Tanks; the EPA finalized the 1987 proposed regulations for USTs (United States, 1988). 40 CFR 280 finalized these rules, and set a deadline of December 22, 1998, for mandatory upgrading or replacement of UST systems that did not meet minimum construction and installation standards. In 2005, the Energy Policy Act further amended Subtitle I, to include provisions for tank operations training, inspections, delivery prohibitions, secondary containment, and financial responsibility, etc. (United States Congress, 2005).

The 1988 regulations were focused on tank owners having systems that met installation and material standards for corrosion resistance, spill and overfill prevention, and leak detection. On November 18, 2011 the EPA stated that "Today's proposed revisions to the 1988 UST regulations focus on ensuring equipment is working, rather than requiring UST owners and operators to replace or upgrade equipment that is already in place." (EPA, 2011).

When the UST regulations were first promulgated in 1988, the EPA confirmed 8078 tank releases (EPA, 1988). In 1990, after just two years of tank owners removing non-compliant tank

systems, the EPA documented 95,514 confirmed tank system releases (EPA, 1990). Per EPA, "Since the beginning of the UST program, preventing petroleum and hazardous substance releases from UST systems into the environment has been one of the primary goals of the program. Although EPA and our partners have made significant progress in reducing the number of new releases, approximately 7,000 releases are discovered each year as of FY 2009." (EPA, 2009). Even with the drastic reductions from the beginning of the UST program to the present, with only 5998 confirmed releases for the end EPA's 2011 fiscal year (EPA, 2012), the EPA points to a lack of proper operation and maintenance of UST systems as the main cause of new releases, and that, among other sources, releases from piping has emerged as one of the more common problems. The EPA has not significantly changed 40 CFR 280 since 1988 (Renkes, 2012 PEI), but with more than 20 years of experience with UST requirements, the EPA has concluded that using improved equipment, combined with operating and maintaining that equipment, is necessary to protect human health and the environment. One of the justifications of the proposed regulations is that many existing UST systems were upgraded to meet the 1988 UST regulations, and that it is vital to ensure that these systems are still working as intended; through improved operation, maintenance and testing. Additionally, a study conducted in 1999 by the California State Water Resources Control Board (SWRCB) concluded that properly maintained double walled or secondarily contained systems are less likely to release into the environment (Camille et.al., 1999).

Per EPA, California has been the only state that has been implementing regulations with rules that are similar to the proposed federal regulations, long enough to provide input on their effectiveness (EPA, 2011). In addition to experience, the California Environmental Protection Agency has promulgated their regulations based on the findings of several studies funded by the State. These studies were intended to determine if other components of the tank systems were functional and adequately protecting the environment, but also determined that secondary containment systems had breaches in their integrity that would have been identified if they were being properly monitored or maintained. One such study investigated the effectiveness of upgraded USTs in controlling the release of Methyl tertiary Butyl Ether (MTBE) from gasoline USTs. MTBE is a compound almost exclusively found in gasoline, and is used to oxygenate the fuel (EPA, 2012). The 1999 study, observed that some of the apparent causes of MTBE releases

were poor maintenance and poor facility operational practices (SWRCB, 1999). This study concluded that these releases could possibly have been avoided if secondary containment testing were required. Another study, published in August 2002, surveyed 124 UST facilities to determine the effectiveness of underground tank and piping systems (Young, 2002). This study was more specifically conducted to investigate the leak detection system's sensors located in tank and piping systems, to determine if they were effective at finding breaches in secondary containment. The findings of this study were that problems with the performance of secondary containment were more common than the problems found with the sensors themselves. Of the total number of systems investigated, 12% and 31% of the leak sensors and secondary containment were found to have problems, respectively. Poor design, construction, and maintenance of secondary containment systems were cited as issues. This prompted the first recommendation of this study to include periodic inspection and functionality testing of secondary containment systems. It is apparent that these studies have contributed to California's existing regulatory requirement for piping secondary containment testing.

California's Legislature enacted Health and Safety Code (HSC) Chapter 6.7 in 1984, creating a regulatory program for USTs storing hazardous substances. In August 1984, the SWRCB proposed storage tank regulations that were made effective on August 13, 1985. The promulgated regulation added subchapter 16 to Title 23 of the California Code of Regulations. Section 23 CA ADC § 2620 imposed regulations that were similar to, but preceded the Federal UST regulations of 1988 (Renkes, 2012). On February 21, 2007, the SWRCB proposed amended UST regulations that went into effect on December 18, 2007. Similar to the California State and Federal regulations that went into effect in the late 1980's, the 2011 proposed Federal UST regulations appear to contain proposed regulations that are based on California's regulatory precedent, and an EPA report has stated that most states have passed requirements that go far beyond the original federal regulation (Industrial Economics, 2011). After the EPA's proposed regulations became available to the public in November 2011, the Petroleum Equipment Institute stated that, "It was time for the federal government to catch up." (Renkes, 2012).

One of the requirements of California regulation 23 CCR 16 §2367(a) is that secondary containment systems installed on or after January 1, 2001 shall be tested every 36 months for integrity. §2367 (b) went on to require that by July 1, 2005, the owner or operator of any

secondary containment that cannot be tested shall be replaced with a system that can be tested, or be replaced with a system that is continuously monitored hydrostatically or with vacuum or pressure. It appears from the EPA's proposed changes to 40 CFR 280.36 that they also intend to hold tank owners and operators to integrity testing that meets the same requirements. EPA stated, in the proposed regulations, that it does not propose the replacement of piping systems, but there are many double walled piping systems that were installed in compliance with the 1988 regulations that cannot be tested in a manner to meet these rules. With the promulgation of these rules, the EPA will force tank owners to replace double-walled piping systems with systems that either meet the three criteria that are not subject to testing, or will have to meet the integrity testing requirement.

POTENTIAL IMPACTS OF THIS RULE

Before publishing the proposed UST regulation amendments, the EPA conducted an assessment of the cost and benefits of the proposed changes (Industrial Economics, 2011). This study further reinforced the responsibility of the EPA to protect the environment and human health from UST releases by developing a comprehensive regulatory program for UST systems, and that releases from piping have emerged as more common problems that have contributed to the EPA proposing integrity testing requirements. This cost assessment concluded that the national compliance costs for the proposed regulations are estimated at $210 million per year, and that the avoided costs associated with the remediation of releases is estimated to be between $300 million and $700 million. In addition, the EPA estimated the proposed rule could potentially protect 110 billion to 350 billion gallons of groundwater each year, and could result in a potential savings of an estimated $1000 to $5000 per year in avoided cancer risks associated with Benzene contaminated groundwater. In its response to the proposed regulations, the Colorado Division of Oil and Public Safety stated that they agree with the EPA's decision to require integrity testing and that they felt that the costs of compliance will be minimal in comparison with the cleanup of a release (Albuquerque, 2012), and the Bureau of Land and Waste Management, of the South Carolina Department of Health and Environmental Control, stated that they feel this integrity testing will prevent small releases from going undetected for long periods of time, resulting in larger cleanups (Neel, 2012).

The EPA's Semi-Annual Report of UST Performance Measures (EPA, 2011) reported a universe of 611,449 active UST systems. Of the total universe of active USTs, this study estimated that approximately 17.5% are secondary containment systems that use interstitial monitoring methods that would require three-year integrity testing of the tank and piping secondary containment. Of this number, 90% of the piping systems that use interstitial monitoring, for leak detection, will be subject to this testing requirement. The study estimates that annual costs for this testing will be $310.25, per integrity test, which is in stark contrast to the estimates provided by tank owners, in their comments to the EPA's proposed rules. The New York State Association of Service Stations & Repair Shops' (NYSASSRS) immediate response is,""are you kidding"" (Bombardiere, 2012). They, and the Petroleum Marketers of America (Morgan, 2012) indicated that the actual costs of interstitial integrity testing will depend on unknown testing parameters, and that the EPA nor the states have a way to estimate regulatory costs for compliance with a non-existent testing standard (Bombardiere, 2012). The Washington, Maryland, Delaware Service Station and Automotive Repair Association and the Service Station Dealers of America and Allied Trades commented to the EPA that they see that the EPA's costs estimates could be off as much as 400% for Maryland dealers and as much as 600% in other states (McCauley, 2012).The Metropolitan Transportation Authority estimates that the testing will likely cost more than twice what the EPA has published. They also stated that, to be in compliance with this requirement, their organization would need to spend over $330,000 for testing, in addition to adding an employee to oversee the testing of their 262 USTs (Jenkins, 2012).In addition to the direct costs of testing, the NYSASSRS and the Louisiana Oil Marketers and Convenience Store Association (LOMCSA) identified that assessing the integrity of piping sumps (part of the piping secondary containment) will also needlessly generate waste water (Bombardiere, 2012 and Isaacks, 2012). LOMSCA and the Petroleum Marketers Association of America estimate that hydrostatic "lake" testing will generate over 2,000 gallons of water per test, at a typical four tank and dispenser facility (Isaacks, 2012 and Morgan, 2012). Based on this 500 gallon per tank system average, utilizing this method to test all applicable double-walled piping systems, would generate over 4.8 million gallons of waste water to be properly transported and disposed of. The American Petroleum Institute, the Tennessee Department of Environment and Conservation, and the Utah Department of Environmental Quality have stated that the EPA needs to consider the

appropriate balance between integrity testing and the cost burden to the tank owner. (Searles, 2012; Bradley, 2012; and Everett, 2012).

In their comments to the EPA, Valero Retail Holdings and the Environmental, Health & Safety Communications Panel (EHSCP) stated that requiring integrity testing of existing double-walled piping secondary containment is punitive and would penalize tank owners who voluntarily installed secondary containment before EPA's proposal, by placing a "significant financial burden" on these system owners (Willrodt, 2012 and Bond, 2012). The Federal Recycling and Remediation Coalition (FRRC) and the Fuel Merchants Association of New Jersey further stated that adoption of this requirement will be a disincentive for tank owners who have not already implemented double-walled piping, to do so. They feel that this will be due to the initial costs of retrofitting their systems, as well as the costs for routine testing that is not required of single-walled piping systems (Bodine, 2012 and Donohue, 2012). EHSCP and the Virginia Department of Environmental Quality, as well as other agencies and tank owners, have proposed alternate language that would only apply this proposed regulation to new or replaced UST piping systems using leak detection sensors in containment sumps for piping interstitial monitoring (Bodine, 2012; Bombardiere, 2012; Bond, 2012; Celeste, 2012; Chamlee, 2012; Donohue, 2012; Hansen, 2012; Isaacks, 2012; Leff, 2012; McCauley, 2012; Rothenstein, 2012; Saunders, 2012; Steers, 2012). Or if this is not acceptable to the, the EHSCP has suggested that the EPA propose an implementation period of 10 years; to be consistent with the implementation period allowed in the 1988 UST regulations, for system upgrades and replacements.

However; the costs identified above generally focus on additional testing and inspection of existing equipment, and do not reflect large-scale investments in equipment, which will be required for replacing piping system that is not capable of being tested per the proposed regulation (Bond, 2012; Rothenstein, 2012; Steers, 2012). Per EPA's 2011 cost assessment, motor-fuel retailers, who own roughly 80% of the UST systems and have annual petroleum throughputs in the tens to hundreds of thousands of gallons per year, are expected to bear approximately 70% of the costs of these rules. The motor-fuel retailers can dilute the cost impacts of these regulations, and pass them on to their customers, as a minor percentage increase to each gallon sold. The other 20% of tank owners; hospitals, manufacturers, transportation

services, and utilities; consume their petroleum stores themselves, and therefore have little throughput, or the luxury of diluting and passing the compliance costs on to their customers.

Tank owners, including gas-stations and petroleum marketers that can directly pass these costs on to consumers, must also be able to remain competitive. The organizations representing these businesses feel that the costs of the EPA's proposed regulations are unfair to the American people that simply cannot afford another burdensome cost to operate their businesses. On February 3, 2011, President Barack Obama issued Executive Order 13563, in which he stated, "Our regulatory system must protect public health, welfare, safety, and our environment while promoting economic growth, innovation, competitiveness, and job creation. It must be based on the best available science. It must allow for public participation and an open exchange of ideas. It must promote predictability and reduce uncertainty. It must identify and use the best, most innovative, and least burdensome tools for achieving regulatory ends. It must take into account benefits and costs, both quantitative and qualitative". The FRRC (Bodine, 2012), the Michigan Manufacturer's Association (Such, 2012), and the Mississippi Petroleum Marketers & Convenience Stores Association (Chamblee, 2012) disagree that the EPA has adopted the culture that the President has established in the Executive Order, and have recommended that the EPA stop following the states and pull back this regulation and create a one that all can embrace. They feel that the EPA should convene a larger stakeholder group, with a global perspective and attempt to lead the states out of an old-style regulatory scheme by providing examples of smart regulation that will help America again become a competitive place for manufacturing in the 21st century. "This stakeholder group should work on new, innovative, regulatory schemes for UST management that will help reduce costs while ensuring appropriate environmental protection."(Such, 2012).

The Maryland Department of the Environment Oil Control Program commented to the EPA that, "…significant efforts have been made at the state level to pass regulations required by the Energy Policy Act grant guidelines, which should not be unintentionally undone by the final rule." (Ralston, 2012) In addition, the Tennessee State Department of Environmental Conservation, Division of USTs (TSDEC) has expressed their opposition to the proposed

requirement for double-walled piping integrity testing. They indicated that their State regulations require continuous monitoring with the presence of sensors in every area of interstice where product could leak and accumulate, and that this provides adequate leak detection. TSDEC argued that the EPA should accept continuous electronic sensors as continuous monitoring in the new regulations, and that testing is not warranted if operating as designed. They also argued that it would be unfair to impose a more stringent rule just 5 years after the EPA approved Tennessee's tank regulation modifications, that were updated to meet their interpretation of the 2005 Energy Policy Act. They went on to state that, *"Not only is secondary containment testing difficult and costly to do, it presents significant costs to the tank owner to repair or replace if components do not pass the test."* (Bradley, 2012). The Virginia Department of Environmental Quality, Tennessee State Department of Storage Tanks , Louisiana Department of Environmental Quality, Sunoco, Inc., and others, echoed these sentiments and indicated that this would place an added burden on tank owners who proactively installed piping with secondary containment and continuous interstitial monitoring on their system prior to the 2005 Energy Policy Act (Bombardiere, 2012; Bond, 2012; Bradley, 2012; Celeste, 2012; Donohue, 2012; Isaacks, 2012; Jones, 2012; Nolan, 2012; Saunders, 2012; Steers, 2012).

The New York State Department of Environmental Conservation stated, in their comments to the EPA, that the EPA should not require tests if the test requires significant modification to the existing system (Leff, 2012). There were several tank owners and agencies that also suggested that testing existing tank systems could not only void manufacturer's warranties (Bombardiere, 2012), but could damage the integrity of existing, tight, piping systems by utilizing test methods which apply vacuum or pressure at levels above those in which the systems were designed to withstand (Bombardiere, 2012; Donohue, 2012; Eighmey, 2012; Ness, 2012; Rothenstein, 2012; Saunders, 2012). The Florida Department of Environmental Protection recognized the risk of damaging existing equipment, and suggested that the EPA extend the test frequency to 5 years (Burns, 2012).And Hess Corporation pointed out that damage to tight piping systems, caused by tightness testing, will decrease rather than enhance protection to the environment (Rothenstein, 2012).

In their December 2011 publication *L.U.S.T. Line*, the National Work Group on Leak Detection (NWGLD) stated that there were no acceptable protocols for evaluating secondary containment test methods, and that protocols would not likely be written until the majority of states require testing with a nationally recognized performance standard (NWGLDE, 2011). In April 2012 the NWGLD further reinforced their message within their comments to the EPA's proposed regulations, stating that, "The shortcoming of the proposal is that it does not set specific performance standards for tightness tests." (Johnson, 2012). However; if the EPA rules are promulgated as they are proposed, piping secondary containment testing would become a national requirement. The New Hampshire Department of Environmental Services interpreted this as a call to action for the EPA (Juranty, 2012), citing the NWGLD's December 2011 *L.U.S.T. Line* article, and stating that it is incumbent on the EPA to seize this opportunity to set standards. In his comment to the EPA's proposed regulations, the North Dakota Department of Health, Underground Storage Tank Program Manager stated the lack of standards as one of his reasons for opposing that interstitial integrity testing are included in the new regulations (Ness, 2012), and the Louisiana Department of Environmental Quality suggested that the EPA evaluate several years of UST system release source/cause data to evaluate the effectiveness of the 2005 Energy Policy Act requirements, prior to requiring this testing provision; and the New England Interstate Water Pollution Control Commission further stated that if the EPA does not mandate standards of testing, the tank owners and operators could utilize any test method that would allow their system to pass (Poltak, 2012).

Ed Kubinsky of Crompco, LLC, a recognized leader in the field of testing tank and piping systems for integrity (Long, 2012), has lead a committee within the Petroleum Equipment Institute (PEI), which developed draft PEI/RP1200**,** *Recommended Practices for the Testing and Verification of Spill, Overfill, Leak Detection and Secondary Containment Equipment at UST Facilities* . Upon finalization and acceptance of this practice, this document will likely become an industry standard for testing double walled piping secondary containment. In an interview with Mr. Kubinsky (March 27, 2012), he agreed that there are double walled piping system that have been designed and installed in a manner that may have integrity, but would not easily be tested with existing piping secondary containment testing methods. And, at this time, there are no nationally recognized test methods available to test secondary containment on all types of existing double walled piping systems. Among others, the following agencies and organizations

have echoed this sentiment, and commented that the EPA should not impose a regulation without also providing a standard by which viable testing results can be achieved: American Petroleum Institute (Searles, 2012), Missouri Petroleum Storage Tank Insurance Fund (Eighmey, 2012), New York State Association of Service Stations and Repair Shops, Inc. (Bombardiere, 2012), Petroleum Marketers Association of America (Morgan, 2012), Tennessee Department of Environmental Conservation, Division of USTs (Bradley, 2012), Oncor Electric Delivery Company (Boyle, 2012), Utah Petroleum Marketers and Retailers Association (Hansen, 2012), New York City (Saunders, 2012), Fuel Merchants Association of New Jersey (Donohue, 2012), Michigan Manufacturer's Association (Such, 2012), State of Idaho Department of Environmental Quality (Lowder, 2012), Hess Corporation (Rothenstein, 2012), and the Louisiana Oil Marketers and Convenient Stores Association (Isaacks, 2012).

CONCLUSIONS

The USEPA has published proposed amendments to 40 CFR 280, the underground storage tank regulations. The promulgation of the EPA's proposed regulation, 40 CFR §280.36, will create regulations that require periodic integrity testing of double-walled underground piping systems, that are not continually monitored by vacuum, pressure or hydrostatic methods. The finalization of these regulations will have financial and operational impacts to tank owners that are currently operating double-walled underground piping systems that were not designed or installed to be integrity tested.

In an effort to ensure compliance with potential regulations impacting their petroleum storage systems, tank owners will need to be aware of this regulation and the impacts it could have on their specific systems. From the information found in the public responses to the proposed regulations, it appears that some tank owners and regulators have reservations whether this regulation is warranted, or not. As of the time this paper was written, the EPA has not responded to these comments, nor promulgated these rules. However, the EPA may determine that promulgating this rule is in the best interest of protecting the health of the public and the environment. Also, if the EPA decides to rescind their proposed changes to §280.36, there may be states that decide to adopt their own regulations with similar requirements. For example,

DEM-OWM-UST08-07 section 8.09 (A), of the Rhode Island underground petroleum storage regulations requires integrity testing of 20 year-old double-walled underground piping, with re-testing every two years thereafter. With this in mind, it is recommended that tank owners correspond with their respective state regulators and law-makers to ensure that their wishes are heard, with regard to similar regulations. This would also allow the tank owners an opportunity to speak with their regulators to ensure that they have a complete understanding of all regulations applicable to their UST systems.

To be prepared for upcoming regulatory changes, tank owners should review each of their underground piping systems to determine how the proposed regulation will impact regulatory compliance. A plan for compliance should be developed that includes contacting integrity testing firms that could potentially assist them with compliance (if available), or the development of strategies and budgets for replacing piping that cannot meet the integrity testing requirements applicable to their systems. A plan of this type will allow the tank owners to be prepared, in the event that they are subject to these rules, and will give them the opportunity to schedule with testing or mechanical contractors, before other tank owners begin scheduling their own projects. Poor planning could create a potential for missed compliance deadlines.

Regardless of how an underground tank and piping system will, or will not, meet new regulations, tank owners can rest assured that there are changes on the horizon and they need to be prepared.

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