

L.U.S.T. LINE



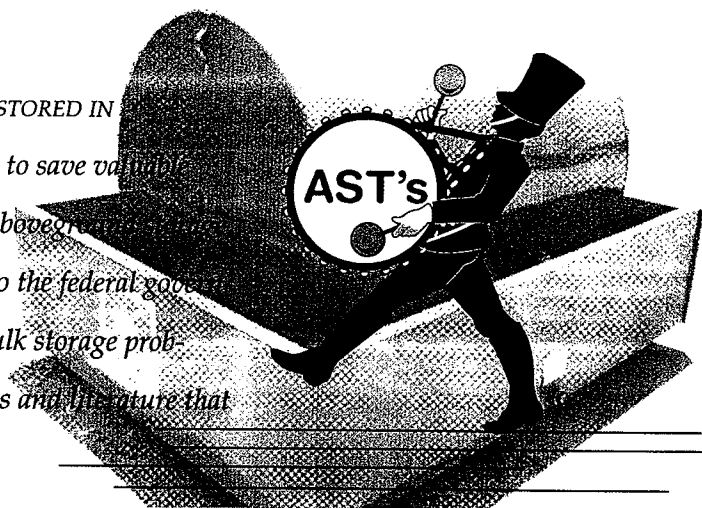
A Report on Federal & State Programs To Control Leaking Underground Storage Tanks

ASTs...The **Hot** Alternative to USTs

Reflections on Some Burning Issues Associated with Aboveground Storage Systems

by W. David McCaskill

HISTORICALLY, PETROLEUM PRODUCTS HAVE BEEN STORED IN underground tanks to diminish the fire risk and to save valuable space. Today, however, many USTs are being replaced by aboveground storage tanks (ASTs). From mom & pop gas stations to industry to the federal government, tank owners are eyeing ASTs as a solution to their bulk storage problems. Trade periodicals are rife with colored glossy AST ads and literature that promise answers to everyone's bulk storage needs.



It's no great secret why many facility owners are looking to make the switch. The reasons include decreased liability (trading potential environmental hazards for potential fire hazards), lower insurance rates (not taking into account potentially higher fire and property damage rates), visual access to tank condition and any leakage (provided anyone is looking), fewer regulations (or the lack of enforcement of current regulations), and reduced costs (especially if current regulations are ignored). The basic problem with this rationale is that the rules governing ASTs and the associated technology are rapidly evolving; a state of affairs similar to the early years of UST regulation. Indeed, an uninformed tank owner could leap onto the AST bandwagon now and be required to retrofit later.







The basic rules and guidelines that govern ASTs are the National Fire Protection Association Codes (NFPA 30, *Flammable and Combustible Liquids*, and 30A, *Automotive and Marine Service Station*); the Uniform Fire Code (UFC Article 79, *Flammable and Combustible Liquids*), a product of the Western Fire Chiefs Association; and the

EPA National Oil Pollution Prevention Regulations, 40 CFR Part 112, commonly referred to as the Spill Prevention Control and Countermeasure (SPCC) rules.

The NFPA and UFC codes apply to above and below ground storage of flammable and combustible liquids in any quantity. Both codes address such issues as siting,

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diking, piping, venting, and other items associated with fire protection. These model codes are either used as guidelines or adopted in full by most state fire safety agencies. In general, NFPA codes are adopted by the eastern states, the UFC by the western states.

The federal SPCC rules were adopted in the 1970s under the Clean Water Act to protect against surface water contamination from petroleum storage tanks greater than 660 gallons and facilities storing an aggregate volume of more than 1,320 gallons aboveground or 42,000 gallons underground.

The SPCC rules are further limited to tanks and facilities that could produce a discharge into a navigable waterbody. The Clean Water Act definition of "navigable waters" has been broadly interpreted to include all facilities meeting the volume requirements which could impact such waterbodies either directly or indirectly via tributaries. The definition of "navigable waters" includes not only water courses used for transport but also those used for public recreation. Unlike the fire codes, the SPCC rules are concerned with spill prevention devices, structures, and procedures. SPCC rules apply to all U.S. states and territories and are enforced by federal employees.

LUSTLine

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Prepared by the NEIWPCC with a grant (#CT-901661) from 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.

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Please give credit to the NEIWPCC.

The New England Interstate Water Pollution Control Commission 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

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All of these regulations are moving targets in that they are currently undergoing either refinement or complete overhauls. For example, until recently NFPA and UFC prohibited the use of ASTs at retail motor fueling facilities. But industry pressure led both organizations to modify their technical requirements to allow for the use of ASTs at such facilities.

NFPA has published its new requirements as Tentative Interim Amendments (TIAs) and has officially incorporated them into the current (1990) edition of NFPA 30A, the ruling document for any service station. (Under the NFPA standards development process, the TIA must be reaffirmed for incorporation into the next edition of NFPA 30A.) The TIAs permit aboveground storage at retail fueling sites for individual tanks up to 12,000 gallons capacity up to a maximum of 40,000 gallons at any one facility. Likewise, the UFC has adopted an appendix to the 1991 edition of its code which specifically allows ASTs for motor vehicle fueling facilities under certain conditions.

The SPCC rules are in a similar state of flux. The EPA Office of Emergency and Remedial Response (OERR) is in the process of upgrading the program using a two phase approach. Phase I has proposed language that mandates requirements rather than recommending them. For example, secondary containment (i.e., diking) will be mandated rather than recommended, unless demonstrated as impracticable. Phase I would also require that the entire containment structure (walls and floors) be impervious to oil for a 72-hour period. Other proposed changes include a one-time facility notification requirement to establish an inventory of regulated facilities. These proposed changes were published for public review in the October 22, 1991 Federal Register, and are expected to be implemented sometime this summer.

Phase II of the SPCC revisions would incorporate the mandates established by the Oil Pollution Act of 1990 (OPA 1990). This Act was born of two events—the 1988 Ashland oil spill in Pennsylvania, in which brittle fracture contributed to tank failure, and the 1989 Exxon Valdez oil spill in Alaska, in which failure of the contingency plan (among other things) worsened the

impact of the spill. With respect to AST facilities, OPA 1990 requires the development of facility-specific contingency plans. These plans may require EPA review, depending on the potential environmental impact from a spill. OPA 1990 also addresses specific technical requirements for items such as construction, testing, leak detection, security, and brittle fracture. These provisions seem to be designed to further clarify the requirements of Phase I. Phase II requirements are still undergoing internal review to assess their impact on the regulated community.

OPA 1990 also commissioned a study (currently underway) of the feasibility of using external tank bottom and dike/floor liners, to prevent groundwater contamination. There is the potential for Phase III revisions to the SPCC rules to implement any liner requirements that result from this study.

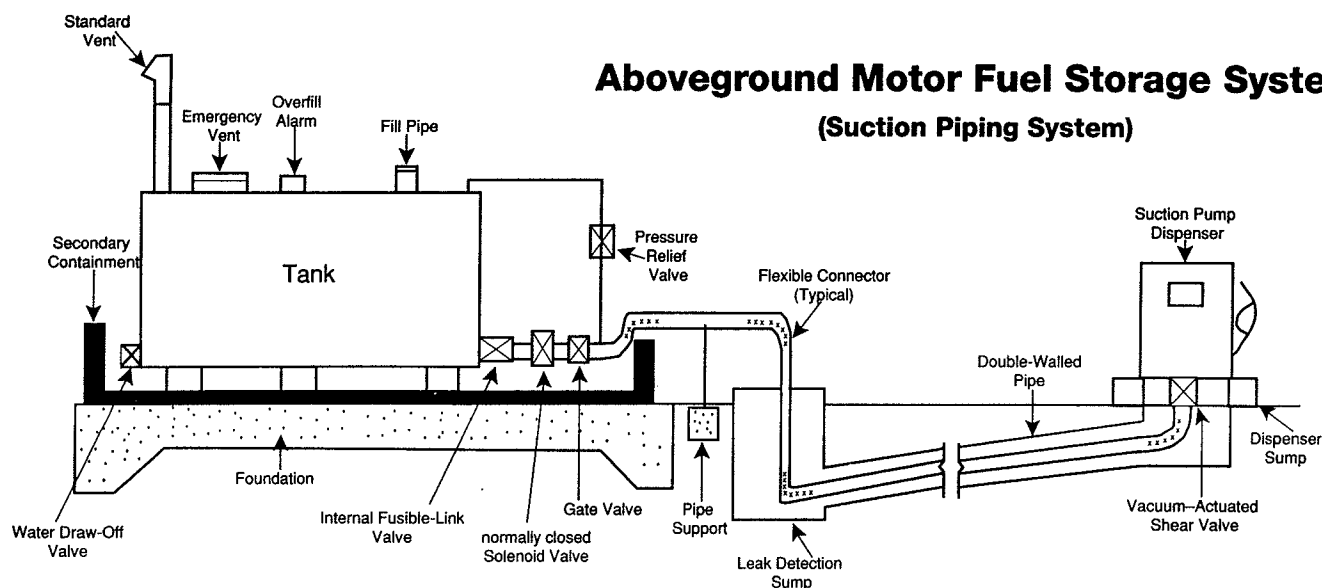
In addition to all the activity surrounding the SPCC regulations, there have been a number of Congressional bills introduced that propose to take ASTs out of OERR authority and include them under the Resource Conservation and Recovery Act (RCRA) with USTs. These bills would impose on ASTs many of the requirements currently applicable to USTs.

With that regulatory quagmire in mind, let's consider some design issues associated with small-volume, horizontal shop-welded steel petroleum aboveground storage tanks, based primarily on existing NFPA codes and code changes and proposed SPCC rules, assuming that ASTs remain under OERR authority...what a mouth full. (Vertical tanks also have some complicated issues (such as leak detection) which we'll cover in the next issue of LUSTLine.)

AST Siting

The key to proper siting of an AST facility is location, location, and location. ASTs need space—the right kind of space. The NFPA Interim Amendments have service station (retail or private) AST setback requirements of 100 feet from any property line, 50 feet from the nearest side of a public way, 50 feet from any fuel dispenser, and 50 feet from the nearest important building on the property. This setback can be

Aboveground Motor Fuel Storage System (Suction Piping System)



reduced by 50 percent if the tanks are located in separate concrete vaults or enclosures. For non-retail facilities, the setback requirements listed in NFPA 30 are a function of tank capacity and content. In general, non-retail setbacks are one-half to one-tenth of the distances required for service stations.

Containment

Of all the AST design issues, containment seems to get the most attention. There are currently two schools of thought on containment: the traditional one in which the tank(s) and containment are separate structures, and the relatively new concept in which the tank and containment are an integrated unit. Containment structures such as earthen dikes were originally used to prevent the spread of flammable or burning liquids. In the 1970s, the SPCC rules were introduced, requiring containment to prevent surface water contamination. In the 1990s the emphasis is turning to providing AST containment that can meet groundwater protection concerns as well as adding permeability criteria to the bottom of the diked area. AST containment is generally required to protect against both catastrophic failures and small releases.

For new, small volume AST facilities using traditional containment dikes, concrete seems to be the containment material of choice. However, concrete is not impervious to liquids or vapors unless proper additives, product-compatible high build-up coatings, and monolithic

castings or waterstops are incorporated into the design.

Traditional containment dikes must have a means for minimizing or controlling precipitation and flammable vapors. Roof structures can be used for precipitation control, but they should be designed to allow for proper ventilation of flammable vapors and constructed of fire resistant materials (e.g., structural steel) for obvious reasons.

The new prefabricated integral tank/containment systems come in three basic designs: tanks with attached steel dikes, double-walled steel tanks, and concrete-vaulted tanks. All of these systems have the advantages of being pre-engineered and relocatable.

Tanks with attached steel dikes provide traditional containment but in a convenient modular form. In case of catastrophic failure caused by overpressurization, structural flaws, ballistic impact, or tank penetration, or in case of smaller releases, such as those caused by overfilling, most of the product should be contained by the steel dike surrounding the tank.

Double-walled steel ASTs, on the other hand, do not meet the requirements of NFPA 30 or 30A and so require additional containment to safeguard against catastrophic failure situations. The primary purpose of double-walled construction is the detection of corrosion-induced leaks. A Canadian design incorporates double-walled tank construction with vacuum monitoring of the interstitial space to

detect corrosion-induced leaks, coupled with a surrounding concrete curbing system to address spill containment requirements.

Concrete-vaulted tanks are steel tanks surrounded on all sides by 6-inch thick concrete. There is an interstitial space between the concrete and the tank. This interstitial space can be monitored with the same techniques used to monitor double-walled steel USTs. The concrete in this design provides protection against ballistic impact and from thermal damage caused by an internal or external fire. The TIAs to NFPA 30A exempt concrete-vaulted tanks from spill control requirements. At least one concrete-vaulted tank is designed so that the concrete can be poured on-site, drastically reducing the shipping weight. These tanks have the disadvantage of being expensive and are generally limited to less than 5,000 gallons in size.

Venting

There are two types of AST vents required by both NFPA and UFC fire codes. The first is the standard vent used to allow for temperature and barometric changes as well as for pressure and vacuum variations from loading and unloading product (if there is no vapor recovery involved). Standard vent pipes for retail AST facilities are the same as those used for UST's, about two inches in diameter.

The second vent, the emergency vent, is designed to open if pressures beyond the capacity of the standard

vent are encountered, such as those that might result from a fire in the containment area. Emergency vents are sized according to a standard formula found in NFPA 30. They are usually 6 to 8 inches in diameter for shop-welded tanks. Pressure relief can be provided by a hinged weighted cover on the vent, designed to blow off at a certain pressure. In a State of Maine 1989 survey, the majority of ASTs were found to be lacking emergency vents.

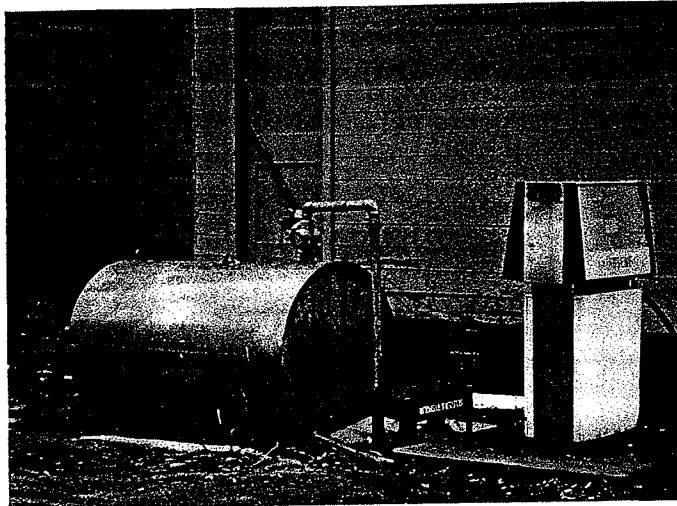
Piping

Proper design of above-ground piping includes metallic construction, proper structural support, and durable, leak-free joints. The American National Standards Institute Code for Pressure Piping (ANSI-B31) provides guidance for pipe supports and other piping design criteria. Pipe flexibility, when needed, can be provided by flexible stainless steel connectors with corrugated steel bladders, UL listed for aboveground use. For joints, most industrial designs favor bolted flanges and welded, rather than threaded, connections. All piping runs should pass over dike walls rather than through them to avoid creating a weak spot in the dike.

In my opinion, any underground piping connected to an AST should be designed using state-of-the-art UST technology, such as double-walled piping. The major difficulty in adapting underground double-wall piping to ASTs is at the juncture of the underground double-walled piping and the aboveground single-walled piping. The termination of the double-walled pipe can be accomplished with the use of a below-grade liquid-tight piping sump. The piping from the product dispenser can be sloped back to this sump which is located adjacent to the tank containment for leak detection. The aboveground pipe can then exit the top of the sump at grade.

Valves

A number of safety and control valves are required because of the gravitational head condition imposed on product piping by the fuel in ASTs (with the exception of



Fit as a Fiddle and Ready to Roll! In the rush to escape USTs by installing ASTs, some AST owners have simply plopped their tanks into place, and into patently unsafe conditions. How many problems can you see with this AST system?

ASTs located in underground vaults). For example, NFPA 30 requires that each product piping connection to a tank have a valve as close as physically possible to the tank shell, a requirement usually met by an internal valve with a fusible fire link that automatically shuts off the valve in case of fire. For service station facilities, the TIAs require that if the tank elevation imposes a gravitational head on a dispenser, then an additional device (such as an electrically operated valve that is closed except when the pump is turned on) must be installed directly downstream of the previously mentioned shut-off valve. In the State of Maine, failure to install such valves has caused several tanks to leak their entire contents into the ground when the underground portion of the piping was damaged.

The TIAs also require that either a vacuum-actuated shear valve (for suction pumps) or an emergency shut-off valve (for submersible pumps) be installed under pressure system dispensers. These valves prevent spillage if the pipe at the fueling island is sheared and electrical power is still being supplied to the pump.

According to NFPA, valve's for tanks storing flammable liquids should be made of high melting point materials (such as ductile iron or steel) unless protected against fire exposure. Finally, all valves must be protected from pressures caused by thermal expansion of product in the piping by providing pressure relief back to the tank.

Spill/Overfill Protection

Spill protection during deliveries to AST facilities has traditionally been provided by drip pans or by the containment area itself. Several of the manufacturers of the integral tank/containment units have incorporated spill containers into their design.

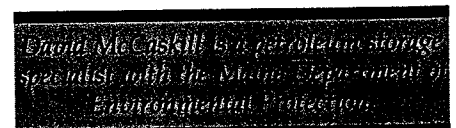
Both the fire codes and SPCC require overfill protection devices or procedures. The two basic methods of overfill protection for ASTs are high level alarms and transfer pump shut-offs. The options are limited because, for the

most part, ASTs are filled under pressure, in contrast with gravity-fill USTs. (When an AST is overfilled, the result is a fountain of product that comes out of the vent pipe.)

Leak Detection

Consistent with SPCC recommendations, leak detection for ASTs has generally consisted of visual inspections. The TIAs require that vaults be equipped with a liquid monitoring system that will sound an alarm. Leak detection (i.e., environmental protection) requirements for ASTs are still remarkably limited. Note, however, that some of the technologies developed for UST leak detection, such as continuous interstitial monitoring and free-product monitoring could easily be adapted to ASTs.

As you can see, there are a number of things to consider when investing in or designing even a small-volume AST system, and if you find it confusing, that is probably because the rules, standards, and technology have not yet been set. While concern over environmental protection does take a back seat (to date), safety issues move up to the front seat. Those who think that ASTs are a quick, easy, and cheap solutions to petroleum storage may find that they have leaped from the UST frying pan into the AST fire. ■



LUST Investigation & Remediation

Cutting the High Cost of Free Product Removal

Three Cheers for Free Product Removal

by June Taylor

ANYONE INVOLVED IN LUST cleanup work knows that removing free product, petroleum floating on groundwater, is very expensive. But, take heart! A new application for tried and true hydrophobic oil-water separating filters has hit the market and promises to provide a faster, cheaper, and more effective way to deal with free product removal at many LUST sites.

Imagine this situation: You are in charge of an underground petroleum cleanup. Ten thousand gallons of gasoline have been released and a foot of free product is floating on the groundwater. Here are two possible cleanup strategies for getting at that product. Choose the one you like best.

Strategy 1: Traditional

You drill a product recovery well (or 2 or 3, or more) and begin pumping. You pump up small amounts of free product along with oodles of contaminated water. Next, you run this contaminated broth through an oil-water separator to get some of the petroleum separated from the water. This exercise yields only a small percent of recovered petroleum. In fact, it is not unusual to pump up 10 or 100 times more groundwater than contaminant. So getting at those 10,000 gallons of "free" product and dealing with the tons of discharge water is an expensive proposition. After all, the pumped up water is contaminated and must be disposed of "properly." To do this, you have a couple of choices:

- Apply for a National Pollutant Discharge Elimination System (NPDES) permit so that the water can be discharged into a nearby stream, river, or dry arroyo. The NPDES process is time consuming and expensive, taking 1 to 3 months or more and costing \$1,000 to \$2,000.

Also, the permit may require additional water treatment, such as carbon absorption, prior to discharge.

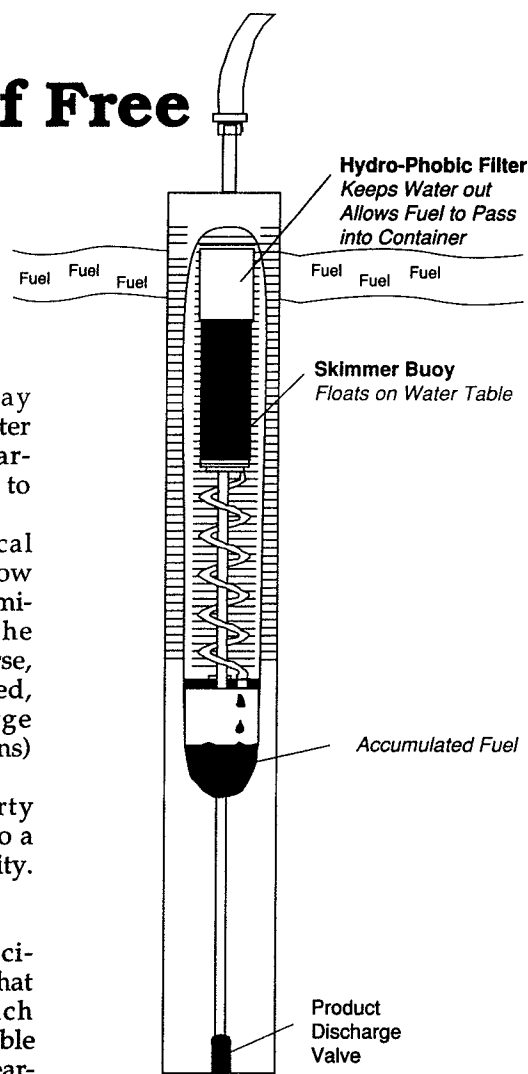
- Convince your local sewer authority to allow discharge of the contaminated water into the sewer system. Of course, if discharge is allowed, there will be a charge (\$10-20 per 1,000 gallons) for the privilege.
- Accumulate the dirty water and haul it off to a private treatment facility. Again, it costs.

A related issue associated with this strategy is that by pumping out so much groundwater the water table is artificially lowered, smearing the floating product in and around more of the subsoil as it descends, a process hydrogeologists call "smearing" the aquifer. Smearing ultimately creates more pollution problems because, when it rains, the water table rises again and groundwater is exposed to a greater surface area of petroleum contaminated soil—contaminating more groundwater faster. (See "Smearing" article on page 6)

Strategy 2: Innovative

Install free-product filters in your monitoring wells and retrieve 90-95% pure free product that can be reused or recycled. Free-product filters are best known for their use in the cleanup of oil spills in the ocean, rivers, and lakes to separate and recover the floating product. That technology has now been adapted for use in monitoring or product recovery wells.

There are two kinds of free-product filtering systems, one for small amounts of product and one



Courtesy of Keck Instruments, Inc.

for large amounts. For sites with low flow or small amounts of free product, the systems generally use a filter-wrapped canister that floats on the groundwater in the well. The canisters hold one or two gallons and are pulled up much like a bailer and emptied. Where there are larger volumes of product, a tube is dropped down to the canister so that the product can be pumped, rather than manually emptied. The canister/filter units are designed to fit in wells as small as 2 inches; costs range from about \$400 to \$1,000 per well.

The hydrophobic filters used in both applications work because water molecules have a high surface tension which allows them to bond together like raindrops on a waxed car. Hydrocarbon molecules do not, so they slide through the filter pores. Filters may need to be cleaned or replaced periodically, but this is relatively inexpensive.

Petroleum naturally accumulates in monitoring wells to a point where it is three or more times greater than the product's thickness on the water table. Free-product filters take advantage of this phenomenon by slowly removing the accumulation. The systems are passive and don't artificially lower the water table, which eliminates the problem of contaminant smearing.

Free-product filters lower the cost of recovering product and they are speedy to implement—you don't need engineering designs which are time consuming and you don't need any permits. Major oil companies with a view to protecting themselves

Recovery of free product is always influenced by soil conditions at a site, but free-product filters promise to remove at least as much product as traditional pump and treat methods.

against liabilities see this as a big advantage. Peg Chandler, a geologist who leads British Petroleum's assessment and remediation group

in the Midwest, notes, "Whenever we get a call telling us there is free product at a site, we immediately classify the site as 'Priority I,' and we want to mitigate right away."

Chandler, who learned about the filters only last fall says, "They're great! We've used dozens already." In addition to the speed in starting cleanups, she finds that the filters reduce labor costs, especially where there is a small amount of product being recovered. "You just send someone out once every week or two to empty the canister. It couldn't be simpler."

Mark Erickson of Superior Environmental Services in Brighton,

A Petroleum Cleanup Vexation

by Tom Schruben

"Smearing" is one of the greatest technical challenges facing today's underground petroleum cleanup industry. It is a process that can cause petroleum releases to get trapped in the soil immediately above and below the water table. It is a problem because it creates serious groundwater contamination and tends to confound traditional cleanup strategies.

Let's use the example of a typical gasoline release: Ten thousand gallons of gasoline have emanated from the inside of a UST. The product has flowed easily down to the water table where it has spread out like a pancake a few inches to several feet thick. At this point the gasoline is called "free product" because it can still move through the soil under the influence of gravity. The free-product pancake sits peacefully atop the water table until summer—the season of heat and drought when water tables are apt to drop a foot or two.

Naturally, the gasoline wants to drop with the water, but as it does, much of it smears onto the wet, soggy soil that was once below the water table. "Why?" you ask. Although gasoline moves freely through relatively dry soil, it has difficulty moving through wet soil because it has to displace the water that is there already trapped between the soil particles. (Smearing tends to be more pronounced in fine-grained silt and clay soils that hold a lot of water.)

With the snow and rain of winter and spring, the water table rises again. The gasoline also tries to rise to the occasion, but again, it smears, contaminating even more soil as it goes. This tiresome scenario is repeated with each season and eventually little of the free product remains "free"—most of the gasoline has smeared through the soils. The droplets and globs of gasoline

that get trapped below the water table more readily dissolve into the groundwater because the combined surface area of all the smeared petroleum is thousands of times greater than the surface area of the original free-product pancake. It's like using an atomizer that quickly spreads a perfume scent throughout a room.

Smearing can also result from human-induced changes in the water table such as those brought about by pumping—which brings us to the reason why smearing is such an important petroleum cleanup challenge. Smearing can muddle attempts to pump free product out of the ground. Recovery pumps tend to lower the water table, which can, in turn, cause the gasoline to smear in the area close to the pump and stop flowing to the recovery well.

Another vexing situation results from a combination of both natural and human-induced water table fluctuation. Going back to our 10,000-gallon release, the contractor has attempted to recover the free product by pumping down the water table several feet. After several months the recovery rates drop to practically nothing and the contractor tells the owner that the 10,000-gallon release was probably closer to 1,000 gallons because that was all they recovered. Further, he suggests that groundwater remediation may not be needed because the spill was so small and the water he was pumping out was pretty clean.

What the contractor doesn't realize is that the other 9,000 gallons of water have smeared in the soil, and they will become a major source of groundwater contamination once the pumping stops and the water table rises back into the smeared zone. Alas, the tank owner is in for the "big surprise" when the contamination hits the first monitoring well.

Because of this smearing caused by pumping, it seems important that the water table be disturbed as little as possible to recover the maximum amount of free product. And by the way, there's lots more to smearing, but let's save it for another article. ■

Tom Schruben is an Environmental Engineer with EPA's Office of Underground Storage Tanks.

Michigan has used filter canisters over the past year at over a dozen sites. While he's had some problem with water entering the canister when contamination is down to a sheen, he's enthusiastic about the product. "We've removed from 10 to 100 gallons at different sites. We've been able to remove all free product that we're aware of in 6 months to a year. In many locations it's a big improvement over past options."

Tom Schruben, the EPA Office of Underground Storage Tank's lead person on LUST cleanups, likes filters because they solve the free-product emergency problem without contributing to future groundwater problems (the smearing situation). Cheers Schruben, "You recover more of the product than with a traditional pumping system, it's faster, cheaper, and you can do it yourself!"

Free product removal is only one aspect of a cleanup, but it is important. (An immediate concern

of emergency personnel is keeping product and vapors out of nearby basements.) Recovery of free product is always influenced by soil conditions at a site, but free-product filters promise to remove at least as much product as traditional pump and treat methods. The fact that they

achieve this at lower cost without worsening subsurface contamination is something to cheer about. ■

June Taylor is a communications consultant to EPA's Office of Underground Storage Tanks.

Here is a list of firms (that we know of) that carry free-product filters:

Billings & Associates
3816 Academy Pkwy. N-NE
Albuquerque, NM 87109
Phone: 505/345-1116

Enviro-Products, Inc.
1431 Renson
St. Lansing, MI 48910
Phone: 517/887-1222

Horner Creative
212 Morton Street
Bay City, MI 48760
Phone 1/800/443-0711

Keck Instruments, Inc.
P.O. Box 345
Williamston, MI 48895
Phone: 1/800/542-5681 or
517/655-1157

Westinghouse Groundwater Recovery
4440 Amville Road
Atlanta, GA 30360
Phone: 1/800/922-9497 or
404/449-9411

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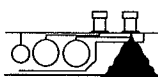
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New EPA Video on Subsurface Contaminants

Imagine! Everything you need to know about soil science and hydrogeology in 40 minutes! Well, not everything, but the EPA Office of Underground Storage Tank's new two-part video, *Petroleum Leaks Underground*, does provide a good basis for understanding what happens to petroleum that has leaked into the soil and groundwater. Part 1 is entitled *How Liquids Move*, Part 2 is entitled *How Vapors Move*, and each is 20 minutes long.

EPA produced the video as a means of promoting more effective investigation and cleanup of petroleum leaks. The two modules graphically depict how petroleum contamination moves through different soil types to the groundwater and how vapors are generated and move in the subsurface. Highlighted, is the importance of dealing with all phases of petroleum contamination—liquid, vapor, dissolved toxics, and trapped product in the soil—during the investigation and cleanup of a release. The videos show and explain both the fundamental principles necessary for understanding how vapor surveying works and why the vacuum extraction technology promises to be a valuable tool for cleaning up petroleum at many sites. State UST program officials, consultants, and scientists lend their expertise to these topics which are of vital interest to the LUST cleanup community.

The video was produced by the Environmental Media Center (EMC), which also produced *Straight Talk on Leak Detection with Joe Thursday*. EPA will distribute copies of the new tape to its regional offices and to state UST/LUST programs. Copies are also available for \$75 from EMC. Call 800/522-0362 or in the Washington, D.C. area 301/229-1944, or write: EMC, Box 30212, Bethesda, MD 20814. ■

LUST Investigation & Remediation

COLIS Update

EPA's Computerized On-line Information System Offers

SINCE WE LAST WROTE ABOUT EPA's Computerized On-line Information System (COLIS) in August 1990, this free, "user friendly," menu driven site cleanup information service has expanded its database. The *Case History File* has been COLIS' ongoing bill of fare, offering a nationwide overview of corrective actions at specific hazardous waste and LUST sites managed by state on-scene coordinators (OSCs). Now the system has three new modules: the *Library Search System*, *Site Applications Analysis Reports*, and the *Risk Reduction Engineering Lab (RREL) Treatability Database*.

The *Library Search System* is a generalized data retrieval system for technical publications and research reports dealing with hazardous waste issues. It is a useful way for those on the cutting edge of hazardous waste remediation to keep up with recent EPA laboratory research efforts. The KEY word search capability and Abstract Record make this library unique from most typical library systems. When users access the COLIS library, they can search on any topic, or set of topics, of interest. For example, a user interested in information on bioremediation at LUST sites can key in "LUST" and "bioremediation." This combination provides the user with comprehensive LUST/bioremediation files and abstracts on record in the COLIS library. Best of all, COLIS has a note pad that allows users to request information directly from EPA after completing the search.

The *Site Applications Analysis Reports* provide performance and cost information on technologies evaluated under the Superfund Innovative Technology Evaluation (SITE) Demonstration Program. The SITE program evaluates "new and promising" technologies to determine their applicability to specific cleanup objectives.

The *RREL Treatability Database*


provides access to data on alternative treatment technologies for the removal of contaminants from aqueous and solid wastes.

The *COLIS Case History File* provides users with detailed accounts of LUST and hazardous waste site removal and remediation actions as well as oil and hazardous material spill responses. This file is routinely updated and includes "after action" reports submitted by state on-scene coordinators and project managers. The files contain information on state-of-the-art site cleanups and descriptions of actions taken by the OSCs and site project managers during remediation.

The Case History Files are divided into two parts, the first is a collection of databases that hold key words or values through which progressively narrower data searches can be pursued. Users can search using such criteria as the state or EPA region in which a particular incident occurred, date of the incident, type of action (i.e., UST corrective action, or spill response), chemicals and quantity involved, or origin of contamination (i.e., leaking tank, pipeline, plant, ship).

The second part of the file holds a narrative for each report that provides detailed information in an easy-to-read format. The subsections of the narrative include: Site Characterization, Free Product Removal, Effects, Background Information, Immediate Corrective Actions, Operational Considerations, and Site Closure. In addition to discussing such factors as permits, public involvement, and administrative issues, the Operational Considerations section includes cost information.

COLIS is a technology transfer system that provides users with insight on decision-making processes, the successes and failures of alternative cleanup technologies, and sources for obtaining publications and training material. The system operates 24 hours a day and is



capable of handling several calls simultaneously. With just a phone call, COLIS can be accessed by anyone with a personal computer, modem, and a communications software program. An information package containing a Users Guide, Fact Sheet, and Access Card is available free of charge upon request, however, most users find them unnecessary after they have tried COLIS on their own. An operator is available to help with any questions. ■

**The COLIS
telephone number
is (908) 548-4636. When
your line connects,
the password is EPA.**

For more information, contact the COLIS system operator at (908) 906-6851, or contact the EPA COLIS project officers, Robert Hillger and Hugh Masters at (908) 321-6630.

NOTE: The EPA Risk Reduction Lab in Edison, New Jersey has produced an impressive number of publications pertaining to Leak Detection, Leak Prevention, and Corrective Action. Much of this material addresses "cutting edge" UST-related technologies. For information on the publications, access the COLIS library, browse through the bibliography, choose your document(s), then leave a message asking for the document. Be sure to leave your name and phone number.

LUST Investigation & Remediation

HEALTH & SAFETY

OSHA, LUST, & Remediation

by Matthew E. Fitzgerald

LET'S BEGIN AT THE BEGINNING. THE OCCUPATIONAL Safety and Health Administration (OSHA) was created by Public Law 91-56 (the OSH Act). The Agency, a part of the Department of Labor, has the mandate from Congress to: "Assure safe and healthful working conditions for men and women; by authorizing enforcement of standards developed by the Act; by assisting and encouraging the states in their efforts to assure safe and healthful working conditions; by providing for research, information, education, and for other purposes." With this broad mandate, OSHA has for the past 21 years promulgated workplace standards that protect worker safety and health.

OSHA law governs employers, not employees. It is incumbent on the employer to provide each worker a safe and healthful workplace pursuant to Section 5(a) of the OSH Act, commonly referred to as the general duty clause which says: "Each employer shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or likely to cause, death or serious physical harm to his employees."

How does all of this fit in with LUST remediation work? Let me try to address this question by responding to a series of basic LUST-related health and safety questions.

Q. Do OSHA standards apply to UST remediation projects?

A. Yes. In addition to the general duty described above, employers of hazardous waste site remediation workers must also comply with all applicable OSHA standards.

There is a popular misconception that OSHA standards do not apply to companies with less than 10 employees. This is not true, OSHA standards apply to all employers regardless of the number of employees. OSHA has a random inspection program from which companies with 10 or less employees are excluded. However, OSHA will inspect companies with ten or less employees in response to an accident or complaint.

Q. What standards would apply?

A. General Industry Standards (1910) and Construction Industry Standards (1926) may apply to UST remediation projects depending on the hazards and equipment used on site. General Industry Standards that may apply to UST remediation include:

- 1910.94 Ventilation for Abrasive Blasting
- 1910.106 Flammable and Combustible Liquids
- 1910.120 Hazardous Waste Operations & Emergency Response
- 1910.132 Personal Protective Equipment
- 1910.134 Respiratory Protection
- 1910.146 Proposed Confined Space Entry
- 1910.180 Crawler, Locomotive, & Truck Cranes
- 1910.184 Slings
- 1910.252 Welding, Cutting, & Brazing
- 1910.301 Design Safety Standards for Electrical Systems
- 1910.1000 Air Contaminants
- 1910.1028 Benzene
- 1910.1200 Hazard Communication

Construction Industry Standards that may apply include:

- 1926.24 Fire Prevention & Control
- 1926.28 Personal Protective Equipment
- 1926.55 Gases, Vapors, Fumes, Dusts, & Mists
- 1926.103 Respiratory Protection
- 1926.350 Gas Welding & Cutting
- 1926.351 Arc Welding & Cutting
- 1926.550 Cranes & Derricks
- 1926.651 Excavations

Note: Neither of these lists is intended to be all inclusive. There may be other OSHA standards that apply to your remediation projects. A competent health and safety professional should be consulted to ascertain exactly which and how OSHA standards apply to your company.

Q. What is the Hazardous Waste and Emergency Response Standard, and how does it apply to UST remediation?

A. The Hazardous Waste Operations and Emergency Response Standard (HAZWOPER), 29 CFR 1910.120, was promulgated by OSHA in response to a Congressional mandate in the Superfund Amendments and Reauthorization Act (SARA) of 1986. Title 1, Section 126(a) calls for the promulgation of "standards for the health and safety protection of employees engaged in hazardous waste operations."

HAZWOPER, the standard that emerged from this Congressional mandate, was promulgated March 6, 1989, effective March 6, 1990. The standard applies to three groups of workers: employees at cleanup operations involving hazardous substances (uncontrolled hazardous waste sites and corrective actions required by RCRA);

employees at hazardous waste treatment, storage, and disposal facilities (TSDFs); and employees expected to respond to emergencies caused by the release of a hazardous substance.

Q. So, does the HAZWOPER standard apply to UST work?

A. Yes. UST remediation is a RCRA Corrective Action and clearly falls under the scope of HAZWOPER.

Q. What does HAZWOPER require of employers with employees engaged in UST remediation?

A. The requirements of this standard are far too numerous to list here. Any company involved in UST remediation work should review all of the requirements in 29 CFR 1910.120 paragraphs (b) through (o) to ensure that it is in compliance.

The major HAZWOPER requirements include developing a site safety and health plan and training workers either for 24 or 40 hours depending on their role on site. In general, UST workers who actively engage in remediation for more than 30 work days a year are required to have 40 hours of initial training, 3 days of supervised field experience, and 8 hours of annual refresher training, thereafter.

Q. Isn't that overkill for UST remediation workers? After all, wasn't this standard really written for workers at uncontrolled hazardous waste site remediation projects?

A. No, it is not overkill; it is a minimum regulatory requirement. The standard was not written exclusively for uncontrolled hazardous waste site workers. Six separate accidents that occurred during UST remediation projects have resulted in six deaths during the 6-year period of 4/84 to 6/90 for an average of one death per year. An additional 38 fatalities and 32 hospitalizations occurred as a result of accidents associated with storage tanks. UST remediation is a dangerous business that is best handled by properly trained and equipped employees.

Q. All the tanks that we work with contain gasoline. Aren't petroleum products excluded from the definition of "hazardous substance"?

A. No. Unlike the EPA term, "hazardous waste" and Department of Transportation term "hazardous materials," the OSHA phrase "hazardous substance" includes petroleum products.

Q. Are all activities associated with a UST remediation project covered by the standard?

A. Most likely, but not necessarily. The HAZWOPER standard is based on exposure. That is to say, if an employer can demonstrate that an employee will experience no exposure and no reasonable possibility of exposure to a hazardous substance or safety and health hazards during an operation, then that operation is not covered by the standard.

An example of an exempted operation might be a soil gas survey at a gas station with a tank suspected of leaking. The operator of the soil gas equipment is isolated from the free product contamination because of the limited intrusive nature of inserting the soil gas probe into the soil. The employer would, however, be required to document that there is not, in fact, an exposure during this operation.

Stay tuned for the next issue when we'll discuss training requirements in 1910.120 and UST remediation activities in greater detail. ■

Matthew E. Fitzgerald is a Senior Environmental Scientist with the Washington Consulting Group, and is currently assigned full time to the Office of Health Compliance Assistance, OSHA, where he works exclusively with HAZWOPER issues.

Health & Safety Training Material For UST Inspectors

EPA Region 10 has prepared a 230 page training manual, *Health and Safety Training for UST Inspectors*, which deals with health and safety issues associated with facility compliance and closure inspections. The manual comes with a set of slides, an *Instructor's Guide*, and a *Student's Guide*. States and EPA Regional Offices will receive free copies. For more information, contact Joan Cabreza at 206/553-1643. ■

Seminar on Bioremediation for Petroleum Contaminated Soils

The Association of State and Territorial Solid Waste Management Officials (ASTSWMO) is sponsoring a **Bioremediation Seminar** for state and federal UST program managers and technical staff on April 28 - 29 at the Hyatt Regency in Minneapolis, Minnesota.

Interest in bioremediation technology is spreading rapidly across the country. Many of these techniques are highly innovative and useful for cleaning up petroleum contaminated media. This seminar will bring experienced technical professionals together to share information about some of the many bioremediation techniques that can be used to treat different site-specific situations. Participants will learn about the technical principles of bioremediation, evaluation and monitoring methods, results of field studies, and practical uses for the technology.

The event provides an opportunity for firms to exhibit bioremediation technologies for petroleum contaminated soils and groundwater; the exhibitor fee is \$550. For registration information, contact Barbara Simcoe at ASTSWMO, 202/624-5828. ■

Leak Prevention

Tank - nically Speaking

by Marcel Moreau

Marcel Moreau is a nationally recognized petroleum storage specialist whose column, *Tank-nically Speaking*, is a regular feature of LUSTLine. As always, we welcome your questions, opinions, and technical interests.

What Tank Tightness Test Would You Use?

BACK IN THE AUGUST 1990 ISSUE OF LUSTLine (Bulletin #13), I set out to write a series of articles on storage system tightness testing. Then I got sidetracked by inventory control and statistics, but now it's time to get back to tightness testing; specifically, which tests are good for which situation.

In my earlier article I listed over a dozen terms that refer to tank testing, and I gave some working definitions for those terms, in hopes of helping people in the tank world to better understand the subtle and not-so-subtle distinctions among terms like "tank test," "pressure test," "hydrostatic test," "volumetric tank test," and "non-volumetric tank test." In that article, I also identified a number of different types of tank tests that meet the "tank tightness test" criteria set forth in the federal regulations.

The federal definition of "tank tightness test" is a generic description of what is acceptable for the purpose of periodic leak detection to supplement inventory control recordkeeping. However, there are other situations where tightness testing is performed for specific purposes other than routine leak detection. In some of these situations, specific types of tightness tests offer distinct advantages over others.

In this issue, I'd like to explore a few of these specific circumstances that point out when different types of tests are appropriate. But first, let's see what you think. Put yourself in each of the following situations and think about which tank tightness test you would use:

1. You are a tank owner in New Orleans Louisiana, with five convenience stores that also sell gasoline. You want to meet the regulations, but you need to do it cheaply and with minimum disturbance to your operations. You tried statistical

inventory analysis (reconciliation) once, but the results were inconclusive because you were unsuccessful in getting your employees to keep accurate inventory records. You scout around to check out the local tank testing options and decide that your best deal is:

- A. An underfilled volumetric test,
- B. An overfilled volumetric test,
- C. A tracer-based non-volumetric test, or
- D. A vacuum-based non-volumetric test.

2. You are a spill response person at the scene of a busy intersection downtown. A sewer manhole cover has just been blown into a third-story window by an explosion in the sewers caused by gasoline vapors. There are gasoline storage tanks on three of the four corners of the intersection. All of the storage systems were installed between 1975 and 1988, so no one has instituted leak detection for their tanks. All of the facility owners claim to have current inventory records proving that their storage systems have not lost a drop of product. Everyone is looking to you to find the leak. You request that all local storage tanks be tested for tightness using:

- A. A tracer-based non-volumetric test,
- B. An underfilled volumetric test,
- C. An overfilled volumetric test, or
- D. A statistical inventory analysis.

3. You are a petroleum marketer considering purchasing an existing convenience store with gasoline tanks. You want to be sure you know what you're getting into. You request permission to conduct:

- A. A tracer-based non-volumetric test,
- B. An underfilled volumetric test,



- C. An overfilled volumetric test, or
- D. A statistical inventory analysis.

4. You are a mom & pop operation with a single motor fuel storage facility. You are a bean counter by temperament, keeping flawless records of the number of twinkies and doughnut holes on your shelves, as well as the amount of gasoline you buy and dispense. You want to meet the state leak detection requirements cheaply and with minimum disruption to your fuel dispensing operations. Besides, you are curious to see how good your fuel inventory records actually are. You decide to try:

- A. A tracer-based non-volumetric test,
- B. A statistical inventory analysis,
- C. An overfilled volumetric test, or
- D. A vacuum-based non-volumetric test.

Got your answers? Ok, here are mine:

1. If I were this petroleum marketer,

• I would not use an overfilled volumetric test for three reasons: filling my tanks costs money, it requires careful scheduling, and it results in longer down time for my gasoline retail operation because the tester must wait for temperature and tank deformation effects to subside. Furthermore, I don't want to find

any leaks in my vent pipes or tank top fittings because they aren't "real" leaks (these areas only leak while the tank is overfilled), but they will cost me a lot to fix if they are found.

- I would not use a tracer-based non-volumetric test because my facilities have been around for a long time and I know a tracer test will likely find some hydrocarbon vapors, and I don't want any incriminating evidence around that says my site is contaminated.

- I would not use a vacuum-based non-volumetric test because the water table in my area is high, and I'm not convinced this method works when the water table is present.

- I would use an underfilled volumetric test because it does not require any special preparation in terms of filling the tanks, and the testing times are usually shorter than for overfilled tests. Also, this test will only find leaks below the liquid level in the tank at the time of the test.

2. If I were this investigator,

- I would not use a tracer-based non-volumetric test because there is a week or two lag time between when the tracer is injected into the system and when the soil vapors are sampled, and I can't wait that long.

- I would not use an underfilled volumetric test because this incident could have resulted from an overfill situation (a leak at a tank top fitting or in the vent line), and an under-filled test wouldn't give me any information about this part of the system.

- I would not use a statistical inventory analysis because, again, this method would give me information about only the portions of the storage system in contact with product during normal use, not the tank top fittings or vent lines. However, I might have the inventory records statistically analyzed both to corroborate the tightness test results and to be prepared when the owner of the leaking tank claims that the tightness test must be wrong because his inventory records are "perfect." Of course, this strategy could backfire if the statistical analyses and the tightness tests yield con-

flicting results. I would only use a statistical analysis service that tells me the smallest leak that can be detected given the quality of data that was submitted.

- I would use an overfilled volumetric test because it tests the entire storage system, including the portions that hold product only when the storage system is accidentally overfilled.

3. If I were this petroleum marketer (or her banker), I would conduct tracer-based non-volumetric tests because this technique analyzes soil vapors outside the storage system for both the presence of the tracer compound and the presence of hydrocarbon compounds. It gives information about the current status of the storage system as well as the history (spills, overfills, past leaks). All other types of tightness tests give information only about the current status of the system. There are many currently tight tanks located at sites with significant contamination. If I am buying the property as well as the storage system, I need to know the status of both.

4. If I were this mom & pop operation, I'd probably go with a reputable statistical inventory analysis. Assuming that my inventory records are as good as I think they are, this method would be the cheapest and most convenient way of meeting the regulatory leak detection requirements.

With the variety of tightness testing techniques available today, choosing the technique that best suits your needs can be confusing, especially when salespeople contend that their technique is the one for all situations. No doubt many people (especially salespeople) would disagree with the rationales I used in these examples to select tightness tests. (*Drop me a line and tell me what you would have chosen and why.*) And while some of my rationales may sound more real-world expedient than environmentally prudent, all of the testing choices in my examples meet the federal definition of "tank tightness test," although states, localities, banks, or insurance companies may have different requirements. ■

Problems with Leak Detection Equipment

by Christina Graulau

Just because an electronic monitoring box is hanging on the wall at an UST facility doesn't mean that it's doing what it's supposed to do. Monitoring for leaks in new UST systems has its own new set of hi-tech problems. In California, most of the new leak detection equipment is found with our required double-wall systems, which must use continuous interstitial space monitoring on both tank and piping. Some systems also have additional types of leak detection equipment. Those of us working in San Diego County's UST program have a big job just keeping up with all the new leak detection equipment available to tank owners.

We try to keep our facility compliance inspectors up-to-date on what leak detection equipment is out there and what some of the potential problems might be. For example, we have seen frequent problems with false positive alarms (where a leak is indicated but none can be found) associated with leak detection monitoring equipment. Some of the more common false positive conditions include:

- Fuse breaks or faulty electrical installation,
- Probes with non-specific sensors, which may not be able to distinguish hydrocarbons from other vapors, such as cutting oil or sealants,
- Inadequate seals on manways, which allow run-off to enter the UST system and trigger an alarm,
- Probes with coatings that degrade after exposure to hydrocarbons.

When a monitoring device at a facility appears to have a problem, our inspectors ask the facility operator to investigate the problem and ensure it is resolved. We request a written report on the cause of the problem and the corrective action taken to resolve it. We make sure the facility operator has a copy of the manufacturer's operating instructions for the equipment on site. ■

Christina Graulau, Supervising
Environmental Materials Specialist with
San Diego County

EPA HQ UPDATE

Financial Responsibility Compliance Date for Small Businesses Extended to December 1993

Contrary to earlier expectations for a one-year extension, EPA has extended the UST financial responsibility compliance deadline for small businesses by two years to December 31, 1993. The extension affects tank owners with 12 or fewer tanks at more than one facility, or fewer than 100 USTs at a single facility, and non-marketers with a net worth of less than \$20 million. This group generally includes the smallest petroleum marketers, particularly individual service station owners, and non-marketers, such as businesses that own tanks for fueling company vehicles.

EPA has been concerned about the ability of these small businesses to have obtained financial assurance by the original compliance date of October 26, 1991. With the December 1993 extension, the Agency has tried to provide some short-term relief to UST owners and operators to whom methods of financial assurance are currently not readily available.

Owners and operators can comply with financial responsibility requirements in a number of ways, such as through insurance, state assurance funds, and self insurance. Because many of those affected by these regulations have found it difficult to acquire insurance, many states have created state assurance funds. To date, 43 states have created these funds and 27 have received EPA approval to use these funds as compliance mechanisms. Many of the states need additional time to have their funds approved and to make them operational.

Under Subtitle I of the Resource Conservation and Recovery Act, UST owners and operators must show financial means to cover cleanup costs and third-party damages resulting from potential leaks. The financial responsibility requirement has

been phased-in over several years, with petroleum marketers owning 1,000 or more tanks and non-marketers with more than \$20 million in tangible net worth required to comply by January 1989. Marketers owning between 100 and 999 USTs were required to comply by October 1989. Marketers owning between 13 and 99 had to comply by April 1991.

EPA has also extended the **local government financial responsibility compliance deadline** to one year after publication of a final rule which will provide additional means for local governments to demonstrate compliance. Additional compliance mechanisms were proposed in June 1990 and are now expected to become final this summer. ■

State Fund Administrator's Conference Set for May

The Office of Underground Storage Tanks (OUST) and the South Dakota Petroleum Release Compensation Fund (SDPRCF) will co-host a State Fund Administrators Conference on May 5-7 in Rapid City, South Dakota. OUST recognizes that with the growing importance of state assurance funds there is a need for a forum devoted to issues and concerns associated with their implementation. Therefore, OUST decided to support a national conference to bring state fund administrators together to discuss and resolve mutual fund-related problems, such as cost-control techniques, third-party claims, fund solvency, and administrative issues.

For more information about the conference, contact Stephanie Bergman of OUST at 703/308-8879 or Dennis Pounds of the SDPRCF at 605/773-3769. ■

OUST Personnel Changes

With recent personnel appointments and reshufflings at the EPA Office of Underground Storage Tanks (OUST), it seems like a good time to bring readers up-to-date. Currently, the OUST management

hierarchy is made up of the following people and positions:

- **Office Director** - David Ziegele
- **Deputy Office Director** - Lisa Lund
- **Special Assistant to the Office Director** - David O'Brien (currently on assignment to the Department of Health and Human Services)
- **Branch Chiefs:**
 - **Technical Standards** - Josh Baylson, Acting Branch Chief
 - **Operations** - Dana Tulis, Acting Branch Chief
 - **Regulatory Analysis** - Sammy Ng, Branch Chief
 - **Planning and Communications** - Karen Ellenberger, Acting Branch Chief

OUST staff are assigned positions within the context of these Branches and they are further organized into an assortment of issue-specific teams, such as the "controlling cleanup costs," "desk officers," and "regional state improvement" teams.

Lisa Lund, the newest member of the management staff, hails from the State of Arizona Department of Environmental Quality (DEQ), where she served as UST Program Manager. Lisa was one of two employees who started the Arizona UST/LUST program in 1987. While at the DEQ, her responsibilities included managing the UST/LUST program, advising technical staff, serving as a data manager, and overseeing the budget process.

What will Lisa be up to at OUST? "I look forward to providing a state perspective on the many issues that arise," says Lund. "I'll be concentrating, primarily, on the various policy and implementation matters that come up here at the Agency, such as TCLP, lender liability, and consistency between UST and other Agency programs." She will serve as liaison between OUST and the rest of the Agency on management and budget issues, which will allow David Zeigele to spend more time working with the regions, states, and other entities outside of OUST. ■

Enforcement**Snapshots of Federal UST Enforcement Actions**

NATIONWIDE, STATE ENVIRONMENTAL AGENCIES AND/OR FIRE DEPARTMENTS ARE TAKING THE LEAD IN REGULATING underground storage tanks. For the most part, the states also work cooperatively with the EPA Regional Offices across the country. The federal role in tank enforcement varies among regions according to state need. The enforcement methods used range from traditional approaches such as notices of violation and consent orders to some innovative techniques such as the issuance of field citations. (See articles on field citations page 16-17). Here is a sampling of recent federal enforcement activities from the EPA Regional Offices:

Region 1

- EPA Region 1 developed state-specific checklists for inspections of existing and new facilities, as well as for closure activities. These lists can and are being adapted for use by federal and state inspectors across the country.
- Cape Cod, Massachusetts (a designated sole source aquifer): EPA Region 1 settled three formal enforcement actions taken last summer; each action involved failure to comply with leak detection requirements. The Towns of Falmouth and Bourne paid \$2,025 each and achieved compliance by removing the tanks. Sorenti Petroleum in Sagamore paid \$10,000 and removed 6 tanks in violation.
- Region 1 has been assisting Massachusetts by conducting file reviews on tanks more than 20-years old in parts of the state; 5 potential violations of leak detection requirements were turned over to local fire chiefs for follow-up.
- Region 1 is currently developing its own field citations program. The Region expects to begin its pilot program in Massachusetts, Connecticut, and Rhode Island by this summer.

Region 2

- Virgin Islands: EPA Region 2 assessed penalties of \$116,105 last July and cited tank owner Frank Mustafa with failure to notify the Department of Natural Resources of the age, size, type, location, and uses of USTs located in three St. Croix facilities. Protection of drinking water sources is a vital concern on this island.

Region 3

- As of January 1992, Region 3 has issued: 7 UST corrective action consent orders and 20 UST administrative complaints with over \$350,000 in assessed penalties. Of the 20 complaints, 9 consent orders were signed by the responsible parties.
- By way of settlement conferences, Region 3 has negotiated 2 pollution prevention projects into consent agreements.
- Philadelphia, Pennsylvania: EPA Region 3 collected \$50,000 in penalties from the Amoco Oil Co. for failure to comply with the stipulated terms of consent orders concerning the cleanup of two separate sites with leaking underground storage tanks.

Region 4

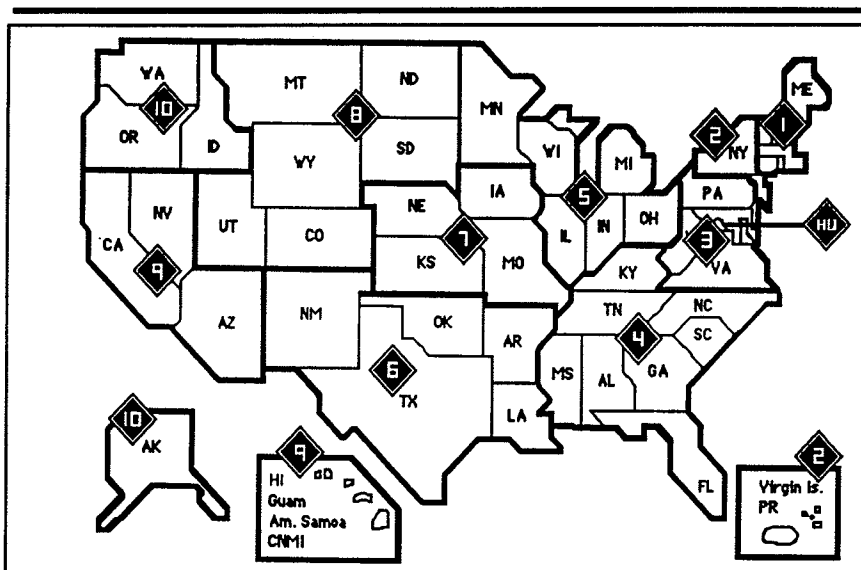
Since May, 1991, EPA Region 4 has taken 14 formal UST enforcement actions. Samples include:

- Gainesville, Georgia: EPA Region 4 assessed penalties of \$41,833 last May and cited tank owner Jerry Carter, Inc. (owner of several retail convenience stores in North Georgia) with failure to provide adequate release detection for USTs and piping.
- Georgia/Kentucky: EPA Region 4 has entered into consent agreements with Altamaha Oil Co., Inc., Baxley, Georgia and Action Petroleum, Inc., Prestonsburg, Kentucky. The companies were cited for failure to comply with the release detection requirements for USTs and piping at their facilities—one in Georgia and three in Kentucky.
- Georgia: the Owenby Enterprises Inc. case (failure to comply with a consent order) is being heard in District Court. This case is the first federal UST action in the nation to be prosecuted by the Department of Justice. In general, federal UST enforcement actions have been settled out of court with consent orders.

Region 5

- EPA Region 5 has issued 8 complaints (including 3 consent orders) overall, totalling over \$1 million in proposed penalties. One of these complaints, which was for violation of financial responsibility requirements, assessed penalties of \$340,756.
- Gary, Indiana: In February, EPA Region 5 assessed penalties of \$377,193 and alleged that USS Gary Works violated several requirements related to monitoring, cleanup, and closing of USTs. Constant monitoring of the company's tanks will be required to protect Lake Michigan and the groundwater.

EPA Regional Map



Region 6

- Since May 1991, Region VI has conducted 38 inspections jointly with its states; 25 field citations or tickets have been issued.
- Of those violations, four have lead to the more formal enforcement action of issuing consent orders; Region 6 assessed penalties of \$12,000 for one of those facilities in Texas.

Region 7

- Region 7 issued 24 compliance information request letters to UST facilities. Of 6 notice of violation letters issued, 5 may result in complaints if compliance is not forthcoming.
- Region 7 hopes to begin a field citation program in the near future.

Region 8

- Wyoming: For leak detection violations, Region 8 issued 10 citations with fines ranging from \$150-450; 5 complaints were issued with penalties ranging from \$9,000 to 21,000.
- Colorado: For leak detection violations, Region 8 issued 10 citations with fines ranging from \$100-500; no consent orders have been issued yet.
- As of the end of 1991, Region 8 issued 10 field citations. In all 10 instances, the responsible parties have corrected the violations and paid the stated fines.

Region 9

- Nevada, Arizona, Hawaii: Region 9 is conducting joint inspections with these states. So far, the Region has not initiated any federal enforcement actions.
- Region 9 is also conducting joint compliance activities on leak detection at federal facilities. Although the first round of letters prompted an 80% response rate, the Region may need to resort to joint enforcement action against unresponsive federal facilities.
- Region 9 is assisting Hawaii and Nevada in addressing state enforcement staffing shortages by providing EPA staff via Interagency Personnel Agreements (IPA's).

Region 10

- Region 10 is involved in 15 formal enforcement actions for LUST sites that have been referred to the Region by the states.
- Region 10 has conducted 85 inspections and issued 30-45 field citations since September 1991 with fines ranging from \$100-600. So far, the Region has experienced 100% compliance after reinspection!
- Region 10 is starting inspections of federal facilities. Although no fines are levied at military facilities, the base commander is required to sign any tickets issued for violations. In this region, these inspections are conducted by EPA staff accompanied by a staff member on IPA from the armed forces through an innovative exchange program between EPA and Department of Defense.

This snapshot is by no means meant to insinuate that number and dollar counting are the goal of the federal UST enforcement program. The enforcement goal of federal and state agencies is, and has always been, to gain compliance with the UST regulations—designed to protect human health and the environment—through voluntary compliance. Voluntary compliance is a lot cheaper than cleaning up a leak or being assessed costly penalties! ■

Enforcement

Ridin' That Field Citation Express

WE TALKED ABOUT "NABbing truant tanks with timely tickets" back in August 1989 (Bulletin #11). Well, it took a tad longer than expected, but timely tickets are now being written by UST inspectors in three EPA Regional Offices and one state—and word is, things are clickety clacking along very nicely, thank you.

EPA Regions 6, 8, and 10 and the State of New Mexico have initiated an enforcement approach that allows UST inspectors to issue on-site notices or citations for relatively minor violations directly to tank owners or operators. On-site citations enable UST inspectors to address a greater number of violations immediately, while leaving traditional administrative, civil, and criminal enforcement actions for the more serious violations. This fast-track enforcement alternative has been extolled by the EPA Office of Underground Storage Tanks (OUST), where emphasis has long been on finding better ways to manage UST programs more effectively and efficiently.

Field citations were first used successfully by a few local jurisdictions (i.e., Dade County, Florida and Washington, D.C.) for UST and other environmental programs. Dade County issues an on-site warning first, giving the tank owner the opportunity to comply within a specified time frame. If the violation is not corrected, then a ticket is issued. "We don't want animosity, so we give them the opportunity to comply voluntarily first," explains Paul Voight, Supervisor of the Dade County Storage Tank Section.

The key to success is to use field citations for minor, easily correctable violations where minimal, if any, judgement is required (i.e., no line leak detectors on pressurized piping system, failure to notify, failure to do proper inventory control). In Dade County, tickets run about \$150 per violation and, although they can be appealed, it rarely happens. "The County always wins," says Voight,

"because the violations are indisputable."

"Tank owners in our Region have to deal with the violation and the fine within 30 days," says Joan Cabreza, EPA Region 10 UST Coordinator. "It's like a traffic ticket. The violations are clear cut, and the owners know the consequences."

"When we started the citation program, people weren't happy to see the tickets, but the compliance rate has gone way up and we cover much more territory in less time"

Jerrie Moore

Some people are angry at first, but when we explain that this \$200 or \$400 violation could cost more like \$20,000 if we took the traditional enforcement route, they usually see our point. So far, we have inspected a little over a hundred facilities, issued over 40 field citations, and obtained 100% compliance. As a result, our inspectors feel like they're accomplishing something, and it saves us a lot of time."

Getting Results In New Mexico

Jerrie Moore is with the New Mexico Environment Department's (NMED) UST Prevention/Inspection Section, and he is delighted that the State instituted its field citation program. "Before, when we were issuing traditional Notices of Violation, we would come back to the office and spend a lot of time writing letters and yet gain little result—people were slow to comply or did nothing to comply."

"When we started the citation program, people weren't happy to see the tickets, but the compliance rate has gone way up and we cover much more territory in less time," says Moore. "It makes a world of

difference to be able to get people to do the things they need to do. Now that the leak detection requirements are kicking in our work has increased, and I actually think a lot of people are waiting for us to come along and explain things to them."

New Mexico is the first state to take the field citation plunge as a means of enhancing and expediting compliance with their UST regulations. Shelda Sutton-Mendoza, NMED's UST Program Manager, says the number one priority of the UST Bureau's Prevention/Inspection Section is to conduct release detection inspections at facilities with tanks installed prior to 1970 or age unknown in areas where the depth to groundwater is less than 100 feet.

If an inspector detects a violation, a field Notice of Violation ("citation") is issued to the owner or operator of the UST system and a pre-litigation settlement penalty is assessed at the time of the inspection or by certified mail immediately following the inspection. Sutton-Mendoza says a release detection violation carries a \$100 penalty per violation. The owner/operator must pay the penalty, correct the violation, and certify compliance within 30 days of receiving the citation. If this does not happen, the NMED may exercise its prosecutorial discretion to issue an administrative Compliance Order or initiate a civil action in state district court against the owner or operator.

A Compliance Order may include a civil penalty not to exceed \$10,000 per tank. Failure to comply with the Compliance Order may result in the assessment of civil penalties up to \$25,000 per tank per day of non-compliance with the order.

From February 1, 1991 when the NMED field citation program began, to December 31, 1991 the field inspectors conducted 655 inspections and issued 211 field citations. In other words, about 32% of the facilities were not in compliance and about 68% were in compliance. Of the 211 non-compliant facilities,

about 50% have corrected the violations. Prior to the introduction of field citations, only about 14% of the owner/operators cited had complied.

...And, of Course, Education

Just about anyone who performs UST compliance inspections stresses that the inspections are for educational as well as compliance purposes. Inspections provide regulatory agencies with the opportunity to inform owners and operators of their legal requirements, to explain

release detection regulations, and to answer any questions.

Failure to do proper inventory control seems to have a commanding lead as the most common violation inspectors encounter. "Inventory control is looney tunes, absolute looney tunes!" declares EPA Region 8's Teri Bahrych, who has worked extensively on leak detection compliance and is now using field citations. "There's a lot of learning that needs to take place on that subject. One city employee led me to the 'inventory records' for

all that city's tanks. The records consisted of a couple of boxes filled with slips of paper—no particular order, no particular tank."

"The citation program gives owners and operators an incentive to comply as well as an understanding of why they should comply," says Sutton-Mendoza. "We have significantly increased compliance and, thereby, reduced threats to New Mexico's environment that are posed by petroleum products and hazardous substances released from USTs." ■



EPA Region 6 Reports:

Field Citations are the Ticket for Minor UST Violations

by John Cernero

IN LATE 1989 AND early 1990, EPA Region 6 (Arkansas, Louisiana, New Mexico, Oklahoma, Texas) took a closer look at compliance within the UST regulated community. Although most of the UST installation and removal requirements were being monitored by the states, very little was being done about leak detection compliance—one of the "pillars" of pollution prevention in the UST program. To glean more information on release detection compliance, EPA Region 6 and state agency personnel conducted joint inspections at various UST facilities. Besides getting a sense of compliance with leak detection regulations, the Region's underlying theme was to encourage the states to perform more of their own compliance inspections.

Over the period of a year, we conducted 53 on-site EPA/state inspections. Forty-one of the facilities, or 77 percent, had violations. Thirty-seven of these violations were considered "minor" (i.e., failure to install line leak detector for pressurized piping, improper inventory recordkeeping) and the remaining four were considered "major" (i.e., unreported releases and no corrective action). All four of the major violations were at federal facilities.

Based on these statistics, the Region confirmed that most non-compliance consisted of minor violations.

To encourage compliance with EPA UST release detection regulations (an EPA priority item), Region 6 determined that it was necessary to begin enforcement actions against violators. However, using standard enforcement procedures (40 CFR Part 22) for minor violations was simply not practical. Thus, with some guidance from the EPA Office of Underground Storage Tanks (OUST) in Washington, D.C., the Region developed a field citation approach to UST enforcement.

We began inspections using field citations for minor violations in May 1991. The goals for the program were to encourage compliance without high penalties and to take action quickly without relying on extensive Regional resources. Since May, the Region conducted 38 of these inspections in cooperation with the states and issued 25 field citations. One facility was in such bad condition that it was considered to be in major violation and was referred to the state agency for initiation of standard enforcement procedures.

Common Compliance Problems

Some of the more common compliance problems we found during the state/EPA inspections include:

- Improper inventory control
- Damaged gauge sticks ("dipsticks")
- No monthly reconciliation
- No line leak detectors for pressurized piping systems
- No records of tank or line tightness tests
- Automatic leak detection equipment not operating properly or not operating at all
- No records of any kind!

One rather startling fact we discovered is that compliance at new facilities is not much better than compliance at existing facilities. Part of the reason for this is that some contractors either fail or forget to correct deficiencies prior to completing construction. In some cases contractors don't fully understand the requirements. The trouble is, the tank owner or operator generally trusts the contractor to do what must be done and figures all is well as far as being in compliance is concerned. In one instance the contractor disconnected the line leak detector to fix a problem involving concrete settling over the tanks, but he never reconnected the detector.

Thus far, one of the most time-consuming problems we have had in conducting inspections is obtaining the records for review at the facility. Many of the facilities in Region 6 are combination gas station and conve-

nience stores. Conducting an inspection when the operator/clerk is handling customers can be frustrating and, in most cases, the clerk at the counter knows nothing or very little about records, UST requirements, or who or what EPA is! We need to deal with the right personnel, it can save a lot of time.

Although EPA is not required to give the owner or operator prior notice of an inspection, problems such as delays in obtaining facility records have prompted EPA Region 6 to notify tank owners and operators of the inspection ahead of time so that records and the appropriate facility representatives are available for the inspection—provided the state agency agrees. Then, if the records are not available for review when the inspector arrives, a field citation may be issued because sufficient notice had been given and the owner or operator failed to cooperate.

There are cases, however, where it may be better not to notify the owner or operator; cases where a surprise inspection has merit. For example, there are instances in which line leak detectors have been disconnected on purpose—perhaps, because the line leak detector was defective or was triggering frequent false alarms—and hooked up just for the inspection.

The Bitter and the Sweet

At the beginning of the field citation program, Region 6 received several comments from the regulated community. Many wanted to know why small businesses were being penalized for UST violations, although no one disputed the violations. The number of comments greatly dwindled after we explained that the new field citation program was better for small businesses because it was designed to encourage compliance by using small fines (\$100 to \$250 per violation) and to avoid standard and more costly enforcement procedures.

The UST program will likely always have that small minority of violators who choose to ignore citations. Region 6 takes disregard of field citations seriously. At one facility, a \$500 ticket was issued and, for what ever reason, the ticket was not paid nor was the violation corrected.

The \$500 ticket expired and a Compliance Order with a civil penalty of \$12,000 was issued.

Based on the statistics and the positive response from our Region 6 states, it appears that the field citation approach for federal enforcement of the UST regulations is effective in encouraging compliance.

In January 1992, Region 6 began reinspecting some of the facilities that had paid their settlement agreements and stated that their violations had been corrected. Of the 7 facilities reinspected, only one had not corrected the violation. This facility may be issued an Administrative Order with potentially much higher penalties.

The encouraging part about the reinspections is that several of the facilities had gone to considerable expense, not only to comply with the violations, but to go beyond what was required. For instance, one facil-

ity added new pumps and lines along with spill and overfill prevention. Another facility installed a new electronic sensor in a double-walled waste oil tank. One marketer has implemented a training program for his operators so that they will understand what an UST regulatory inspector needs to review when inspecting their facilities.

Based on the statistics and the positive response from our Region 6 states, it appears that the field citation approach for federal enforcement of the UST regulations is effective in encouraging compliance. However, the real success as far as Region 6 is concerned is that the states and other EPA regions are considering developing and implementing their own field citation programs. (EPA Regions 8 and 10 and New Mexico have field citation programs.) Unfortunately, field citations are not an enforcement panacea. Standard enforcement must be used when there is a major violation or if field citations do not do the trick. ■

John Cernero is an Environmental Engineer with the EPA Region 6 Office of Underground Storage Tanks.

EPA and ALCOA Negotiate Pollution Prevention Project for Lebanon, Pennsylvania Facility

EPA REGION 3 AND THE ALUMINUM COMPANY OF AMERICA (ALCOA) have entered into a consent agreement under Subtitle I of the Resource Conservation and Recovery Act (RCRA) that requires ALCOA to complete a "supplemental pollution prevention project" at its facility in Lebanon, Pennsylvania. ALCOA agreed to complete the project in exchange for a reduction in penalties assessed against the company for violations of UST regulations. Completion of the project will reduce the penalty ALCOA must pay from \$24,839 to \$6,500. The estimated cost of the project is \$290,000.

"EPA is constantly looking for opportunities to negotiate good pollution prevention projects into consent agreements with industries," said Bruce P. Smith, Region 3's Director of RCRA Programs. "Such projects ultimately benefit both business and the environment; therefore, everybody wins."

EPA and ALCOA negotiated the pollution prevention project as part of a settlement for an administrative complaint initiated by the Region in March, 1991. The project involves the closure and removal of the company's eight remaining 30,000-gallon tanks that were installed 12 years ago in anticipation of a fuel shortage. The removal of these USTs will help remove the risk of any future releases into the environment. ■

NOVs? Complaints?

...What Are They Talking About?

Not many of us have bothered to memorize federal or state statutes on UST enforcement authorities. But, because we write about enforcement issues in *LUSTLine*, we thought that we should explain some of the federal enforcement terms and procedures (many states have similar procedures) that pertain to USTs.

Under the authorities in RCRA Sections 9005 and 9006, EPA enforcement personnel may take the following actions in response to a **violation of UST technical regulations** (we'll cover violations for reported and unreported releases next time):

- **INFORMATION REQUEST LETTERS** may be sent to an UST owner/operator (o/o) to obtain additional information on a potential violation. The o/o must provide EPA enforcement personnel with the requested information, allow the Agency to conduct monitoring or testing, and provide access to all records relating to the tanks. Such information is typically used by the Agency to determine that a violation has, in fact, occurred.

- **INITIAL RESPONSES** are used to encourage voluntary compliance, notify the owner/operator of the violation, advise what actions are needed to correct the situation, provide a deadline for compliance, and indicate more stringent actions that may be taken if the o/o does not respond. *Notices of Violation (NOVs)* and *warning letters* are often used to achieve these objectives. Although these notifications are not required prior to taking more formal actions, they serve as documented evidence in case more severe actions must be taken.

- **ADMINISTRATIVE ACTIONS** may come into play if initial responses appear to be ineffective. EPA may issue *administrative orders* to compel compliance with federal UST regulations. These *compliance orders* are usually issued in non-emergency situations where cooperation is expected. A typical compliance order will require that the o/o

■ continued on page 20

Field Notes

from Robert N. Renkes, Executive Vice President, Petroleum Equipment Institute

The UST Climate in 1992

AS EXECUTIVE DIRECTOR FOR THE PETROLEUM EQUIPMENT INSTITUTE and editor of the *TulsaLetter*, I talk weekly with scores of manufacturers, distributors, and installers of UST equipment. I also try to stay in touch—albeit on a less regular schedule—with many state UST officials. With all of this talk to draw from, I thought I'd jot down my perceptions about the state of the UST industry based on what I've heard in the first two months of 1992.

- The number of contractors in the UST business hit the high water mark early in 1991 and has declined gradually since then. I expect the number of new products on the UST market to grow at a much slower rate in 1992.
- Only a handful of new tank installer/remover licensing or certification programs will debut this year. Most states already have their programs in place; states lacking a program have reviewed that option and made a conscious decision to not require one in their jurisdiction.
- Complete compliance with leak detection deadlines for tanks and, to a lesser extent, lines has not been achieved. 1991 was a tough year for most oil marketers. In most cases, small oil jobbers and commercial accounts seem to be willing to comply with the regulations, but they simply don't have the wherewithal to do so. However, I am told that lack of enforcement by some states has much to do with the lower-than-anticipated compliance levels. I expect to see improvement in 1992 because: a) the marketers are finally beginning to make some money again, and b) regulators will give more effort to enforcement activities.
- I continue to hear mixed reviews about state cleanup funds. Although most state programs are run efficiently, there are some rough edges to smooth out. The loudest complaints coming from tank owners and contractors concern state approval and payment of cleanup expenses. Some cleanup firms (or tank owners, depending on how the system is set up) have waited as long as a year to receive payment for their services. When they finally do get paid, a few find that some charges were disallowed, although the procedures employed by the contractor were necessary.
- Aboveground tanks at refueling sites—particularly those serving the commercial, government, and manufacturing user—continue to gain in popularity. Although we see a great number of ASTs being installed, the lack of a standard reference document describing the proper installation of these systems has resulted in a hodgepodge of AST refueling sites throughout the country. The Petroleum Equipment Institute is in the process of drafting a document that will cover all aspects of installing ASTs at vehicle fueling areas. PEI hopes to publish the recommended practice by the end of the year.
- The quality of UST installations continues to improve. The number of tank failures resulting from improper installation methods appears to be at an all-time low. ■

■ Enforcement Definitions *continued from page 19*

come into compliance immediately or within a specified time period. The order may include a civil penalty not to exceed: (1) \$10,000/tank/day for each violation; and (2) \$10,000/tank for failure to comply with the initial notification requirements. The order should also indicate that continued non-compliance will result in further legal action, including the assessment of additional penalties of up to \$25,000 for each day of non-compliance with the compliance order.

The major steps in issuing an administrative order are:

- **Complaint preparation and filing** - establishes the allegations, assesses a penalty (if applicable), and notifies o/o's of their right to a hearing.
- **Pre-hearing** - o/o responds to complaint, any pre-hearing motions may be made, default orders may be issued, and settlement or pre-hearing conferences may take place.
- **Hearing** - EPA Administrative Law Judge hears the case, examines evidence, make initial decision.
- **Post-hearing** - appeal to initial decision may be made and the final order is issued by the Agency.
- **Settlement** - may take place at any stage of the administrative process. The settlement is incorporated into a negotiated consent agreement between EPA and the o/o. The settlement is issued as a final and binding *consent order* (C.O.), which states that the o/o will pay the stated penalties and correct the violation(s).
- **JUDICIAL ACTIONS** are more formal, and potentially more severe, actions initiated in the U.S. Court system by the Department of Justice (DOJ). Because this litigative process can be both time-consuming and resource-intensive and because the issuance of an administrative order will increase the strength of a judicial case, judicial referral does not usually begin unless prior efforts have been ineffective. Judicial actions may be taken without a prior administrative order in emergency situations and cases where the o/o has a history of non-compliance. ■

NEIWPCC Wins Award for Video



The NEIWPCC video, *What Do We Have Here?...An Inspector's Guide to Site Assessment at Tank Closure*, has won a Gold Screen Award in this year's National Association of Government Communicators (NAGC) Gold Screen Video/Screen competition. Ellen Frye, the video's executive producer and writer, accepted the award on behalf of NEIWPCC at the NAGC awards banquet on December 5 in Arlington, Virginia.

What Do We Have Here is the second of three national Underground Storage Tank training videos and companion booklets NEIWPCC has produced through grants from the EPA Office of Underground Storage Tanks. *What Do We Have Here* is actually three videos on one tape, a 30-minute feature presentation on site assessment at tank closure, plus two short presentations, one on field testing instruments (14-minutes) and another on soil and water sampling (7-minutes).

NEIWPCC's 30-minute video and companion booklet, *Tank Closure Without Tears...An Inspector's Safety Guide*, deals with safety issues at tank closure. The third, *Searching For the Honest Tank...A Guide to UST Facility Compliance Inspections*, covers UST facility inspection priorities, protocol, equipment, documentation, recordkeeping, compliance with technical standards, and enforcement follow-up. ■

Copies can be ordered from: NEIETC, 2 Fort Road
South Portland, ME 04106

UST-A3	Tank Closures Without Tears	\$35 set, \$5 book
UST-A4	What Do We Have Here	\$45 set, \$5 book
UST-A5	Searching for the Honest Tank	\$40 set, \$5 book

All orders must be prepaid. Make checks payable to NEIETC. The videos and booklets are also available on loan for a one week period from NEIETC for \$10.

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