Where Has Our Petroleum Storage Capacity Gone?

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Tracking the success or failure of the federal underground storage tank program is a difficult task. One of the most telling statistics publicly available is the number of storage tanks in the federally regulated tank universe that remain in service. When the United States Environmental Protection Agency (EPA) began its program, an estimated two million regulated tanks existed. According to a recent survey sponsored by the Petroleum Equipment Institute, only about 750,000 tanks remain-a 62.5 percent decrease in the number of tank units. These figures suggest that five of every eight tanks in existence in 1988 are no longer in service.

Environmentalists might say that the program is an overwhelming success-over half of the potential leaking tank systems have been erased. An equipment manufacturer, installer, or petroleum storage system user might have other thoughts. After all, fewer tanks means less business for manufacturers and installers and less product availability for consumers. Or does it? Has American society changed because of this drastic reduction in regulated underground storage tank units?

As I travel down the federal highway system, my first impression is that the downsizing of our tank universe has had very little impact. I continue to see a tremendous number of motor vehicles on the road. For example, in 1996, NPN reported that in the United States, total motor vehicles driven amounted to 2.48 trillion miles, an increase of 2.2 percent over 1995. According to NPN Market Facts, an annual statistical guide of the petroleum industry, gasoline consumption has increased from 114.7 trillion gallons of gasoline consumed in 1988 to 128.9 trillion gallons of gasoline consumed in 1998, a 12.7 *percent increase* over the past ten years.

According to NPN however, the number of retail service stations in the United States has dropped from 210,120 in 1991 to 182,596 in 1998, a 13 *percent decrease* over the past seven years. Despite this decrease, little media commentary has emerged regarding public inconveniences, except perhaps, in a few remote areas left without a nearby service station. In fact, as older facilities take their leave, new service stations continue to be built with better conveniences and in more desirable locations. Many fabricators tell me that a large percentage of their constructed tanks are being installed at new facilities.

Can Less Be More?

So, if vehicle miles traveled are way up, the tank universe is way down, and the public has not been terribly inconvenienced, what has happened to all of the previous storage tank capacity? A number of theories have been put forth to explain this curiosity.

Some say that much of the 1988 regulated tank population was either not in use or little used. Others hypothesize that oil companies and petroleum marketers today exercise

greater control over the amount of product stored. A large product of inventory is bad for the bottom line. Keep product moving, because if less product sits idle in a tank, fewer tanks are necessary.

One textbook (or industry report stated) reported that 317,000 gas stations dispensed fuels in December 1927. The report made an assumption that it took 15 minutes to dispense 5 gallons of gasoline, half the actual dispensing rate of that time period. Further, with the 604,000 dispensers in existence then, the report calculated that the nation could dispense 5 times the nation's needs in an 8-hour day. The report concluded that a glut of tankage and service stations then. If we use that type of analysis, we can obtain a further comparison between 1988 and 1998. Let me assume that the average tank is operating ten hours a day, 300 days a year, is dispensing fuel at a rate of 8 GPM, and is storing gasoline. Further, let me assume that 60% of the regulated underground storage tanks in existence during the past decade store gasoline. With some sophisticated sixth grade mathematics, we can calculate that the average tank dispensed gasoline 4.25 minutes out of every hour in 1988 and 12.75 minutes out of every hour in 1998. That is nearly a 300% increase in tank usage. On the other hand, the usage rate of 12.75 minutes dispensed out of every hour today could also tell us that the tanks are not fully utilized yet.

Remember, not every underground storage tank is located at a retail service station, nor does it store gasoline. So don't go to Las Vegas with the assumptions and calculations made above. Some gas stations pump 2 - 5 million gallons of gasoline a year. As a matter of fact, new stations are built today on the premise that 1.2 million gallons of gasoline will be dispensed annually - *at a minimum* . For comparison purposes, 1.2 million gallons dispensed annually equates to a tank usage rate of 14.6 minutes out of every hour, assuming 3 gasoline tanks per service station, 365 days of operation for 10 hours per day, and fuel is dispensed at a rate of 8-gpm. My main point here is that many of the unused tanks or underutilized tanks in place during 1988 are gone and that the utilization rate of tanks has increased. Blending fuel grades on site, the use of compartmented tanks, and the shift to aboveground tanks are additional reasons why there are fewer tanks installed and used underground today.

But I have another reason to throw into the mix. I checked out the Steel Tank Institute's registration database and engaged in some undercover detective work. STI keeps detailed computer records on every new steel underground and aboveground storage tank that bears the STI label.

For example, STI records indicate that over 1,000,000,000 gallons of new STI-labeled underground steel storage tank capacity was installed between 1988 until 1998. That's right-one billion gallons! This time period corresponds with EPA's UST regulatory compliance timeframe.

Upon further examination of the most recent ten years of data, we find some startling trends. The average STI-labeled UST tank capacity has increased by over one third, to nearly 8,000 gallons of capacity today. For example, STI statistics for ACT-100® and Permatank® tank technologies show that the average tank capacity is approximately

10,000 gallons, more than a 20 percent increase during a seven- to eight-year time frame.

In the mid-to late-eighties, the typical sti-P3 tank capacity was around 5,500 gallons. The sti-P3 tank was the only nationally standardized corrosion resistant steel tank available back then. It provides pre-engineered cathodic protection via galvanic anodes of zinc or magnesium metal attached to the tank. In 1987 and 1988, over 30,000 of these P3 tanks were built and installed each year. Today, less than 25 percent of that number of tank units are being built with the P3 label. Other underground steel storage tank technologies that do not use cathodic protection, such as composite tanks and jacketed tanks, have displaced some of the P3 tank installations.

Yes, it Can!

For hypothetical purposes, then, let's say that the average tank capacity in the ground prior to 1989 was 4,000 gallons (20% less than the average reflected by STI statistics to accommodate the probability that older tanks were smaller). Two million tanks multiplied by a 4,000-gallon average tank capacity yields a total of 8 billion gallons of regulated capacity at the start of the EPA program. Let's also say that the average tank size in the ground today is 8,000 gallons. So, 750,000 tanks multiplied by 8,000 gallons average tank capacity yields 6 billion gallons of regulated tank capacity, a 25 percent drop in tank capacity over the past ten years.

Thus the decline in storage capacity is much smaller than the decline in tank numbers. This correlates well with our calculation of average tank throughput - we are selling more fuel from fewer tanks.

While retail petroleum marketing is still predominantly conducted using USTs, this is not so true for non-retail storage. Many smaller fleet fueling operations have gone to AST storage, as well as many emergency generator tanks. Much of the 25% decline in UST storage capacity could probably be found aboveground if we looked hard enough.

Statistics on shop fabricated ASTs are difficult to collect because of the far greater varieties of storage tank types. So it is more difficult for me to be absolute in reaching conclusions on total storage capacity. Nonetheless, some trends are apparent. For example, in 1998, STI's statistics for double-walled F921® ASTs and secondary-contained, protected Fireguard® tanks indicated a 45 percent growth in tank units built. Not surprisingly, an increase in tank capacity is clearly evident here as well. The Fireguard tank experienced an 80 percent increase in average tank capacity over the past five years-the average capacity today is more than 4,000 gallons. STI members are building ASTs to USTs at a 2:1 ratio, quite different from 10 years ago, when USTs far outnumbered ASTs.

The trends with secondary containment of aboveground storage tanks are indicative of the trend with secondary containment of all regulated shop built tanks. In 1988, STI was registering less than 18 percent of its tanks as secondary-contained P3s. As a matter of fact, 1984 was the first year that any significant number of double-walled tanks was being built. That number has easily doubled today. When accounting for other types of

steel-jacketed tanks that do not bear the STI label, it appears that over 50 percent of the steel USTs built today are secondary contained.

So the bottom line is that, without a doubt, the number of USTs has reduced since the UST regulations were promulgated. However, more product than ever is flowing through the remaining storage tank systems-through larger tanks and in tanks located both under and above the ground.