Automatic Tank Gauging System: A Next Generation Tool for UST

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Abstract

A settlement between the United States and Total Petroleum Puerto Rico Corp was agreed to improve leak detection in their gas service stations. The automatic tank gauging with a centralized monitoring system is the method selected to improve the leak detection. It is regulated by the U.S. Environmental Agency and the P.R. Environmental Quality Board. The ATG system is cover under the Next Generation Tool Policy under the USEPA. The system was studied in an effort to identify the regulation and specification for the installation, operation and maintenance to initiate a conceptual program. The system is promoted by the state and federal agencies. It can provide centralized real time monitoring information, inventory control, a non-destructive leak detection test, and can be operated by an operator class C The installation cost fluctuates between $28,000 and 34,000.00.

Key Terms — ATG, UST ATG system, UST Automatic tank gauging, UST release detection

Literature Review

- The different sources of information about automatic tank gauging (ATG) are related mainly to the regulation.
- The U.S. Environmental Protection Agency (USEPA) is responsible of keeping compliance with the 40 CFR 280 [1] that provides the regulation about underground storage tanks (UST). T
- The PR Environmental Quality Board (PREQB) is responsible of the state regulation about UST.
- Both regulations provide rules about the construction or installation, operation and maintenance.
- This paper was based in the Total Petroleum settlement announcement [2].
- It purpose is to evaluate the ATG system and its programs such as installation, operation and maintenance.
- The state and federal regulation covers the implementation of those programs. ATG systems provides several alternatives to be applied in a gas service station.
- Figure 1 [3] illustrates an ATG system for USTs.

Project Statement

- A petroleum company in Puerto Rico agrees to improve leak detection in several service stations.
- The agreement undertake a supplemental environmental project (SEP) consisting of an ATG system with a centralized monitoring system that provide surveillance to gas service stations from a single point.
- The objective is to identify the regulation and specification for an UST ATG system and to present a conceptual program related to the installation, operation and maintenance.

Methodology

To achieve compliance with the regulation and the ATG system programs is necessary to:

- Review the actual federal and state regulations.
- Select an ATG system alternative.
- Estimate a conceptual cost and time for a service station.
- Propose an operation and maintenance inspection.

Analysis

A typical gas service station has three underground storage tanks (UST). Each UST system is composed of tanks, pipes and ancillary equipment, as seen in Figure 2 [2]. A leaking UST can affect water supplies, surface water and groundwater in different communities. State and federal regulations have been approved to protect the water supply. Two companies had a settlement with the U.S. Court and the USEPA in the last years to install a release detection system such as automatic tank gauging with a centralized monitoring system, a Next Generation technology. The ATG system is the leak detection method selected to be installed in gas service stations. It functions are used for inventory control, water detection, and leak detection among others. Several gas service stations can be monitored from a centralized offsite monitoring center via networking, see Figure 3. This can be done using a software and an internet connection. The data can be obtained in real time. It can perform continuous monitoring testing and send e-mail alerts from the ATG. The installation requires a modification permit from the Environmental Quality Board, a contractor certified by the manufacturer and a broadband internet connection. Figure 2 shows a typical installation of the equipment. The estimated installation cost is between $28,000 and $34,000 for three UST. The cost considers inventory control and leak detection probes for the tanks. The operation and maintenance program is influence by the UST Regulation. The PREQB UST Control Regulation requires that operators have to be certified al levels A, B or C. An inventory report is used to know the actual amount of product and to program the delivery of products by headquarter or to be order by the dealer. The system can perform a line and leak detector test, if it is provided with the modules and sensors to perform it. The UST and lines are tested at the frequency programmed.

Figures

Figure 1
Basic components of an ATG system [3]

Figure 2
Gas service station with an ATG system for UST [4]

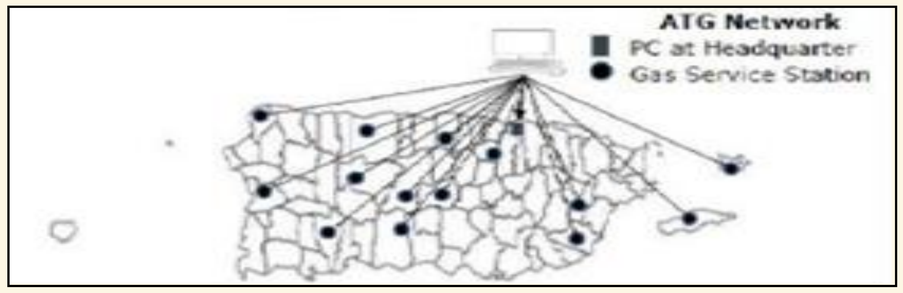

Figure 3
Illustration of an ATG network for UST

Results

- The state regulation has the primacy jurisdiction about the underground storage tanks in Puerto Rico.
- The regulation requires a UST Permit Modification submittal previous to the installation.
- The installation cost of the automatic tank gauging system for three underground storage tanks is between $28,000 and $34,000.
- An installation contractor of the ATG system must be certified by the manufacturer.
- The estimated time to install the equipment are two week.
- A daily inspection and record keeping can be performed by an operator level C after be properly trained.
- The ATG system can be used for inventory control of product and leak detection. A centralized monitoring system can be used using a software and internet connection.
- It can be implemented from headquarter or the desire location to monitor the notification alarms, perform leak detection test, and inventory management.

Discussion

- The automatic tank gauging equipment has multiple features more than inventory control and leak detection.
- Exists several trademarks and models of ATG that can satisfy any situation or case at different cost.
- An UST equipment inventory must be performed to know the actual needs of a gas service station, and especially in the case of a company with a network.
- The right selection of ATG equipment and the quantity to be order must be based in the equipment inventory.
- The ATG is an alternative between others approved by the regulatory agencies. However, it can provide more reliability as leak detection method because a daily test or follow up of the UST system can be performed.
- A company can implement a centralized monitoring system from any point or peripheral (computer, tablet or smartphone), using only a software and internet connection.

Conclusions

The automatic tank gauging for underground storage tanks can:

- Provide real time monitoring information.
- Improve regulatory compliance.
- Reduce the risk of a product release.
- Control product delivery through inventory management.
- Perform a non-destructive leak detection test.
- Be created centralized monitoring system for a network of service stations.
- Adjust to the needs of the UST owner.
- Promote USEPA Next Generation Tool for UST Policy

The system is promoted by the state and federal agencies. The installation cost fluctuates between $28,000 and $34,000.00 in one gas service station.

Reference

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[3] Underground Storage Tank Office, U.S. Environmental Protection Agency. Retrieved from: http://www.epa.gov/oust/states/pr.htm

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