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Project Profile – Oil Tank Monitoring

Overview

Near the airport in Manchester, New Hampshire inside a modern office and warehouse building are seventy-six oil storage tanks. Motor oil of various weights, hydraulic fluid and automatic transmission fluid are stored in tanks ranging from a few hundred to eight thousand gallons in capacity. From this facility they supply bulk oil to the automotive repair and maintenance industry throughout New England. The various oils come to the facility in semi-trailer tankers. It is routed through a network of connecting pipes and pumped into the appropriate storage tank. The oil leaves in bulk delivery trucks as well as barrels and five gallon pails. All are filled from the storage tanks.



In order to protect their facility and the environment as well as to comply with state law a monitoring and alarm system was needed to prevent overfilling. Historically drivers and operators would determine the current level in the destination tank by checking its site gage. Knowing the current level and the capacity of the tank it could be determined how much new oil the tank could hold. Careful measurements before and during pumping were necessary to prevent spills.

What We Did

Canary Systems designed and installed a system to monitor tank volumes and warn of impending spills. A Campbell Scientific Inc. CR10X Control Module is the heart of the monitoring and alarm system. Each storage tank has a Gems Sensors Inc. pressure transducer or level probe. The gages are connected to the CR10X via five Canary Systems' MiniMuxes. Five CSI SDM-SI04 Switch Control Modules control the state of eighty red LED's mounted on the door of the system enclosure. Each LED designates a particular tank. Three Alarm Stations with red flashing lights and claxons are installed at the filling and pumping sites.

Canary Systems' MultiLogger software was used to create and monitor the alarm program. The alarm program calculates the current volume of oil in each tank by converting the pressure transducer data to gallons of product. If the volume is greater than what has been determined to be a safe level the alarms are turned on and the LED corresponding to the overfull tank is lit. Each Alarm Station has a "defeat" button. When the button is pressed the alarm is suspended for ten minutes. During that time employees would pump off the amount necessary to regain a safe level.

While providing real time protection against spillage the monitoring system also provides inventory data. Historically, once a week employees would spend up to two hours "sticking" the tanks. They would walk from tank to tank with a large measuring stick and record the height of the oil in the sight tube. These measurements were then entered into a spreadsheet where the volumes were calculated. The monitoring system automates this process. Now the inventory is known daily instead of weekly and takes minutes instead of hours to produce. Accuracy has been determined to be better than 100 gallons for the largest tanks with a capacity of 8000 gallons. With accurate and immediate display of inventory more efficient utilization of tank capacity is also accomplished.

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