El Segundo Refinery Subsurface Recovery & Source Control Projects

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The following information is an overview of Chevron's Subsurface Recovery and Source Control Project to remove subsurface hydrocarbon vapors from beneath portions of El Segundo and El Porto adjacent to the El Segundo Refinery.

Background

The Chevron El Segundo Refinery began operations in 1911, making kerosene and other products. Historical leaks in tanks and piping during the refinery's early decades of operation led to the release of gasoline and other hydrocarbon products. These products migrated through the soil to the nonpotable (non-drinkable) water table which is about 100 feet beneath the refinery. Vapors created through evaporation of these liquid products then migrated upwards into the sandy soils beneath parts of El Segundo and the El Porto section of Manhattan Beach.

Starting in 1985, numerous studies were conducted to assess the boundaries of both the liquid products and the vapors in the subsurface. As a follow-up to these studies, Chevron initiated a two-pronged clean-up program: (1) the removal of the liquid product beneath the refinery; and (2) the removal of associated vapors beneath portions of El Porto and El Segundo. The vapor extraction systems began operating in 1985 and have effectively removed hydrocarbon vapors in soils and structures. Both vapor recovery and liquid hydrocarbon recovery continue today in an ongoing long-term cleanup program supported by the California Regional Water Quality Control Board (CRWQCB).

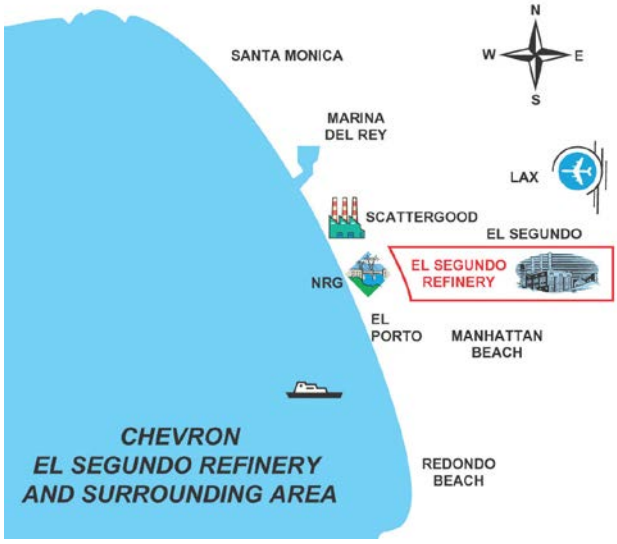
Ongoing Hydrocarbon Recovery Program

The vapor recovery systems consist of networks of approximately 50 extraction wells located in El Porto and 26 wells in El Segundo. These networks act like giant subsurface vacuums that collect hydrocarbon vapors and route them to incinerators in the refinery where they are consumed. Collectively, the systems removed an estimated 500 gallons (liquid equivalent) of hydrocarbons per day during the early years of operation and have successfully reduced vapor levels to nearly zero.

Today, these systems are operated to ensure the continued safety of the residents of Manhattan Beach and El Segundo.

The liquid recovery system, located within the refinery, consists of approximately 60 recovery wells. The liquid product is removed and recycled into refinery processes. Currently, the system removes up to 1,800 gallons per day.

Procedures for notification to the city officials, as well as initiating response actions, have been established in the unlikely event of elevated hydrocarbon levels recurring in the future. Chevron provides annual reports to the cities and agencies reporting the results of routine well monitoring and system changes.



Source Control

To avoid any future loss of product from leaks in tanks or pipes, Chevron began an aggressive program to retrofit tanks with specially designed double bottoms and to upgrade pipelines throughout the refinery. The process of changing

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tank bottoms represents a total project cost of over $100 million. With the new double bottom design, weep holes between the bottoms serve as a leak detection system, allowing inspectors to observe leakage before it can make its way into the soils.

The refinery has over 1,000 miles of pipes, most of which are above ground. However, approximately 675 locations where pipe was buried were targeted for upgrade. This upgrading consists of digging up buried pipe and leaving it exposed, or sleeving it wherever it must remain underground (such as beneath road crossings), thus making leaks visible to inspectors.

At the end of 2011, all major oil containg tanks in service had upgraded with double bottoms and/or leak detection systems. Also, over 600 piping sites have been upgraded.

Project Scope

Chevron has a group dedicated full time to the project. Operators monitor the systems daily, and the engineers are planning future modifications in conjunction with the regulatory agencies. When looked at collectively, these source control and site cleanup activities represent an investment of more than $200 million by Chevron.

For further information about these programs or other refinery processes, contact the refinery's Policy, Government and Public Affairs office at 310.615.5254. Off-hour needs can be addressed by calling the 24-Hour Community Response Hotline at 310.615.5342.