SOIL VAPOR EXTRACTION SYSTEM

HARTFORD PETROLEUM RELEASE SITE

WHAT IS SOIL VAPOR EXTRACTION?

Soil Vapor Extraction (SVE) is a method to remove gasoline vapors from below the ground. SVE works by pulling gasoline vapors to a well and then sending them through treatment equipment to be destroyed. As shown below, the primary components include extraction wells, vapor-liquid separator (to handle any groundwater or liquid gasoline that may enter the system), vacuum pump, and thermal oxidizers to treat the collected vapors. Just as steam condenses to liquid water when cooled, gasoline vapors can be converted into liquid gasoline. Although the SVE system collects and treats gasoline in the vapor phase, the amount recovered is often reported in equivalent gallons of *liquid* gasoline.

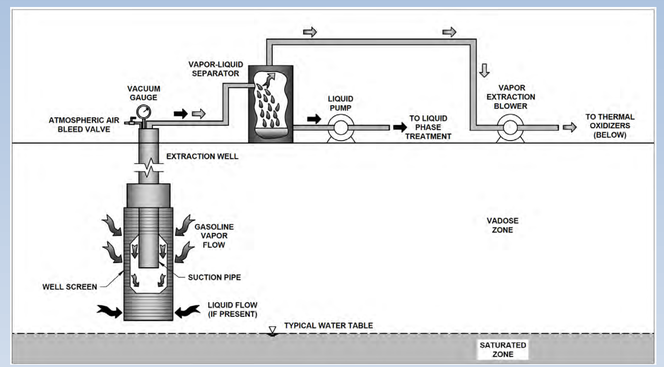

Figure 1. *Depiction of typical SVE system, including an extraction well, vapor-liquid separator with liquid pump, and vacuum extraction blower. Extracted vapors are transported to thermal oxidizers (like a furnace) on the Premcor Refinery Facility for treatment.*

Figure 2. *Four thermal oxidizers on the Premcor refinery property are being used to burn the gasoline vapors piped from the system of extraction wells.*

SYSTEM HISTORY

The original SVE system was installed by Clark Oil & Refining Corporation (now Premcor) and operated from approximately 1992 until it was upgraded in 2005. The original SVE system consisted of 12 vapor extraction wells and a single thermal treatment oxidizer.

The original system was replaced in three phases beginning in 2005 by the Hartford Working Group and currently consists of a network of approximately 120 vapor extraction wells connected through a series of pipes transporting recovered vapors from beneath the Village to four vacuum blowers located on the Premcor refinery facility. The recovered gasoline vapor is treated using between one and four thermal oxidizers, as needed.

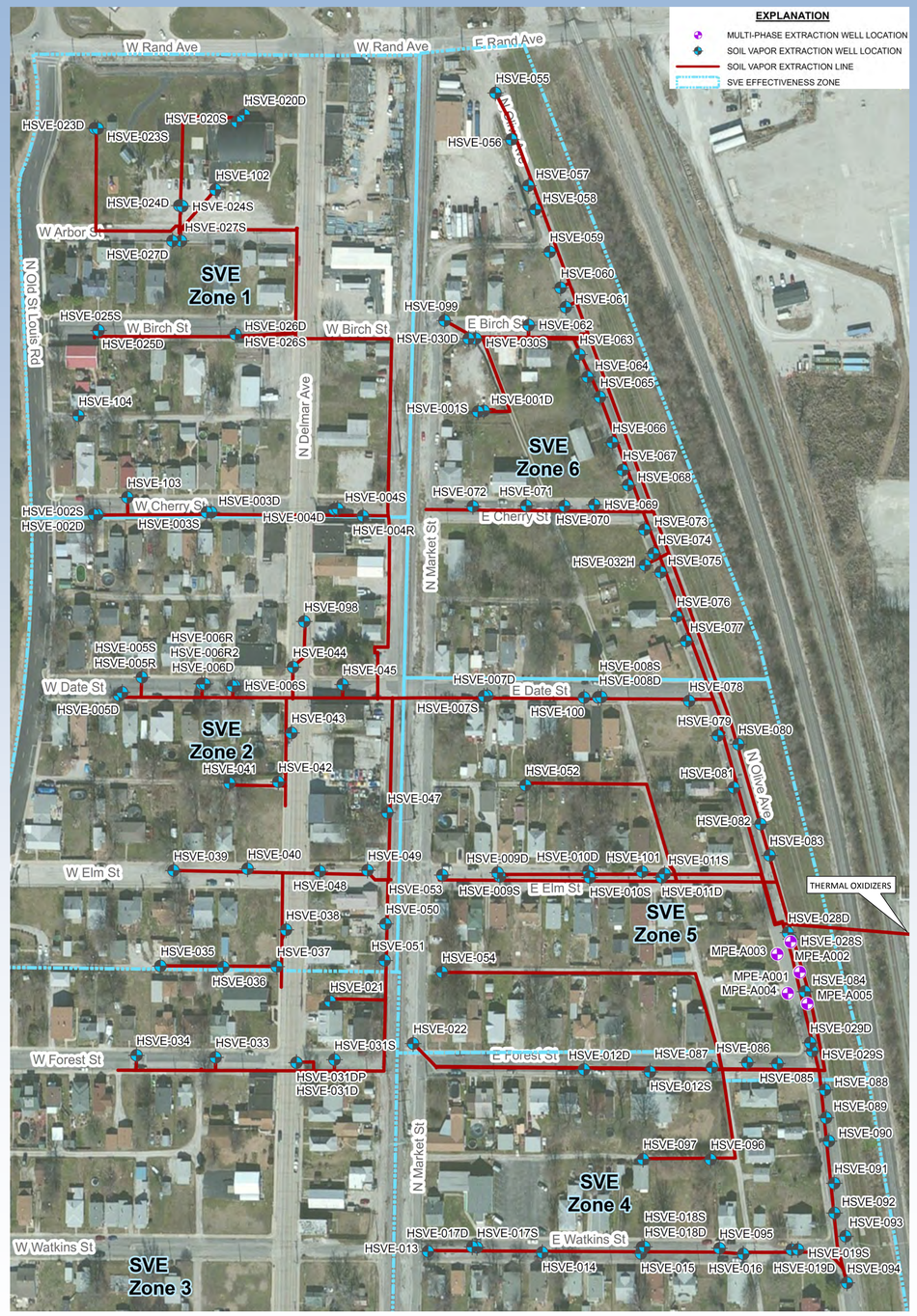

Figure 3. *Map of Hartford showing the location of soil vapor extraction wells, transmission pipelines, and the thermal oxidizers used for treatment.*

RECOVERY OVER TIME

Detailed records of gasoline recovery for the SVE system were kept after it was replaced by the Hartford Working Group in 2005. Approximately 950,000 gallons of gasoline have been recovered from the SVE system between May 2005 and December 2013. Recovery is still improving as the highest daily recovery occurred in late 2012 when low water table conditions were observed beneath the Hartford Site.

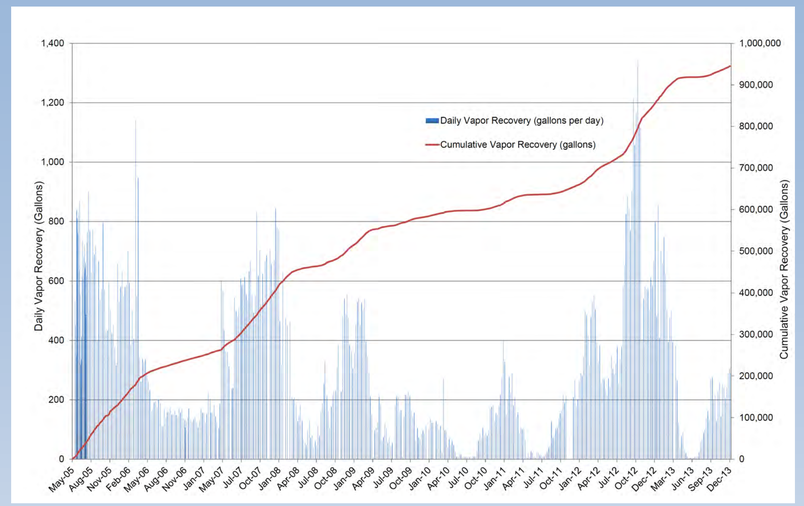

Figure 4. *Gasoline recovered over time reported in equivalent liquid gallons. Blue lines indicate the daily recovery rate while the red line indicates the cumulative gasoline recovered since the system was expanded in 2005.*

SVE SYSTEM VAULTS

In order to control the rate vapors are removed from each extraction well, a valve is constructed near the well and placed in a vault (this is a concrete box placed below the roadway and covered with a large metal lid) accessible to maintenance workers. At some locations, the SVE well and control valve are contained within a single vault; at other locations, the control vault is separate from the well. A diagram showing the two different types of vaults is shown below.

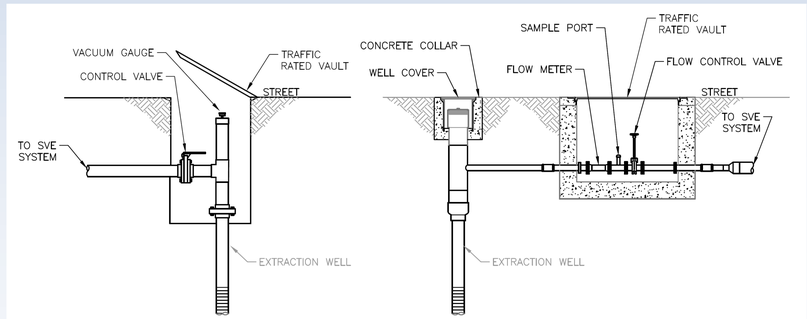

Figure 5. *Two diagrams showing (1) typical vault containing both the SVE well and control valve (left) and (2) SVE well and control valve in separate vaults (right).*

FOR MORE INFORMATION

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You may call the EPA's Chicago regional office toll-free at 800-621-8431, weekdays from 8:30 a.m. to 4:30 p.m.

Or visit: www.epa.gov/region5/cleanup/hartford//index.htm.

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