Dry Cleaners: Airing Dirty Laundry

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It's your laundry. It's supposed to be clean. And so, do we imagine, is the facility that makes that happen. The dry cleaner. But do you ever stop to consider the processes involved in keeping your delicate garments clean? They most typically involve a mix of chemicals, the residue of which is left behind to permeate, leach into and contaminate the soil below and surrounding your neighborhood dry cleaner.

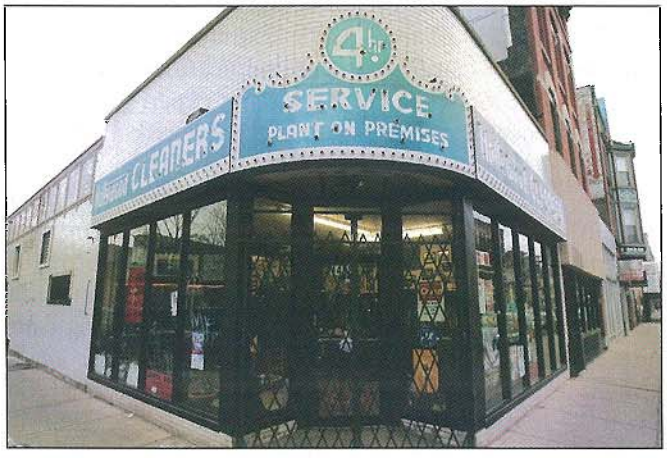
In the course of conducting due diligence environmental site assessments in urban locales, it is not unusual to find evidence of former laundries or dry cleaners on or adjacent to particular parcels.

Groundwater and soil both can be contaminated with the solvents used in the cleaning process. Typically, the solvent in question is perchloroethylene (PCE). And for much of the latter part of the 20th century, the specter of PCE contamination has hovered menacingly over the business of laundering.

PCE is an insidious solvent. Both the liquid and vapor migrate readily through imperceptible cracks in concrete floors, often resulting in extensive contamination in the underlying soils. As a dense, non-wetting solvent, PCE can migrate through the soil into groundwater. If the concentration in groundwater is high enough, drinking water wells will be shut down and, in extreme cases, contaminated aquifers can become Superfund sites.

PCE and other chlorinated hydrocarbon solvents are environmentally persistent, and remediation of soil and groundwater can be time-consuming and expensive. Identifying potential chlorinated solvent contamination is an essential part of the environmental due diligence process. The maximum contaminant level in groundwater established by the Environmental Protection Agency is a mere 5 parts per billion. So, it doesn't take much of a spill to contaminate an enormous quantity of groundwater.

One drop of PCE from a dry cleaning machine every 10 seconds for one week is enough to contaminate 100 million gallons of groundwater to twice the maximum contaminant level. In contrast, petroleum hydrocarbon-based solvents tend to be less mobile in soil and less persistent in the environment. They are less likely to migrate as vapors through cracks in concrete floors and into the soils beneath.



Looking Back

At a recent meeting of parties litigating over a contaminated site, consultants for one of the litigants tried to exonerate their client by claiming that the use of chlorinated solvents did not become widespread until around World War II. The consultants argued that because of this, their client could not possibly have contributed to the identified soil and groundwater contamination. Without commenting on the merits of this case, the principal "fact" in this assertion is anything but.

Dry cleaning reportedly originated in France in the 1840s. In the early years, camphene, benzene, kerosene, and gasoline were used as common dry cleaning solvents. Explosions and fires made this a dangerous business. Consequently, the search for a less immediately hazardous solvent soon began.

Carbon tetrachloride began its use as a dry cleaning solvent in the United States in 1898. It was probably the first widely-used, non-petroleum-based dry cleaning solvent. While gasoline continued to be the solvent of choice for several more decades, carbon tetrachloride went into large-scale production in the U.S., in 1907.

By 1930, trichloroethylene (TCE) was in vogue in the American dry cleaning industry, but was soon supplanted after a patent was issued for the use of PCE for cleaning textiles and clothes, in 1932.

By 1935, it was estimated that dry cleaners in the United States used 8,500,000 gallons of PCE, accounting for slightly more than five percent of the dry cleaning solvent use in that year. The remainder were petroleum-based solvents. But, shortages of petroleum and petroleum-based solvents during World War II increased PCE usage out of necessity. By the early 1960s, PCE had become the predominant dry cleaning fluid and it is estimated that 85 percent of dry cleaners today use PCE.

Effects of Solvents

Today's dry cleaners are facing many problems due to solvents. Landlords and shopping center owners are refusing to lease or renew leases, banks and other

Remediating the Dirt on Dry Cleaners: A Case Study

In 2006, SCS Engineers remediated subsurface perchloroethylene (PCE) contamination from a former dry cleaner that had operated in Southern California for 15 years. During investigations conducted in 2003 and 2004, PCE was detected at elevated concentrations in soil vapor and in soils. The highest concentrations were detected near the former dry cleaning machine and in the area of a suspected spill in the driveway.

A soil boring was advanced to 120 feet to define the vertical extent of PCE. A vapor extraction well constructed in this boring was used to conduct a Soil Vapor Extraction (SVE) Pilot Test to evaluate the feasibility and design parameters for a permanent SVE system.

The SVE pilot test is a "temporary" extraction of vapors from a single vapor extraction well in a worse-case location. The information from the pilot test is used to design a full-scale, permanent SVE system.

In this case, the pilot test extraction well was the only well needed to remediate the site. Following agency review and approval of the pilot test, "permanent" extraction pipelines, electrical system and fencing were installed for the final SVE system.

Following regulatory approval, the final remedial SVE system included an extraction blower capable of recovering 200 cubic feet of soil vapor per minute, and two carbon canisters to remove the PCE from extracted vapors. The SVE operated from March until October 2006, when vapor concentrations and confirmation soil testing showed the SVE system had remediated the PCE to concentrations acceptable to the regulatory oversight agency, in this case, the San Bernardino County Fire Department

The cost of Soil Vapor Extraction (SVE) remediation was budgeted at approximately $100,000. In addition, prior to remediation, an estimated $35,000 was spent conducting several phases of site investigation, as well as the SVE pilot test.

In summary, the SVE system operated 3,684 hours and approximately 581 pounds of PCE were recovered. During remediation, PCE vapor concentrations decreased from a high of 510 parts per million to a low of 3 parts per million. Soil samples collected prior to remediation showed PCE concentrations as high as 30,000 parts per billion; post-remediation samples contained a maximum PCE concentration of 22 parts per billion.

Remediation on the Southern California site is now considered complete. BFN

lenders are balking in lending money, buyers are unwilling to purchase dry cleaning properties, and insurance companies are hesitating to provide insurance—all because of concern over dry cleaning solvent contamination.

Remediation is necessary to clean up these properties. Owners must decide whether it makes sense to push for a more aggressive cleanup, or a natural attenuation/limited free product removal strategy. The former likely will mitigate environmental contamination for developers, increase the time frame of market turnover, and cost more; whereas the latter would likely save time and money, but leave more contamination in place. BFN

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