

Spill-Prevention Practices And Equipment Are A Worthwhile Investment

By Christopher W. Richter

Historically, tetrachloroethylene, also referred to as perchloroethylene (PCE), has been the primary solvent of choice for drycleaning businesses. However, similar chemicals – such as trichloroethane (TCE), Freon 113 and other, petroleum-based mixtures (paraffins, petrol, Stoddard solvent) – have been used as well. Though drycleaning utilizes a fairly closed-loop system, the potential for spills exists in nearly every stage of the process.

Environmental issues

Environmentally, there are myriad causes for concern with PCE (and other chlorinated solvents, such as TCE). Nearly three-quarters of all drycleaners are affected by some form of PCE-related environmental impact. Such impacts stem from any one of the steps involved in PCE handling at drycleaning businesses, including drum-storage areas, above- and underground-storage tanks and associated piping systems, cleaning process vessels, piping and ventilation systems, septic or dry well systems, leaking sewer lines, rooftop storm drains, groundwater pumps and spent filter disposal areas.

PCE is classified as a volatile organic compound. PCE also has a density of nearly two times that of water. Because of the chemical's weight and the fact that it is water soluble, it spreads readily upon contacting surfaces or groundwater. In fact, PCE tends to sink deeply into soils and underlying groundwater aquifers following a spill. Such impacted soils

often act as a sponge that releases drycleaning fluid to groundwater over a long period of time, thus acting as a continuing source of contamination.

It is not uncommon to detect PCE at 200 feet below the ground's surface, within groundwater that flows through cracks of the underlying bedrock. Additionally, such spills can spread to one-quarter mile or more from the property of origin via gravity and groundwater flow. Under certain conditions, PCE can naturally degrade, but this transformation generally takes decades.

PCE vapors from underlying, impacted soils or groundwater can also concentrate within structures present atop impacted soils or groundwater. It is not uncommon to detect PCE vapors in retail establishments adjacent to drycleaners and within homes and offices located within the path of the impacted groundwater.

Regulatory agencies typically require a receptor search and an up-front investigation of soils, groundwater and indoor air in order to define the extent of any impacts. The single most important factor that dictates the level of effort required by regulatory agencies in conducting drycleaning business cleanups is the presence or absence of receptors. Receptors include drinking-water wells, streams, lakes, rivers or structures where vapors may collect.

Suggested solutions

The presence or absence of receptors, spill volume, concentration, affected areas and regional geology all play a part in dictating the required remedial strategy. For example, a

clayey soil may tend to bind tightly to a spill within a localized area, whereas a sandy soil – with underlying, highly fractured bedrock – may impact an area of one-quarter mile or more.

Removal of the immediate spill area by excavation or in-ground treatment, followed by a period of groundwater monitoring throughout the entire affected area, is the most common cleanup scenario.

In some cases, contaminants can be demonstrated to degrade naturally; therefore, a shorter period of groundwater monitoring throughout the affected area is required for regulatory compliance. This method is commonly referred to as monitored natural attenuation (MNA.)

The period of MNA can often be sped up by introducing certain non-hazardous liquid mixtures to the affected spill area, which tend to oxidize contaminants or speed up the rate of contaminant digestion by naturally occurring bacteria. In rare cases involving confirmed receptor impacts, controls such as groundwater pumping and treatment, and/or vapor venting of affected structures, are required.

When it comes down to the selection of a remedial remedy for PCE and its related by-products, source- (or spill-) area soil cleanup is of paramount importance. Removal of the leaking tank, dry well or other septic structure, and repair of leaking building sewers and removal or treatment of surrounding impacted soils is key.

If accessible, soils can be excavated, transported and properly disposed of by properly licensed firms.

If the spill area is inaccessible, or too large for excavation, a proven technology called soil vapor extraction (SVE) can be utilized.

SVE is essentially the application of a vacuum and airflow to subsurface soils in order to volatilize and vacuum out volatile organic compounds such as PCE. While the benefit of source excavation is nearly immediate, the capital costs are typically much higher. SVE systems operate for a period of six months to two-and-a-half years, depending upon soil type and contaminant concentration.

Shallow groundwater impacts

run hand in hand with PCE-impacted soils. Removal of grossly impacted soils in the saturated zone (below the water table) during an excavation event will generally pay dividends in the form of shortened cleanup duration.

In the event that excavation is not an option, and underlying soils are not clayey, groundwater air sparging (AS) may be conducted in tandem with the aforementioned SVE process in order to cause the volatilization of PCE from a liquid to vapor state by introducing air into groundwater for ease of recovery throughout the vacuum process.

In the event that receptor impacts exist (e.g., drinking-water wells, surface-water bodies, indoor air), regulatory agencies may require that groundwater pumping be conducted to hold the plume in place, effectively preventing any further spread of contamination, while also slowly recovering and treating impacts over time. Such systems typically operate for five to 10 years, and sometimes even longer.

Financial impacts

Environmental liabilities associated with PCE and related product spills typically cost between \$250,000

Financial Assistance For Drycleaners

The following table briefly summarizes financial programs that may be available to assist drycleaners in the Northeast in the investigation and remediation of soil and/or groundwater that may have been impacted by a release of perchloroethylene.

State	Description	Additional Information
Connecticut	Financial assistance (grants) are available through the Dry Cleaning Establishment Remediation Fund for investigation and cleanup.	Dry Cleaning Establishment Remediation Fund (860) 270-8151 www.ct.gov/dep
Maine	No specific funding sources are available. Financial assistance may be provided if the drycleaner property is part of a larger brownfield redevelopment project. Technical assistance is available free of charge to small businesses (fewer than 100 employees) through the Small Business Technical Assistance Program.	ME Department of Environmental Protection (800) 452-1942 www.maine.gov/dep
Massachusetts	Grants are available for phase-out of equipment utilizing PCE. Financial assistance may be provided if the drycleaner property is part of a larger brownfield redevelopment project.	Toxic Use Reduction Institute (978) 934-3275 www.turi.org
New Hampshire	Funding may be available through the revolving loan fund if the property is part of a larger brownfield redevelopment project.	NH Department of Environmental Services (603) 271-3503 http://des.nh.gov
New Jersey	Financial assistance is available from state Hazardous Discharge Site Remediation Grant/Loan Program for investigation and cleanup.	NJ Department of Environmental Protection (609) 292-1251 www.nj.gov/dep/srp
New York	No specific funding sources are available. Financial assistance may be provided if the drycleaner property is part of a larger brownfield redevelopment project.	NY Department of Environmental Conservation (518) 402-8013 www.dec.ny.gov
Rhode Island	Funding may be available through the revolving loan fund if the property is part of a larger brownfield redevelopment program.	RI Department of Environmental Management (401) 222-6800 www.dem.ri.gov

and \$1.2 million to properly remedy, depending on regulatory requirements. While costs do vary from state to state (primarily due to the degree of required pre-cleanup investigations), most drycleaner remediation case costs fall within the aforementioned range.

Financial assistance does exist in the form of state relief funds and innovative cleanup technology grants. States typically offer low-interest

loans to finance investigations and cleanups.

Additionally, grants of up to 25% of remediation costs are available for the use of innovative cleanup technologies. For example, consultants recently assisted in the procurement of two loans totaling approximately \$250,000 to finance a client's cleanup.

Spill-prevention practices and equipment are a worthwhile invest-

ment for drycleaners. However, in the event a spill does occur, there are many available options to conduct and finance cleanups. **DCN**

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