Dry Cleaners: The Environmental Scourge of Commercial Real Property

Larry Schnapf

"Taken to the cleaners" can have a particularly disturbing connotation for owners, sellers, and lessors of commercial real estate.

REAL ESTATE PROFESSIONALS are generally aware of the risks posed by gas stations and tend to exclude these parcels or implement risk management strategies before acquiring title or control over properties containing these businesses. In contrast, the environmental risks of dry cleaners are often overlooked. Worse yet, dry cleaners tend to be small business with limited resources and usually do not have environmental insurance. As a result, dry cleaners are the leading source of environmental liability at commercial retail properties. This article explores the key risks posed by dry cleaners and discusses strategies for managing the risks posed by current and former dry cleaners.

HOW PREVALENT IS DRY CLEANER CONTAMINATION? • While dry cleaners are small businesses, they generate relatively large volumes of hazardous substances. EPA estimates the average dry cleaner generates 660 gallons of hazardous wastes a year. Moreover, due to poor housekeeping, dry cleaners have historically had a high frequency of spills and discharges.

Historic dry cleaners pose a particular risk to property owners because the former operations used considerably more solvents and suffered from a high frequency of spills

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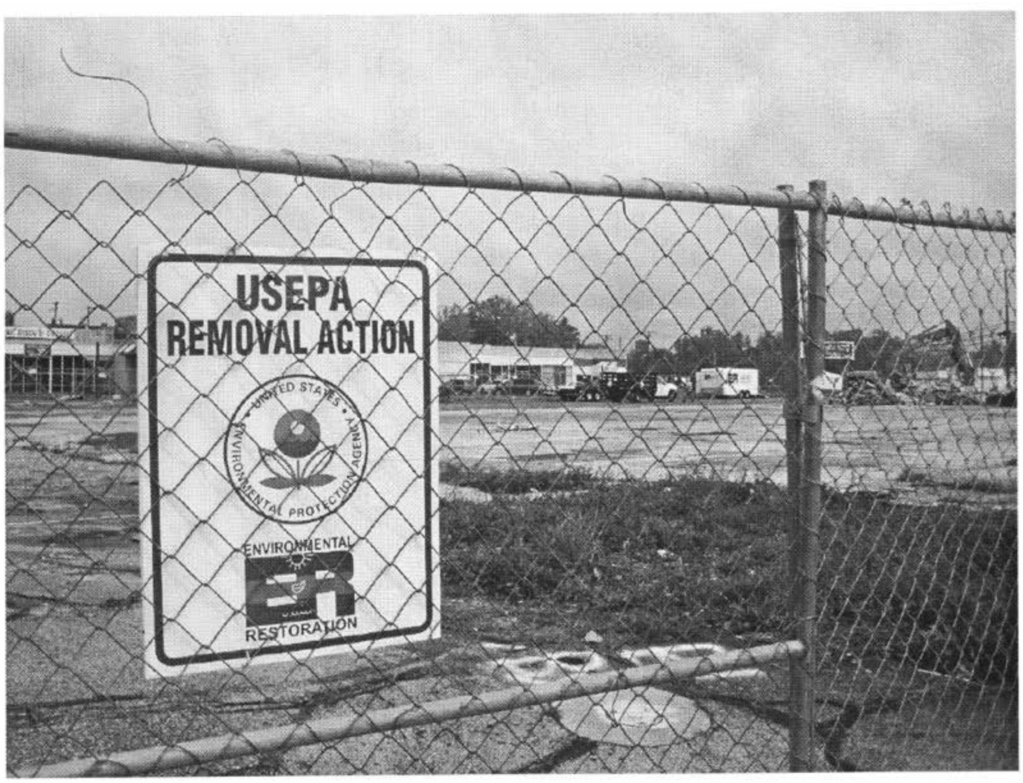
and discharges due to poor housekeeping and business practices. Yet the existence of former dry cleaners is often overlooked in due diligence or potential impacts from these operations are frequently discounted by consultants and property owners.

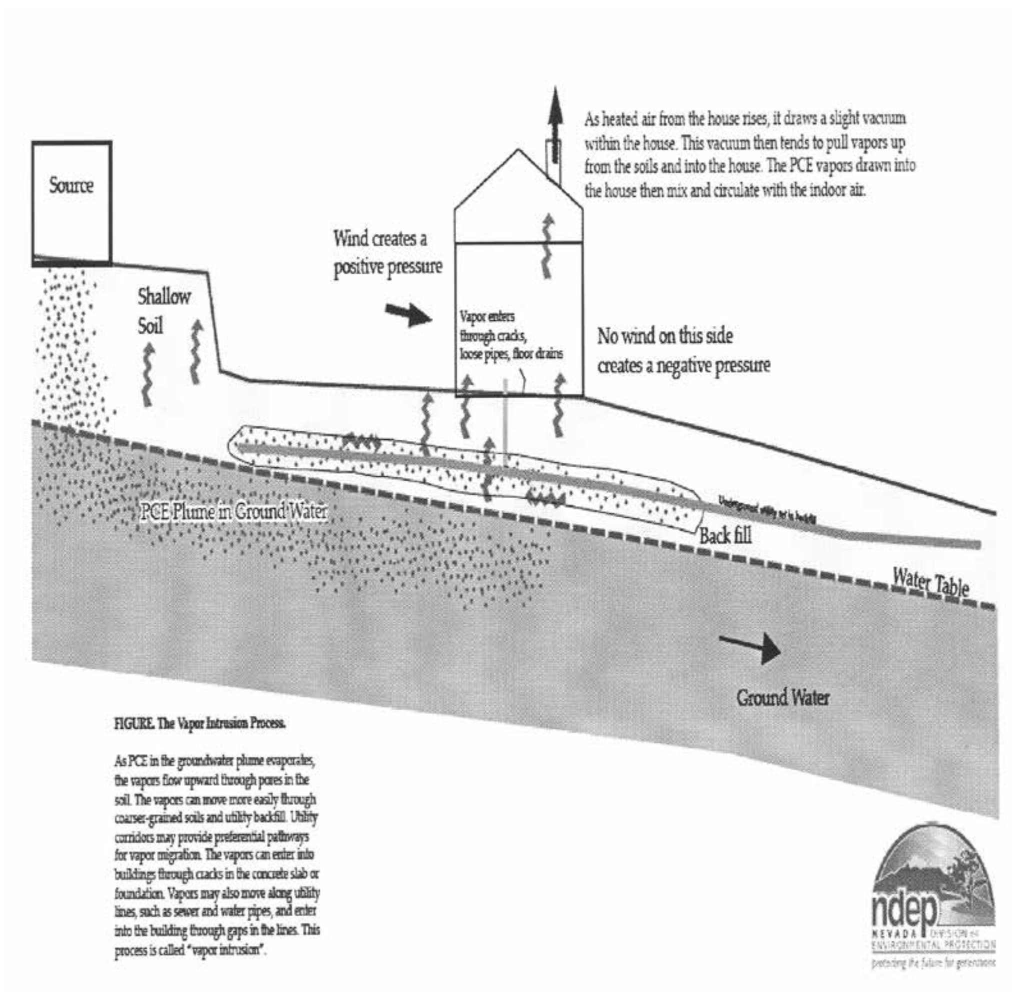
Studies by EPA, the State Coalition for Remediation of Dry Cleaners (SCRD) and others have estimated that 75 percent of the approximately 30,000 dry cleaners currently in operation have contamination (i.e., 22,500 actively contaminated sites). California studies in 1992 and 2007 found that dry cleaners are a major contributor to groundwater contamination with the leading cause of the groundwater contamination being wastewater discharges to sewers and septic systems. Over 150 dry cleaners are listed in the EPA CERCLIS and over 200 dry cleaners appear in the New York database of contaminated sites. EPA estimates there may be an additional 9,000 to 90,000 former dry cleaner sites that likely present a significant risk of contamination. According to EPA, the average dry cleaner cleanup ranges from $400,000 to $500,000 but can be as high $3 million when groundwater is impacted. EPA has estimated that the total national cleanup cost for dry cleaners could approach $7.6 billion.

Unlike petroleum contamination which may break down over time by naturally-occurring bacteria in the environment, the chlorinated solvents that are used by dry cleaners are resistant to biodegradation. As a result, groundwater contamination from dry cleaners has a greater potential to migrate off-site which can be problematic since dry cleaners are often located within proximity to residential neighborhoods. Indeed, a 2002 Florida study found that dry cleaner contamination had migrated off-site at 57 percent of the contaminated sites. A 1999 Livermore study determined that the median dry cleaner plume length was approximately 1600 feet while SCRD found the average plume to be 1270 feet. EPA reported that the 90th percentile plume length was 2585 feet and that 89 percent of dry cleaner plumes exceeded 100 feet.



It does not take a lot of solvent to contaminate soil or groundwater. A solvent leak dripping at a rate of one drop per second will result in one gallon of solvent discharged during an eight-hour work day and 320 gallons per year. One tablespoon of PCE is enough to contaminate two Olympic-sized swimming pools. Just one gallon of PCE can cause a 200,000,000 gallon drinking water reservoir to exceed the drinking water standard of five parts per billion (ppb).

In addition to cleanup costs, contaminated dry cleaner sites can expose property owners to significant toxic tort liability because these business tend to be located in densely populated areas, the contaminants do not easily degrade, are highly volatile and can migrate considerable distances. In the past, regulators were not concerned about plumes when groundwater was not used for drinking water purposes. Often times, the regulators did not even delineate the extent of the plume Now, though, many regulators are concerned about the potential for vapor intrusion when solvent plumes extend from the former dry cleaner location to residential communities. As a result, owners of property that formerly contained a dry cleaner have finding themselves subject to toxic tort litigation because of risk of vapor intrusion to residences, schools and other buildings located above the plumes.



Vapor Intrusion Illustration Showing Groundwater Plume

DRY CLEANER WASTE STREAMS • Older dry cleaners used transfer machine systems where clothes were cleaned in one machine and then the solvent-laden clothing was manually transferred to a separate dryer. Transfer systems machines were used exclusively until the late 1960s when they were replaced by dry-to-dry machines where clothes were cleaned and dried in one machine. The initial dry-to-dry machine vented residual solvent vapors directly to the atmosphere. The vapors often condensed when coming into contact with cooler air and would drip from the exterior exhaust pipe onto the surface. Third-generation dry-to-dry non-vented machines were introduced in the late 1970s and early 1980s and used refrigerated condensers to capture PCE vapors. Fourth-generation systems further reduce PCE emissions and usage by adding a carbon absorber as a secondary vapor control.

During the wash cycle on either machine, the machine cylinder is filled with soiled garments and then filled with PCE. When the high speed machine cylinder rotates, excess PCE will be forced out of the garments through the perforations in the cylinder. During the drying cycle, hot air is passed over the garments, volatilizing (evaporating) the PCE remaining in the garments. This air stream is then cooled by the condensing coils, condensing PCE vapor out of the air stream. The air stream is then reheated and recirculated over the garments.

PCE flowing from the dry cleaning machine cylinder during the wash/drain/extract cycle flows through a button trap before reaching the pump. The button trap contains a strainer and keeps buttons, pins, lint, and other small items from reaching the PCE tank, filters, and pump.

Contact Water

Contact water is any water that has come into contact with dry cleaning solvents or dry cleaning solvent vapors. Contact water contains some level of dissolved solvent. Several types of contact water are associated with dry cleaning operations: separator water, vacuum water, mop water, and process water. Other disposal practices for contact water have included discharge to the ground, discharge to storm sewers, dry wells, and pits.

Separator Water

Separator water is generated during the distillation and solvent recovery processes. The purpose of a distillation unit is to purify and recover used PCE to recycle it back into the dry cleaning system. Distillation units typically consist of steam and condensation coils. Vapors from the distillation process are condensed into a liquid which is a mixture of solvent and water. The solvent is separated from the water by gravity separation in a water separator. The recovered separator water is generally routed to a five-gallon plastic bucket located behind the dry cleaning machine. The separator water is saturated with solvent. Separator water is also recovered from steam stripping carbon adsorption units, known as "sniffers" which are used to capture solvent vapors.

Vacuum Water

Vacuum water is condensed steam from clothing pressing and pre-cleaning/spotting operations. Vacuum water generally contains dissolved dry cleaning. This is also known as press return water. Some residual dry cleaning solvent may remain on clothing. When the clothes are steam pressed, some of the solvent retained in the clothing will be dissolved into the steam and steam condensate. The contaminated steam and condensate from this operation is collected in a vacuum unit. Vacuum water samples collected from PCE dry cleaning operations generally contain PCE in concentrations in the tens of parts-per-billion range, but some samples have had PCE concentrations exceeding 100 parts per billion.

Process Water

Some drycleaners have steam-cleaned machines. The steam condensate generated by these operations is a form of contaminated contact water.

Mop Water

This is a commonly overlooked source of contact water at dry cleaning facilities. Mopping the floor at a dry cleaning facility can result in mop water that is saturated with solvent. Separator water has been used to mop floors. Mop water can collect solvent from vapors, lint and still bottoms at a dry cleaning facility. It is not uncommon, during the operation of some machines, to splash still bottoms or cooked powder residues when cleaning out the distillation unit or muck cooker. When these distillation residues are mopped up they will saturate the mop water with solvent.

Boiler Blowdown Water

To prevent scale buildup, water/steam is normally purged daily from boilers through a process known as blowdown. Normally, boiler blowdown water is not contact water. However, some drycleaners have disposed of separator water to the boiler. Dry cleaning solvent can also be introduced into the boiler from the distillation unit by backflow of still bottoms into the boiler during steam sweeping operations.

Still Bottoms

Still bottoms and cooked powder residues that are contaminated with chlorinated solvents have to be managed as hazardous wastes. Before the mid-1980s, most still bottoms/cooked powder residues were either disposed of in landfills or discharged to the ground or in dumpsters.

The waste generated from the distillation process is known as either still bottoms or cooked powder residues (from powder filtration systems). These distillation residues can contain up to 75 percent solvent by weight. Note that not all drycleaners perform distillation.

Muck/Cooked Powder Residues

Older dry cleaning systems that used tubular powder filtration systems used muck cookers to distill the residue from these systems. Muck cookers recover PCE from filter muck, which is a combination of water, PCE, filter powder, carbon, detergent, and soils. The filter waste generated by this process, known as "muck," can contain considerable solvent.

Spent Filters

Filters are used to remove suspended particles and dyes from the PCE. There are several types of filters used at dry cleaning facilities. Spent jumbo cartridge filters can contain up to one gallon of solvent. While spent cartridge filters should be allowed to drain in the dry cleaning machine overnight prior to being changed, spent cartridge filters were usually discarded as trash before the solvent was drained. A common storage point for spent cartridge filters was a cardboard box stored inside the dry cleaning facility, on the ground outside the facility near the service door or in the dumpster where residual spent solvent could drain from the spent cartridge filters onto the ground or into dry wells and storm sewers.

Solvent Vapors

A considerable amount of solvent is lost to the atmosphere as vapors in PCE transfer machine operations. Prior studies estimated that approximately 53 percent of PCE losses for transfer machine operations were through the machine vents and in clothing transfer. As a result, the initial regulation of dry cleaners focused on controlling air emissions-especially for dry cleaners located in apartment buildings.

Spotting Residues

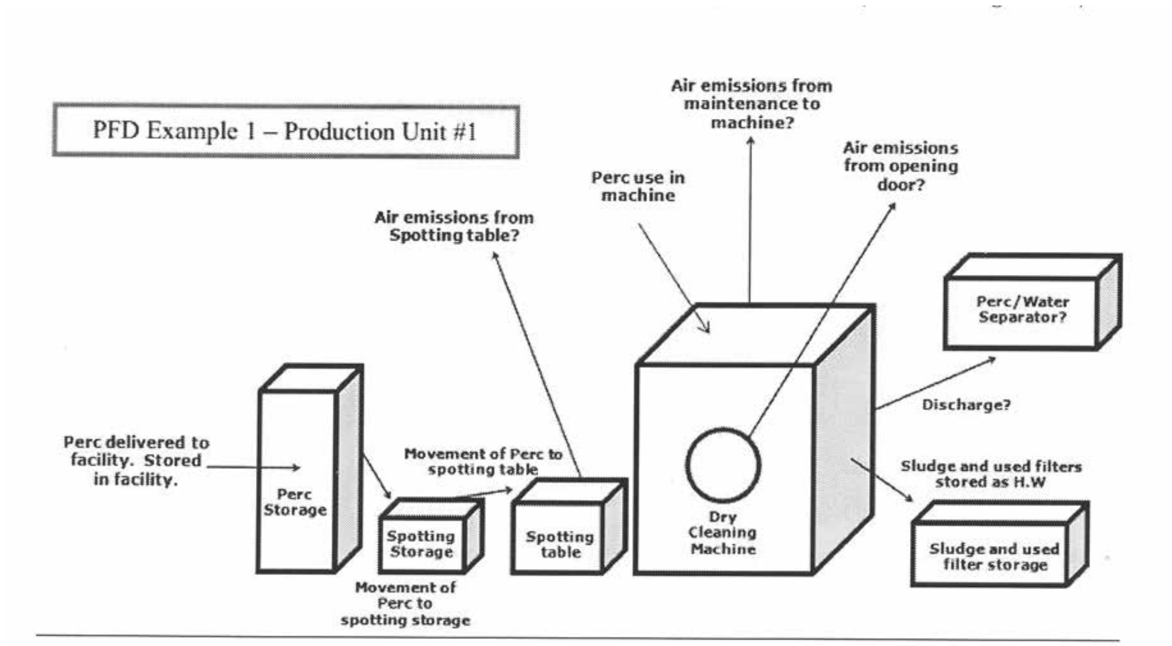
These wastes are generated during the pre-cleaning or spotting process and can contain a variety of solvents, bleaches, detergents, etc.. Spotting wastes are generally collected by a vacuum line at the spotting board and routed to the vacuum unit and a drain receptacle mounted at the base of the spotting board. Most containers of spotting agents at dry cleaning facilities are not stored in secondary containment, but instead on shelves or on the floor. Spotting board wastes historically have been discharged to floor drains that discharge to the sanitary sewer, septic systems, or to the ground.

Lint

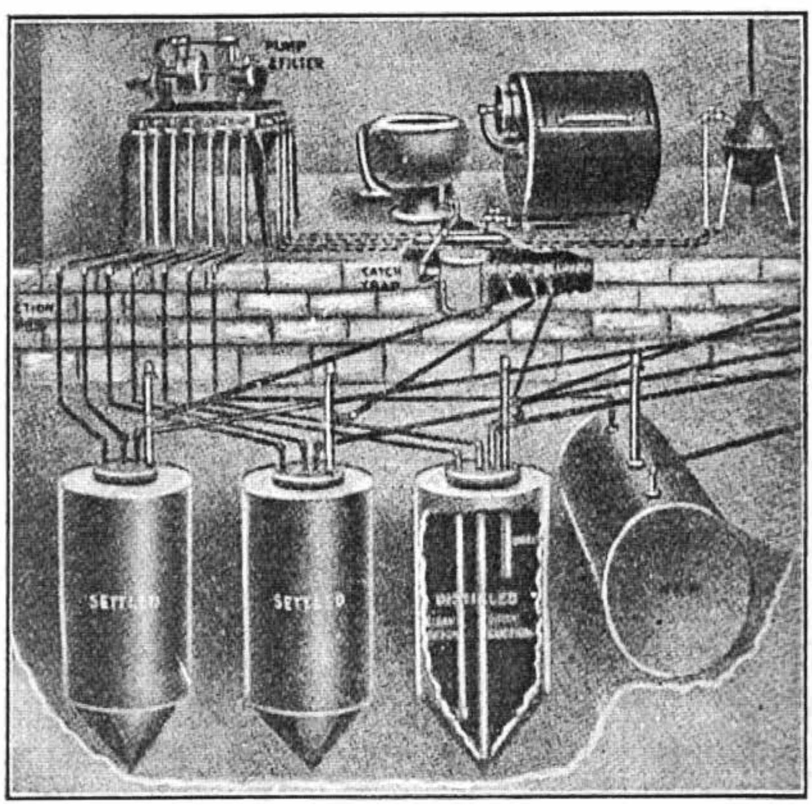
Lint accumulates in the button trap, pump strainer, bag filters and on the fins surrounding the condensing and heating coils of the dry cleaning machine. Lint generated from dry cleaning operations contains dry cleaning solvent. The lint collected from the button trap and pump strainer is saturated with solvent and could result in contamination if disposed on the ground or dumpsters.

COMMON TYPES OF SPILLS AT DRY CLEANERS • Following are the more common types of spills associated with dry cleaners:

- Spills during solvent transfer or storage;
- Spills resulting from operator error or equipment failure;
- Discharges of dry cleaning wastes into septic systems and sewers;
- Improper waste disposal (disposing used filters in dumpsters, backyard storage, etc.).

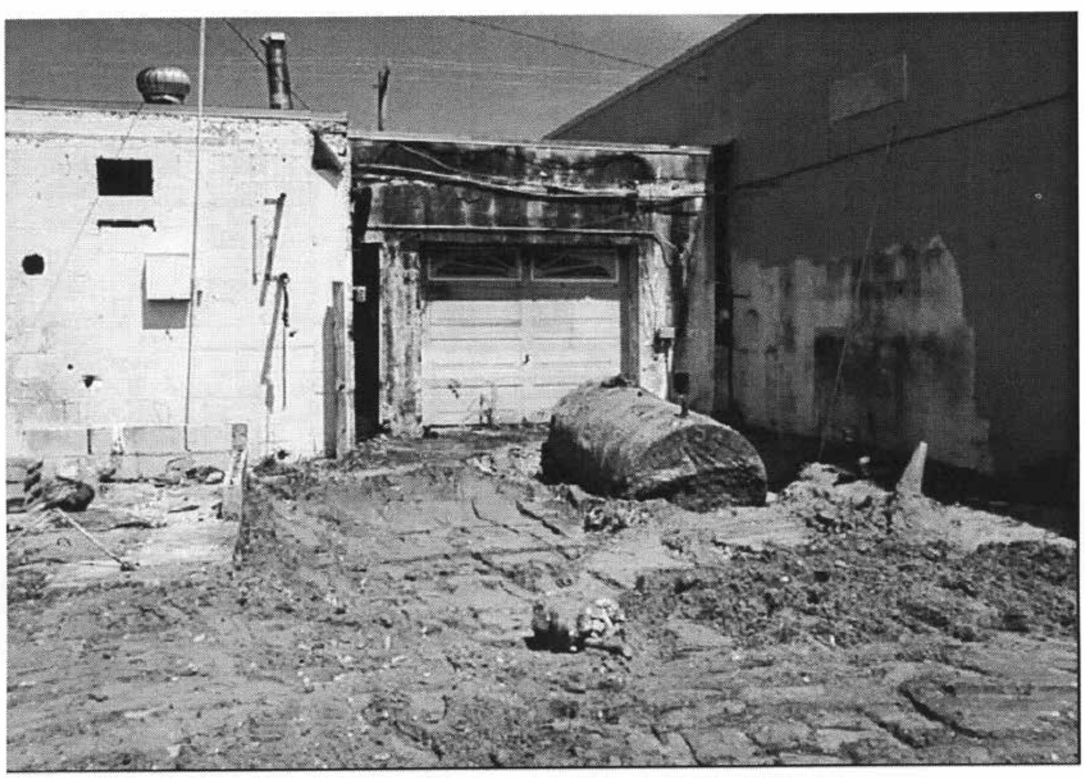


Production Unit—Areas of Potential Spillage

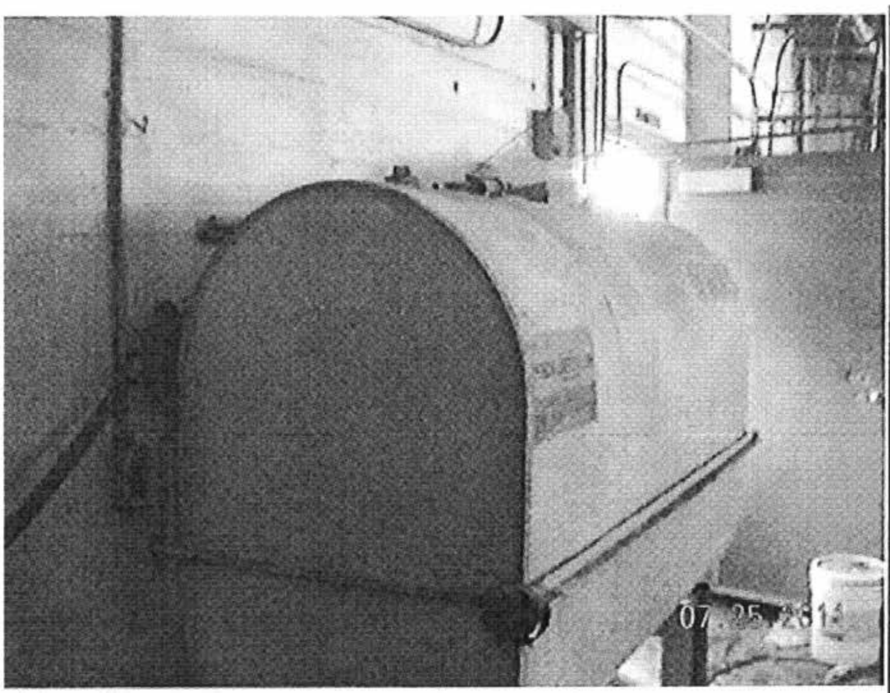


Schematic Drawing Depicting Tanks Used in Dry Cleaner Operation

Vertical and Horizontal Product Tanks at Former Dry Cleaner Site



Dry Cleaner Solvent Product UST Removal



PCE Bulk Storage Above-ground Storage Tank (AST)

Solvent delivery/Storage/Transfers

Historically, most solvent spills have occurred during delivery or transfer of solvent product. In the past, solvent was delivered to the dry cleaning facility by a tanker truck. The solvent would be pumped from the truck into a storage tank or directly to the dry cleaning machine. Currently, solvent is usually delivered by drums that are either placed below the dry cleaning equipment or placed within proximity of the equipment. PCE is either directly piped from the drum to the dry cleaning equipment or manually transferred using buckets or containers from the drum to the dry cleaner equipment.

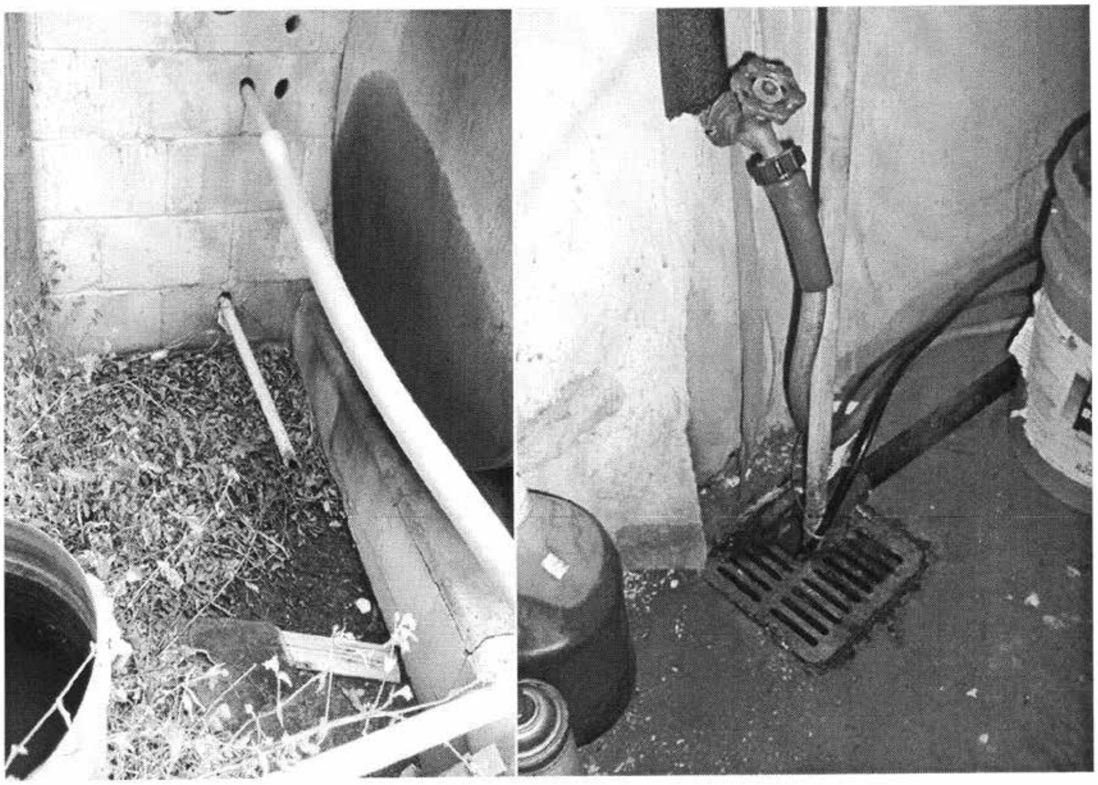
The six leading scenarios for product delivery/transfer spills at dry cleaners are:

- Transfers from tanker trucks;
- Delivery hose uncoupled from tanker truck and reeling hoses back to the truck;
- Overfilling of solvent storage tanks;
- Transfer of solvent from an AST though leaking values or spills from buckets;
- Overfilling AST or dry cleaning machine;
- Operation/equipment failure/poor maintenance.

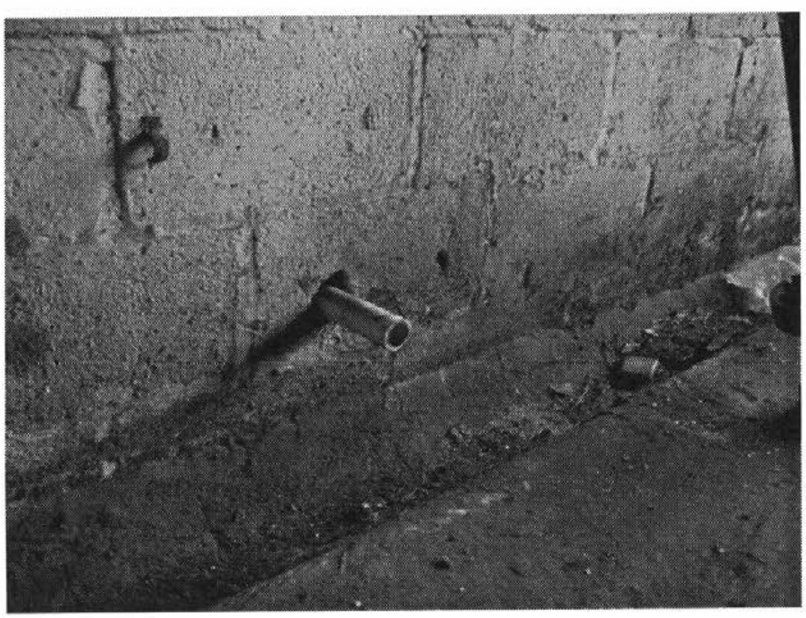
Operator Error/Equipment Failure

Operator error and inadequate maintenance are a common source of PCE spills. Common operator errors include still boilovers, clothing caught in the machine door, loose cartridge filter housings, overflow of water separator, and open valves. However, studies suggest that the largest number of reported spills/discharges were associated with equipment failure such as leaking door and filter gaskets and seatings, seals, hose and pipe connections, fittings, couplings, valves and pumps. Another significant source of potential PCE emissions for dryers was the intake and exhaust dampers on exhaust systems. For the transfer systems, significant leakage occurred during transfer of garments that are not adequately dried for transfer. PCE spilled onto bare floor concrete can eventually pass through the concrete into the environment.

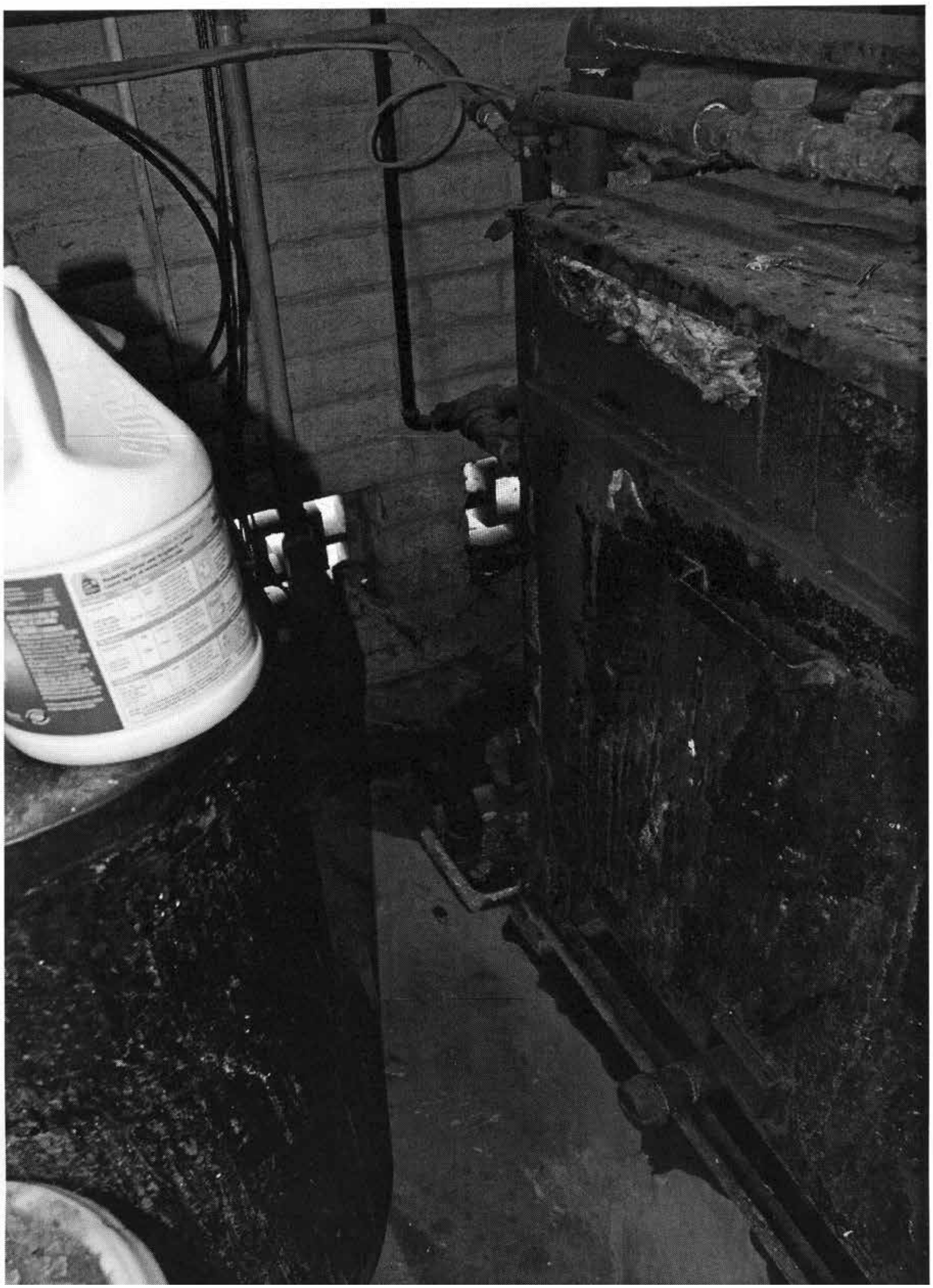
A 2002 Florida study found that the largest source of reported spills/discharges was associated with dry cleaning equipment failure (39.2 percent of reported discharges). Equipment leaks can be the result of equipment wear and corrosion; expansion and contraction of metal from temperature changes; and vibration of equipment. The most common source of equipment spills was leaking door gaskets followed by leaks associated with piping and hoses, coupling failures (failed hose clamps, and piping joint failures). Other common sources of equipment leaks were associated with distillation units, gasket failures for button traps and cartridge filter housing.



Discharge points: to Bare Ground (left photo) and to Floor Drain to Sewer (right photo)



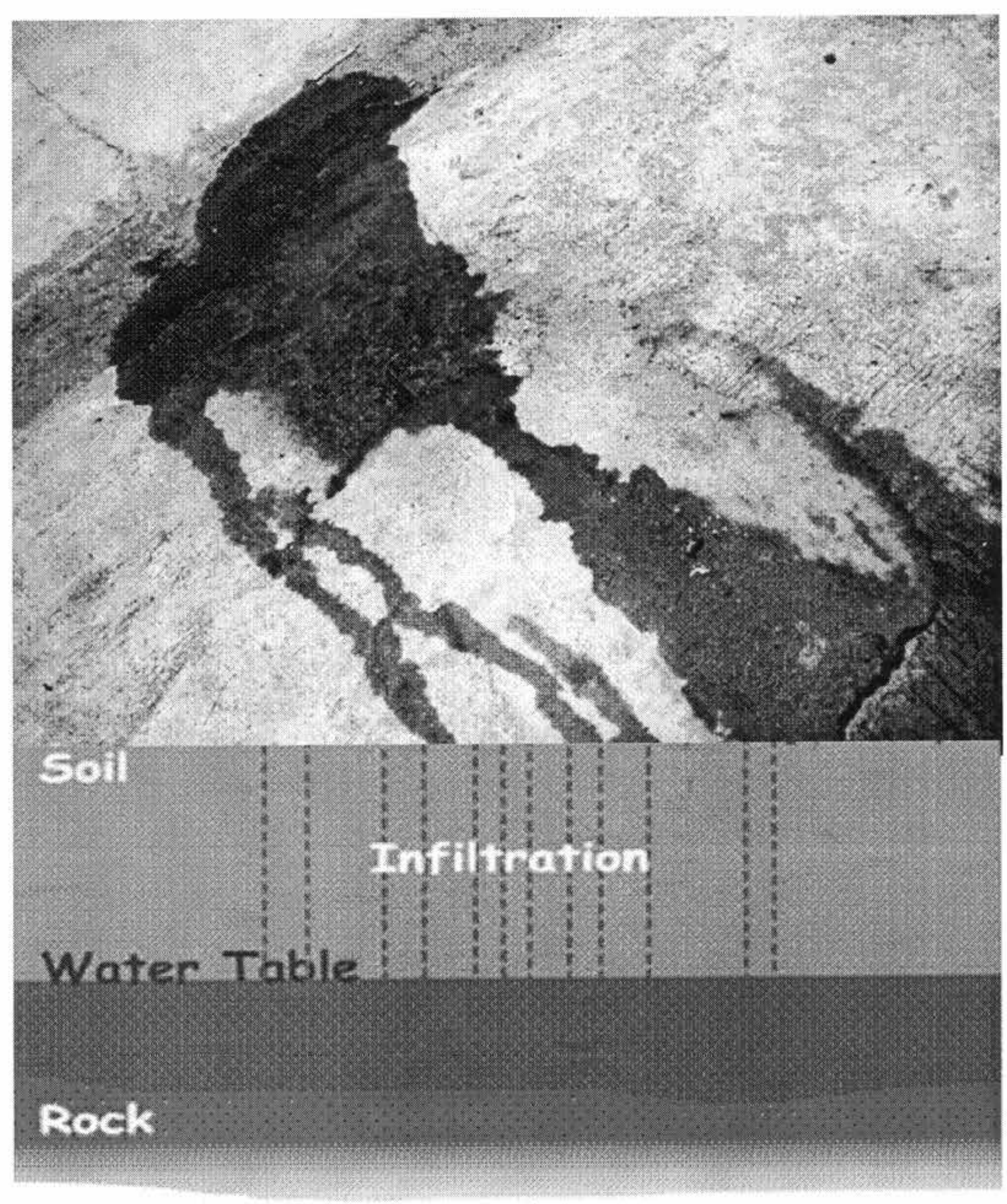
Trench Leading to Floor Drain



Hose Discharging to Sump

Discharge to a Septic System

Remnant of a Septic Tank at a Former Dry Cleaner



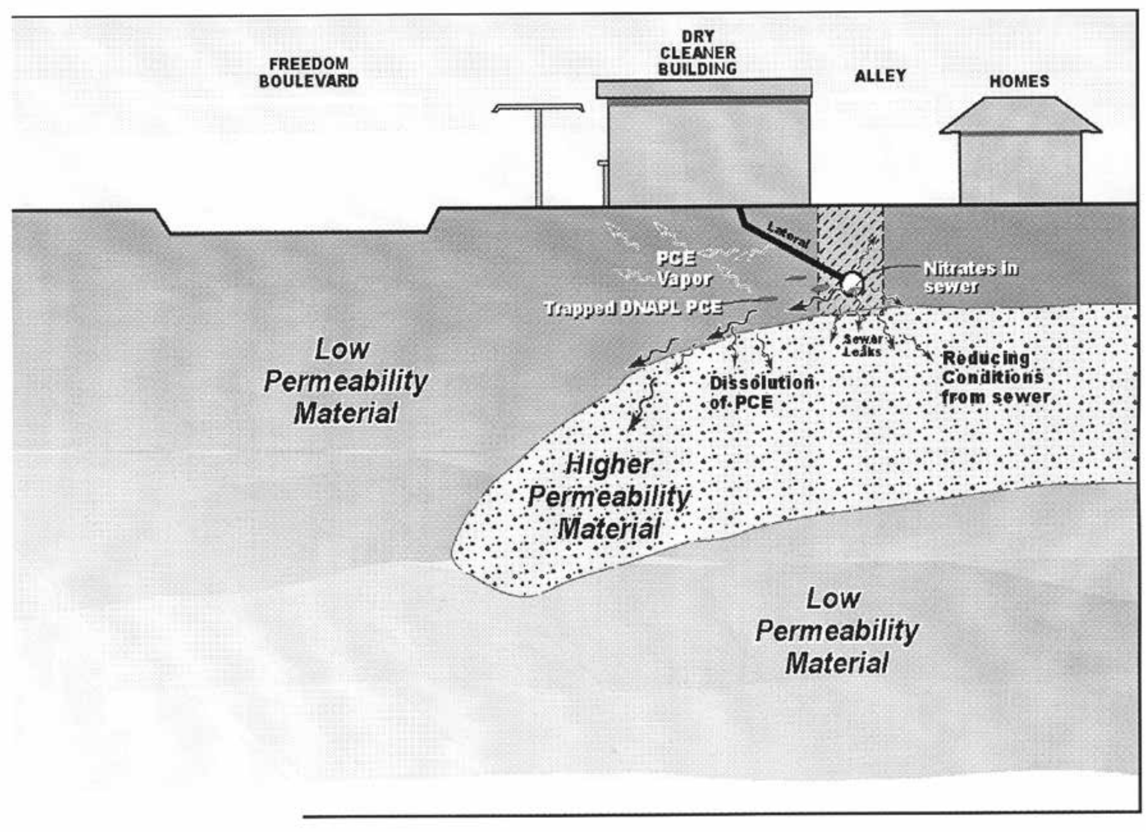
Spills from operator failure were also often due to boilovers of solvent/distillation residues from distillation units-usually from overfilling the distillation units or excessive operating temperatures

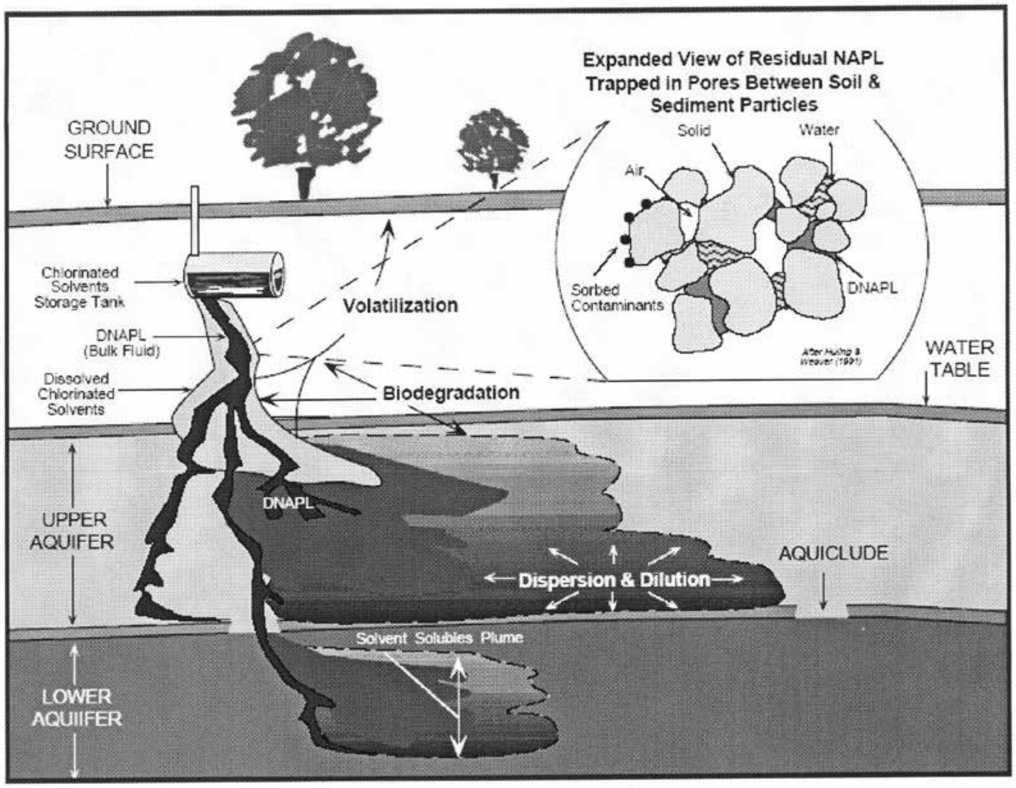
Today, most dry cleaning solvent is delivered in drums and pumped into the dry cleaning machine where it is stored in tanks located in the base of the machine.

Discharges to Septic Systems or Sewers

Discharges of solvent-laden separator water to sewers and septic systems pose the greatest cleanup and toxic tort liability. A 1988 survey by the International Fabricare Institute (IFI) found that 71 percent of the dry cleaners discharged separator water either down the sanitary sewer or into septic systems.

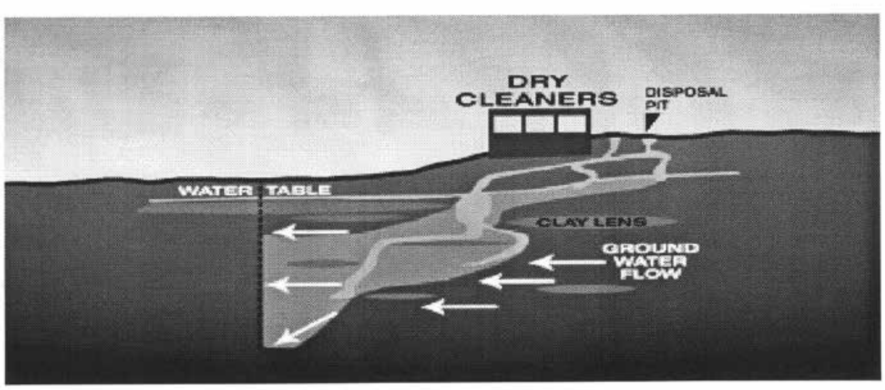
These discharges can result in significant soil and groundwater contamination problems and may allow solvent to travel considerable distances from the dry cleaner, often into residential communities where vapor intrusion becomes a concern. For example, a 1992 well investigation program conducted by the Central Valley Regional Water Quality Control Board in California identified 20 PCE-impacted drinking water wells in Central Valley towns where dry cleaners were the likely source of PCE. The study concluded the main discharge point for dry cleaners was the public sewer line. Other studies have found free-phase PCE in sewer lines serving dry cleaners. A 2007 study by the Santa Clara Water District concluded that past dry cleaners that operated as long as 50 years ago pose a greater threat to groundwater than current dry cleaners.





If a historic dry cleaner has been identified for a property, it is important to determine if a property was serviced by septic systems in the past.

OTHER DISCHARGE SCENARIOS • It was common in the past for dry cleaners to store spent cartridge filters outside the back service door where solvent drained from the filters onto bare ground or pavement, or disposed dispose solvent wastes into dumpsters where the solvent escaped into the environment as runoff into dry wells, stormwater drains or bare soil.



STATE DRY CLEANER FUNDS: DO NOT BE FOOLED! • A dozen states have established dry cleaner programs that will fund investigation and remediation of dry cleaners. Program eligibility, the scope of liability relief, and funding is highly variable. Indeed, SCRD estimates that these state trust funds will only be able to finance cleanups at 5,000 sites.

Purchasers, lenders, environmental consultants and real estate lawyers often find that after a site has been enrolled in a state dry cleaner program it is assigned a low priority. However, most state programs prioritize sites based on impacts to drinking water and do not take vapor intrusion into account when ranking sites for funding priority. Thus, while owners may be sitting back waiting for their sites to receive funding, vapors from the migrating plume could be wafting into residential neighborhoods or in into other sensitive tenant spaces such as day care centers or schools, exposing the owner to potential toxic tort liability.

SHOULD HISTORIC DRY CLEANERS BE RECs? • Because the ASTM E1527-13 Phase 1 standard definition of a Recognized Environmental Condition (REC) refers to conditions indicative of a release or threatened release of hazardous substances, consultants normally do not identify a current or former operation as a REC simply because it uses hazardous substances. Instead, the consultant usually needs to find evidence of a current or past release (e.g., staining) or threatened release (e.g., rusting drums) before identifying a condition as a REC. (See *ASTM Publishes New Phase 1 Standard—But Will It Matter?* 30 Prac. R. Est. Law 5 (March 2014) for more information about the ASTM E1527-13 standard practice for Phase 1 environmental site assessments.)

The challenge in assessing the risks of a past dry cleaner is that the typical signs of past spills has been removed because the location that was occupied by the dry cleaner usually has been renovated and is now occupied by a new tenant, or the shopping center buildings may have been reconfigured. In the absence of such evidence, the consultant is left to rely on its professional judgment and experience. Because of the frequency of spills and poor housekeeping that was known to have existed in the dry cleaning industry, consultants will often identify former dry cleaners as RECs.

In addition, because of the potential for vapor intrusion is now evaluated as part of the Phase 1 process, consultants may identify off-site dry cleaners that are located within the critical search distance (100 feet) from the property as a Vapor Encroachment Condition (VEC) and recommend sampling to determine if vapors have reached the property.

WHAT TO DO WHEN A CONSULTANT IDENTIFIES A REC OR VEC • When a consultant identifies a current or former dry cleaner at a property as a REC or an adjacent dry cleaner as a VEC, consultants will usually recommend sampling to determine if there are in fact vapors at or beneath the property. As we discussed in *How Phase 1 Reports Can Hurt Your Client,* 27 Prac. R. Est. Law 5 (November 2011) consultants are only required to identify releases of hazardous substances (RECs in ASTM parlance) and are not obligated to make recommendations. Because clients can lose their liability protections if they do not timely implement recommendations, we suggested in the article that recommendations not be included in Phase 1 reports but instead be discussed in a side letter to counsel.

Just because a consultant recommends a sampling does not mean a property owner or lender should implement the recommendation. It is important to understand the consultant's rationale for recommending additional investigation. A decision to proceed with sampling will depend on site-specific factors (such as depth of groundwater, the local geology, proximity to sensitive receptors), the enforcement posture of the state regulator and the risk tolerance of the property owner or lender. Evidence of spills at a current dry cleaner where groundwater is shallow and used for drinking water is a different risk profile than a site where a dry cleaner may have operated for a couple of years, groundwater is 200 feet deep and the area has always been connected to public water. If the property is located in a state that does not require groundwater cleanup and the local groundwater is not being used, the principal risk posed by the dry cleaner would be vapor intrusion at the property or nearby properties if the plume has migrated off-site. If the chief concern is vapor intrusion at the property, the owner could consider installing a sub-slab depressurization system (SSDS) as preemptive remedy to cut off potential human exposures in lieu of sampling. If there is concern that there may be a plume that is migrating towards residential properties and groundwater is not used, the better option is often for the owner or lender to obtain an environmental insurance policy to cover potential toxic tort claims (i.e. bodily injury or property damage claims).

If the owner proceeds with sampling to assess impact of a current dry cleaner tenant, the sampling will usually involve drilling near the dry cleaner equipment, material storage areas and outside near the rear entrance of the dry cleaner space to collect soil, soil gas and groundwater sampling. If the dry cleaner is no longer operating at the property, samples will probably be collected from outside the tenant space to avoid interfering with the current tenant. Since a VEC will involve an off-site dry cleaner, where access may not be granted, samples would probably be collected from the boundary of the property closest to the dry cleaner to determine if vapors or contamination has migrated beneath the property.

Mitigation is the usual option when the risk at the property is vapor intrusion and involves installation of an (SSDS) which is like a radon mitigation system. The SSDS creates negative air pressure under the slab of the building to prevent vapors from migrating into the building. The vapors will be collected by the SSDS and the vented to the roof. When proceeding with mitigation, the property owner will need to decide if the work should be done under state supervision by enrolling in a state voluntary cleanup program or simply have their consultant design an SSDS without any regulatory oversight (known as "self-directed" or "at risk" mitigation). The benefit of conducting mitigation with regulatory oversight is that the property owner will know that the SSDS is properly designed, what standards need to be attained, when the SSDS can be turned off and that the project will receive a no further action letter. Lenders tend to prefer that the work be performed under regulatory supervision. However, obtaining regulatory approval will be more expensive and take longer than a self-directed mitigation since the regulator will likely require more sampling and reporting/certifications.

Another option may be obtaining an environmental insurance policy. A pollution legal liability (PLL) policy can provide coverage for on-site and off-site cleanup as well as toxic tort claims. Lender policies are also available that will pay the lesser of the cleanup costs or the loan balance. Environmental insurance policies are generally only available for unknown conditions so insurance may not be available if sampling detects on-site contamination. However, it might be possible to get coverage for off-site toxic tort claims depending on the sampling results. Environmental insurance can be obtained for up to 10 years for a one-time premium. Pricing has become very competitive during the past year or so.

CONCLUSION • Finally, while current dry cleaners use significantly less solvent and equipment that is less prone to leaks, improper maintenance and operational practices can still result in releases to the environment. Property owners should ensure that dry cleaning tenants use best management practices such as having solvent-grade epoxy floor coating and secondary containment for the drum storage areas as well as the dry cleaning equipment.