

Environmental Evaluation of Dry-Cleaning Industry

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Adaptability is commonly known as a key success factor in the dry-cleaning industry. As a result of its long history, widespread presence and many well-known environmental concerns, dry-cleaning professionals have grown accustom to inheriting demanding business practices that adhere to ever-evolving industry standards.



Although the dry-cleaning industry is highly fragmented and numerically in decline, it is still widespread across the United States and faces an increasingly stringent environmental regulatory burden.

SECTION I

Solvents – Background, Current Types

The first dry-cleaning businesses reportedly started in Paris, France circa 1820 and in the U.S. circa 1840. Initially, the use of low flash point, highly flammable, petroleum-based solvents led to most facilities being located outside of cities due to the increased fire hazard they posed. To reduce this hazard, the U.S. Department of Commerce required dry-cleaning solvents to have a minimum 100-degree flash point in 1928. This led to a rapid switch to Stoddard Solvent which met the new requirement. PCE, which is non-flammable, was reportedly first used in the industry in the early 1930s¹. The perceived safety of PCE led to its rapid and widespread growth of usage throughout the industry.

Dry-Cleaning Solvents Currently Used and Environmental Cleanup Considerations

Perchloroethylene (PCE): Various Estimates Centered Around ~ 50% Of The Market, Some Current Estimates Still As High As 65%² Peak Market Share At Over 90% In Late 1990s

- PCE remains the most common chemical solvent used in dry-cleaning industry, particularly in the retail segment, for many reasons including its proven cleaning ability and installed equipment base.
- Denser than water, cleanup costs for a PCE release can rapidly add up when the contaminant sinks into deep fractured bedrock making removal difficult and time consuming. Remediation costs in excess of \$100K are routine and often over \$500K. In fact, it is not unusual for these costs to exceed \$1MM.
- The growth in third-party bodily injury risk appears to be increasing. As expanded on later in this report, a 2020 EPA issued draft re-evaluation of PCE health risks required by 2016 amendments to the Toxic Substances Control Act (TSCA) notes PCE presents an “unreasonable risk to” numerous groups including “bystanders”.
- Common products include Exxon-Mobil’s DF-2000, Chevron Phillips’ EcoSolv, and Pure Dry. These petroleum-based solvents are less effective than PCE. DF-2000 is a high flashpoint synthetic paraffin (petroleum) dry-cleaning solvent.
- A market negative for hydrocarbon solvents is the reported characteristic of leaving a strong odor on garments.
- Environmental considerations are difficult to evaluate due to numerous variations in the product category and much shorter history of current petroleum products.
- General clean-up expectations tend to be lower in costs and time required than PCE due to hydrocarbons being lighter than water. This would tend to avoid releases entering deeper aquifers and fractured bedrock with associated clean-up difficulties.

Hydrocarbons: ~10% And Growing Share Of The Market

<p>Co2 And Supercritical Co2: Unknown % Of Market</p>	<ul style="list-style-type: none"> • CO2 cleaning involves converting carbon dioxide from gas to liquid which is then used to clean the clothes. After cleaning, the carbon dioxide is reconverted to gas and then disposed. It is the most expensive method of dry-cleaning. • The Dry Cleaning and Laundry Institute (DLI) notes this method as having a “fairly low cleaning ability” in a 2007 report. The effectiveness has been increased through the addition of surfactants and other additives, and it is considered the most effective for removing soot and odors from a fire. Other than future greenhouse gas concerns, existing environmental risk appear to be very low to non-existent.
<p>Liquid Silicone, Decamethylcyclopentasiloxane (D5): Unknown But Growing % Of Market</p>	<ul style="list-style-type: none"> • GreenEarth introduced and popularized this silicon-based solvent in 1999. An October 2016 piece published by GreenEarth noted the number of stores supplied worldwide at over 1,600. This has grown to over 6,000 stores worldwide with over 1,000 machines installed in the U.S. (June 2020, GreenEarth website). As locations often have more than one machine, it is unclear how many U.S. locations exist. Although many consider it as effective as PCE, it is reportedly more expensive. As a positive, it degrades in the environment within days.

There are several additional new solvents in use including:

- **Glycol ethers**
 - Rynex Holdings, LTD developed the solvent marketed as Rynex in 1995.
 - Solveair (aka Solvair), a dual system of cleaning with Glycol Ether and extraction with liquid CO2.
- **Impress** introduced by the Lyondell Chemical Company in 2004.
- **DrySolv™ (n-propyl bromide)** introduced by Enviro Tech International in 2006.
- **Solvon K4 (dibutoxymethane)** introduced by Kreussler in 2010. Solvon K4 is listed as a possible ‘Dangerous Waste’ in Washington State³.
- New, high flash-point synthetic petroleum solvents.

Despite its name, dry-cleaning involves the use of a solvent other than water to wet clothes in a cleaning process.

As the dry-cleaning market continues to evolve, New York has taken additional regulatory precautions. Any dry-cleaner solvent used in New York must be approved prior to use. Machines using only water or liquid carbon dioxide are not regulated. The [NYS DEC website](#) lists over a dozen state approved solvents other than PCE.

Some reliable old solvents reportedly still in use for isolated niche applications include:

- ✓ Benzene
- ✓ White gasoline
- ✓ Stoddard solvent
- ✓ Higher 140 flash solvents

Importantly, ‘green’ dry-cleaning has come to mean any dry-cleaning process that does not use PCE. As a result, even petroleum-based dry-cleaning solvents are commonly marketed as being ‘green’. Environmental considerations for the various new niche solvents have largely not been evaluated to date. Environmental considerations for the older existing solvents are expected to largely mimic those of the hydrocarbons group.



Industry Equipment

After WWII, smaller equipment and safer solvents allowed the industry to move into city centers and other populated areas. Modern dry-cleaning machines have undergone steady improvements.

Machines are commonly referred to by design generation:

1st Generation	Earliest machines, transfer required between wash and dry machines.
2nd Generation	Dry-to-dry machine. No transfer needed following wash
3rd Generation	Improved dry-to-dry machine. Earliest vapor recovery systems still vented to atmosphere however.
4th & 5th Generation	Enhanced vapor recovery. Referred to as closed loop integral to machine. Newest machines are not vented to atmosphere.

The length of the wash cycle depends on the solvent and soiling, typically ranging from 8-15 minutes for PCE and at least 25 minutes for a hydrocarbon solvent due to its less aggressive cleaning. Total wash and dry times are compressed in the newest machines to 45 minutes+/-.

A modern dry-cleaning machine's ability to both clean and dry garments in one machine is a key difference from early machines where drying required transfer of clothes between two machines. Transfer machines often resulted in a steady, repeat release of solvent drippings onto a facility's floor.

Cost variation appears to be driven by equipment size with larger machines capable of handling very large, heavy commercial loads holding the highest price point.

Industry Establishments

The dry-cleaning industry is highly fragmented with no single operator accounting for more than 2.0% of industry revenue, and the top 50 industry operators estimated at less than 9.0%.

The industry has undergone significant restructuring over the past five years, with what were once-major companies downsizing considerably or exiting the industry altogether. [US Dry Cleaning Services Corporation](#), which owned more than 40 locations across the Country in 2018, is nearly nonexistent with stores shuttering without notice to customers or the community. Its website currently consists of a single webpage noting all locations are currently closed due to COVID-19.

In contrast as well as temporarily setting aside COVID-19 concerns, some new operators have reportedly flourished by making use of pick-up and drop-off locker services and at-home delivery services.

New entrants⁴

- Rinse, a company started and headquartered in San Francisco and now in Los Angeles, Washington, D.C., Chicago and Boston
- Press 4 Time and other brands under the Huntington Group
- Cleanly (NYC)
- U2Laundry (Charlotte, NC)

Some established entrants include:

- Martin Franchises of Martinizing fame (one-hour service) is an industry entrant from 1949 with 170 sites
- Huntington Group, is the largest dry-cleaning franchiser in the U.S. with over 400 franchise stores when considering their entire family of brands – its largest brand being the Certified Restoration Drycleaning Network (CRDN) which works closely with insurance companies on fire and water damage claims⁵.
- Although not confirmed, CO2 dry-cleaning is reportedly the most effective for removing soot and odors from a fire (see note earlier), this may be the solvent of choice for CRDN. Surprisingly, even as the largest industry operator, Huntington Group only commands 1.6% of the industry market (IBISWorld).

Did you know?

- IBISWorld estimates machine cost between \$50K and \$250K.
- GreenEarth advertises its silicone-based cleaning machine cost as varying between \$35K and \$90K.



Business scaling appears to be very difficult. A challenge many industry entrants face is increasing their market share. For this reason, we see a limited number of large or chain dry-cleaning companies and many smaller, mom and pop dry-cleaners.

"The barriers to entry into this space – to get up and running and start serving a handful of customers – are pretty low. It's the barriers to scale that are incredibly high," Ajay Prakash, Co-founder and CEO of Rinse, said.

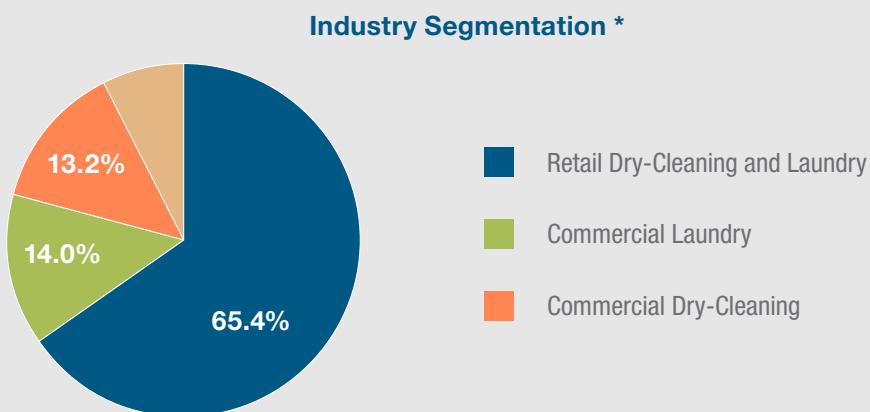
Industry Segmentation

Dry-cleaning falls under NAICS 8123: "Drycleaning and Laundry Services" and more specifically as NAICS 812320.

NAICS industry descriptions are divided into three groups:

1. Retail dry-cleaning and laundering services; includes drop-off and pick-up sites and those offering specialty cleaning such as for furs, wedding gowns, draperies and more
2. Coin-operated laundry facilities
3. Commercial companies that generate the majority of its revenue from linen and uniform rentals

IBISWorld further segments the industry by breaking out commercial into laundry services and dry-cleaning services.

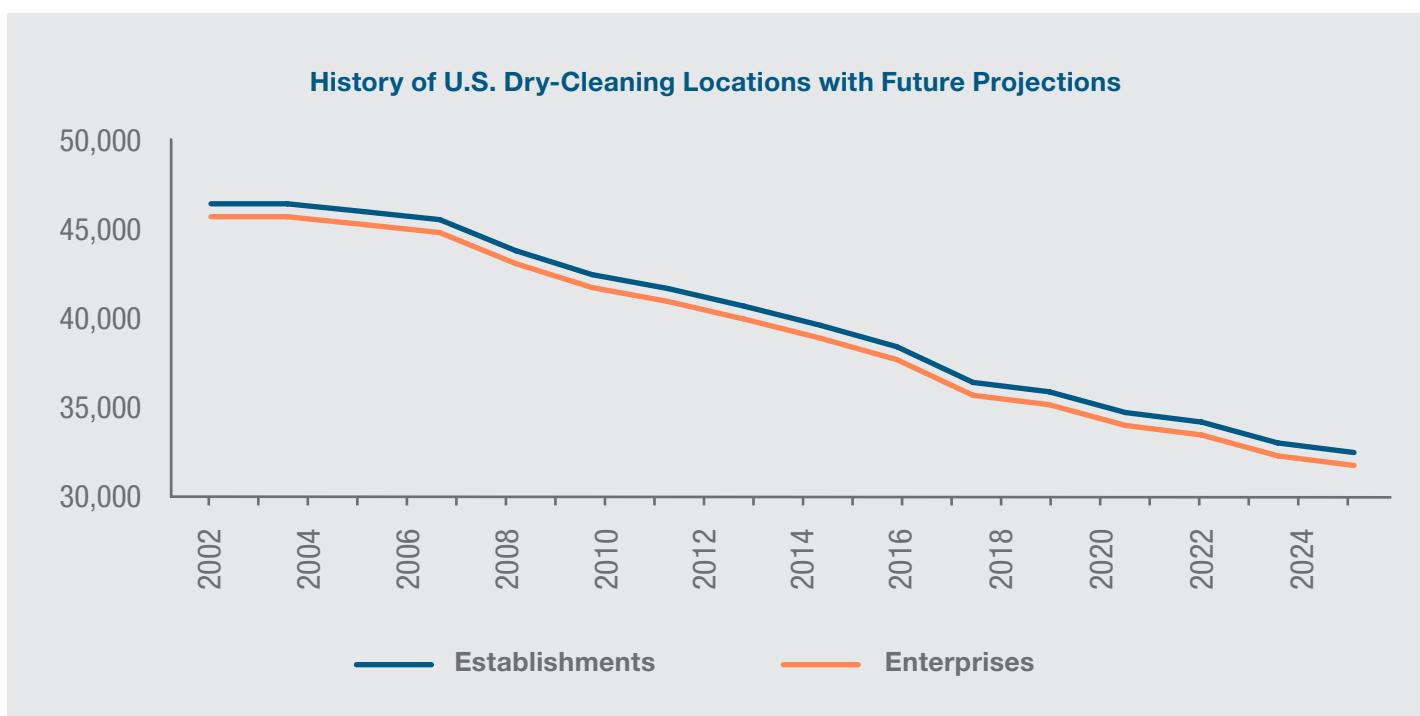


The largest commercial clients of full-service laundry are hospitals, restaurants and hotels. Over the next five years, hospitals are expected to experience robust demand because of rising per capita healthcare expenditure. Prior to COVID-19, demand from the hospitality industry was expected to similarly rise as the trend of Americans dining out and taking domestic trips has risen. It is unclear how much the growth in each of these markets will drive corresponding growth in commercial dry-cleaning services versus laundry services.

While being only slightly less common than the commercial linen and uniform laundry segment, commercial dry-cleaning appears to be an area of growth in an otherwise challenged industry. It is likely that many commercial laundry and dry-cleaning facilities are co-located.

Industry Key Trends and Stats

IBISWorld notes that the dry-cleaning industry displays the characteristics of an industry in the declining stage of its life cycle. This indication supports the fact that the industry's small contribution to the overall economy is expected to continue a decline at a projected annualized rate of 1.1%. Moreover, other indicators of the decline stage include falling employment, low profit margins, a consistent stream of enterprises exiting the industry and intensifying competition from substitute products and other industries.



An expansion on some key industry trends include:

- ✓ The industry has experienced increasingly challenging and unfavorable operating conditions due to declining demand for professional dry-cleaning services, unfavorable shifts in consumer preferences including purchasing more low-maintenance garments and a shift to business casual wear.
- ✓ The industry has been subject to a wide range of increasingly stringent federal and state environmental regulations regarding the use of perchloroethylene (PCE).
- ✓ The industry has undergone significant restructuring over the past five years as declining demand and relatively low profit margins has forced many operators to exit the industry.
 - ✓ The total number of establishments/locations has decreased an annualized 2.0% over the last five years to 34,696 and is projected to decrease to 32,055 by 2025.
- ✓ Similarly, the number of industry enterprises in 2020 fell to 32,380 and is forecasted for continual decline at an annualized rate of 1.6% to 29,870 operators by 2025.
- ✓ With the larger commercial clients being hospitals, restaurants and hotels, industry operators have increasingly targeted commercial markets to hedge against reduced retail demand.
- ✓ Total industry revenue for 2020 decreased to \$9.2bn
- ✓ Aggregate industry annual growth for 2015-2020 showed a decrease of (0.8)%
- ✓ Aggregate industry annual growth for 2020-2025 is projected to decrease (1.1)%
- ✓ Low profit margin of 8.8%

IBISWorld expects industry revenue to continue declining over the next five years to 2025 due to unfavorable shifts in consumer preferences that will continue to diminish demand for dry-cleaning and full-service laundry. Steadier demand from commercial clients is expected to lead more operators focusing on this segment.

Despite these negative trends, the industry remains highly competitive, localized and fragmented.

Industry Environmental Regulation

Continued tightening of environmental regulations, particularly in respect to use of PCE, will likely force many retail dry-cleaners out of the market, predominantly older single-shop facilities that still use PCE. A history of how various regulations impacted PCE use and more broadly the dry-cleaning industry⁶ with increasingly stringent regulation follows:

1963	Clean Air Act is enacted to include national emission standards for hazardous air pollutants (HAPs). PCE is later designated a HAP (see 1985).
1972	Clean Water Act (CWA) is passed which regulates indirect discharges such as to Publicly Owned Treatment Works (POTWs) through a public sewer system. It also requires industrial facilities to pretreat their waste. The CWA provision that typically applies to dry-cleaners is the NPDES, which controls both direct discharges to surface waters and indirect discharges through POTW pretreatment program.
1974	Safe Drinking Water Act – In addition to developing national drinking water standards via Maximum Contaminant Levels (MCLs), the EPA also regulates underground injection of liquid wastes under the SDWA to protect groundwater sources of drinking water. Required testing by drinking water systems over the years that followed resulted in the discovery of numerous dry-cleaner PCE releases.
1976	The Resource Conservation Recovery Act (RCRA) was signed into law providing legislation that regulated the generation, transportation, treatment and disposal of hazardous waste in the U.S. EPA estimates the average dry-cleaner generates 660 gallons of hazardous wastes a year ⁷ . Even unused dry-cleaner PCE is a RCRA listed hazardous waste (D039 and U210). RCRA permits the U.S. EPA to direct clean-up at operating sites when found in violation of an environmental regulation.
1980	CERCLA aka Superfund was established to address abandoned and non-operating hazardous waste sites. PCE is estimated to be the fifth most common contaminant at a Superfund site ⁸ being found at 28% of all Superfund sites. Circa 2014, over 150 dry-cleaners are listed in the EPA CERCLIS ⁹ . A June 2020 Google search of “dry-cleaner superfund site” turned up numerous webpages of Superfund sites named after former dry-cleaning facilities.
1985	The Environmental Protection Agency (EPA) published a Notice of Intent to list PCE as a potentially toxic air pollutant to be regulated under Section 112 of the Clean Air Act. At that time, approximately 86% of commercial dry-cleaning facilities utilized PCE in their operations, according to the U.S. Department of Commerce. All dry-cleaners who use perc in both transfer and later dry-to-dry machines are required, regardless of size, to undertake listed pollution prevention steps.
1993	National Emissions Standards for Hazardous Air Pollutants (NESHAP) prohibits the sale of transfer dry-cleaning machines ¹⁰ . The use of existing transfer machines continues, both at small, older facilities as well as a few large commercial facilities.
1998	The State Coalition for Remediation of Drycleaners (SCRD) was formed with the help of the U.S. EPA and has grown to include 13 States (Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas and Wisconsin). These states have enacted formal dry-cleaner remediation programs. A 2001 SCRD study estimated as many as 75% of U.S. dry-cleaning facilities were contaminated. The 2008 10-yr SCRD “...Accomplishments Report” estimated that 90% of dry-cleaning facilities use PCE ¹¹ .
2005	New dry-cleaning facilities co-located in residential buildings are prohibited by EPA. Existing co-located facilities can continue to operate ¹² .
2007	California becomes the first State to independently tighten PCE dry-cleaning use , banning new PCE machine installations. Additional restrictions will lead to a complete PCE usage ban by 2023. CA regulators estimated their state had 3,400 dry-cleaners with 70% using PCE at the time the regulation was put in place. CA also prohibited co-location of PCE dry-cleaning in any buildings with residential use after July 1, 2010, more than 10-years before a similar EPA nationwide restriction.

2008	Publication of EPA new regulation (73FR39871) prohibiting co-locating a PCE dry-cleaning facility in residential buildings after December 21, 2020. Numerous articles ¹³ highlight this deadline. A separate EPA regulation establishes July 27, 2008 as deadline to phase out all first generation PCE transfer machines ¹⁴ .
2012	The EPA released an updated health assessment, which elevated PCE from a “chronic irritant” to a “ likely human carcinogen. ”
April 2020	EPA releases updated ‘ Draft Risk Evaluation ’ on PCE as required by 2016 amendments to TSCA. Draft report found unreasonable risk to workers, occupational non-users, consumers, bystanders and the environment. ¹⁵ Comment period closed July 6, 2020.
2020-current	Current EPA website provides dry-cleaning sector three areas of information on requirements ¹⁶ : <ul style="list-style-type: none"> • Laws and Regulations • Compliance • Policies and Guidance Petroleum based dry-cleaners also have federal requirements per the US EPA ¹⁷ ; however, these do not appear to be as developed when compared to PCE. Interestingly, the EPA refers to the petroleum dry-cleaner segment as Petroleum Dry Cleaners: New Source Performance Standards (NSPS). The requirements appear focused on the solvent filter cartridges and control of VOCs emissions.
December 2020	Per federal regulation, PCE facilities can no longer operate co-located in residential buildings. After December 21, 2020, any dry-cleaners using PCE will need to have moved to a new location with no co-located residential or close.

2020 Implications

This co-location ban may result in many site assessments at dry-cleaning locations as these businesses exit from mixed use, residential buildings. It is unclear if state regulations will require site assessments. NJDEP ISRA Appendix C which provides NAICS code for industrial establishments subject to ISRA assessments does not include NAICS 8123.

Separately, landlords may ask for an assessment before dry-cleaner tenants leave. It is unclear if they can require this, especially if the exit occurs simultaneously with the permanent closure of the business. This could potentially leave landlord/former tenant battles on responsibility for contamination issues left behind.

Since switching to an eco-friendlier solvent is costly and requires facilities to replace most of their equipment, many smaller operators experiencing declining sales have been reluctant to make this changeover. Tougher environmental regulations are expected to continue driving up operating and capital expenses for dry-cleaners, which will further reduce profitability and likely force many smaller operators out of the market.

State regulation is also growing tighter as states either look to follow CA's outright ban on PCE or develop audit and compliance requirements to augment federal regulations. There are even county level requirements and guidance documents adding to the cost of business, e.g. Broward County, FL18. This would add to the following State level requirements in FL:

- Management of Drycleaning Separator Water
- Management Options for Chlorinated Solvent Drycleaning Equipment Taken out of Service
- Weekly Container Inspection Log
- Secondary Containment Information

SECTION II

State Dry-Cleaner Funds

There are 13 States with formal dry-cleaner remediation programs for solvent release cleanup efforts.

State(s)	Formalized Program(s) Created
 Connecticut	1994
 Florida	
 Kansas	
 Minnesota	1995
 Oregon	
 South Carolina	
 Illinois	
 North Carolina	1997
 Tennessee	
 Wisconsin	
 Alabama	2000
 Missouri	
 Texas	2003

Most states with established funding programs are not accepting new applications but are allowing historically known sites the opportunity to register for the funding while paying an annual fee. This allows them a way to participate in the program while also recycling money back into the available funds. Fees often are scaled and dependent on type and amount of solvent used. State programs have varying types of priority clean-up lists; however, many do not clearly define how they are prioritizing the clean-up efforts.

Funds appear to be depleting rapidly and many have established higher deductibles that the dry-cleaners must pay to be eligible for entry and use of program funds. Many of the programs also established an annual limit that will be distributed to participants as a means to keep the funds alive for as long as possible.

It appears that Illinois, Missouri and Wisconsin funds may have expired based on the language featured on these states' websites; however, all still have registration information available.



As depicted above, the dry-cleaning industry is complex and presents many regulatory hurdles. As a professional working within the environmental insurance market, it is important to partner with a knowledgeable carrier who can properly help mitigate the risks described above. Contact your underwriter today to learn more about how our core products and services can help protect your clients' dry-cleaning operations.



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