

Professional Wet Cleaning

By John Koeller

Background

Adapted from “Commercialization of Professional Wet Cleaning”, Final Report, October 28, 2002¹:

“Dry cleaning is a widely recognized method for cleaning delicate garments and a convenient service that is offered in nearly every community in the United States. For more than 40 years, the vast majority of dry cleaners have relied on perchloroethylene (PCE) as the solvent used to clean clothes as part of the dry cleaning process. In recent years, however, a wide array of scientific studies and federal, state, and local regulatory actions have focused on PCE in relation to the health and environmental risks that it poses. Costly regulatory and liability actions are becoming increasingly prevalent for this industry, and have created significant economic burdens for cleaners, most of whom are small businesses.

“These concerns about health and environmental effects of PCE, regulatory pressures, and the threat of liability actions have prompted, both inside and outside the garment care industry, a search for alternative cleaning processes. The first pollution prevention technology introduced commercially was *professional wet cleaning* – a water-based cleaning process that uses computer-controlled washers and dryers, specially formulated detergents, and specialized finishing equipment to facilitate the cleaning of delicate garments in water. Beginning in the mid-1990s, case study evaluations of professional wet cleaners concluded that professional wet cleaning represented a viable pollution prevention technology for the garment care industry.

“The essential technological innovation of professional wet cleaning has been to mechanically simulate hand-laundering by retrofitting front-loading commercial laundry machines with a computer to control the rotation of the drum in order to minimize agitation while providing sufficient movement for effective garment cleaning. Wet clean dryers include moisture sensors to assure that garments retain a proper amount of moisture after the dry cycle is complete. Specialized tensioning pressing machines are used to enhance the restoration of constructed garments, such as suit jackets, suit pants, and tailored items.

“This is the first study to evaluate multiple (five) cleaners who made the switch from PCE-based dry cleaning to professional wet cleaning. The report contains a plant level analysis that compares the real world conditions of each of these technology changes at the five locations.”

Water Use in Wet Cleaning

“In professional wet cleaning, water is used as the solvent. Yet, the pollution control devices on dry clean machines also require water use; refrigerated condensers use water in cooling the

¹ By Pollution Prevention Education and Research Center (PPEREC), Occidental College; Financial support for the study came from the South Coast Air Quality Management District, The California Wellness Foundation, Southern California Gas Company, and Southern California Edison.

refrigerant, cooling towers evaporate water in the process of cooling PCE, carbon absorbers are steam stripped; some distillation systems are equipped with steam injection. In both professional wet cleaning and dry cleaning, water is used by the boiler, laundry washers, and water conditioning systems.

“Previous research conducted by PPERC estimated water use at a professional wet cleaning facility to be 77 percent greater than at a dry clean shop.² Yet this previous research was based on industry estimates and research assumptions, not on actual water use at a dry cleaner switching to professional wet cleaning. The data from the current analysis (see the attached Executive Summary) suggest that the regional impact on water demand associated with a switch to professional wet cleaning is likely to be substantially smaller than previously estimated.”

Water Use: Current Study Results

You will note in the Executive Summary of this study that the change in water consumption varied significantly among the five installations studied. That is because the study components did not include monitoring of water consumption changes due solely to the technology change³. Rather, water billing records were used and because these five cleaners also provided laundry services both before and after the retrofit, the change in real world water use caused by the technology change could not be isolated.

For the typical dry cleaner, it appears that a changeover to this new technology holds some significant financial and customer service benefits. This is becoming evident at the same time as the South Coast Air Quality Management District (SCAQMD) is mandating phase-out (by 2020) of PCE-based cleaning. Thus, it is likely that cleaners in Southern California (and eventually throughout California) will be seeking the new technologies and converting their operations. As this occurs, however, it is important that we more clearly identify the impacts that might be expected upon water consumption as the new technologies take over.

Water Use: Proposed Follow-on Study

In 1999, the SCAQMD approached the PPERC to administer the Professional Wet Cleaning Commercialization Project. That project was designed to provide equipment and technical training grants to eight cleaners in the air basin switching from dry cleaning to wet cleaning. The attached Executive Summary documents some of the outcomes of that project.

In 2002, the SCAQMD funded a follow-on project to include 14 additional wet cleaning demonstration sites. The additional research that will accompany the 14 retrofits will be an expansion of the research conducted to date, with more focus on the use of resources. In addition to professional wet cleaning, other technologies will be evaluated as well in this project, including petroleum dry cleaning, silicone dry cleaning, and CO₂ dry cleaning. Incentives will be offered to PCE-based dry cleaners to switch to these technologies, such that valuable data can be gathered on all of the available substitutes for PCE-based cleaning.

² “Pollution Prevention in the Garment Care Industry: Assessing the Viability of Professional Wet Cleaning”, Pollution Prevention Education and Research Center, 1997, p. 5-8.

³ Due largely to the fact that the primary proponents of the study were the two Investor Owned Utilities: Southern California Gas Company and Southern California Edison. As such, the resource focus was mainly on energy.

This project is now at the point where the PPERC and Southern California Edison are seeking input and support from the water provider community to facilitate the collection of resource data on water use. Extensive metering of utilities at the data collection sites is planned and it is critical that the water industry play a role as a technical advisor and supporter of this latest effort. Therefore, we are suggesting that immediate steps be taken to join the team of specialists that are now implementing the incentives and designing the measurement and evaluation protocols.

Additional information on the follow-on project, including a full task proposal, is available upon request.

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