United States Environmental Protection Agency
Pollution Prevention And Toxics (7406)
EPA 744-F-01-003
June 2001

Design for the Environment
Garment and Textile Care Program Fact Sheet

What is *Design for the Environment*?

EPA's Design for the Environment (DFE) Program is a voluntary initiative that forges partnerships with various stakeholder groups in an effort to:

- Incorporate environmental concerns into the traditional decision-making parameters of the business world: '*cost*' and '*performance*.'
- Build incentives for behavior change to encourage continuous environmental improvement.
- Encourage green chemistry and green engineering approaches that reduce or eliminate environmental concerns.

To accomplish these goals, the program utilizes EPA expertise and leadership to compare the relative environmental and human health risks, performance, and cost tradeoffs of traditional and environmentally-preferable technologies. DFE disseminates information on its work to all interested parties and also assists businesses to implement the new technologies identified through the program.

The program currently has cooperative partnerships with:

- Industry
- Trade associations
- Academia
- Environmental & public interest groups
- Labor unions
- Research organizations
- Government purchasing agencies
- Professional institutions
- State and local governments

Other federal agencies

Military Uniform Cleaning Study

What is the Goal of the Study?

The Environmental Protection Agency (EPA) is collaborating with the Department of Defense (DOD) to explore the feasibility of replacing traditional drycleaning solvents, particularly perchloroethylene, the primary process for clean ing military dress uniform components, with environmentally-preferable cleaning technologies. The overall goal is to reduce military personnel exposures to hazardous chemicals at military installations, as well as to reduce costs associated with the storage, transport, and disposal of traditional drycleaning solvents. The cleaning of standard military uniforms in wetcleaning and liquid carbon dioxide is currently being evaluated. The study may be expanded in the future to include other new cleaning processes. The study is being conducted as part of the Defense Logistics Agency Defense Supply Center Philadelphia's broader Pollution Prevention and Waste Minimization Programs aimed at reducing the use of chemicals that are potentially harmful to human health and the environment.

Who is Conducting the Study and Why?

In 1992, EPA established a partnership with the drycleaning industry and other stakeholders, including the DOD Defense Logistics Agency's (DLA) Defense Supply Center Philadelphia (DSCP), as a result of shared health and environ-mental concerns with perchloroethylene, or *perc*, the chemical solvent used by most drycleaners. The DSCP is managing the study with technical support from the EPA Design for the Environment (DFE) Garment and Textile Care Program (GTCP). The uniform cleaning is being done by a well-known large commercial drycleaner, Lansing Cleaners, Lansing, Illinois. Garment testing is being carried out at the DLA Physical Testing Analytical Laboratory.

The DOD's DSCP is responsible for procurement of a wide range of services for military personnel, including professional cleaning services for all military installations and Naval vessels. In recent years, DSCP has become increasingly concerned about military personnel exposures to hazardous chemicals at military installations, as well as the regulatory costs associated with traditional drycleaning solvents. Professional drycleaners located at over 500 U.S. military bases and on-board many Naval vessels provide cleaning services to approximately 1.2 million military personnel plus their families. As such, professional drycleaners are one of the largest groups of civilian chemical users that come into direct contact with military personnel and their families. That is why DSCP has decided to evaluate the performance of environmentally-preferable technologies for the cleaning of military clothing and textile apparel. If new cleaning processes not dependent on regulated chemicals are found to be feasible for cleaning standard military uniforms, this will reduce the opportunity for human exposures as well as reduce overall chemical handling costs.

How is the Study Being Conducted?

The study involves cleaning standard military uniforms labeled "*Dry Clean Only*" in three professional cleaning processes, followed by standardized testing to determine changes in the garments as a result of the cleanings. All of the uniforms were supplied by the DLA's Directorate of Clothing and Textiles (DCT) and were selected from the same contract and lot to ensure uniformity of fabric and construction. The standard military uniforms selected for the study include three sets of Army Green polyester/wool blend enlisted uniforms and black all-weather coats. Each set of test garments consists of a suit coat, a skirt, a pair of trousers, and an all-weather coat. To allow comparisons between processes, identical sets of these four garments will be cleaned in each one of the three test methods. One set of uniforms will be cleaned in a Unimac wetcleaning system, one set in a Micare liquid carbon dioxide process, and one set in a perchloroethylene process. All cleaning processes including detergents, additives, and machine settings, will be according to industry standards and fully documented. In order to employ "real world conditions," all test uniforms will be handled, cleaned and finished exactly as they would be if they were brought in by a typical Lansing Cleaners' customer. A fourth identical set of uniforms will not be cleaned so it can serve as a control to be compared to the cleaned garments.

In order to approximate the normal expected life of these military uniforms, the garments will be cleaned a total of fifteen times, accomplished in three sets of five cleanings each. At the conclusion of each set of five cleanings, all uniforms will be sent to the DLA Physical Testing Analytical Laboratory where they will undergo a series of standardized textile tests for visual appearance, dimensional stability, color fastness, break and tear strength, and standard stain removal.

As of June 2001, a pilot study was concluded and involved cleaning identical sets of uniforms five times each in the three cleaning processes. The pilot was conducted primarily to establish study methods and determine feasibility for the larger study.

When Are the Results Expected?

Results from the study are expected in the fall of 2001. In the meantime, results from a pre-pilot test of the study cleaning methods indicate that there were visible differences in the garments cleaned by the three cleaning processes, as evidenced by changes in their physical appearance. In the pre-pilot, the appearance of the liquid carbon dioxide-cleaned uniforms most closely resembled new uniforms, and the perc-cleaned uniforms showed the greatest amount of surface deterioration in the form of overall pilling. The three black all-weather coats had noticeable color changes, i.e., fading. The coats with the least amount of fading were cleaned in the liquid carbon dioxide process.

It is important to point out that these preliminary results are based on the subjective observations of DOD and EPA personnel, and may or may not be confirmed by the more objective standardized test methods to be employed in the full study.

How Will The Study Affect Drycleaners at Military Sites?

The results will be used to support a DOD recommendation to place an instruction such as "*Professional Fabricare*" or "*Professionally Clean*" on the care label of selected military garments. This change in labeling would officially allow drycleaners providing services to military personnel to use environmentally-preferable processes instead of traditional drycleaning solvents. In addition, information collected in this study may be used as the basis for revising the military pecification to replace traditional "drycleaning" with a term such as "professional cleaning," opening the door for use of environ-mentally-preferable technologies on military bases world-wide and on U.S. Navy vessels. This study may begin to pave the way for professional cleaners at military sites to offer environmentally-preferable cleaning technologies to their customers.

In the long run, the use of these technologies will reduce drycleaners' costs from regulatory compliance as well as from chemical handling and disposal. By joining EPA and DOD in a commitment to safer, environmentally-preferable technologies, drycleaners can maintain a competitive edge in the marketplace. By offering environmentally-preferable process choices to their customers, drycleaners can improve their operations and bottom line, while contributing to a safer environment and healthier workplace. As consumers, military and civilian, increasingly opt for "green" environmentally-sound products and services, drycleaners that consider the health and environmental impacts of their business decisions are more likely to sustain solid support from both their customers, neighbors, and communities.

How Can I Get More Information?

For information about the DOD Defense Logistics Agency's ***Defense Supply Center Philadelphia***, visit their web site at: http://www.dscp.dla.mil/
For information about ***EPA's DFE Garment and Textile Care Program***, visit their web site, where publications can be read and downloaded: http://www.epa.gov/dfe/garment/garment.html

Recent publications include:

Military Uniform Cleaning Study Fact Sheet (EPA 744-F-01-003)
100% Wetcleaning Facility: Route-Only Service Case Study (EPA 744-F-01-004)
Liquid Carbon Dioxide and Surfactant System Case Study (EPA 744-F-98-018)
Wetcleaning Systems for Garment Care Case Study (EPA 744-F-98-016)
Water-Based Cleaning System for Suede and Leather (EPA 744-F-98-017)
Major Federal Regulations Affecting Petroleum Drycleaners Fact Sheet (EPA 744-F-99-005)
Frequently Asked Questions about Drycleaning (EPA 744-K-98-002)
Garment and Textile Care Resource Guide (EPA 744-K-98-005)
Cleaner Technologies Substitutes Assessment for Professional Fabricare Processes (CTSA) (EPA 744-B-98-001)
CTSA: Summary (EPA 744-S-98-001)
CTSA Fact Sheet (EPA 744-F-98-011)
A web list of cleaners offering wetcleaning, liquid CO2 & liquid silicone processes

Single copies of DFE documents can be ordered from:

EPA's Pollution Prevention Information Clearinghouse
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue NW (7409)
Washington, DC 20460
Telephone: (202) 260-1023
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