

Tennessee Pollution Prevention Partnership Success Story



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Y-12 Eliminates Freon in Chip Cleaning

The Member

The Y-12 National Security Complex is a high-precision manufacturing, assembly and inspection complex comprised of more than 20 facilities and organizations located on 800 acres near Oak Ridge, Tennessee. Operated by Babcock & Wilcox Technical Services Y-12 L.L.C. (B&W Y-12) for the National Nuclear Security Administration, Y-12 plays a vital role in the Department of Energy's (DOE) Nuclear Weapons Complex.

The Story

B&W Y-12 continually searches for ways to reduce hazardous materials used, and has an ongoing program to eliminate use of Class I ozone depleting substances (ODS). The Clean Air Act has phased out manufacture of Class I ODS, and DOE established goals for all sites to eliminate use of Class I ODS by 2010 to the extent that safe alternatives are available.

In 2008, B&W Y-12 completed a project two years ahead of the DOE goal by replacing Freon (CFC-113) used in chip cleaning with a safe substitute. The Freon previously used in this process could not be captured and was therefore emitted to the atmosphere. To identify a substitute, Y-12 engineers evaluated Solvent 140, Vertrel, and other substitutes based on cleaning effectiveness, safety and environmental hazards. Vertrel, a solvent with no ozone-depleting potential, was selected and subjected to exhaustive pilot testing. A special version of Vertrel, called XBW was identified as the only product that meets all requirements to replace Freon 113 in Y-12's chip cleaning operations. Vertrel XBW is made exclusively for Y-12. The transition to full-scale use of Vertrel and elimination of Freon 113 was completed in late August 2007 with an annual cost savings of

\$250,000. In 2008, as part of the continual improvement process, Y-12 determined that another version of Vertrel, Vertrel XF, would reduce operational costs and eliminate the use of a surfactant. Therefore, Y-12 began use of Vertrel XF and realized an additional \$27,000 in annual cost savings.

The Success

This change in B&W Y-12's manufacturing process was completed 2 years ahead of schedule, and eliminated more than 19,600 lbs of yearly chlorofluorocarbon (CFC) emissions per year. This project demonstrates that doing what is right for the environment, safety and health can also save money. This switch has saved more than \$277,000 per year in operating expenses due to the lower cost of the Vertrel XF, and will grow as plans for reducing yearly evaporative losses are fully implemented. In addition to cost savings, the switch to Vertrel XF enables manufacturing areas to eliminate safety concerns that were ever-present when Freon was in use.



The Pollution Prevented

The Vertrel XF substitution project eliminated an average of 1,500 gallons per year of CFC-113 used in chip cleaning eliminating more than 19,600 pounds per year of emissions of Class I ODS to the atmosphere. The project eliminated 100% of Y-12's CFC-113 use in chip cleaning.