



U.S. Environmental Protection Agency

Waste Minimization

[Recent Additions](#) | [Contact Us](#) | [Print Version](#) Search:



[EPA Home](#) > [Wastes](#) > [Waste Minimization](#) > [Success Stories](#) > Flowserve

[Home](#)

[About Waste Minimization](#)

[Partnership](#)

[Success Stories](#)

[Federal Facilities](#)

[Priority Chemicals](#)

[Trends Report](#)

[Projects](#)

[Tools](#)

[Links](#)

Success Stories

Flowserve Corporation Eliminates MEK, Saves \$45,000 Annually

Flowserve is one of the most recognized and preferred global suppliers of pumps, valves, seals automation and services to the power, oil, gas, chemical and other industries. Flowserve employs over 14,000 employees in more than 56 countries. We combine our global reach with a local presence.

The company was created in 1997 with the merger of two leading fluid motion and control companies, BW/IP and Durco International. Flowserve heritage dates back to the 1872

founding of Byron Jackson, one of the companies that became part of BW/IP. The most recent additions to the Flowserve family include Invensys Flow Control in 2002, Thompsons Kelly & Lewis in 2004, and Interseal in 2005. The 130 year history of Flowserve heritage brands serves as the foundation for the breadth and depth of Flowserve products and services today.



October 25, 2005. EPA officials present an NPEP Achievement Award to Bob Hendricks of Flowserve Corporation.

Flowserve's NPEP Goals

In order to maintain market share and conduct our worldwide business operation in an environmentally responsible manner, Flowserve has set goals to reduce our hazardous waste generation to less than 90 pounds of waste generation per million dollars revenue. Methyl ethyl ketone (MEK) poses a significant human health and environmental hazard. MEK can burn the skin and eyes, while vapors may cause dizziness or suffocation. If the solvent catches fire, it can produce irritating, corrosive, or even toxic gases. Due to the risks associated with the use of MEK, Flowserve set a goal to completely eliminate the use of MEK and reduce volatile organic compounds (VOCs) by 25 percent and hazardous waste generation by 50 percent. The introduction of a product known as EP-921 was tested and found to be a perfect substitute.

EP-921 is a unique cleaning compound designed as a substitute for MEK, MEK/Toluene blends, and lacquer washes. EP-921 functions well as a low volatility surface preparation solvent and is excellent for resin and paint application equipment clean up. EP-921 is a lightly regulated, low VOC, low toxicity, high flash point formulation that is ideal for functioning within the modern regulatory climate. In fact, the emission limitation inherent in its formulation may qualify it as a Maximum Available Control Technology (MACT). Its use without vapor collection will compete favorably with the use of MEK and a 99.7% efficient vapor collection system.

EP-921's formulation is outside the RCRA hazardous waste regulations. None of its components are listed in SARA, Title III, Sections 302 or 313. None of its components are listed under CERCLA. Its unique characteristics allow the product to be recycled and re-used with a life expectancy ten times greater than MEK.

Hurdles Faced

Initially it was a concern that EP-921 would affect the quality of the painting process. The reclamation of EP-921 and its ability to separate paint from the solvent in a closed loop system presented initial doubts about its effectiveness after one or two applications. The unit was used and tested at several intervals with paint concentration ranging from 10-50 percent to assist in determining the quality of the cleaning agent. During the initial set-up and testing

phases, the loss of productivity slightly increased. Once the system was in place, the concerns of quality, maintenance, and productivity loss showed favorable results.

Waste Minimization Results

The economic and environmental benefits derived from the use of EP-921 were extremely favorable. The elimination of MEK has demonstrated cost savings of nearly \$15,000 annually. Hazardous waste generation has decreased by nearly 60 percent. Additional savings with loss of productivity, training, waste management, and regulatory compliance generated an additional \$30,000 annually. Net savings with the use of EP-921 the first year yielded over \$45,000 with a payback rate of 1.4 years.

Because EP-921 is a safer, healthier, and more environmentally safe product, management and most importantly, the associates who work with EP-921 embraced the substitute of MEK with positive thinking.

Lessons Learned

Continually improving your process so that it leads to a safer, healthier, and more environmentally friendly workplace is easily achievable. Identifying your goals, developing a solid plan, and utilizing your resources allows you to exceed your own expectations. Incorporating your engineering staff with line workers provides a smoother transition to a new process.

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Last updated on Wednesday, February 22nd, 2006
URL: <http://www.epa.gov/epaoswer/hazwaste/minimize/flowserve.htm>