

WMRC Factsheet

Pollution Prevention Services of the Illinois Waste Management and Research Center

The Pollution Prevention (P2) Program is comprised of engineers and scientists who bring a wealth of industrial experience to the Illinois Waste Management and Research Center. The P2 staff works closely with established partners, including publicly-owned treatment works, power utilities, manufacturing extension centers, and chemical suppliers to enhance the diffusion of pollution prevention technologies to various types of private and public sector operations. Innovative pollution prevention strategies are promoted by WMRC according to the following three strategies.

Creating Awareness

P2 staff prepare and deliver to various customers pertinent presentations, technical papers, factsheets, databases and internet resources. These materials are designed to heighten awareness among customers regarding potential P2 solutions to waste problems.

Developing P2 Principles

The P2 Program develops cutting edge technological solutions to specific process problems that generate waste. These efforts are conducted in conjunction with other Center programs as well as various university and other technical resources.

Demonstrating How to Implement P2

The P2 Program conducts assessments of operations to identify opportunities for incorporating P2 into processes. Staff make specific recommendations regarding how procedures can be changed to improve efficiency and reduce waste generation. Additionally, they demonstrate and evaluate innovative P2 principles and technologies

that can be incorporated into both existing and proposed processes.

WMRC operates three specialty industrial P2 pilot research laboratories for conducting technology evaluations. These labs are uniquely equipped for conducting such evaluations.

Pilot Technology Laboratory

The Pilot Technology Laboratory is used to evaluate technologies for recovering resources and minimizing wastes within industrial processes. Technologies commonly evaluated in this lab include membrane filtration (microfiltration, ultrafiltration, nanofiltration, reverse osmosis, and pervaporation), vacuum evaporation, centrifugation, distillation, advanced oxidation technologies, precipitation and crystallization. Available equipment includes:

Solid/Liquid Centrifuge—this basket centrifuge is designed to separate solids from liquids without consumable filtration elements. This unit can remove suspended particles as small as 5 microns. Center staff often use this centrifuge for pretreatment of solutions prior to membrane filtration.

Liquid/Liquid Centrifuge—this disc-stacked separator is designed to separate liquids with different densities and to break and separate weak emulsions along with some finely dispersed solids. A retaining bowl is used to remove fine solids while liquids are separated by density.

Membrane Filtration—WMRC capabilities in membrane filtration include a variety of microfiltration, ultrafiltration, nanofiltration, and reverse osmosis.

Vacuum Evaporation—vacuum evaporation processes solution by removing volatiles with a boiling point lower than water. It functions much like a distillation column. The effective boiling point of liquids is lowered by applying a vacuum, thereby reducing the energy required to induce separations. Vacuum evaporation is useful in concentrating solutions beyond the capabilities of membrane filtration and reverse osmosis.

Alternative Cleaners Laboratory

This laboratory is useful for evaluation and optimization of environmentally friendly parts cleaning processes. WMRC has unique, custom-designed equipment for testing aqueous cleaners. This equipment allows the testing of various types of cleaners, chemical concentrations, agitation methods, temperatures and times on solid parts to determine the ability of the process to achieve a specified level of cleanliness.

While working with a company, WMRC tries to emphasize the potential financial savings, improved public image, safe work environment, reduced waste generation and continuous improvement options available with new alternative solvent technologies. Information on cleaner selection based upon their physical properties, health and safety hazards, surface on which they work, and their chemical activity are available through WMRC.

The Alternative Cleaners Laboratory can be used by a variety of industries including fabricated metals, painting and coating, machining, military, printing, chemical processing, medical institutions, pulp and paper, plastic formulations, agricultural chemicals, electronics, and transportation industries as well as academic institutions.

Alternative Chemical Process Laboratory

The Alternative Chemical Process Laboratory develops more efficient and environmentally friendly chemical production processes through chemical process optimization, minimization/extraction of hazardous by-products, and design of environmentally benign chemistries. The lab is

equipped with bench-scale reactors, including both photochemical and medium pressure reactors.

This lab focuses on operation cost reductions through productivity gains, process efficiency improvements, and toxic raw material and product emissions avoidance. The key issues include:

- ◆toxic substances handled by workers
- ◆toxic and hazardous by-products generated and contaminants in products
- ◆compliance issues
- ◆cost incurred for water treatment or disposal
- ◆liability concerns in the life cycle of products

As well as the chemical manufacturing industry, the Alternative Chemical Process Laboratory can help the pharmaceutical, health care, beauty, paint manufacturing, coatings manufacturing, plastic formulations, and oil processing industries, as well as academic institutions.

For more information on pollution prevention and on assistance available from WMRC, contact:

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Also visit WMRC's web site for access to specific pollution prevention case studies as well as information on other services provided by WMRC at:

<http://www.hazard.uiuc.edu/wmrc>