

Monsanto



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The Krummrich Plant:

A Commitment to Waste Minimization

Monsanto's W.G. Krummrich plant in Sauget has made a strong commitment to reduce the amount of waste it generates through significant financial investment and employee involvement. This in turn has helped improve the environment in the Metro East area.

The plant has reduced air emissions of hazardous chemicals by 64 percent in just three years. It is more than two-thirds of the way toward the Monsanto goal of reducing such emissions by 90 percent by the end of 1992, with the ultimate goal of zero effect.

In addition, the plant has pledged to reduce releases of most process waste by 70 percent by the end of 1995 -- from nearly 10 million pounds to fewer than 3 million pounds. Projects have been identified to eliminate 67 percent of the organic and toxic inorganic process waste by the end of 1993.

These waste-minimization goals are being achieved by a wide range of projects, from new seals on tanks that prevent the escape of vapors to a \$25 million investment in equipment to remove chemicals from wastewater leaving the plant.

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The Krummrich Plant At A Glance

- [The Krummrich plant is the second-oldest plant in the Monsanto family. It began operation in 1907 as the Commercial Acid Company and was purchased by Monsanto in 1917.
- [It is the largest Monsanto plant in the St. Louis area and a major economic force. In 1990, the plant had 630 employees and a payroll of \$32,585,000.
- [The plant operates 24 hours a day, seven days a week, producing more than 500 million pounds of chemicals a year.
- [The 12 different chemical products made at the plant are used in such diverse items as swimming pool sanitizers, oil additives, dry cell batteries, mothballs, scouring powders, automobile tires, inks, dyes and non-aspirin pain relievers.

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New PDCB Crystallizer Eliminates 1 Million Pounds of Waste

The Krummrich plant's new \$5 million process for making paradichlorobenzene (PDCB) -- the main ingredient in mothballs -- is proof that what's good for the environment can also be good for business.

The PDCB Continuous Crystallizer has increased production by 36 percent while eliminating 1 million pounds of waste that had been discharged to the air and water annually.

Basically, the crystallizer works like a giant ice cream maker. A liquid mixture is chilled and crystals are formed that are almost 100 percent pure PDCB.

The operation is self-contained -- all the chemicals remain enclosed in vessels or piping -- and emissions to the environment have been virtually eliminated.

Monsanto's worldwide search for a more efficient -- and more environmentally sound -- way to make PDCB began in 1986, when it was projected that the Krummrich manufacturing process could not easily meet growing demands for PDCB. The new crystallizer,

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which began operating at the end of 1989, is the first in the United States to use this technology.

Monsanto's customers repackaged PDCB as mothballs and use it to make bathroom cleaners, deodorizers and high-strength plastics.

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Wastewater Pre-Treatment:

\$25 Million Investment in a Cleaner Environment

Monsanto has invested more than \$25 million in equipment to pre-treat wastewater leaving the Krummrich plant, going far beyond what was required by environmental regulations.

The equipment removes 11 organic chemicals covered by recent federal regulations, plus reduces six additional organic chemicals. In all, 1.8 million pounds of organic chemicals are removed from the plant's wastewater each year. Of these, 1.2 million pounds are recycled and reused.

The pre-treatment system, which began operation in November 1990, was the largest engineering effort ever undertaken at the Krummrich plant. Construction involved:

-] 1200 engineering drawings
-] 640 new instruments
-] 150 trucks of concrete
-] 71 miles of new wire and cable
-] 80 new tanks, pumps and heat exchangers
-] 5 miles of pipe

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About 4 million gallons of wastewater leave the Krummrich plant daily for off-site treatment. The wastewater goes first to the Sauget Physical-Chemical Primary Treatment Plant, where acids are neutralized and solids and heavy metals are removed. The wastewater then flows to the American Bottoms Regional Wastewater Treatment Plant, where organic chemicals are removed.

With the new pre-treatment system, the plant's wastewater is treated three times before it is discharged to the Mississippi River.

The pre-treatment system has three components: a carbon treatment unit and two steam strippers designed to treat different chemicals.

Carbon Treatment

Carbon treatment removes from wastewater low concentrations of organic chemicals from the plant's departments that produce rubber chemicals and an ingredient for Monsanto's Saflex interlayer for windshields and windows.

After neutralization, the wastewater is fed through four carbon towers, where the organic chemicals are absorbed by activated carbon. The system pre-treats 24 million gallons of wastewater a year and removes 600,000 pounds of organic chemicals.

The saturated carbon is sent to a facility in Pennsylvania, where the chemicals are removed and incinerated. The recycled carbon is then returned to the plant for reuse.

Steam Stripping

Although it would have been cheaper and easier to use carbon treatment to pre-treat all of the plant's wastewater, plant officials were guided by Monsanto's policy of recovering and reusing materials wherever possible. As a result, steam strippers were installed to recover volatile organic chemicals from wastewater.

Steam is used to "strip" or separate the chemicals from the wastewater. The wastewater is boiled, and the organic chemicals boil off -- or vaporize -- at different temperatures than the water. The chemical vapors are condensed into a liquid for reuse at the plant.

Monsanto is required by federal law to pre-treat monochlorobenzene -- an ingredient in Lasso herbicide -- and it is essentially eliminated from the plant's wastewater through steam stripping. Ninety-five percent of the nitrochlorobenzene, which is used to make non-aspirin pain relievers and dyes, is also removed, even though it is not required. The equivalent of four tank trucks of nitrochlorobenzene is recovered each year.

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Other Waste Minimization Projects

Several other significant projects to reduce waste have been completed or are in the works at the Krummrich plant. They include:

- [A new \$1 million centrifuge in the department that makes an ingredient used in rubber chemicals has reduced air emissions of xylene, a raw material, by about 300,000 pounds a year. Plans call for replacing several other pieces of equipment in the department with a "melt surge tank system," which will eliminate an additional 400,000 pounds of xylene emissions annually.
- [Improvements in the process to make swimming pool sanitizers have reduced air emissions of chlorine from 400,000 pounds in 1987 to 100,000 pounds last year. The reductions were achieved through improved instrumentation, added packing material in the scrubber, improved chlorine absorption in the process and modifications made to improve raw material yields. A \$1.2 million scrubber project planned for the end of this year or early next year is expected to further reduce emissions.
- [An old filter tank in the paranitroaniline department, which makes an ingredient used in animal feeds, pharmaceuticals and rubber chemicals, was replaced with one of improved design. It collects more product for sale that would otherwise go to the sewer. Emissions are reduced by 100,000 pounds a year. The project cost \$480,000.
- [A bulk rail car loading system was installed in January in

the phosphorous pentasulfide department, which produces an additive used in motor oil to prevent engine wear. The new system reduces air emissions by 6,200 pounds a year and non-hazardous liquid waste by 44,900 pounds a year.

- [Three new scrubbers were installed in the nitrochlorobenzene department at a cost of \$500,000. They reduce air emissions by 76,000 pounds a year. The department makes a chemical used in non-aspirin pain relievers and dyes.

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Emergency Preparedness:

Within the Plant and Beyond the Gates

The Krummrich plant works closely with neighboring industries, fire and police departments and emergency service and disaster agencies to develop emergency plans and to share resources. Joint drills and mutual aid cooperation help ensure the highest level of community protection.

The Krummrich plant was one of the founding co-sponsors of the St. Clair County Community Awareness and Emergency Response (CAER) program, which seeks to improve the protection of public health and safety. CAER is a detailed emergency response plan that involves local public safety officials and industry to provide procedures for handling emergencies and for communicating safety information to area residents.

The plant also fully supports and participates in Responsible Care, the Chemical Manufacturers Association's initiative to respond to public concerns by continuously improving the industry's responsible handling of chemicals.

The plant has been designed with safety devices that detect problems early and warn employees so incidents can be prevented. In addition, the plant led the chemical industry by installing a community warning system in 1984.

The Krummrich plant also sponsors safety and emergency training for area fire departments and has a reciprocal agreement with Scott Air Force Base for the use of foam to fight certain chemical fires.

The plant also has its own fire department, an emergency response team and an emergency medical technician squad on-site. The emergency response team is on call 24 hours a day to handle any plant emergency.

The plant fire department can respond to a fire call within minutes. There are 70 fire hydrants throughout the plant, capable of delivering more than 1 million gallons of water to put out fires quickly.

Within the plant, safety is the Number One priority. Monsanto works constantly to ensure that the plant's safety equipment is the most modern available. The plant's target is zero injuries, and the safety record has improved steadily. Over the last four years, injuries have decreased by more than 40 percent.

Monsanto has joined with labor unions to help promote emergency response training. Instructors from the International Chemical Workers Union Center for Worker Health and Safety recently conducted a three-day hazardous materials response course at the plant. This was the third time that the course has been offered at the plant. On the last day of the course, plant employees applied what they had learned by responding to mock emergencies. The drill was videotaped so employees could evaluate their performance.

An employee committee was formed in February to develop an environmental training program for plant employees. Training is expected to begin this fall. All employees will receive general training on environmental issues; business units and manufacturing groups will undergo a more comprehensive and technical program.

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Community Responsiveness

At the Krummrich plant, being open and responsive to the community is an integral part of daily operations.

The plant was the first Monsanto facility to form a Community Advisory Committee to discuss safety and environmental issues with neighbors who live and work near the plant. Other chemical plants have looked to the Krummrich plant for guidance in establishing their own committees.

The committee has met quarterly since September 1988. The goal has been to form a partnership with the community by ensuring that plant operations meet or exceed community expectations. The committee is made up of representatives from nearby communities, emergency response agencies, hospital administrators and plant employees.

The committee discusses safety and environmental issues, reviews emergency communication and safety programs and discusses preparedness procedures. It also serves as a conduit between the plant and community, channeling suggestions to the plant and updating local residents on plant progress.

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The committee is one way Monsanto is working to meet its goal of keeping plants open to the communities in which it operates. Another way is by inviting the public to visit the plant and to learn more about its operations. Plant employees also visit local schools to talk to students about chemicals and the environment.

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Monsanto in the Community

The Krummrich plant and its employees are actively involved in a wide range of community programs, from education to job training to helping the needy. The plant received the 1991 Salute to Southwestern Illinois Award for Community Service from the Leadership Council of Southwestern Illinois.

-] The Krummrich plant and the Monsanto Fund sponsor an after-school center and summer field trip program through the Villa Griffin Homes and other public housing projects in East St. Louis. "St. Louis is rich in all kinds of cultural and scientific opportunities, but not for a kid stuck in a housing project," says Sister Julia Huiskamp, who runs the program. "Monsanto's contribution has helped hundreds of East St. Louis children see the bigger world and have fun together."
-] The Krummrich plant has been a longtime partner with Target 2000, a non-profit organization aimed at revitalizing East St. Louis. As a major contributor to Target 2000 since its founding in 1978, Monsanto has helped the organization implement economic development programs, including the Bluffview Estates apartment project.
-] The Krummrich plant and the Monsanto Fund support the new Jackie Joyner-Kersey Foundation, which helps youth in East St. Louis develop into tomorrow's community leaders. The program emphasizes academic preparation and development of community consciousness.

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Greatest emphasis is placed on not generating waste in the first place. Materials are also reused or recycled wherever possible. The next preferable option is to destroy or treat the waste, with land disposal the last option. The Krummrich plant no longer uses landfills to dispose of waste from chemical manufacturing processes.

"Hands-on" involvement by Krummrich employees has been an important key to the waste-minimization progress. Many of the 630 employees live in the Metro East area and have a personal interest in working to improve the local environment.

As the plant has worked to meet its waste-minimization goals, it has remained open and responsive to the community. Reducing waste and being open to the community are two components of the Monsanto Pledge, a seven-part management initiative on health, safety and the environment that governs all of the company's operations.

For years, the Krummrich plant has made public information about the content of its waste and all chemical materials. The plant also was the first Monsanto facility to form a community advisory committee to discuss environmental and safety issues with neighbors who live and work near the plant.

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-] Monsanto donated \$5,000 to help fund a business education program at the GEMM Center in East St. Louis. Thirty youths, age 12 to 19, will be taught the basics of business, including taxes, banking, advertising and legal issues. Each students will be required to start his or her own small business before the course is over.
-] Through the Monsanto Fund, the plant also supports the United Way, local fire and fire departments and emergency services and disaster agencies, Belleville Area College, H.I.S. K.I.D.S. for seriously ill children, St. Mary's Hospital, Bicycle Safety Rodeo, Boy Scouts and Girl Scouts, St. Clair County Local Emergency Planning Committee, Illinois Center for Autism job training program, MECCO community action organization in East St. Louis and the East St. Louis School District Science Fair.

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