

# Pollution Prevention in Enforcement

## Solvent Distillation Case Study

### Introduction

*To a manufacturing facility, waste generated from production processes represents lost raw materials and an environmental burden. To the Ohio Environmental Protection Agency (Ohio EPA), waste generation often identifies areas requiring regulation. When a company does not comply with environmental regulations, an enforcement action may be necessary. Ohio EPA can use pollution prevention (P2) to gain added environmental benefit from an enforcement action, settle the enforcement case more quickly, return the company to compliance, and reduce future oversight.*

To use P2 in an enforcement settlement, P2 is introduced during negotiations and is included in Administrative Findings and Orders as a P2 supplemental environmental project (P2 SEP). P2 SEPs are environmentally beneficial projects that a facility agrees to perform as part of the enforcement settlement, in exchange for a penalty reduction. The Ohio EPA, Office of Pollution Prevention (OPP) can assist the company and Ohio EPA's enforcement staff in developing a P2 SEP.

Ohio EPA has developed a number of case studies that document the inclusion of P2 SEPs in enforcement settlements. This case study was developed by OPP and the Ohio EPA Division of Hazardous Waste Management (DHWM) to illustrate the benefits of using P2 SEPs in enforcement cases. OPP can help a company

### **Using Pollution Prevention (P2) in enforcement helped this company:**

- **Settle the enforcement case with Ohio EPA,**
- **Optimize their environmental performance,**
- **Reduce solvent purchase and disposal by 100,000 gallons per year,**
- **Save \$500,000 in raw materials costs annually, and**
- **Save \$170,000 in waste disposal costs annually.**

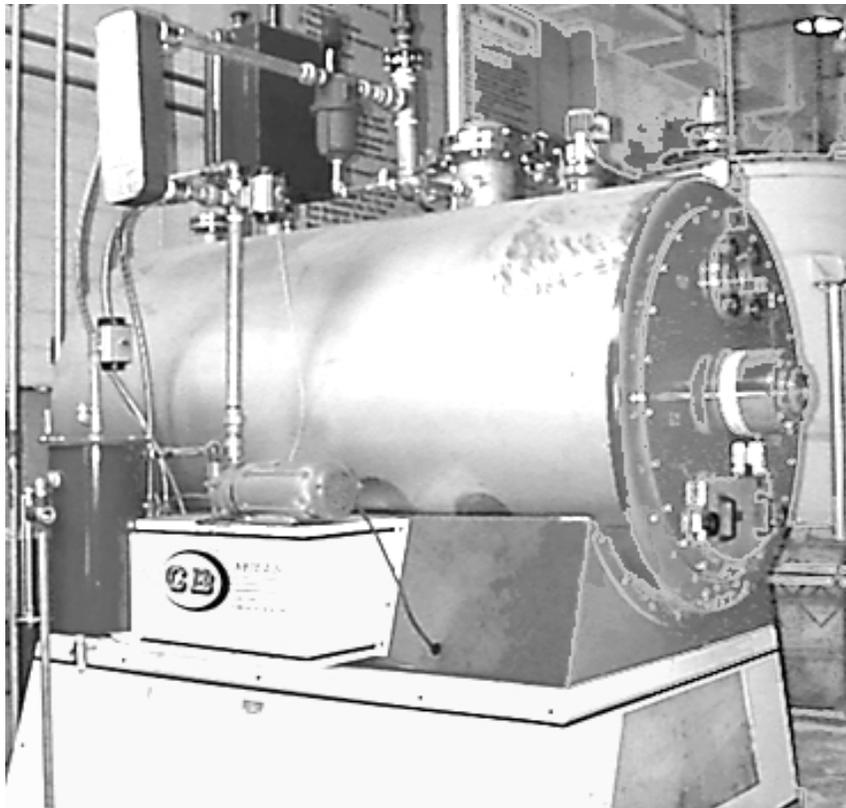
evaluate their waste streams and production processes, then use source reduction techniques to reduce generation of waste and go *beyond* compliance.

### **Facility Description**

This case study examines an Ohio vinyl products manufacturer. The facility is referred to in this document as "the plant" or "the company". The plant produces vinyl roll products used in the automotive industry for dash boards, seat covers and door panels, as well as landfill liners, pool liners and vinyl roofing materials.



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## Solvent distillation unit

The plant utilizes plastisol coating lines and calendering machines to produce their vinyl roll goods. Once the roll goods are produced in the desired color and width, they are rolled and cut to the desired length, or sent to the print and finish department for color adjustment, texturizing or luster finishing. The print and finish process uses roto gravure machines to coat the vinyl goods. A top finish is applied to the vinyl using solvent-based inks.

The mixtures used in the print and finish department are made in the vinyl prep department, where solvents and colored inks are combined to obtain the

desired color or finish on the final product.

Excess solvent-ink mixtures from the print and finish department, and off-specification solvent-ink mixtures from the vinyl prep department, generate the waste ink which accounts for the plant's largest hazardous waste stream. The material can not be re-blended back into the process due to quality requirements. This material was formerly sent off-site for incineration as a hazardous waste. The P2 SEP project involved recycling this waste on-site.

## Enforcement Case

Environmental violations at the plant involved hazardous waste handling and management procedures under previous ownership. Ohio EPA's DHWM suggested that the company perform a P2 SEP as part of the settlement. The company proposed a P2 SEP project that involved installation of a solvent distillation system to recycle their waste solvent-ink. The company was granted a 25% reduction in their penalty for agreeing to perform the P2 project at the facility.

## Implementation

Pursuant to the Director's Final Findings and Orders, the company implemented the P2 project designed to minimize the large quantity of solvent-ink waste that was being hauled off-site as a hazardous waste. The P2 SEP project centered on distilling the spent solvent-ink waste and reusing the solvent.

The company investigated a number of different types of distillation equipment, using in-house expertise and technical information provided by vendors. Various options were explored for removing the solvents from the waste stream, including direct steaming, continuous bake oven operations, and batch distillation. Heating rates, optimum treatment volumes,

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and optimum temperature ranges were used to select the most efficient system and to determine the maximum recovery rate for the solvent.

The chosen system, developed by Hydro-Tek, of Mokena, Illinois, is a "batch still" distillation unit that delivers approximately 99.9 percent solvent reclamation. The solvent-ink mixture is heated to force the solvents to flash and leave the solid material behind. The solvent evaporates into a condenser then drains into a tank for reuse. A white grade solvent (visually clear and free of contaminants) is obtained from the unit which is reused in the plant's manufacturing process. All of the reclaimed solvent is reused in new ink mixtures, which greatly reduces the volume of new solvent purchased, and waste solvent disposed. The company is currently recycling several hundred gallons of solvent per day.

The solid residue from the distillation is not currently a hazardous waste because the company no longer uses solvents that are listed under federal waste regulations in this process. The company has developed a material safety data sheet (MSDS) for the residue and is pursuing possible buyers who can use the residue as raw material.

## Results

During the first half of 1997, the distillation unit recycled over 50,000 gallons of solvent. This represents the quantity of waste material that did not have to be sent off-site for incineration, and the quantity of virgin solvent that did not have to be purchased.

The distillation unit saved the company over \$500,000 in solvent purchases and approximately \$170,000 in hazardous waste disposal costs in 1997. These calculations do not include other savings or costs associated with running the unit, such as savings in labor or the cost of electricity.

The project centered on hazardous waste but is multimedia in scope. Installation of the distillation unit has helped the company comply with federal air regulations, due to decreased fugitive emissions and changes in storage and handling procedures for the waste solvent.

The company also benefits from decreased worker and environmental liability because they are no longer handling and storing drums and totes full of waste. Prior to the installation of the distillation unit, up to 6,000 gallons of hazardous waste were stored in 300 gallon totes in a staging area (satellite accumulation area). Now, as soon as the waste drums are full, they are transferred to two

2,000 gallon tanks located next to the unit, to await distillation. The tanks are surrounded by a concrete dyke designed to contain a possible spill, decreasing the chance of release to the environment.

## Discussion and Conclusions

Pollution Prevention can help a company improve efficiency and productivity which translates into a more competitive and profitable business. Pollution prevention helped this vinyl products manufacturer recognize their wastes as lost raw materials that can affect their bottom line.

The plant has eliminated its largest hazardous waste stream, allowing the company to go *beyond* compliance for that same waste stream. The company feels that the project has been very successful. The company has established a goal of "meeting and exceeding regulatory requirements by incorporating environmental considerations into their every day decision making process."

This company has not only improved compliance with respect to handling and storage of their solvent-ink waste, but is reaping savings in excess of \$670,000 annually. The project has been so successful that the parent company is purchasing an additional (similar) unit for a different facility.

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## Future P2 Projects

The company anticipates combining the decrease in hazardous waste generation from this project with one or two future projects to drop from large quantity generator status to small quantity generator status. This change would lighten the facility's reporting and regulatory burden.

After eliminating its primary hazardous waste stream, the company is now addressing its secondary hazardous waste streams, including a petroleum-naptha solvent from its parts washers, and rags and filters from its printing operations. The company is researching P2 options for these wastes, and recycling options for its non-hazardous wastes. The company is also developing technology to recycle 16,000-

20,000 pounds per week of fabric backed vinyl waste that historically has been landfilled.

In addition, the company is pursuing ISO 9000 (quality) certification with the intention of adding ISO 14000 (environmental) certification in the future.

The company believes that its experience in implementing the solvent distillation and recycling unit should provide a good example for other industries that utilize solvents. In a report to the Agency, the company writes: "This project has represented a tremendous success for the company and the technology applied here has the potential to provide beneficial results to others as well."

**Ohio EPA, Ohio citizens and the environment all benefit from this P2 SEP, through:**

- **settling the enforcement case and returning the company to compliance,**
- **reducing the generation and disposal of hazardous waste,**
- **reducing fugitive air emissions,**
- **potentially reducing future regulatory oversight, and**
- **decreasing risk to human health and the environment due to accidental release of hazardous waste.**

**This is one in a series of documents Ohio EPA has prepared to promote pollution prevention activities in Ohio and integrate pollution prevention into Ohio EPA programs. For more information, call the Office of Pollution Prevention at (614) 644-3469.**

***The Office of Pollution Prevention was created to encourage multi-media pollution prevention activities in Ohio to reduce risk to public health, safety, welfare and the environment. Pollution prevention stresses source reduction and, as a second choice, environmentally sound recycling while avoiding cross media transfers. The Office develops information related to pollution prevention, increases awareness of pollution prevention opportunities, and can offer technical assistance to business, government, and the public.***

**Office of Pollution Prevention WWW address: [www.epa.state.oh.us/opp](http://www.epa.state.oh.us/opp)**