

*Pollution Prevention Supplemental Environmental Projects***Mitchellace, Inc. Portsmouth, Ohio****Introduction**

The Ohio Environmental Protection Agency (Ohio EPA) Office of Pollution Prevention (OPP) has developed a number of case studies that provide information on the use of pollution prevention supplemental environmental projects (P2 SEPs) in Ohio enforcement settlements. Each case study describes the development of pollution prevention programs or projects that have been included in an enforcement settlement. OPP presents the Mitchellace, Inc. case study to illustrate how P2 SEPs can be used in enforcement cases and how the environment, the State of Ohio, and the company benefit from pollution prevention.

**Facility Description**

Mitchellace, Inc. (Mitchellace) is the world's largest manufacturer of shoelaces, producing more than four million pairs of shoelaces weekly. Mitchellace uses various weaving, braiding and tipping machines to produce both braid and cord laces. These laces are available in many materials including cotton, polyester, nylon and polypropylene. Mitchellace also does printing of packaging materials. Mitchellace's facility occupies about 360,000 square feet, and employs approximately 300 staff.

**Mitchellace's Two Pollution Prevention Supplemental Environmental Projects (P2 SEPs) included:**

- ❶ Purchasing and installing five new recycling solvent parts washers to replace previous solvent cleaning methods used for maintenance and equipment repair; and
- ❷ Completing a pilot project to study the feasibility of replacing a solvent-based card coating process with a water-based system (the success of the pilot project led to implementation of the water-based system). The coating is used for Mitchellace's blister pack shoelace packaging.

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### **Enforcement Settlement**

In March 1999, Mitchellace and Ohio EPA reached a Director's Final Findings & Orders (DFFOs) settlement addressing past hazardous waste violations.

In 1996, a previous inspection and compliance evaluation by Ohio EPA revealed

agrees to complete to help settle an enforcement case.

Ohio EPA provided assistance to Mitchellace to help identify potential P2 SEPs. Ohio EPA's assistance included an on-site visit from OPP. OPP is a non-regulatory office that helps businesses identify opportunities to lower costs

and accepted them as suitable P2 SEPs. Language was incorporated into the DFFOs outlining conditions for implementation and reporting.

Mitchellace received a partial reduction in the penalty for performing the P2 SEP. The final penalty was negotiated to \$33,200.

### **Ohio EPA considered Mitchellace a good candidate for a P2 SEP because of their:**

- understanding and commitment to P2;
- willingness to work with Ohio EPA on a P2 SEP;
- processes where P2 could be applied; and
- technical capabilities to provide adequate oversight and coordination of P2 SEP activity.

violations at the facility, which included failure to perform a waste evaluation and properly dispose of waste within 180 days. Ohio EPA's Division of Hazardous Waste Management (DHWM) offered Mitchellace the opportunity to conduct a P2 SEP as part of the settlement. A SEP is an environmentally beneficial project that a company

and reduce wastes through source reduction and recycling.

Mitchellace proposed two P2 SEP projects: the purchase and installation of five recycling parts washers, and the completion of a pilot project to evaluate the use of water-based card-coating. Ohio EPA reviewed the details of the two projects

Mitchellace agreed to pay \$18,650 cash penalty, and spend over \$14,550 towards the completion of the two P2 SEPs.

The DFFOs established dates for submittal of reports detailing the results of the P2 SEPs. The reports included information on costs and estimated waste reduction.

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## Pollution Prevention Activity Before the Settlement

Mitchellace recycles several non-hazardous wastestreams-including cardboard and pallets-generated from packaging activities. Soy-based inks are used for printing activities. Rags used for various cleanup activities are sent to an off-site industrial laundry for wash and reuse. Under normal operating conditions, Mitchellace was classified as a small quantity generator (SQG) of hazardous waste.

Although Mitchellace does not have a comprehensive P2 program, they do have an effective program for employee involvement called “TIPs” (Total Improvement Process). The purpose of TIPs is to identify cost-effective improvements in quality, productivity, safety and waste reduction. TIPs provides several incentives for employees who provide suggestions for improvements that are implemented.

## Implementation and Results

Below are P2 SEP details of the implementation and results of recycling solvent parts washers and the water-based card coating pilot project. Included is information on project costs, savings, waste reduction and other benefits.

### *Recycling Solvent Parts Washers*

Mitchellace previously operated four solvent-based parts washers and one small solvent dip tank for maintenance and repair activities. The parts washers removed typical oil, grease, and dirt from metal

equipment, parts and tools. Mitchellace leased the parts washers from a company that provided periodic servicing of the units. Servicing included maintaining filters, removing sludge and replacing spent solvent with new solvent. The solvent used in the units was petroleum-based, and had a 105°F flashpoint.

**Mitchellace estimates that approximately thirty 30-gallon drums (about 7,200 pounds) of hazardous waste will be eliminated annually by using the recycling parts washers.**

During the negotiation of the settlement, Mitchellace arranged for an on-site demonstration and evaluation of a solvent-recycling parts washer. The unit, manufactured by SystemOne, combines the features of a typical solvent parts washer with internal solvent distillation to recover solvent for reuse. The cleaning solvent used in the unit is mineral spirits. As a result of the on-site demonstration, Mitchellace agreed to purchase five new units as a P2 SEP.

The units operate much like a typical solvent parts washer. Features include a large wash basin with a spigot and flow-through brush for dispensing mineral spirits. The wash basin also includes a 100 micron basket drain. A pneumatically supported lid closes to reduce evaporative loss of mineral spirits. The unique feature of the unit is a low temperature vacuum distillation process located under the wash basin.

To recycle solvent, dirty solvent is flushed into the distillation chamber. Five gallons of clean solvent from the reservoir at the bottom of the unit is transferred into the wash basin. The dirty solvent is heated under vacuum in the distillation chamber to vapor point (about 250°F). The solvent vaporizes, leaving only a oily residue separated from the solvent. The vaporized solvent is cooled back to the liquid state in the condenser, and returned to the reservoir for reuse. Leftover oily residue must be evaluated and managed accordingly.

The solvent distillation process takes about four hours. The clean solvent reservoir holds about 30 gallons. During distillation, parts can continue to be cleaned using the clean solvent in the wash basin. All operations are automatically controlled.

Mitchellace invested \$14,550 to purchase and install five solvent recycling parts washers. Mitchellace expects to save at least \$3,400 annually by eliminating costs associated with maintaining solvent parts washers through the leasing and servicing agreement. Mitchellace estimates that approximately thirty 30-gallon drums (about 7,200 pounds) of hazardous waste will be eliminated annually by using the new units. Labor and electrical costs are reportedly similar to the previous solvent parts washers.

About one gallon of new mineral spirits per machine per month have been added to replenish loss. The new units have met Mitchellace's expectations. Mitchellace reports that overall satisfaction with the units has been great.

### ***Water-based Card Coating Pilot Project***

Mitchellace produces printed cards for its blister pack shoelace packaging. Previously, a solvent-based coating containing toluene and ethyl acetate was applied to the cards on a card -coating machine in the print shop. The coating was needed to secure the clear plastic blister pack to the card during packaging of shoelaces.

As part of a P2 SEP, Mitchellace committed to conduct a pilot project to determine the feasibility of replacing the current solvent-based card-coating process with a water-based process. Mitchellace was interested in a water-based system to reduce the vapors generated from the application of coating by the rollers, again when the cards are heated, and finally from air movement generated by fans.

The project involved either the purchase or fabrication of a system to automatically apply a water-based coating, then dry, count, and stack the cards. Previous efforts by Mitchellace to replace the solvent-based system were not successful. Through research, Mitchellace determined that it would be more cost-effective to purchase a new coating machine and modify it, instead of fabricating an entirely new machine.

Mitchellace purchased a card coater from Nessler & Wagner. One important modification Mitchellace made was to replace steel rollers with rubber rollers for feeding the cards and applying the thin, water-based coating. Steel rollers did not apply the coating well. Other equipment modifications included the purchase and installation of additional heaters and other

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parts to adapt the new coater to the current conveyor system.

**The new water-based coating replaces the use of over 4,000 pounds annually of a solvent-based coating containing toluene, a volatile organic compound (VOC) and hazardous air pollutant (HAP) under Ohio air regulations.**

Mitchellace also evaluated several water-based coatings before deciding on a coating called Latiseal, supplied by Pierce and Stevens. Adjustments in the coating's viscosity had to be made to improve performance. After a period of trial testing the new water-based card coater, Mitchellace implemented the new system in daily production operations to replace the previous solvent-based process.

The total cost of the water-based card-coating project was \$15,085. Although the

water-based coating cost \$12.60 per gallon versus the previous solvent-based coating cost of \$8.31 per gallon, actual yield costs are lower, because the water-based coating yields about 1,500 cards per gallon compared to 875 cards per gallon using the solvent-based coating. Actual yield costs are estimated at \$4.26 per 500 cards for water-based coating and \$4.74 per 500 cards for the solvent-based coating. Annually, this actually saves more than \$535 in raw-material coating costs. The production rate of the new system is expected to stay the same.

The new water-based coating replaces the use of over 4,000 pounds annually of a solvent-based coating containing toluene, a volatile organic compound (VOC) and hazardous air pollutant (HAP) under Ohio air regulations.

Mitchellace also has eliminated the need for about 55 gallons annually of xylene, used to clean the rollers on the card-coat machine. With the new water-based system, cleaning is done with water. This saves about \$570 annually in raw-material costs.

Other costs, including labor and energy, are not expected to change with the new system.

Another important benefit of the new system is improved working conditions in the print shop. Vapors from the previous solvent-based card coating system have been eliminated with the new water-based system. Mitchellace employees no longer need to operate an exhaust fan near the coater.

## **Discussion and Conclusions**

Reductions in hazardous waste generation from the solvent recycling parts washer P2 SEPs will help Mitchellace maintain a conditionally exempt small quantity generator (CESQG) status under the Ohio hazardous waste regulations. The water-based card coating P2 SEP has eliminated the use of toluene, a hazardous air pollutant (HAP) and volatile organic compound (VOC) under Ohio air regulations. Due to long estimated economic payback, Mitchellace would not have implemented these projects without the P2 SEP credit.

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These factors were important considerations for Ohio EPA in working with Mitchellace on the P2 SEPs.

The success and effectiveness of the P2 SEPs in this enforcement settlement is largely attributed to the determination and commitment made by Mitchellace to identify and implement the P2 projects. This was

**Without the P2 SEP credit, the Projects would not have been implemented because of long estimated economic payback.**

### **Estimated environmental benefits achieved by Mitchellace through the two P2 SEPs:**

- reduced hazardous waste generation by more than 7,000 pounds annually helping the facility maintain CESQG status; and
- eliminated the use of over 4,000 pounds annually of a solvent-based coating containing toluene, a HAP and VOC under Ohio air rules.

particularly evident in the water-based card coating pilot project. Previous efforts to convert from a solvent-based process were not successful. The P2 SEP provided the framework for Mitchellace to commit the resources necessary to completely study the conversion to a water-based system.

The success of the pilot project led Mitchellace to proceed with full-scale implementation, which was not a required condition of the P2 SEP.

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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.



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