

# Nevada Small Business Development Center Business Environmental Program

CS-FY9501006-F

## CUTTING OIL FILTRATION AT MALLORY INC.

### Waste Reduction Case Study

#### PROJECT

Mallory Inc., a 215 employee manufacturing firm located in Carson City, Nevada received grant funding from the Nevada Division of Environmental Protection (NDEP) to implement a waste reduction project. The waste reduction project involved installing a custom built cutting oil filtration system to recycle spent machining cutting oil generated from their manufacturing operations.

#### BACKGROUND

Mallory is a manufacturer of automotive ignition components. Machining cutting oil is used in their screw machines. There are sixteen screw machines in their Screw Machine Department, of which nine are large multi-spindle machines. The combined total of the sixteen machining oil sumps is approximately 2,000 gallons. Mallory purchases about 2,600 gallons of cutting oil per year, which when spent is managed off-site. Mallory purchased a portable compressed air powered filtration system to remove particulates down to 10 microns. The new equipment has so far eliminated the need for draining the cutting oil sumps for cleaning. Prior to the purchase of the filtration unit, cleaning the screw machine sumps required about 150 gallons of cutting oil to be drained out and held in drums while 20 to 30 gallons of sludge consisting of metal turnings and fines was shoveled from the bottom, five to six times a year. The sludge contained considerable amount of oil that was disposed off-site due to the lack of a filtration unit.

#### TECHNOLOGY

Mallory purchased a custom built diaphragm pump and a bag filter combination unit mounted on a wheeled cart. The wheeled cart allows the unit to be moved from one screw machine sump to another. The cutting oil is pumped through the filter and back to the sump several times to allow sufficient filtration of the cutting oil without having to drain the sump. The diaphragm pump develops sufficient suction to draw oil contaminated with metal chips and fines. The first round of filtering is accomplished with a 250 micron bag filter and when the bigger chips and fines are removed, the bag filter is replaced with a 10 micron bag filter. The oil is circulated to remove smaller metal particles. "The use of this pump/filter unit is a much cleaner process for the operator than emptying the sump and shoveling the muck left in the sump bottom," says Jim Sadilek, Engineer at Mallory Inc. A few adjustments were made by Mallory for the system to work satisfactorily; the pre-pump strainer, which is a fine mesh was removed to avoid clogging (the pump on the unit can pass particles up to 1/4"). The suction hose inlet strainer was also removed and replaced with a simple vacuum cleaner nozzle with wire grate to protect the pump from particles larger than 1/4". The filter piping was also modified to place the pump downstream of the filter bag. Generally speaking a modification of this nature will reduce the pump efficiency substantially; however, the pump on this unit is a positive displacement diaphragm pump and the modification had little effect on the efficiency. "In contrast to most of our experiences with new equipment and processes, this project has been remarkable for its lack of unforeseen problems and catastrophes," says Jim Sadilek, commenting on the project implementation.

#### COST SAVINGS

Prior to the installation of the filtration system, Mallory was generating 2,640 gallons per year of cutting oil that was managed off-site for a cost of \$7,200. By installing the filtration system, Mallory has reduced the waste oil generation to 100 gallons per month which costs \$3,300 per year to manage off-site. The custom built filtration system cost \$5,900 and NDEP provided

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*This case study was developed by the Business Environmental Program of the Nevada Small Business Development Center with funding provided by the Nevada Division of Environmental Protection.*



half the amount is grant money. On-site filtration of cutting oil saves \$3,900 per year in avoided disposal costs alone.

Cutting oil recycling has also reduced their cutting oil material purchase costs. Prior to installing the system, Mallory purchased 220 gallons of fresh oil at a cost of \$995 per month. On-site filtration has reduced oil purchase to 100 gallons per month, costing \$453. Mallory is saving \$543 in avoided material purchase costs per month. The filter bags costs \$3 each, and depending on the use, Mallory’s filter bag usage is between 5 to 10 per month. The filtered metal is recycled as scrap metal.

Cost Savings Per Year	
Waste Disposal	\$ 3,900
Material Purchase (\$543 x 12)	\$ 6,516
TOTAL	\$10,416

The initial installation costs of \$5,900 was recovered in about 6 months. Mallory is saving an additional \$10,416 a year from this project.

**COMMENTS**

This project demonstrates that a simple design, with a relatively inexpensive equipment can reduce waste generation and reduce costs. Not only does the filtration unit save money on disposal and material purchase costs for Mallory, but extended machine and tool life are other undocumented savings. “Plant tours seem an excellent method of sharing information with other businesses,” says Jim, “we are willing to open our plant to any business that is willing to reciprocate.” Congratulations to Mallory on a fine job. Jim Sadilek can be reached at (702) 882-6600.

**SUPPLIERS OF CUTTING OIL RECYCLING SYSTEMS**

Wagner Process Equipment (Custom pump/filters)  
(510) 786-3929

Engineered Filters  
(313) 471-0199

Alfa Laval Separation  
(215) 443-4000

Porter Systems  
(315) 633-2828

*Note: The above listing of vendors and manufacturers is provided for informational purposes only. This list is provided as a service to Nevada businesses in order to assist them with waste minimization. This listing of businesses is not to be construed as an actual or implied endorsement of their products or services. Additionally, other businesses which provide similar products and services may not be listed; this omission is not to be construed as an actual or implied denouncement of those businesses.*