

Completed Pollution Prevention Project Case Study

United States Department of Energy
Office of Environmental Management
Fact Sheet

Perchloric Acid Fume Scrubber at the CMR Facility Los Alamos National Laboratory

Original Problem

The CMR Facility originally had standard wet scrubbers to remove acid from the exhaust of the fume hoods. These commercial inline scrubbers were continually corroded by the strong perchloric acid fumes. Since they were only between 60-70% efficient with respect to acid fume removal, the potential existed for heat and shock sensitive perchloric acid crystals to form.

The Project Solution

Dennis Basile designed a new kind of perchloric acid fume scrubber that is 90% efficient with respect to removing the acid from the exhaust. Some of the higher efficiency can be attributed to the closer proximity of the capture device to the site of generation. The new scrubber design uses fine water fog to provide binding sites for the acid. The new fume hood is waterproof, allowing for complete washing to remove trace acid and reduce corrosion.

Value of Improvement

Since the scrubber has no moving parts, wear and damage that could happen to the scrubber are limited. The cost to develop the scrubber was only 5% of a conventional scrubber. The waterproof hood can be washed to prevent corrosion from the accumulation of trace acid. The new hood eliminates 90% of the liquid waste formerly produced by the old hood design.

Lifecycle Waste Reduction	
Lifecycle Waste Reduction	90% less liquid waste vs. wet scrubbers
Commencement Date	2000
Project Useful Life (Years)	15+



DOE Monetary Benefits	
Total Project Cost	5% of Conventional scrubber
Lifecycle Savings	Varies by Usage
Return on Investment	NA

Benefits At-A-Glance

- The new design reduces the chance of the formation of perchloric acid crystals or corrosion of the interior.
- The new scrubber is over 90% effective with respect to the removal of perchloric acid from the fume hood exhaust.
- The new hood design reduces the amount of liquid waste produced when compared with the old design.

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	Summary Data
Priority Area:	Waste Minimization Projects
Project Type:	Process Redesign
Total Project Cost:	\$500,000 (includes replacement of fume hood)
Lifecycle Savings:	Varies by Usage
Implementing Group:	CMR Facility
Benefiting Group:	CMR Facility
Useful Life Years:	15+
Return on Investment:	NA
Lifecycle Waste Reduction:	The new hood design will reduce the quantity of liquid waste by approximately 90%.
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