Completed Pollution Prevention Project Case Study

United States Department of Energy
Office of Environmental Management
Fact Sheet

Upgrade of Argon Gas Flow System for O-16 Exchange and Sintering Furnaces

Los Alamos National Laboratory

Original Problem

Plutonium general purpose heat sources are used to prevent the lubricating grease on moving joints of spacecraft from freezing while in deep space. Part of the fabrication process involves baking the plutonium in a sintering furnace while water-saturated argon blows past. Oil traps were used to trap plutonium molecules and verify that the argon was flowing through, but the plutonium caused the oil to thicken within a month. The oil had to be changed frequently, generating about 1-2 Liters of liquid and 1m^3 of solid fittings as transuranic waste every year.

The Project Solution

The sintering furnace design was improved to eliminate the oil traps and minimize the number of parts that routinely had to be changed. New gas flow monitors were placed in the furnace exit tubes, and solid filters that only require annual replacement are now used to prevent plutonium molecules from escaping the furnace.

Value of Improvement

The new furnace can be serviced in about 15 minutes instead of the 8 hours the process used to require, minimizing the radiation dose the technician receives. The solid filters create much less waste than the oil traps. The gas flow monitors are more accurate than the oil traps.

Lifecycle Waste Reduction	
Lifecycle Waste Reduction	~1m^3 / year
Commencement Date	2000
Project Useful Life (Years)	Indefinite

DOE Monetary Benefits	
Total Project Cost	NA
Lifecycle Savings	~$100,000 / year
Return on Investment	NA

Benefits At-A-Glance

- Reduces the time required to service the sintering furnace, thereby reducing the radiation dose the technician receives from performing this task.
- The new gas flow monitors are more accurate than the oil traps at measuring gas flow through the sintering furnace.
- Eliminates liquid and reduces solid transuranic waste generation.

Building Upon An Office of Science and Technology Demonstration Success

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	Summary Data
Priority Area:	Waste Minimization Projects
Project Type:	Source Reduction
Total Project Cost:	NA
Lifecycle Savings:	~$100,000 / year
Implementing Group:	NMT-9
Benefiting Group:	NMT-9
Useful Life Years:	Indefinite
Return on Investment:	NA
Lifecycle Waste Reduction:	1-2 Liters of liquid oil transuranic waste / year ~1m^3 of solid transuranic waste / year
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