

NEVADA SMALL BUSINESS DEVELOPMENT CENTER BUSINESS ENVIRONMENTAL PROGRAM

CS-FY9401008

ANTIFREEZE RECYCLING AT WASHOE COUNTY SCHOOL DISTRICT Waste Reduction Case Study

PROJECT

Washoe County School District, a 4500 employee public school district, received grant funding from the Nevada Division of Environmental Protection (NDEP) to install an antifreeze recycler on-site to recycle spent antifreeze. Prior to installing the recycler, Washoe County School District was disposing of the antifreeze through a private waste hauler. The proposed recycling system not only saves money on the amount of raw antifreeze they purchase, it also reduces the amount of spent antifreeze they generate and have to pay to dispose of.

"It works great," says Charlie Fong, the Environmental/Safety Officer at the Washoe County School District, "the system is best utilized in summer when most of our vehicles receive preventative maintenance."

BACKGROUND

Washoe County School District maintains a fleet of approximately 450 automotive vehicles and school buses. Apart from generating antifreeze from the two facilities in Reno and Sparks, Washoe County School District is also responsible for the antifreeze generated at the auto repair shops used for high school education. Prior to installing the antifreeze recycler, Washoe County School District was generating approximately 42 gallons of used antifreeze per month and managed it through a private waste hauler.

TECHNOLOGY

Washoe County School District installed a Finish Thompson (FT) Model BE-55c Recycler, and a pair of FT Quick Changers. The purchased unit separates water from the antifreeze and then pure ethylene glycol is recovered by distillation. The batch size of the recycler is 55 gallons and it distills antifreeze at the rate of 3.2 gallons per hour. The entire batch takes approximately 18 hours to distill. Once the ethylene glycol is recovered, re-inhibitor additives are added and a buffer is mixed to adjust the pH to between 9.5 and 10. It works great," says Charlie Fong, Environmental/Safety Officer at the Washoe County School District, "Use of proper technology was a very important consideration when we purchased the recycler; some recycling units merely filter the antifreeze and that was not acceptable to be used in our school buses under factory warranty. Our school buses require a low silicate antifreeze, unlike the other automotive vehicles in our fleet."



The FT Quick Changer stores fresh antifreeze in a 5 gallon pail and collects spent antifreeze in a 15 gallon holding tank. It is provided with hoses that can be used to drain antifreeze from the vehicle radiator and the engine block, and to replenish the system with fresh antifreeze. The entire operation of flushing and replenishing the system is accomplished in approximately 10 minutes.

WASTE MANAGEMENT

Prior to installing the antifreeze recycler, Washoe County School District was generating approximately 42 gallons of spent antifreeze per month and having it all picked up for off-site recycling. Still bottoms generated during recycling should be analyzed for lead to determine whether they are hazardous waste. If the still bottoms turns out to be a non-hazardous waste under TCLP, they can be disposed of as normal trash. Washoe County School District is generating approximately 8 gallons per month of still bottoms

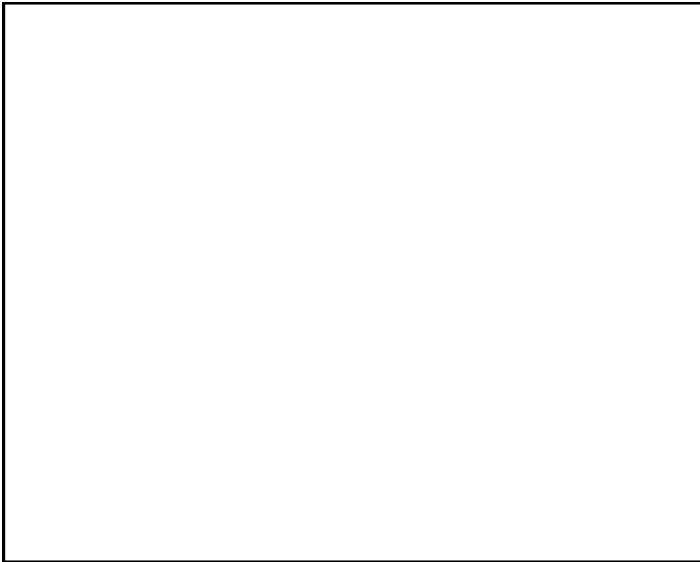
This case study was developed by the Business Environmental Program of the Nevada Small Business Development Center with funding provided by the Nevada Division of Environmental Protection.



which are accumulated in a 55 gallon drum. The results of the TCLP test for lead, cadmium and chromium indicate the sludge is a hazardous waste due to elevated levels of lead. The waste is shipped off-site through a hazardous waste management company.

COST SAVINGS

Prior to installing the antifreeze recycler, Washoe County School District was generating about 504 gallons of antifreeze per year, at an annual disposal cost of \$850. The total cost of the antifreeze recycler amounted to \$12,524. The Nevada Division of Environmental Protection provided half the cost in grant money. The re-inhibitor additive and buffer is available in a kit and can be used to process up to 200 gallons of spent antifreeze. The kit costs \$250. Prior to installing the recycler, Washoe County School District was purchasing 16 drums of fresh antifreeze a year totaling 880 gallons at a cost of \$2,640. Washoe County now purchases two drums of fresh antifreeze, costing \$330. The cost of disposing of a drum of still bottoms is \$300. Use of the recycler results in a cost savings of \$420 per year for antifreeze disposal and \$2,310 per year in avoided purchase costs for new antifreeze. Considering 2 additive kits per year, the total savings from this project is \$2,230 per year. The cost to test the still bottoms under TCLP for lead, cadmium and chromium was \$81. This project will break even in 5.7 years.



COMMENTS

Recycling antifreeze on-site can save money. It is feasible to install the antifreeze recycler even in a small shop; however, care must be taken to purchase a recycler that fits your needs. Selection of the type of recycler required should be based on the volume of spent antifreeze generated and the separation efficiency desired. Automotive manufacturers have approved the use of filtration equipment for recycling the antifreeze of cars covered under warranty. To break even in two years, Washoe County School District needs to generate between 110 and 120 gallons of spent antifreeze per month. Washoe County School District might accept antifreeze from other local government motor pools for recycling

Marvin Thiessens, Shop Supervisor with his Finish Thompson antifreeze recycler at the WCSD maintenance shop in Sparks, NV.

which will accelerate the payback period, but may require NDEP approval. For a business generating 40 to 50 gallons of antifreeze per month, a 15 gallon batch size recycler will suffice. The 15 gallon model BE 15/C antifreeze distillation unit made by Finish Thompson costs around \$6,000. This would provide break even period of 2.7 years based on the school district's generation rate. Filtration units are available starting at about \$2000 which will provide a much faster payback when antifreeze filtration will suffice.

ANTIFREEZE RECYCLING EQUIPMENT SUPPLIERS

BG:CASCO, Temple Hills, Maryland
Bob Crovato, (800) 327-8883

Finish Thompson - Automotive of Nevada
2901 S Highland #10B, Las Vegas
Bob Seltzer, (702) 791-0177

Re-Neva Auto Supply
935 S Rock Blvd., Sparks
Don Ellis, (702) 331-2886

Robinair
Reno: Greenfield Enterprises (702) 849-1488
Las Vegas: Cap Warehouse (702) 642-0616

Solar Division of Century Mfg.
Northern Nevada (209)474-7764
Southern Nevada (714) 879-6062

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 actual or implied endorsement of their products or services. Additionally, other business 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.





The following table provides some cost estimates and break even periods for distillation units and filtration units.

Spent antifreeze generated in gallons per month	Waste handling costs \$ per year \$1.50/gallon	On-site recycling technology	Initial cost of the equipment (approximate)	Cost of additive kits/chemicals	Cost savings \$ per year	Break even period
50	900	Closed loop filtration	\$3,085*	\$12/pint per 12 cars	2,700**	1.2 years
80	1,440	Filtration based system (40 gallon batch)	\$5,585*	\$120 per 80 gallons	3,540**	1.7 years
75	1,350	Distillation Unit (15 gallon batch)	\$6,085*	\$250 per 200 gallons	3,325**	1.8 years
150	2,700	Distillation Unit (55 gallon batch)	\$12,685*	\$250 per 200 gallons	7,150**	1.7 years

NOTE:

* includes a one time cost of \$85 for TCLP test of the loaded filter or sludge.

** cost savings reflect avoided fresh antifreeze purchase costs and spent antifreeze disposal costs, but are adjusted to account for costs involved in the disposal of the spent filters/still bottoms at the rate of \$300 per year, and the cost of the additives. The \$300 disposal costs reflect a conservative estimate of one 55 gallon drum of spent filter/sludge per year, managed as a hazardous waste.

Cost savings may vary from business to business depending on the brand of the equipment purchased and the cost of the additives/chemicals. These numbers are based on data collected from businesses who received grant funding to implement on-site antifreeze recycling projects from the Nevada Division of Environmental Protection.



Finish Thompson Quick Changer at WCSD maintenance shop.