

Division of Science, Research and Technology

Research Project Summary

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Removal of Mercury Switches from Surplus New Jersey State Motor Vehicles

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Abstract

This project assessed two potential ways to maximize the removal of mercury-containing switches from vehicles owned and operated by the State of New Jersey. Considered were 1) replacement of mercury switches with non-mercury switches while vehicles were in service, and 2) removing these switches at the time the vehicles are retired from State service. It was determined that option 2) was more feasible. The Department of Environmental Protection (DEP) and the Department of Treasury entered into a Memorandum of Understanding whereby Department of Treasury agreed to remove switches which would be picked up periodically by DEP and sent to be recycled. As of October, 2006, nearly 600 switches had been removed, representing approximately 1.5 pounds of mercury.

Introduction

The DEP's Division of Science, Research and Technology received a Pollution Prevention grant from USEPA, Region II in October 2003 for the purpose of developing a program to remove mercury switches from the state fleet of motor vehicles. Mercury switches were installed in convenience lights in the hood and/or trunk of some motor vehicles up to and including the 2002 model year. This mercury is typically released to the environment when vehicles are discarded and are subsequently shredded and the shredded steel is melted to make new products. Once released to the environment, mercury can accumulate in fish and other biota, presenting a health hazard to humans and wildlife that consume these fish.

In 2004 there were approximately 6000 motor vehicles in the New Jersey state fleet. Most were automobiles or light trucks. A study by the DEP¹ of end-of-life motor vehicles found that they contained, on average, about 0.8 mercury switches each and each contained an average of 1.2 grams of mercury. It was estimated that the average number of switches per vehicle in the state fleet was somewhat less than this, since the peak use of mercury switches in motor vehicles appears to have been in the late 80s and early 90s² and the average state-owned vehicle was newer than that. Overall it was estimated that the state fleet accounted for perhaps 3000 switches, representing approximately 3 kg of mercury. Removing the switches, either while the vehicles were in service or at the time they were removed from state service could prevent the subsequent release to the environment of this mercury.

State vehicles are housed at a number of locations throughout the state, and managed by various State agencies, including the Department of Environmental

Protection, the Department of Transportation, the State Police, NJ Transit, the NJ Turnpike Commission, and others. Therefore replacement of switches in in-service vehicles would require substantial outreach, training, parts distribution, and switch collection from many locations. However, all surplus (retired from service) state vehicles are conveyed to one central location operated by the Department of Treasury, Division of Purchase and Property, Distribution and Support Services (DSS) where they are then auctioned. It was determined that it is feasible for the switches to be removed and collected at this location. Discussions with DSS led to the establishment of a Memorandum of Understanding between the Department of Environmental Protection (DEP) and DSS whereby DSS agreed to remove switches and the DEP agreed to provide some financial support, to be transferred if possible from the EPA grant that funded this project, and to periodically pick up removed switches and see that they were managed appropriately.

Methods

DSS inspects vehicles as they are being readied for auction at the Department of Treasury Distribution Center in Trenton, NJ and identifies mercury-containing switch assemblies. Such assemblies are removed, using small hand tools as necessary, and placed in a marked 5-gallon bucket provided by DEP. See Figures 1 and 2. The vehicle make, model, year, and location of switch assembly (hood or trunk area) are recorded on data sheets provided by DEP. DEP periodically visits the Distribution Center and picks up the bucket containing switch assemblies and replaces it with an empty bucket. DEP conveys the switch assemblies to the Comus International manufacturing facility in Clifton, NJ. This facility then ships the switches to a recycling firm, Bethlehem Apparatus, in Bethlehem, PA, for recycling.



Figure 1. DSS Surplus Vehicle Auction Coordinator Jake Olearchik removes a mercury switch assembly

Results

DSS personnel have become adept at recognizing mercury-containing switches and removing them. The entire removal process typically takes less than a minute per assembly. Lack of a functioning convenience light assembly in vehicles to be auctioned is not considered by DSS to represent a significant detraction from a vehicle's value. It has been observed that convenience lights are sometimes not functional anyway by the time a vehicle is retired from state service.

As of October, 2006, approximately 600 mercury switch assemblies, containing approximately 0.7 kg (1.5 lbs.) of mercury had been removed from surplus state vehicles.

The number of mercury switches found in surplus vehicles appears to be declining, as is expected because no mercury switches were installed in new vehicles after 2002. Removal of switches by DSS is planned to continue until mercury switches are no longer present in surplus vehicles.



Figure 2. Bucket for removed switch assemblies, tools, and data sheet

Discussion and Conclusions

Removal of mercury switch assemblies from fleet vehicles that are conveyed to a central location upon retirement as is the case with New Jersey state vehicles is feasible and is an effective method of ensuring that the mercury contained in the switches is not released to the environment when the vehicles are eventually discarded.

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