
Name of Organization: Minnesota Pollution Control Agency

Type of Organization: State

Contact Information: Mr. John Wachtler

Policy and Planning

520 Lafayette Road

St. Paul MN 55155

Phone: (651) 297 - 8333 **Extension:**

Fax: (651) 297 - 8676

E-Mail: john.wachtler@pca.state.mn.us

Project Title: Finding Hidden Mercury Using a Specially Trained Dog

Project Category: Pollution Prevention and Reduction - BNS

Rank by Organization (if applicable): 1

Total Funding Requested (\$): 59,550 **Project Duration:** 1.5 Years

Abstract:

Mercury spills in buildings will be found through adaptation of a Swedish program that has been successful on two levels: it found mercury in a cost effective manner and it generated extensive media coverage that helped educate the population about proper mercury use and disposal. A dog will be trained in Minnesota to find mercury spills in buildings (e.g., school laboratories, hospitals, clinics, and buildings slated for renovation or demolition), including areas located within the Great Lakes basin. Once the mercury spills have been located, building owners and operators would remove the mercury and dispose of it in an appropriate manner. This is a pilot project to demonstrate that the dog finds mercury in a cost-effective manner, that the dog experiences no adverse health affects, and that utilizing a dog produces appropriate publicity that enhances the goal of virtual elimination of mercury. Other Great Lakes states would be able to have the dog and handler visit to demonstrate the utility of the dog. The sensitivity of the dog's nose will be evaluated using Tekran instrumentation purchased through a 1999 EPA grant.

Geographic Areas Affected by the Project

States:

- | | |
|---|---------------------------------------|
| <input type="checkbox"/> Illinois | <input type="checkbox"/> New York |
| <input checked="" type="checkbox"/> Indiana | <input type="checkbox"/> Pennsylvania |
| <input type="checkbox"/> Michigan | <input type="checkbox"/> Wisconsin |
| <input checked="" type="checkbox"/> Minnesota | <input type="checkbox"/> Ohio |

Lakes:

- | | |
|--|------------------------------------|
| <input checked="" type="checkbox"/> Superior | <input type="checkbox"/> Erie |
| <input type="checkbox"/> Huron | <input type="checkbox"/> Ontario |
| <input type="checkbox"/> Michigan | <input type="checkbox"/> All Lakes |

Geographic Initiatives:

- | | | | | |
|--|----------------------------------|-------------------------------------|--------------------------------------|---|
| <input type="checkbox"/> Greater Chicago | <input type="checkbox"/> NE Ohio | <input type="checkbox"/> NW Indiana | <input type="checkbox"/> SE Michigan | <input type="checkbox"/> Lake St. Clair |
|--|----------------------------------|-------------------------------------|--------------------------------------|---|

Primary Affected Area of Concern: St. Louis River, MN

Other Affected Areas of Concern:

For Habitat Projects Only:

Primary Affected Biodiversity Investment Area:

Other Affected Biodiversity Investment Areas:

Problem Statement:

Liquid mercury spilled on a floor or down a drain tends to flow to low points and stay there. Liquid mercury is 13.5 times more dense than water, so it tends to stay in a plumbing trap, gradually releasing mercury into the water that flows over it (liquid mercury is not very water soluble). A program in Sweden focuses on finding and collecting mercury that accumulated in plumbing traps and forgotten mercury on lab shelves. One floor drain yielded over two kilos of liquid mercury. This program has led to the collection of 1.3 tons of mercury that was in sinks, drains, floors, and closets. Specially trained dogs find mercury deposits using their sensitive noses in schools, laboratories, clinics, and hospitals. Sometimes, the dogs found mercury in older instruments, in which case the instruments were retired or labeled with warning signs.

Researchers in Sweden and in America estimate that there are significant amounts of spilled mercury in low spots in buildings throughout Europe and North America, mostly traps in sinks and floor drains. These small, widely dispersed deposits add up to a significant source of mercury contamination. And in some locations, such as schools, mercury deposits represent a potential source of exposure to children. The EPA IRIS database gives a reference concentration of just 300 nanograms per cubic meter in air for both short and long-term exposure. The corresponding ATSDR number is even lower, at 200. It is entirely possible that some spills could produce air concentrations that exceed these levels, especially in older buildings with inadequate air exchange rates.

Forgotten and spilled mercury is important to locate and remove for multiple reasons:

- Children and adults may be currently exposed to higher than advisable air concentrations.
- Children may find the mercury and do inappropriate things with the mercury, which commonly increases exposure and costs large amounts of money to clean up.
- Mercury in drains contributes to the mercury load at treatment plants and in discharge to waters, undoubtedly contributing to mercury contamination of fish.
- Spilled mercury contributes to the general mercury burden of the atmosphere and deposition to surface water everywhere, which is responsible for most of the mercury contamination of fish.

Using dogs to locate mercury spills saves time and money. The dogs are faster and more accurate than mechanical devices. Once located, mercury deposits can be collected safely and quickly, without wasting time looking for spills in places where they did not occur.

The hard to get at sources of mercury that the dogs can find comprise an exposure route that has yet to be addressed by state and federal programs in the U.S. As we progress toward reduction goals, implementation of collection programs will become increasingly critical. The Swedish identification, collection and removal program has had striking effects.

Communities that were not receptive to mercury collection were open to the program and willing to clean up the hidden mercury sources, once they were identified. We expect that a comparable program will have comparable results in Minnesota and other states. The MPCA proposes a pilot program to test whether a program comparable to the Swedish one can have similar benefits in the Great Lakes region.

Proposed Work Outcome:

The MPCA and its partner, Northern States Power Company, propose to adapt the Swedish program to Minnesota conditions. The project will begin with an 8-week training program for both a dog and its handler, who will be an employee of the MPCA. The St. Paul Police K-9 unit has tentatively agreed to provide this training for about \$2,000; St. Paul K-9 has trained national champions and has wide experience in training dogs for a variety of purposes. Other public and private training opportunities are available in the United States. We investigated the possibility of purchasing a trained dog from the Swedish firm that has a proven record, but a number of impediments encouraged us to run this pilot completely in the U.S: The Swedish dog would cost \$41,000, plus the costs of sending a U.S. handler to Sweden for 8 weeks training, export fees, and the inherent logistical problems of international trade.

A work plan for the balance of the one-year pilot project will be developed while the dog is being trained. The plan will be developed in cooperation with interested groups such as local utility firms (electrical generators and POTWs), hospitals and school districts. Elements of the plan for the pilot program will include:

- agreements between all partners on their individual and collective roles and responsibilities
- an itinerary for the dog and its handler
- a model agreement for the owners and operators of sites that the dog visits
- public information campaigns for use before and after site visits
- specific criteria to be used in evaluating the success of the pilot program
- an outline for an evaluation report that will be completed at the end of the six-month pilot period

Clean-up costs will be covered by the organizations that own and/or operate the buildings in which the dog finds mercury. Expenses incurred in the care and handling of the dog will be covered by the MPCA and its partner.

We expect that the proposed program will have results comparable to those of the Swedish program. That is, significant amounts of mercury will be found in public building and that useful media coverage is generated. Once located, we expect that the model agreement will require owners and operators to remove the mercury from their buildings and appropriately manage the collected waste materials. Some funding may be available to assist schools and other public entities with these removal and disposal costs.

This project is proposed as a one and a half-year pilot project. We anticipate that either the dog will be able to find mercury or it won't. If the dog fails to find mercury, we would terminate the program. However, we anticipate that the dog will find mercury, since the Swedish firm has successfully trained two dogs to do so. If the dog finds mercury, we anticipate no problem in finding funding to continue the program for the anticipated working life of the dog, about five years.

During the pilot program, a Tekran instrument will be used to measure the mercury concentration in building ambient air and in drains (it may be necessary to have building ventilation turned off for a given time). A statistical number of measurements will be made (at least 15) to test for significant differences in mercury concentrations. It may be found that it is not worth scanning a building with a dog if the mercury concentration building in the building air is below a certain level.

Four times during the pilot year, including before training starts, the mercury level of the dog's blood will be monitored to test the hypothesis that mercury detection significantly raises the dog's absorption of this metal. Concentrations will be compared to levels of concern. Toxicological blood level monitoring and modeling in Sweden reportedly predicted no deleterious effect to the dog.

Project Milestones:	Dates:
Project Start	07/2000
Purchase the dog	08/2000
Hire a dog handler	08/2000
Train the handler and the dog	10/2000
Arrange site visits	10/2000
Design studies & data collection system	12/2000
Mid-term progress report to EPA	12/2000
Project End	01/2002

Project Addresses Environmental Justice

If So, Description of How:

Mercury exposure occurs primarily by eating fish. Communities that experience the highest exposures are those in which fishing supplies a significant part of family diets. In Minnesota, these communities consist of people in lower income classes and Native American people who live on tribal lands. To the extent that the program reduces the amount of mercury in fish, it will benefit the people who experience the highest mercury exposures.

Project Addresses Education/Outreach

If So, Description of How:

A public information campaign is planned as an integral part of the pilot program. Public information materials developed for the pilot program will be revised and adapted to suit full-scale operations.

The Swedish project has received considerable media attention. It has been featured in over 1,000 newspaper articles and more than 100 radio and television programs. We expect comparable attention will be given to the Minnesota pilot program and to the full-scale program that develops from the pilot. This publicity will serve to not only advertise the mercury removal efforts, but to also raise public awareness of the mercury issue in general.

Project Budget:

	Federal Share Requested (\$)	Applicant's Share (\$)
Personnel:	35,000	35,000
Fringe:	7,350	7,350
Travel:	2,500	2,500
Equipment:	500	500
Supplies:	1,000	1,000
Contracts:	1,000	1,000
Construction:	0	0
Other:	500	5,500
Total Direct Costs:	47,850	52,850
Indirect Costs:	11,700	11,700
Total:	59,550	64,550
Projected Income:	0	0

Funding by Other Organizations (Names, Amounts, Description of Commitments):

One private sector firms will participate directly in the proposed project:

Northern States Power Company is an investor-owned electrical utility. NSP's headquarters are located in Minneapolis. NSP has committed \$20,000 cash to the project, plus \$5,000 in kind preparation of public outreach materials.

Description of Collaboration/Community Based Support:

The MPCA and NSP plan to work with local governments and statewide agencies in developing and implementing the proposed project. Education administrators, school faculty associations, hospital administrators, and other professional groups likely to become involved will be consulted before the project gets underway. Information from these groups will be used to arrange the details of project implementation. Consultations with these groups will also be used to develop the public outreach part of the project. After public information materials are developed, we will ask the organizations we have consulted with to participate in public outreach activities such as meetings, public affairs programs and the distribution of written materials.