EPA State Innovation Pilot Grant Program 2006

Project Summary Information Page

Project Title and Location:

Title and Location: Using the Environmental Results Program (ERP) Model to Reduce Mercury by Effective Management of Dental Amalgam

New Jersey Department of Environmental Protection
Trenton, New Jersey

Applicant Information:

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Other federal funding: [withheld by EPA]

Federal Regulatory Flexibility: None anticipated

Support from Commissioner: Assistant Commissioner Jeanne Herb knows of and supports this project.

Summary Budget Information Withheld by EPA

Pre-proposal Project Narrative

Using the Environmental Results Program (ERP) Model to Reduce Mercury by Effective Management of Dental Amalgam

Issue addressed by the project:

Mercury is a persistent, bioaccumulative, toxic pollutant (PBT) and a potent neurotoxin. Exposure to mercury contamination can cause permanent brain damage to the fetus, infants, and young children. Mercury exposure has been shown to affect the ability of children to pay attention, remember, talk, draw, run, see, and play. Even exposure to low levels can permanently damage the brain and nervous system and cause behavioral changes. Human exposure to the most toxic form of mercury comes primarily from eating contaminated fish and shellfish. In aquatic systems, mercury (in the form of methylmercury) is quickly taken up into higher organisms through the food chain, and those organisms retain the mercury in their bodies. Levels of methylmercury in fish are typically 100,000 times those in the water in which they swim. Concentrations exceeding 1.0 ppm have been found in higher trophic level fish, especially largemouth bass and chain pickerel, in about 40 percent of 55 New Jersey water bodies that have been sampled.

Dental facilities (such as private dental practices, as well as other facilities where placing or removing dental amalgams occurs, such as hospitals, dental schools, and community health centers) are a substantial source of mercury to New Jersey's surface waters. Dental facilities contribute more than any other sector to the mercury entering POTWs[1]. While there is a significant amount of incidental removal of mercury at POTWs, this removal is not complete. As a result, POTWs discharge mercury directly to the surface waters of the State. In addition, to the extent that the POTWs' treatment processes remove mercury, much of that mercury is concentrated in the POTWs' sludge. Approximately 27 percent of sewage sludge generated in New Jersey is incinerated, resulting in the atmospheric release of mercury, and ultimately deposition to surface waters.

Scope of project's impact

The NJDEP is planning to implement a new rule to curtail the release of mercury from dental facilities into the environment by requiring dental facilities to employ best management practices (BMPs) for the collection and recycling of mercury-containing wastes and to install and operate amalgam separators. New Jersey's dental amalgam rule will impact approximately 3,400 facilities that generate amalgam waste through placement or removal of mercury amalgam fillings. Based on registrations in the Department's Medical Waste Generator data base, there are approximately 4,400 dental facilities in New Jersey. The New Jersey Dental Association

[1] According to the American Dental Association (ADA), 35 to 45 percent of the mercury entering POTWs comes from dental facility sources (see Eichmiller, Statement of the ADA to the Wellness and Human Rights Subcommittee, Government Reform Committee, United States House of Representatives, on The Environmental Impact of Mercury Containing Dental Amalgam, October 8, 2003). Another study estimated that dental facilities contribute approximately half of the estimated total mercury load to POTWs in the U.S. (see Vandeven, Jay and Steven McGinnis, 2005, An assessment of mercury in the form of amalgam in dental wastewater in the United States, Water, Air, and Soil Pollution, 164, 349-366).

estimates that the dental practices in approximately 1,000 of these facilities are specialists that would be exempt from the regulation because they do not place or remove amalgam fillings.

Traditional approaches to permitting and compliance in a sector of this size dominated by small businesses will likely produce ineffective and inefficient results. Therefore, the NJDEP plans to propose that facilities can avoid the need to obtain an individual Significant Indirect User (SIU) permit by implementing BMPs and installing amalgam separators. To help ensure success and to track environmental improvements achieved by dental facilities, NJDEP is proposing to use the Environmental Results Program (ERP) model to implement this new rule. The ERP approach will include the development of compliance assistance materials, self-certification of compliance by dental facilities through electronic filing, and baseline and followup compliance inspections on a portion of covered facilities to assess compliance.

Project Goals and expected environmental outcomes

Wastewater generated by dental facilities that remove or place amalgam fillings can contain significant amounts of mercury. Based on data from the American Dental Association (ADA), New Jersey dental facilities discharge approximately 2,580 pounds per year of mercury amalgam.[2] ADA data also indicate that chair-side traps and vacuum filters, would remove 1.01 tons (2,013 pounds) per year of mercury amalgam from the dental waste stream. But it is not known if dental facilities are properly managing and recycling these wastes. Requiring dental facilities to implement BMPs and document compliance will ensure proper management of these wastes. In addition, installation of mercury amalgam separators meeting the ISO 11143 standard (minimum 95 percent removal efficiency) is estimated to remove 0.27 tons (540 pounds) per year of mercury from the wastestream prior to discharge into the sanitary sewer

In combination, the NJDEP estimates that proper management requirements in the BMPs and the installation of amalgam separators will decrease mercury releases to the environment by an estimated 2,550 pounds per year. The goal is to achieve these reductions within 2 years of the effective data of the regulations. The NJDEP estimates that these measures will reduce the amount of mercury discharged to waters of the State through local agency's treatment plants by 22 percent, and mercury loading to the POTW sludge by 51 percent.

Link to EPA's Strategic Goals

New Jersey's proposed dental amalgam ERP program is directly linked to three of EPA's strategic goals. First, the program meets Goal # 5: Compliance and Environmental Stewardship. Specifically, the program meets Objective 5.2 Improve Environmental Performance Through Pollution Prevention and Innovation by using the ERP model for an entire sector.

Second, the proposed program meets EPA Goal #2: Clean and Safe Water. Specifically, Objective 2.1 Protect Human Health. As discussed in the EPA strategic plan, most fish consumption advisories are issued because of unhealthy levels of mercury. The Department has already taken significant steps to reduce mercury emissions into the air by establishing stringent

[2] NJDEP estimates for New Jersey based on national data in a November, 2002 report prepared for the ADA by Environ International Corporation

new restrictions on mercury emissions from coal-fired power plants, iron and steel melters, and municipal solid waste incinerators. (See 36 N.J.R. 123(a), 36 N.J.R. 5406(a)). The dental amalgam program is part of New Jersey's continuing effort to reduce mercury in the environment to "make more fish safe to eat" as stated in EPA's strategic plan.

And third, the proposed program is linked to Goal #4: Healthy Communities and Ecosystems. Mercury is a PBT and a high-risk chemical where targeted, chemical-specific strategies are needed to reduce the known impacts from human exposure included in Objective 4.1 Chemical, Organism, and Pesticide Risk.

Description of Innovation and program criteria

NJDEP is proposing to implement a sector-wide ERP program at all dental facilities in New Jersey that generate mercury amalgam wastes. This will reduce mercury discharged to surface water—which is both an EPA strategic goal (Goal #2: Clean and Safe Water and #4: Healthy Communities and Ecosystems) and identified in EPA's Innovation Strategy (restoration and maintenance of water quality by reducing toxic substances).

The NJDEP is planning to implement a new rule to curtail the release of mercury from dental facilities into the environment by requiring dental facilities to employ best management practices (BMPs) for the collection and recycling of mercury-containing wastes and to install and operate amalgam separators. Facilities can avoid the need to obtain an individual Significant Indirect User (SIU) permit by complying with the new requirements. The NJDEP will use the ERP approach to assess compliance with this new rule. The proposed approach meets the core requirement—innovations in permitting or alternatives to permitting—because facilities can avoid the need to obtain an SIU permit if they comply and self certify compliance.

The ERP model is a new approach that combines compliance assistance, self certification, and performance measurement to document compliance and reduce impacts to the environment. Facilities are required to conduct self audits and certify compliance. NJDEP will provide compliance assistance materials and conduct statistical analysis of pre and post compliance inspections on a portion of covered facilities to assure compliance. ERP has been demonstrated in other sectors in other states but has never been applied in New Jersey. This will be the first experiment using ERP in New Jersey where we hope to learn from experience gained in other states. Applying this new approach to control pollution will address one of the biggest contributors of mercury in discharges to POTWs and, ultimately, surface waters of the State.

By applying the ERP model to dental facilities, the NJDEP will be able to track measurable environmental improvements. Measures tracked will include "output measures", specifically the number of amalgam separators installed and BMP plans certified. We will also track "outcome measures," specifically the estimated reductions in mercury discharged to POTWs and surface water. A database will track information obtained from self certifications and baseline/post inspections and will be used to track compliance and reductions. NJDEP will assess these data and report on progress achieved.

Facilities that forego the permit exemption, and instead choose to obtain a NJPDES SIU permit from either the Department or a delegated local agency, will incur a variety of costs. Those costs are incurred in applying for a permit, complying with permit conditions, paying permit fees, and paying penalties or fines if the permit is not applied for or is violated. Currently, the minimum annual permit fee for a Department issued permit is $5,400. Delegated local agencies (DLA) have permit fees that range from $50.00 to $11,000 per year. The cost of complying with permit conditions will depend upon the particular conditions that either the Department or the DLA establishes in an individual permit.

Other states have implement similar laws. For example, a 2003 Maine law required dental offices to install amalgam separators by December 31, 2004 (38 M.R.S.A. 1667). New Hampshire rules adopted in May 2005 required amalgam separators to be installed by October 1, 2005 (Env-Ws 905.04). Under a Connecticut statute, dental practitioners and dental schools must install and maintain amalgam separators (C.G.S. chapter 446m, sec. 22a-622; see also http://dep.state.ct.us/wst/mercury/dental_bmp.htm). Massachusetts has proposed rules to require dentists to install amalgam separators and recycle their mercury-containing amalgam waste (proposed new chapter 310 CMR 73.00 and amendments to 310 CMR 30.000 and 310 CMR 70.00). New York has also proposed rules to require dental facilities to use an amalgam separator to treat all facility waters likely to come into contact with amalgam waste (Proposed 6 NYCRR Subpart 374-4 and Associated Revisions to 6 NYCRR Parts 364, 370, and 371). New Jersey will share its experiences with these and other states interested in tracking results of the program.

Project Activities and Key milestones

The NJDEP is proposing a three-year project. The project will be implemented in three steps: (1) Rule Development, (2) Compliance assistance and self-certification materials, and (3) Performance Measurement through baseline and post inspections. In step one, the NJDEP will promulgate a rule for dental facilities following our typical rule development procedures. The goal is to require dental facilities to implement BMPs within 12 months of the effective date of the rule and to install amalgam separators within 24 months of the effective date of the rule. All other activities conducted in the project are linked to these compliance dates.

In step two, NJDEP will develop compliance assistance materials and self certification forms. The materials will be developed shortly after the rules are effective. The NJDEP will establish process to allow for electronic filing of self certification forms. The NJDEP already has a active e-government portal, eNJEMS, allowing facilities to a wide variety of functions electronically including applying for air permits, underground storage tank registrations and submitting compliance information under various programs. (see http://www.nj.gov/dep/online/). NJDEP also has a well, established enterprise facility and regulated activity data system, NJEMS. Both products will be leveraged with minor enhancements to allow facilities to electronic submit their self certification through eNJEMS and store and track the data in NJEMS. NJEMS will also be use to maintain inspection and compliance information, collected in step 3 below. NJDEP will be able to use these tools along with its reporting tools, Business Objects and iMap, to report out on the regulated universe and compliance rate, and display this data geospatially with other data layers, to evaluate potential environmental impacts.

In step 3, NJDEP will conduct baseline and post compliance inspections and conduct statistical analysis to document compliance and environmental results. Baseline inspections will be conducted prior to the first compliance deadline. Post inspections will be conducted in two phases. The first phase will be after the BMPs are required to be in place (12 months after the effective date of rule) and the second phase after the amalgam separators are to be installed (24 months after the effective date of the rule).

The baseline and post inspections will provide the information needed to track progress and assess environmental results. Output measures will include compliance rates and numbers of certified BMPs and installation of amalgam separators. Outcome measures include estimated reductions in mercury discharged to POTWs from the implementation of BMPs and installation of separators based on self certifications and baseline/post compliance assessments.

Project Schedule and Time Frame

Table 1 below outlines the overall program schedule. These dates could change due to unexpected issues that arise during the rule promulgation process.

Table 1: Summary of Key Milestones

Key process or outcome	Mar-06	Jun-06	Sep-06	Dec-06	Mar-07	Jun-07	Sep-07	Dec-07	Mar-08	Jun-08	Sep-08	Dec-08	Jan-09	Mar-09	Jun-09
Propose rule															
Final rule															
Compliance assistance/and self certification materials															
Baseline compliance inspections															
1st round of Follow up inspections															
Assess Compliance and Environmental performance															
2nd round of Follow up inspections															
Final Assessment of Compliance and Environmental performance															

Proposal Budget

Table 2 below outlines the proposed budget for the project.

Table 2: Proposed Budget

[withheld by EPA]