ENVIRONMENTAL PROTECTION

ENVIRONMENTAL REGULATION

DIVISION OF WATER QUALITY

WATERSHED PERMITTING ELEMENT

Water Pollution Control

Requirements for Indirect Users - Dental Facilities

Proposed New Rules: **N.J.A.C. 7:14A-21.12**

Proposed Amendments: **N.J.A.C. 7:14A-1.2**

Authorized By: Lisa P. Jackson, Commissioner, Department of Environmental Protection.

Authority: N.J.S.A.58:10A-1 et seq. and 58:11-49 et seq.

Calendar Reference: See Summary below for explanation of exception to calendar requirement

DEP Docket Number: 11-06-08/563

Proposal Number:

A **public hearing** concerning this proposal will be held on:

Date: October 11, 2006

Time: 1:30 PM to 4:30 PM (or until the end of comments, whichever comes first)

Location: New Jersey Department of Environmental Protection
401 E. State Street
Hearing Room, First Floor, East Wing
Trenton, New Jersey

Submit written comments, identified by the DEP Docket Number given above, by (60 days after publication) to:

Alice A. Previte, Esq.

Attn: DEP Docket No. 11-06-08/563

Office of Legal Affairs

New Jersey Department of Environmental Protection

PO Box 402

Trenton, N.J. 08625-0402

The Department of Environmental Protection (Department) requests that commenters submit comments on disk or CD as well as on paper. Submittal of a disk or CD is not a requirement. The Department prefers Microsoft Word 6.0 or above. Macintosh™ formats should not be used. Each comment should be identified by the applicable N.J.A.C. citation, with the commenter's name and affiliation following the comment.

The agency proposal follows:

Summary

As the Department has provided a 60-day comment period on this notice of proposal, this notice is excepted from the rulemaking calendar requirement pursuant to N.J.A.C. 1:30-3.3(a)5.

Dental facilities are a substantial source of mercury, a potent neurotoxin. The Department is proposing new rules to curtail the release of mercury from dental facilities into the environment. Dental facilities can eliminate the release of mercury by 95 percent or more by installing and operating amalgam separators, and employing best management practices for the collection and recycling of mercury-containing wastes.

With this proposal, New Jersey joins a growing number of state and local governments in the United States, as well as local and provincial governments in Canada, in requiring dental facilities to use amalgam separators. 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 and Vermont have also adopted rules to require dental facilities to use an amalgam separator to treat all facility waters likely to come into contact with amalgam waste (6 NYCRR Subpart 374-4 and Associated Revisions to 6 NYCRR Parts 364, 370, and 371).

Background

Risks from mercury in the environment. Mercury is a toxic heavy metal. 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. Scientists estimate up to 60,000 children may be born annually in the United States with neurological problems leading to poor school performance because of mercury exposure while in utero.

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.

Mercury reaches its highest levels in large predatory fish and in birds and mammals that consume fish. Accordingly, mercury poses a severe risk not only to human health, but to wildlife as well.

How mercury enters the environment. Mercury enters the aquatic environment through a variety of sources that release mercury to the land, air, and water. For example, much of the mercury that iron and steel melters, incinerators, and coal-fired power plants emit to the air is deposited in surface waters.

The Department has already taken significant steps to reduce mercury emissions into the air. In 2004, the Department established stringent new restrictions on mercury emissions from coal-fired power plants, iron and steel melters, and municipal solid waste incinerators. Those rules will reduce in-State mercury emissions by over 1,500 pounds annually, reflecting up to a 90 percent reduction of mercury emissions from the State's ten coal-fired power plants by 2007, a 75 percent reduction from the State's six iron and steel melters by 2009, and a 95 percent reduction below 1990 levels from the State's five municipal solid waste incinerators by 2011. (See 36 N.J.R. 123(a), 36 N.J.R. 5406(a)).

In addition, more than one-third of mercury deposited from the air in New Jersey is emitted from sources in upwind states. Accordingly, the State is challenging recent Federal regulations that would allow mercury emissions from many of these sources to continue unabated.

However, air emissions of mercury from power plants, incinerators, and foundries are not the only source of mercury in New Jersey's waters. New Jersey's wastewater treatment plants, also known as publicly owned treatment works, or POTWs, receive substantial amounts of mercury. 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.

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) contribute more than any other sector to the mercury entering POTWs. 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).

This large contribution is attributable to the use of "dental amalgam" in dental facilities, as a direct filling material used in restoring teeth. Dental amalgam is formed by the reaction of mercury with amalgam alloy containing silver, tin, and copper, and is often called a silver filling because of its appearance. Dental amalgam is approximately 50 percent mercury by weight (McGinnis, S.L., and Vandeven, J.A., 2005).

Dental facilities generate amalgam waste when they create fillings with dental amalgam, and when they place or remove those fillings. Examples of those wastes include non-contact amalgam (scrap), which is the excess mix left over at the end of a dental procedure, amalgam that has been in contact with the patient, such as extracted teeth with amalgam restorations, carving scrap collected at chair-side, and amalgam

captured by chair-side traps, filters, or screens; and empty amalgam capsules, which are the individually dosed containers left over after mixing precapsulated dental amalgam.

Dental facilities generate wastewater from restorative procedures. This wastewater flows through a chair-side trap, and in the majority (71 to 88 percent) of facilities, a filter that protects the vacuum pump (McGinnis, S.L., and Vandeven, J.A., 2005). Amalgam waste not captured by these filters, and waste captured but rinsed down the drain in dental facilities, ultimately ends up in the influent to the POTW. Mercury not removed by the POTW's treatment processes is discharged into the surface waters of the State. Mercury that is removed by those treatment processes is concentrated in sludge that may be incinerated. When amalgam waste is not rinsed down the drain, it may be deposited in biomedical waste containers or placed in trash, destined for incineration. That method of disposal challenges the ability of the incinerator to control its mercury emissions, and thus increases the risk that mercury will be released into the environment. If the waste is landfilled rather than incinerated, the mercury may ultimately reach a POTW through the discharge of leachate generated by the landfill, or may be emitted to the air along with other landfill gases. (See Lindberg, Wallschlager, Prestbo, Bloom, Price, and Reinhart, "Methylated mercury species in municipal waste landfill gas sampled in Florida, USA," cited in Savina, "Mercury in Waste Dental Amalgam: Why Is It Still A Problem?")

For these reasons, mercury-containing wastes from a dental facility are difficult to control once it leaves the facility. Conversely, those wastes can be controlled most effectively before they leave the facility.

Management of mercury-containing wastes from dental facilities. The ADA recommends against disposing of dental amalgam wastes in the trash, in medical waste containers, or down the drain (See American Dental Association, "Best Management Practices for Amalgam Waste," September 2005). The ADA strongly recommends recycling of amalgam waste.

To recycle amalgam waste, the dental facility must first collect the waste. Chair-side traps collect some of the amalgam waste, and can collect more when they are combined with a vacuum filter. In addition, installing and properly operating an amalgam separator (in accordance with standards developed by the International Organization for Standardization specifically for dental amalgam separators) can prevent at least 96 percent of the amalgam waste from entering the office wastewater (see Fan, P.L., Batchu, Hanu, et al. May 2002, Laboratory evaluation of amalgam separators, JADA Vol. 133, 577-589). An amalgam separator is equipment designed to remove waste amalgam contained in rinse or wastewater from chair-side water collection and discharge systems.

The Department agrees with the ADA relative to the concept of recycling mercury amalgam waste. The Department believes that recycling amalgam waste will help substantially reduce the amount of mercury that reaches waters via sewers, and also reduce the amount of mercury that indirectly reaches waters via incineration of medical waste and sewage sludge. Accordingly, the Department is proposing new rules to accomplish those purposes.

Based on ADA data, New Jersey dental facilities discharge approximately 2,580 pounds per year of mercury. The November, 2002 report prepared for the ADA by

Environ International Corporation estimated that chair-side traps or vacuum filters capture approximately 78 percent, or 2,013 pounds, of this material from the wastewater, with recycling not currently required. The remainder of the mercury is discharged into the sanitary sewer. Further reduction or removal of the mercury from the dental waste streams would be achieved through installation of amalgam separators at dental facilities. Any amalgam separator installed at a dental facility must meet the 95 percent amalgam removal efficiency established under the International Standards Organization (ISO) 11143 protocol. Again based on ADA data, at 95 percent efficiency, these separators would remove approximately 540 pounds per year of mercury from dental facility wastewater prior to discharge to the sanitary sewer. Removal and recycling the 2,550 pounds of all mercury in amalgam waste, including chair-side traps, vacuum filters, and amalgam separators, would cost 54 to 81 cents per New Jersey dental patient per year. Amalgam separators can be readily purchased from at least a dozen manufacturers within the United States.

N.J.A.C. 7:14A-1.2 Definitions

The Department is proposing amendments at N.J.A.C. 7:14A-1.2, Definitions, to provide definitions for new terms used in Subchapter 21.

The Department is proposing a new definition for the term “amalgam separator," which is a device to remove amalgam and its metal constituents from dental office wastewater. The Department is also proposing a definition for the term “amalgam waste,” which describes waste products containing amalgam generated by dental facilities, as well as a definition for the term “dental facility,” which means any dental

clinic, dental office, or dental practice, including hospitals, dental schools, and community health centers. Lastly, the Department is proposing a definition for the term "ISO 11143," which refers to the International Organization for Standardization's standard for amalgam separators.

N.J.A.C. 7:14A-21.12 Requirements for Dental Facilities

The Department is proposing new rules at N.J.A.C. 7:14A-21, Requirements for Indirect Users. Subchapter 21 incorporates the pretreatment program requirements for indirect users as specified under the Federal Water Pollution Control Act, the Federal General Pretreatment Regulations under 40 CFR Part 403, and other applicable State statutes and regulations. The pretreatment program is designed to prevent discharges into POTWs by non-domestic users that will upset, pass through, or interfere with the operations of the treatment works, as well as protect the local agency's workers' health and safety, and protect and/or improve the quality of sludge generated by the POTWs. Protecting the receiving treatment plants will enable the plants to operate in an efficient manner and result in fewer pollutants entering the waters of the State.

The proposed new rules are intended to significantly reduce mercury released to the environment by dental facilities. Taking preventive measures to capture mercury at the source of the pollution is more-effective than having local agencies provide treatment. and is consistent with the recommendation of the New Jersey Mercury Task Force that the State reduce the mercury content in sewage sludge. The Task Force recommended as a goal that no POTW should produce sludge with a mercury concentration higher than 2 ppm within 10 years. In 2003, the New Jersey median sludge value for mercury was 1.47

mg/kg (see Statewide Sludge Management Plan, Appendix K, January 2006). However, the 2003 mean sludge value for mercury was 2.5 mg/kg. With the mean value over 2 ppm, source reduction options are still necessary to achieve the 10-year goal noted above.

As indicated in the Economic Impact below, installation of additional treatment units specifically for removal of mercury at the POTW would result in POTWs incurring significant annual costs. In November 2002, the Department proposed to adopt the surface water quality standards based on wildlife criteria for mercury (0.53 parts per trillion). Due to implementation concerns raised during the public comment period, the Department chose not to adopt that criteria, and at that time committed to develop an implementation plan to control the release of mercury into the environment. (See 37 N.J.R. 3481). This proposal to control discharges of mercury from dental facilities is a l step toward the Department's commitment to develop an implementation plan.

Rule requirement. The proposed new rules at N.J.A.C. 7:14A-21.12 establish specific regulatory requirements for dental facilities that discharge wastewater to the sanitary sewer and generate amalgam waste through placement or removal of amalgam fillings. These requirements will affect approximately 3,400 dental facilities in New Jersey.

Under proposed N.J.A.C. 7:14A-21.12(e), a dental facility that discharges to a POTW operated by a Delegated Local Agency (DLA) will be required to apply for a NJPDES significant indirect user (SIU) permit from the DLA, unless an exemption from permitting is available. If the dental facility discharges to a POTW that is not operated by a DLA, it will be required to apply for a NJPDES SIU permit from the Department, unless an exemption from permitting is available. This rule does not address dental

facilities that discharge wastewater containing amalgam waste to an onsite wastewater disposal system, such as a septic system. The existing rules require such facilities to hold an individual NJPDES discharge to groundwater permit.

Proposed N.J.A.C. 7:14A-21.12(a) exempts specified types of dental specialties that stand alone and generate little or no amalgam wastes. These specialists include orthodontists, periodontists, endodontists, or oral and maxillofacial surgeons/radiologists/pathologists. Any amalgam waste generated by these specialties would continue to be managed in the current manner, via placement of such wastes into the appropriate regulated medical waste container.

Exemption from permitting. Proposed N.J.A.C. 7:14A-21.12(b) would exempt a dental facility from the requirement to obtain a NJPDES SIU permit, if it i) implements the dental amalgam best management practices (BMPs) listed in the proposed new rule, ii) installs and properly operates an amalgam separator, and iii) registers and certifies to the Department compliance with this rule. Under the proposal, dental facilities are required to implement the BMPs no later than 12 months after the effective date of the regulation, and must install an amalgam separator no later than 24 months after the effective date. New facilities that begin operating after the effective date of the proposed new rules must have the amalgam separator in place when they commence operation.

The BMPs proposed at N.J.A.C. 7:14A-21.12(d) include measures that target pollution prevention, such as the use of mercury-free material, and the elimination of the use of bulk elemental mercury in favor of using precapsulated alloys only. Others target proper collection of mercury-containing wastes, through the proper operation and maintenance of the amalgam separator, chair-side traps, and other equipment. Proper

collection is also facilitated by implementing BMPs designed to prevent the improper disposal or release of mercury-containing wastes. The BMPs also call for the recycling of the collected wastes and recordkeeping to document compliance with all of the requirements.

The proposed new rules also require the installation and operation of an amalgam separator. Proposed N.J.A.C. 7:14A-21.12(b)2 includes requirements for the performance of the amalgam separator. The separator must conform to the ISO 11143 protocol. ISO 11143 is the International Organization for Standardization's standard for amalgam separators. The ISO standard requires that the amalgam separator remove at least 95 percent of the amalgam when the separator is subjected to the test methods specified in the standard. The separator must serve every dental chair in the facility, and must be sized adequately for the maximum expected flow rate. The proposed rule also requires the owner of a dental facility to register and certify with the Department compliance with the rule. The Department will make an effort to incorporate the reporting provisions within the annual registration submitted by all dental facilities under the Regulated Medical Waste Generator Registration Program at N.J.A.C. 7:26-3A.8(f).

Those facilities that do not comply with the requirements of proposed N.J.A.C. 7:14A-21.12(b) within the time frame established by the rule will be required to apply for a NJPDES SIU permit from either the Department or a delegated local agency pursuant to N.J.A.C. 7:14A-21.12(e). Those dental facilities that generate amalgam waste and do not comply with the BMPs provisions under N.J.A.C. 7:14A-21.12(b)1 must apply for a NJPDES SIU permit no later than 12 months after the effective date of the proposed rule. Those dental facilities that generate amalgam waste and do not comply with the

requirement to install an amalgam separator under N.J.A.C. 7:14A-21.12(b)2 must apply for a NJPDES SIU permit no later than 24 months after the effective date of the proposed rule. As provided in N.J.A.C. 7:14A-21.12(c), the exemption allowed under (b) shall not apply if a local agency conducts a headworks analysis and determines that additional measures are necessary to control mercury and ensure compliance with its NJPDES discharge permit. Treatment plant sampling completed as part of a headworks analysis will enable the local agency to determine its maximum allowable headworks loading (MAHL) for mercury. The local agency will compare its MAHL to its current loading, and will take appropriate action to decrease the incoming mercury loading as necessary. Where additional control measures are necessary, the control authority will seek to identify all sources contributing mercury into the treatment works, and will require that these sources apply for a NJPDES-SIU permit. Dental facilities, being sources of mercury, will also be required to apply for a NJPDES-SIU permit. Based on these permit applications, the control authority will, on a case-by-case basis, either issue a NJPDES-SIU permit, or determine that the applicant is not an SIU pursuant to N.J.A.C. 7:14A-1.2 and does not need a NJPDES-SIU permit.

The Department estimates that if the affected dental facilities implement the BMPs and install amalgam separators, their wastewater discharges of mercury would decrease by about 540 pounds per year. This estimate is based on findings from a number of studies.

For example, the Toronto (Ontario) Sewer District found that, after requiring installation of amalgam separators by dental facilities, the average monthly mass of

mercury in the combined sludge of its four treatment plants had been reduced by 58 percent, with plant by plant rates varying from 45 to 74 percent. This decrease was based on a 73 percent (800/1100) compliance rate by dental clinics. Toronto estimated that full compliance would result in an 80 percent reduction in the monthly mass of mercury in the sewage sludge. (See Shaw, Martin, Reduction in Mercury Loading to Four Toronto Area Sewage Treatment Plants Due to Implementation of an Amalgam Separator By-Law.) Similarly, in a study conducted cooperatively between the Minnesota Dental Association and the Metropolitan Council of Environmental Services, installation of amalgam separators in dental offices resulted in mercury levels in wastewater treatment plants influent being lowered by as much as 29 to 44 percent.

Social Impact

The Department expects the proposed new rules and amendments to have a positive social impact for the State's residents, and for those whose work in or visits to the State would be enhanced by reducing the amount of mercury in the waters, air, fish, and wildlife of the State. The proposed new rules and amendments will result in a reduction in the amount of mercury entering POTWs. This reduction will ultimately result in a decrease in mercury releases to the water and air, which will result in less accumulation of mercury in the aquatic food chain. The reduction will serve as an essential part of the State's overall strategy to reduce the number of fish consumption advisories and to mitigate the effect of mercury exposure on the health of fetuses and young children.

This regulation will affect approximately 3,400 dental facilities that generate amalgam waste through placement or removal of dental amalgam. The most effective and efficient way to keep mercury from dental amalgam out of the State's environment is for those facilities to effectively collect and recycle their amalgam wastes in compliance with the proposed new rule.

Economic Impact

Impact on dental facilities

Proposed N.J.A.C. 7:14A-21.12 will impact approximately 3,400 dental facilities in New Jersey that generate amalgam waste through placement or removal of mercury amalgam fillings. The rules allow for an exemption from the NJPDES SIU permitting requirements for dental facilities that comply with the BMPs and install an amalgam separator. The proposed rules will have an economic impact on dental facilities that generate amalgam waste, as well as manufacturers and suppliers of amalgam separators, amalgam recycling companies, and possibly licensed plumbers in the State of New Jersey.

As discussed in more detail below, the costs associated with installation of amalgam separators and recycling of all waste amalgam generated by affected dental facilities in New Jersey would be 54 to 81 cents per patient per year. The Department estimates that costs for recycling amalgam waste associated with BMPs (not including amalgam waste generated by separators) would be approximately $300.00 per facility per year, or about 20 cents per patient per year.

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 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. What conditions will be established in an individual permit cannot be determined at this time, especially because such permits are subject to public comment before they can become final. The cost of paying penalties or fines depends on whether a violation occurs, the nature of the violation, and whether mitigating or aggravating circumstances are present.

Costs related to compliance with the BMPs and installation of an amalgam separator are based largely on the information provided in a November 2002 report prepared for the American Dental Association by Environ International Corporation (Environ report). 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 estimates that the dental practices in approximately 1,000 of these facilities are specialists that are exempt from the regulation because they do not place or remove amalgam fillings. As such, about 3,400 facilities would be subject to the regulation, and would need to comply with the BMP and install an amalgam separator. The Environ report notes that the average purchase price for an amalgam separator would

typically range from $1,000 to $2,000 per facility. The initial statewide capital costs for 3,400 facilities to purchase separators would therefore range from $3.4 to $6.8 million. With the life of the separator estimated to be 10 years, the annual average cost over this period would be $340,000 to $680,000. The annual operating cost for a separator, which includes the cost of recycling the captured material, is estimated at $700.00 to $1,000 per year. For 3,400 facilities, this totals $2.4 to $3.4 million per year. Thus, the annual costs for purchase, installation, and operation of the amalgam separators would total $2.7 to $4.1 million on a Statewide basis.

Based on the 1999 CDC National Oral Health Surveillance System study (the most recent available), 72 percent of New Jersey residents visited a dentist in 1999. Utilizing the census data closest to that year, the 2000 census data indicated the New Jersey population to be 8,414,350. This would imply that 6.05 million New Jersey residents saw a dentist in 1999. There are approximately 6,000 dentists in New Jersey, including the approximately 1,000 specialists that would be exempt from the proposed new rule. With 5,000 of the 6,000 dentists handling amalgam, and assuming conservatively that visits to dentists are distributed evenly among dentists handling amalgam and exempt dentists, there would be 5.04 million patients who visited a dentist that placed or removed amalgam. Accordingly, the costs of complying with the BMPs and installing, maintaining and operating the amalgam separators would increase the cost 54 to 81 cents per patient per year.

ADA data indicates that chair-side traps and vacuum pump filters remove 40 to 80 percent of the total mass of amalgam particles from dental office wastewater, with the remainder being discharged into the sanitary sewer. Taking into account the fact that

some facilities have both a chair-side trap and a vacuum filter, while some have chair-side traps only, the Environ report developed a weighted average of 78 percent as an industry-wide amalgam capture efficiency for dental facilities in the United States. Utilizing this capture efficiency along with ADA data on amalgam placements and removals, and apportioning to New Jersey, indicates that chair-side traps and vacuum filters would remove 1.01 tons (2,013 pounds) per year of mercury from the dental waste stream, assuming proper management and recycling of all amalgam waste.

Installation of the mercury amalgam separator meeting the ISO 11143 standard (minimum 95 percent removal efficiency) shows that an additional 0.27 tons (540 pounds) per year of mercury would be removed from the wastestream prior to discharge into the sanitary sewer. Annual costs per pound of mercury removed ranges from $5,100 to $7,700 (including costs associated with compliance with the BMP and recycling of captured material). In comparison, these cost estimates are far lower than the range of costs estimated by the Department for other types of facilities that are now required to reduce mercury emissions. For example, in the Department's proposal for air pollution control regulations (see 36 N.J.R. 123(a)), which have since been adopted (see 36 N.J.R. 5406(a)), the Department estimated that the costs for the installation or upgrading of mercury emission controls by municipal solid waste incinerators, iron and steel manufacturing facilities, and coal-burning utilities would be in the range of $5,000 to $40,000 per pound of mercury reduced.

In developing the proposed rules, the Department also considered costs associated with mercury removal at the POTW. The preferred treatment technology for mercury at a POTW is reverse osmosis. Annual cost for such treatment would range from

$1,280,000 per million gallons per day (MGD) for larger POTWs with flows greater than 100 MGD, to $1,980,000 per MGD for smaller POTWs with flows less than 0.5 MGD (SAIC, Technological Feasibility of Proposed Water Quality Criteria for New Jersey, prepared for USEPA Region 2, March 2005). Assuming New Jersey POTWs treat approximately 1,000 MGD of wastewater, the annual cost for treatment of mercury at the POTW would range from $1.28 to $1.98 billion. These costs would enable POTWs to remove mercury from their effluent, but would not address mercury in the POTW sludge.Compared with dental facility estimated annual costs for purchase, installation, and operation of the amalgam separators of $2.7 to $4.1 million, treating mercury at the source is much more feasible and cost effective.

Reductions in releases of mercury to the environment should have beneficial impacts on healthcare costs due to decreased incidence of illness related to mercury exposure. While these impacts are expected to be positive, their magnitude is difficult to estimate.

Impact on fishing industry

Human exposure to the most toxic forms of mercury comes primarily from eating contaminated fish. Exposure to methylmercury from fish is known to have a potentially profound impact on the developing nervous system, and mercury-contaminated fish in the mother's diet can significantly alter fetal development. Since contamination of fish represents a major health concern, it poses a significant economic threat to New Jersey's commercial and recreational fishing industries.

As explained in the Environmental Impact below, a significant reduction in inputs of mercury to New Jersey water bodies will eventually lead to lower levels of mercury in fish. There will be many economic benefits from lower levels of mercury in fish including, potentially, the relaxation of mercury-based fish consumption advisories that may result from the full implementation of the proposed new rules and amendments. Such relaxation could lead to greater attractiveness of sport fishing to recreational fishermen, with a corresponding increase in dollars spent in New Jersey on fishing gear, licenses, and travel and lodging for fishing trips. A recent study in New Jersey indicates that party and charter boat captains believe that fish advisories have some negative effect on their business (J. Burger, B.B. Johnson, S. Shukla, and M. Gochfeld, 2003, Perceptions of Recreational Fishing Boat Captains: Knowledge and Effects of Fish Consumption Advisories, Risk Analysis, 23, 369-378). The over 260,000 licensed anglers in New Jersey have been estimated to spend nearly $500.00 each per year on freshwater fishing, for a total of $130 million per year (NJDEP, DRAFT, Freshwater Fishing in New Jersey 1992: A Survey of License Holders, Division of Fish and Wildlife, Trenton, NJ). Recreational saltwater fishing is estimated to contribute $1.5 billion per year to the State economy. Lower levels of mercury in fish caught for sale could increase the marketability of fish and fish products, which would lead to higher value of commercial fishing activities. Commercial saltwater fishing is estimated to contribute over $590 million to the New Jersey economy (NJDEP, The Economic Impact of Saltwater Fishing in New Jersey during 1996, NJDEP, Division of Fish and Wildlife, Trenton, NJ, 1996).

Environmental Impact

The Department expects the proposed new rules and amendments to have a positive environmental impact. Mercury is a persistent, bioaccumulative, toxic pollutant. Mercury, in the form of methylmercury, contaminates freshwater fish caught throughout New Jersey. 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. Contaminated fish have been found in remote areas such as the Pine Barrens, as well as in industrialized areas of the State. Mercury concentrations in lower trophic level fish are also elevated in New Jersey and often are in the range of 0.2 to 0.5 ppm. Many tested water bodies exceed the surface water criterion of 0.3 ppm in fish tissue promulgated by the USEPA (New Jersey Mercury Task Force, Volume II, page 95, NJ Department of Environmental Protection, 2002).

The Department expects the proposed rules to lead to a significant reduction in inputs of mercury to New Jersey POTWs. Wastewater generated by dental facilities that remove or place amalgam fillings can contain significant amounts of mercury. The Environ report indicates that 53 percent of the mercury entering into wastewater treatment plants is from dental offices. Similarly, in testimony to Congress in October, 2003, the ADA noted that 35 to 45 percent of the mercury entering POTWs is from dental office sources. When discharged to a local agency's treatment plant, mercury can accumulate in the biosolids and discharge to the waters of the State with effluent from the local agency's treatment works. Regulating this discharge under a NJPDES SIU permit, a permit from a delegated local agency, or through implementation of BMPs and

installation of amalgam separators, will reduce the amount of mercury discharged to a local agency's treatment plant.

Decreasing the mercury in the POTW influent will result in a decrease in the mercury found in the POTW biosolids. The Toronto (Ontario) Sewer District found that, after requiring installation of amalgam separators by dental facilities, the average monthly mass of mercury in the combined sludge of its four treatment plants had been reduced by 58 percent, with plant by plant rates varying from 45 to 74 percent. This decrease was based on a 73 percent (800/1100) compliance rate by dental clinics. Toronto estimated that full compliance would result in 80 percent reduction in the monthly mass of mercury in the sewage sludge.

Implementation of the BMPs and installation of amalgam separators proposed in N.J.A.C. 7:14A-21.12 will reduce mercury released to the environment from dental facilities. The Department estimates that the recycling and proper management requirements in the BMPs will decrease mercury releases to the environment by an estimated 2,550 pounds per year, including mercury captured by separators. The Department estimates that these measures will reduce the mercury loading to the POTW sludge and decrease the amount of mercury discharged to waters of the State through local agency's treatment plants.

Federal Standards Statement

Executive Order No. 27 (1994) and N.J.S.A. 52:14B-1 et seq. (P.L. 1995, c.65), require State agencies that adopt, readopt or amend State regulations that exceed any

Federal standards or requirements to include in the rulemaking document a Federal standards analysis.

The Federal General Pretreatment Regulations at 40 CFR Part 403 include the requirements for indirect users and the role of the control authority to regulate such users. Subchapter 21 incorporates the requirements from 40 CFR Part 403 relevant to indirect user control mechanisms for implementing the pretreatment program in the State. Proposed N.J.A.C. 7:14A-21.12 establishes specific requirements for dental facilities that discharge to the sanitary sewer and generate amalgam waste through placement or removal of amalgam fillings. The proposed new rules set forth specific requirements for dental amalgam waste collection and management. The proposed rules do not have any Federal counterpart. Accordingly, they are not more stringent than the Federal rules, and a Federal standards analysis is not required.

Jobs Impact

The Department anticipates that the proposed new rules and amendments will have a slight net positive impact on employment in the State.

Proposed N.J.A.C. 7:14A-21.12 will impact dental facilities that generate amalgam waste through placement or removal of dental amalgam. Such facilities will be exempt from the requirement to obtain a NJPDES SIU permit provided they comply with the dental amalgam BMPs and install an amalgam separator. Facilities required to install amalgam separators will need to: i) purchase dental amalgam separator equipment; ii) contract with a waste management and recycling company; and iii) hire licensed

plumbers. Sectors supplying the equipment and services may, therefore, see an increase in job and employment opportunities.

Facilities that generate amalgam waste and do not comply with the conditions for exemptions must apply for a NJPDES SIU permit. These facilities will need to contract with Department-certified laboratories for analysis of their wastewater discharge. The Department anticipates that a vast majority of the affected facilities will comply with the BMPs and install amalgam separators, and very few will apply for a NJPDES SIU permit. The Department expects that resources at existing laboratories will be utilized for analytical work and does not anticipate job growth at laboratory facilities as a result of the proposed new rules and amendments.

The Department does not anticipate that any dental facilities will cease operations as a result of these proposed regulations.

Agricultural Industry Impact

One of the primary objectives of the pretreatment program is to protect POTW sludge quality and improve opportunities for POTWs to beneficially re-use biosolids. The proposed new rules and amendments will provide both delegated local agencies and the Department with a tool to protect and/or improve the quality of biosolids generated as a result of wastewater treatment. The proposed new rules and amendments will result in a decrease in the loading of mercury in the influent to the treatment plants. This will result in improved and/or protected biosolids quality and continue to allow for beneficial re-use of this material. As such, the agricultural industry can benefit from the proposed rules because they will result in the availability of sludge whose quality has been improved and/or protected. The agricultural industry can utilize the biosolids to improve

the productivity of the land using the soil conditioning properties and nutrient content of the biosolids. Additionally, utilization of biosolids in a beneficial manner reduces dependence on chemical fertilizers.

Regulatory Flexibility Analysis

As required by the New Jersey Regulatory Flexibility Act, N.J.S.A. 52:14B-16 et seq., the Department has evaluated the reporting, recordkeeping and other compliance requirements that the proposed new rules and amendments would impose upon small businesses. The Regulatory Flexibility Act defines the term "small business" as "any business which is a resident in this State, independently owned and operated and not dominant in its field, and which employs fewer than 100 full-time employees." Based upon this definition, the Department has determined that the proposed new rules and amendments will have an affect on the standards, monitoring, reporting or record keeping requirements applicable to small businesses.

Subchapter 21 regulates industrial and non-domestic facilities that discharge process wastewater into the sanitary sewer. Proposed N.J.A.C. 7:14A-21.12 will allow for an exemption from the NJPDES SIU permitting requirements for dental facilities that comply with the BMPs, and install an amalgam separator. The proposed regulation will affect approximately 4,400 dental facilities in New Jersey, many of which are small businesses. However, an estimated 1,000 of these facilities are dental specialists (e.g. orthodontists, endodontists) that do not place or remove amalgam fillings and have been exempted from the requirements under N.J.A.C. 7:14A-21.12.

Facilities that are exempt from the NJPDES SIU permit due to compliance with the BMPs and installation of an amalgam separator must report only on an annual basis. In an effort to minimize the impact under the annual reporting requirement, the Department will make an effort to incorporate the reporting provisions within the annual registration submitted by all dental facilities under the Regulated Medical Waste Generator Registration Program at N.J.A.C. 7:26-3A.8(f). Record retention for a five-year period, consistent with the existing NJPDES regulations, would be required. Facilities required to install amalgam separators will need to: i) purchase dental amalgam separator equipment; ii) contract with a waste management and recycling company; and iii) hire licensed plumbers.

Any facility obtaining a NJPDES SIU permit from either the Department or a delegated local agency would be subject to reporting, record keeping, and compliance requirements consistent with those established in the federal General Pretreatment Regulations in 40 CFR Part 403 and the New Jersey statutes at N.J.S.A. 58:10A-1 et seq. These facilities must report monthly, and must complete an analysis of their wastewater discharge at least twice per year. Record retention for a five-year period would be required. These facilities will need to contract with Department-certified laboratories for analysis of their wastewater discharge, and may need the services of an existing engineering/environmental firm for proper completion of the NJPDES SIU permit application.

The costs associated with permitting and compliance for small businesses are further elaborated in the Economic Impact above.

Proposed N.J.A.C. 7:14A-21.12 provides dental facilities an opportunity to demonstrate compliance with the pretreatment program requirements by implementing the BMPs and installing amalgam separators. This initiative will significantly reduce compliance costs for dental facilities that opt to participate under this exemption. If regulated under an NJPDES SIU permit, dental facilities would be subject to annual permit fees, compliance with the standards by sampling at least once every six months, monthly reporting, and significant penalties under the New Jersey Water Pollution Control Act in cases where non-compliance is demonstrated. Currently, the minimum annual permit fee for a Department issued permit is $5,400. Delegated local agencies have permit fees that range from $50.00 to $11,000 per year. The average purchase price for an amalgam separator would typically range from $1,000 to $2,000 per facility. Annual operating costs for a separator, which includes the cost of recycling the captured material, are estimated at $700.00 to $1,000 per year. The Department estimates that costs for recycling amalgam waste associated with BMPs (not including amalgam waste generated by separators) would be approximately $300.00 per facility per year.

Because the proposed rules and amendments affect small businesses, the requirement to comply with the BMPs and install a separator will be phased in over a 24 month period. Those facilities that do not comply with the BMPs and install a separator will be required to apply for a NJPDES SIU permit from either the Department or a delegated local agency. The Department anticipates that the majority of facilities will comply with the BMPs, including installing an amalgam separator. Allowing 24 months from the effective date of the regulation should allow such facilities the necessary time to comply with the proposed regulations. In comparison, the State of Maine passed

legislation (PL 2003, chapter 301) in September 2003, giving affected facilities 15 months (until December 31, 2004) to install an amalgam separator. The State of New Hampshire adopted regulations in May 2005 requiring dental facilities to install amalgam separators no later than October 1, 2005.

Smart Growth Impact

Executive Order 4 (2002) requires State agencies that adopt, amend, or repeal any rule to describe the impact of the proposed rule on the achievement of smart growth and implementation of the New Jersey State Development and Redevelopment Plan (State Plan). The proposed new rules and amendments do not involve land use policies or infrastructure development and therefore will not have an impact on the achievement of smart growth or implementation of the State Plan.

Since the proposed rules implement a program of reducing the amount of mercury discharged from dental facilities, the proposed rules support the State Plan's goal of protecting the environment and preventing pollution by implementing a strategy of reducing pollution at the source.

Full text of the proposal follows (additions indicated in boldface **thus**; deletions indicated in brackets [thus]):

CHAPTER 14A. POLLUTANT DISCHARGE ELIMINATION SYSTEM

SUBCHAPTER 1. ABBREVIATIONS, ACRONYMS, AND DEFINITIONS

7:14A-1.2 Definitions

…

“Amalgam separator” is a device to remove amalgam and its metal constituents from dental facility wastewater, installed downstream of the chair-side trap and any vacuum filter.

“Amalgam waste” means and includes non-contact amalgam (amalgam scrap that has not been in contact with patient); contact amalgam (including but not limited to extracted teeth containing amalgam); amalgam sludge captured by chairside traps, vacuum pump filters, screens, and other amalgam trapping devices; used capsules containing amalgam; and leaking or unusable amalgam capsules.

…

"Dental facility” means any dental clinic, dental office, or dental practice, including hospitals, dental schools, and community health centers.

…

"ISO 11143" is the International Organization for Standardization's standard for amalgam separators, as supplemented or amended, and incorporated herein. The standard is available from the ISO at http://www.iso.org.

…

SUBCHAPTER 21. REQUIREMENTS FOR INDIRECT USERS

7:14A-21.12 Requirements for Dental Facilities

(a) This section establishes Best Management Practices and regulatory requirements for owners of dental facilities that generate amalgam waste through the removal or placement of amalgams. The requirements of this section do not apply to a dental facility at which no dentistry is practiced other than any of the following specialties:

1. **Orthodontics;**
2. **Periodontics;**
3. **Endodontics;**
4. **Oral and Maxillofacial Surgery;**
5. **Oral and Maxillofacial Radiology; and**
6. **Oral and Maxillofacial Pathology.**

(b) Except as provided under (c) below, an owner of any dental facility that generates amalgam waste shall be exempt from the requirement to obtain a NJPDES-SIU permit from the Department or the DLA for the discharge of wastewater into a local agency's treatment works, provided the owner complies with following requirements:

1. The owner of a dental facility shall implement the Best Management Practice described in (d) below no later than (12 months after the effective date of this rule);

2. The owner of the dental facility shall install an amalgam separator to serve every dental chair in the facility where amalgam waste is generated. The amalgam separator must be adequately sized for the maximum expected flow rate. The amalgam separator shall be installed no later than (24 months after the effective date of this rule). The separator shall conform with the ISO 11143 protocol. Each dental facility constructed on or after (the effective date of this section) shall include an installed amalgam separator that conforms with the ISO 11143 protocol; and

3. The owner of a dental facility subject to this section shall register and certify compliance with the requirements of (b)1 and 2 above. This registration and certification shall be submitted annually to the Department on forms or in the format provided by the Department.

(c) If a local agency conducts a headworks analysis pursuant to N.J.A.C. 7:14A-19.7(a) and determines that additional mercury control measures are necessary to

ensure compliance with its NJPDES permit, then the control authority shall impose additional mercury control measures on dischargers to the local agency's treatment works, including, as appropriate, dental facilities subject to this section. Where additional mercury control measures are necessary, all dental facilities discharging to such local agency shall apply for an NJPDES-SIU permit.

(d) Best Management Practices require a dental facility to, at a minimum:

1. **Use mercury-free material when appropriate;**
2. **Eliminate all use of bulk elemental mercury;**
3. **Use precapsulated alloys only;**
4. **Recycle used disposable capsules containing amalgam;**
5. **Maintain and operate the amalgam separator when installed according to its manufacturer's specifications;**
6. **Install chair-side amalgam traps in both the vacuum system and cuspidor of each operatory where restoration work is done;**
7. **Change and clean chair-side amalgam traps frequently;**
8. **Not rinse traps or vacuum pump filters over drains or in the sinks;**
9. **Not throw or place the disposable trap or sludge from reusable trap with regular garbage;**
10. **Not throw or place the disposable trap or sludge from reusable trap into sharps containers or biohazard bag;**
11. **Not flush amalgam waste down the drain;**
12. **Use only non-bleach, non-chlorine cleaners to clean vacuum system lines;**

13. Appropriately disinfect and store amalgam pieces from removal and restoration with amalgam waste;

14. Store amalgam waste in airtight containers;

15. Have a licensed recycling contractor, mail-in service or hazardous waste hauler remove amalgam waste;

16. Recycle all amalgam waste containing mercury;

17. Train staff in the proper handling, management, and disposal of mercury containing material; and

18. Keep records to document that the BMP requirements are being met.

(e) Those dental facilities that generate amalgam waste and do not comply with the requirements of (b)1 and 2 above shall apply for a NJPDES-SIU permit from the Department or the DLA in accordance with the following:

1. No later than (12 months after the effective date of this rule), when a dental facility fails to comply with (b)1 above; or

2. No later than (24 months after the effective date of this rule), when a dental facility fails to comply with (b)2 above.