

US EPA ARCHIVE DOCUMENT

DCN FLEP-00059

COMMENTER Connecticut Dept. of Env. Protection

SUBJECT MERC

COMMENT b) Mercury ecotoxicity is complicated and poorly understood. Concerns exist with the transformation of mercury to higher toxicity forms and other environmental release pathways. Such complicated behavioral factors are of concern given the evidence of significant mercury contamination in remote locations, it's very high toxicity in the bioconcentration/biomagnification potential.

RESPONSE

The Agency recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

Studies show that the greatest threat of mercury releases from the management of lamps is during storage and transport when uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a framework for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

DCN FLEP-00065

COMMENTER American Fisheries Society

SUBJECT MERC

COMMENT RESOLUTION: REGULATION OF MERCURY IN DISPOSAL OF FLUORESCENT

LAMPS WHEREAS, mercury is a serious contaminant that adversely impacts fisheries and is the most frequent fish contaminant responsible for human health fish consumption advisories in the United States and Canada, and WHEREAS, mercury is a highly toxic, persistent and bioaccumulative element which is transported throughout the global atmosphere and deposited in "remote" waters. First (and most importantly), mercury is a toxin of special concern because it biomagnifies by a large factor in fish. Once mercury is released into the environment, it volatilizes to the atmosphere, widely dispersing this toxic contaminant. This contributes to the regional and global problem, of mercury contamination of the aquatic resource that is just now being recognized. Health authorities in 37 States have issued fish consumption advisories triggered by methyl mercury

contamination in certain aquatic systems. Additional such advisories are anticipated as more states discover the problem. Recent research shows that wetland environments are emerging as watershed components where mercury is readily methylated and discharged downstream. Because of the large biomagnification factor from water to fish and piscivorous wildlife, it is difficult to find an acceptably low concentration in the environment. In any case, there is no reason to release more mercury to the environment than is necessary.

#### RESPONSE

The Agency agrees with the commenter's assertion that the main threat of mercury in the environment may be through an air pathway and recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

Studies show that the greatest threat of mercury releases from the management of lamps is during storage and transport when uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a framework for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

As required by the Clean Air Act Amendments of 1990, the Agency issued the *Mercury Study Report to Congress*. The study estimates the quantity of mercury emissions to the air from a number of human activities, estimates the health and environmental impacts associated with these mercury emissions, and describes the technologies available to control mercury emissions from these sources. The report concludes that there is cause to seek further reductions in mercury releases and exposures to mercury.

The Agency has been considering the regulation of air emissions from other sources of mercury and other pollutants simultaneously with the effort to modify the management of hazardous waste lamps, the Agency has been actively pursuing regulation of mercury air emissions from a wide variety of other sources. On December 19, 1995, EPA issued a final rule limiting emissions of mercury and other pollutants from large municipal waste combustors (60 FR 65387). Subsequently, on September 15, 1997, EPA issued a final rule setting emission limits for mercury (and other pollutants) for medical waste incinerators (62 FR 48348) (remanded for further explanation, *Sierra Club v. EPA*, 167 F.3d 658 (D.C. Cir. 1999)). In addition, the Agency finalized a rule that sets performance standards for new municipal solid waste landfills (MSWLF) and emission guidelines for existing MSWLF (61 FR 9905; March 12, 1996)). Lastly, on April 19, 1996, the Agency proposed a rule that would limit emissions of various air pollutants including mercury from hazardous waste incinerators, cement kilns, and lightweight aggregate kilns (61 FR

17358, finalized in part, 63 FR 33782 (June 19, 1998)). In the future, EPA is planning to propose two rules to address (1) air emissions from industrial and commercial waste incinerators that burn non-hazardous waste, and (2) boilers that burn hazardous waste.

DCN FLEP-00136

COMMENTER Wisconsin Dept. of Natural Resources

SUBJECT MERC

COMMENT Comments on Pacific Issues Presented in the Federal Register

Notice 1.P. 38291, ' III.A, column one, last paragraph: While the USEPA has noted that the drinking water standards and TCLP criterion for mercury generally are not exceeded by the typical landfill leachate, USEPA also must recognize that mercury-contaminated leachates can impact wildlife or other aspects of the environment. In the notice, the Agency notes that the average mercury concentration in leachate is 0.0008 mg/L, which is equivalent to 800 ng/L. In Wisconsin, our surface water quality standards for the protection of wildlife and domestic animals is set at 2 ng/L (per s. NR 105.07, Wis. Adm. Code), or 400 times less than the average mercury concentration in landfill leachate, as noted by USEPA. These standards also establish an upper bound human criterion of 80 ng/L (s. NR 105.08, Wis. Adm. Code). Due to the presence of mercury in fish in many Wisconsin waters, we also have issued fish consumption advisories for over 200 Wisconsin surface waters. Similarly, the State of Wisconsin has ground-water quality protection standards. Wisconsin's mercury enforcement standard for ground-water protection is 2 ug/L, while our preventative action limit is 0.2 ug/L. Based on the information provided in the notice, seven percent of the nation's landfills could exceed Wisconsin's standard enforcement standard, and a higher and unknown number of landfills could exceed our preventative action limit. The point that the WDNR wants to make is that other standards exist that must be considered. Whether or not USEPA has promulgated ground- or surface-water quality standards, other uses of water must be appraised besides human drinking water when considering allowing the disposal of mercury in landfills and the consequences to the environment of allowing that disposal.

RESPONSE

The Agency does not believe that its proposed conditional exclusion approach would sufficiently protect human health and the environment. EPA gave considerable weight to actions that would minimize mercury emissions to the environment while encouraging the collection and environmentally-sound management of spent lamps. Based upon commenter input and additional information collected and reviewed by the Agency since the publication of the proposed rule, EPA decided to adopt the proposed universal waste approach for controlling potential risks from the

management of spent hazardous waste lamps. Today's final rule adds hazardous waste lamps to the universal waste regulations under 40 CFR Part 273. The universal waste rule provides a reduced, or streamlined set of requirements (i.e., universal waste rule is less stringent than Subtitle C management standards).

The Agency thanks the commenter for the information and additional data on mercury releases from landfills and their potential impacts on the environment. The Agency does not have extensive data characterizing the behavior of mercury released from spent lamps in a landfill environment over long periods of time. Although available data may support the conclusion that mercury may stay in a stable, non-mobile state over the shorter term and may not migrate from a landfill environment very quickly, studies also show that the greatest threat of mercury releases from the management of lamps is due to crushing and breakage during storage and transport. The universal waste rule provides a format for controlling the management of spent lamps during handling, storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management requirements.

Studies on the evaluation of the fate and transport of TC metals (including mercury) are still ongoing. The regulatory limit for mercury (i.e., 0.2 mg/L using the TCLP) has not changed. EPA studies have determined that the majority of hazardous waste lamps fail the TCLP for mercury and sometimes for lead. Spent lamps that exhibit any of the hazardous waste characteristics are subject to today's rulemaking.

DCN FLEP-00145

COMMENTS ASTSWMO

SUBJECT MERC

COMMENT Mercury is increasing in the environment ASTSWMO is concerned about the fact that mercury is increasing in the environment. This environmental threat is evidenced by the ever-increasing number of fish consumption advisories which have been issued throughout the nation. Currently, there are over one thousand five hundred (1,500) lakes in thirty eight (38) States throughout the nation which have had fish consumption bans or advisories issued due to mercury contamination of the fish. The number of lakes with bans or advisories is increasing rapidly.

RESPONSE

The Agency recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

Source reduction, which is the reduction or elimination of the toxicity and/or volume of a waste

product, is at the top of EPA's hierarchy of solid waste management methods. The Agency encourages cost-effective source reduction of mercury contained in fluorescent lamps and other hazardous wastes. Second on the hierarchy is recycling. Today's final rule will greatly facilitate the environmentally-sound collection and the proper recycling or treatment of hazardous waste lamps. Based on the belief that less complex regulations will increase the collection of universal wastes, the Agency did not limit the universal waste system to the recycling of waste. Generators have several options with regard to waste management, but the ability to access large quantities of universal waste from central collection centers may encourage the development of safe and effective methods to recycle universal waste. Today's rule retains requirements for hazardous waste lamps to be treated and disposed or recycled in accordance with RCRA Subtitle C hazardous waste management requirements. This may provide incentives for lamp manufacturers to pursue additional source reduction efforts to reduce or eliminate the amount of mercury used in the manufacture of fluorescent tubes. If source reduction is pursued aggressively by the fluorescent lamp manufacturing industry, the overall contribution of mercury from fluorescent lamps to municipal solid waste could decrease over time.

DCN FLEP-00146

COMMENTS Sierra Club/North Star Chapter

SUBJECT MERC

COMMENT MERCURY PRESENTS A DEADLY AND GROWING THREAT TO MINNESOTA'S ENVIRONMENT The threat which mercury presents to human health

and the environment in Minnesota cannot be overstated. Ninety four per cent (about 400) of the lakes surveyed in Minnesota have mercury contamination that requires fish consumption advisories. Nationally, over 1500 lakes in 38 states have bans or advisories due to mercury, and the number is increasing rapidly. Evidence points to the fact that mercury concentrations are increasing in the environment. Even very small amounts of mercury in the environment are a threat because mercury concentration increases to a high degree as it is passed along the aquatic food chain. With a bioconcentration factor of 225,000, just one pound of mercury has the potential to contaminate one million northern pike. Mercury presents a particular threat to wildlife which eat large quantities of fish such as loon, eagle, otter, mink, kingfisher, and osprey. It appears that loons in Minnesota are accumulating the point that reproduction is impaired. Elevated mercury has been documented in Minnesota's mink and otter population. Because mercury is a neurotoxin, it is a particularly insidious toxin for predators, who rely on speed and coordination for food.

RESPONSE

The Agency recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even

in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

Studies show that the greatest threat of mercury releases from the management of lamps is during storage and transport when uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a framework for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

Source reduction, which is the reduction or elimination of the toxicity and/or volume of a waste product, is at the top of EPA's hierarchy of solid waste management methods. The Agency encourages cost-effective source reduction of mercury contained in fluorescent lamps and other hazardous waste lamps. Second on the hierarchy is recycling. Today's final rule will greatly facilitate the environmentally-sound collection and the proper recycling or treatment of hazardous waste lamps. Based on the belief that less complex regulations will increase the collection of universal wastes, the Agency did not limit the universal waste system to the recycling of waste. Generators have several options with regard to waste management, but the ability to access large quantities of universal waste from central collection centers may encourage the development of safe and effective methods to recycle universal waste. Today's rule retains requirements for hazardous waste lamps to be treated and disposed or recycled in accordance with RCRA Subtitle C hazardous waste management requirements. This may provide incentives for lamp manufacturers to pursue additional source reduction efforts to reduce or eliminate the amount of mercury used in the manufacture of fluorescent tubes. If source reduction is pursued aggressively by the fluorescent lamp manufacturing industry, the overall contribution of mercury from fluorescent lamps to municipal solid waste could decrease over time.

DCN FLEP-00160

COMMENTER Central and South West Services, Inc.

SUBJECT MERC

COMMENT (6) "There is little, if any, evidence of adverse impacts of mercury in MSW on ground-water resources" and "no significant human exposure to mercury is to result from MSW landfill leachate contamination of ground water." *Id.* at 101, 166 (emphasis added). The findings of the RTI Report were compelling and unambiguous: the management of mercury-containing lamps in MSWLFs does not present a significant risk to human health and the environment. Based on this survey of the record evidence, the RTI Report provides the most comprehensive and detailed review of this subject and its conclusions cannot be dismissed by Agency staff. The RTI Report buttresses other findings in the record regarding the management of mercury-containing lamps in MSWLFs, including a study, measuring mercury deposition (in

landfill gas and leachate) in four Swiss landfills. That study found approximately 0.007 percent of the mercury from the landfill in the leachate, which is far below the TC regulatory level of 0.2 mg/L. 59 Fed. Reg. at 38291. The findings in this study are reinforced by other EPA studies involving Superfund Records of Decision ("RODs") at MSWLFs where mercury was identified as "contaminant of concern." Id. Here again, the Agency found only minimal groundwater impacts attributable to mercury, with none of the mercury groundwater concentrations at these sites exceeding the mercury maximum contaminant level ("MCL") of 0.002 mg/L, let alone the TC regulatory level of 0.2 mg/L. Id.

#### RESPONSE

The Agency believes that management controls for hazardous waste lamps are necessary to minimize releases of mercury and other hazardous constituents to the environment during lamp accumulation and transport, to ensure safe handling of such lamps, and to keep hazardous waste lamps out of municipal waste facilities (both landfills and solid waste incinerators). Mercury is high on the Agency's priority list of toxic pollutants, along with other heavy metals such as cadmium and lead. These metals have been identified as constituents of some waste lamps. The primary health effects from mercury are on the neurological development of children exposed through fish consumption and on fetuses exposed through their mother's consumption of fish.

As required by the Clean Air Act Amendments of 1990, the Agency issued the *Mercury Study Report to Congress*. The study estimates the quantity of mercury emissions to the air from a number of human activities, estimates the health and environmental impacts associated with these mercury emissions, and describes the technologies available to control mercury emissions from these sources. The report concludes that there is cause to seek further reductions in mercury releases and exposures to mercury.

The Agency does not have data characterizing the behavior of mercury in different types of landfills over long time periods, although the available data suggest that mercury may stay in a stable, non-mobile state for many years and may not migrate from a landfill environment very quickly. Data available to the Agency show that mercury can be found in municipal landfill leachate, and EPA remains concerned that landfill releases may pose threats over the long term. The Agency has concluded that some management controls are essential for these wastes. Further data and analysis are necessary to evaluate the potential for mercury to be released in landfill leachate as a landfill ages.

Studies on the evaluation of the fate and transport of TC metals (including mercury) in this context are still ongoing. These analyses include additional study of the MINTEQ model and its application for determining the fate and transport of mercury and other hazardous metals. However, because these studies are not complete, today's final rulemaking does not change the current regulatory limit for mercury (i.e., 0.2 mg/L using the TCLP), and EPA studies show that the majority of hazardous waste lamps exceed this limit.



Studies also show that the greatest threat of mercury releases from the management of lamps is due to crushing and breakage during storage and transport. Today's rule adds hazardous waste spent lamps to the universal waste regulations. The universal waste rule provides a reduced, or streamlined set of requirements (i.e., the universal waste rule is less stringent than Subtitle C management standards), but also allows the Agency to set specific management standards to control potential emissions. Uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a format for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

The Agency believes that the data and information provided to the Agency and the Agency's own studies and analyses that were conducted during the period of time since the mercury-containing lamps rulemaking was proposed provide adequate evidence of the behavior of mercury in the environment and the potential releases of mercury to the environment to support today's final rule. The Agency notes, however, that should sufficient and compelling information related to the behavior of mercury become available in the future, the Agency can always re-evaluate the standards promulgated in today's final rule.

DCN FLEP-00160

COMMENTS Central and South West Services, Inc.

SUBJECT MERC

COMMENT B. Subjecting Mercury-Containing Lamps That Are Managed in MSWLFs to Subtitle C Regulation Would Be Inconsistent with the Record and Arbitrary and Capricious The above groundwater and air emission data demonstrate convincingly that the management of mercury-containing bulbs in MSWLFs -- as they have been for years without resulting in any "significant human exposure" -- will not result in any adverse impact on human health or the environment. First, the disposal of mercury-containing lamps in qualified MSWLFs will not result in the contamination of groundwater at levels exceeding the MCL for mercury; indeed, the majority of data did not detect any measurable level of contamination due to the management of bulbs in MSWLFs. The Agency itself recognizes this point. 59 Fed. Reg. at 38293 ("The available data on landfill leachate suggests that mercury-containing lamps may not pose a threat to groundwater when placed in a state-controlled municipal landfill due to the low levels of mercury found in landfill leachate"). This point is significant because the TC regulatory levels -- and thus the determination of whether a waste is hazardous -- are predicated upon the assumption that the contaminants of concern (in this case, mercury) will reach drinking water receptors at concentrations above the relevant MCLS. See 55 Fed. Reg. 11798 (March 29, 1990); 59 Fed. Reg. at 38288. The record evidence

makes clear, however, that this assumption is completely unfounded in the case of managing mercury-containing lamps in MSWLFs. Therefore there is no technical or legal basis for regulating mercury-containing lamps under Subtitle C of RCRA because of groundwater concerns. In short, because mercury-containing lamps do not pose a threat to human health and the environment when managed in MSWLFs, the continued regulation of these materials under the hazardous waste program would fly in the face of the record evidence and would be arbitrary and capricious.

#### RESPONSE

The Agency does not have data characterizing the behavior of mercury in different types of landfills over long time periods, although available data from shorter-term studies suggest that mercury can be, and has been released to groundwater and air from municipal landfills. (For a more complete discussion of mercury releases from landfills and fate and transport in groundwater, see the Toxicity Section of this Response to Comments document). Data available to the Agency show that mercury can be found in municipal landfill leachate, and EPA remains concerned that landfill releases may pose threats over the long term. The Agency has concluded that some management controls are essential for these wastes due to the potential for mercury to be released in landfill leachate as a landfill ages.

Studies on the evaluation of the fate and transport of TC metals (including mercury) in this context are still ongoing. These analyses include additional study of the MINTEQ model and its application for determining the fate and transport of mercury and other hazardous metals. However, because these studies are not complete, today's final rulemaking does not change the current regulatory limit for mercury (i.e., 0.2 mg/L using the TCLP) and EPA studies show that the majority of hazardous waste lamps exceed this limit.

The Agency believes that the data and information provided to the Agency and the Agency's own studies and analyses that were conducted during the period of time since the mercury-containing lamps rulemaking was proposed provide adequate evidence of the behavior of mercury in the environment and the potential releases of mercury to the environment to support today's final rule. The Agency notes, however, that should sufficient and compelling information related to the behavior of mercury become available in the future, the Agency can always re-evaluate the standards promulgated in today's final rule.

DCN FLEP-00169

COMMENTS Advanced Environmental Recycling Corp.

SUBJECT MERC

COMMENT The occupational safety and health exposure associated with broken fluorescent lamps has been well documented. Applying these exposures to transportation vehicles, dumpsters, and landfill operations at the magnitude of lamps being disposed increases the environmental risks and hazards. Many documents

detail that the exposure to humans is related to indirect sources (e.g., the food chain). It must be explicitly stated that the focus of this contamination included various activities such as generation facilities, process facilities, resource recovery facilities, landfills, and so forth.

#### RESPONSE

The Agency appreciates the commenter's concern about exposures to mercury. The main threat of mercury in the environment may be through an air pathway, and EPA recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

Studies show that the greatest threat of mercury releases from the management of lamps is during storage and transport when uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a framework for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

Today's rule retains requirements for hazardous waste lamps to be treated and disposed or recycled in accordance with RCRA Subtitle C hazardous waste management requirements. This may provide incentives for lamp manufacturers to pursue additional source reduction efforts to reduce or eliminate the amount of mercury used in the manufacture of fluorescent tubes. If source reduction is pursued aggressively by the fluorescent lamp manufacturing industry, the overall contribution of mercury from fluorescent lamps to municipal solid waste could decrease over time.

DCN SCSP-00172

COMMENTER Advanced Environmental Technology Corp.

SUBJECT MERC

COMMENT Mercury is a highly toxic heavy metal found to be a problem in landfills and resource recovery facilities. Mercury bioaccumulates in the food chain and has been found to typically enter the food chain from water sources through air deposition. The metal vaporizes at room temperature and is absorbed into water.

#### RESPONSE

The Agency agrees with the commenter's assertion that the main threat of mercury in the environment may be through an air pathway and recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the

need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

Studies show that the greatest threat of mercury releases from the management of lamps is during storage and transport when uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a format for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

DCN FLEP-00178

COMMENTS General Electric Company

SUBJECT MERC

COMMENT The risks from various spent lamp management methods are very low, particularly when uncontrolled product breakage is minimized.

RESPONSE

The Agency agrees that control of product breakage is critical to minimizing the environmental impacts from the management of spent hazardous waste lamps. Studies show that the greatest threat of mercury releases from the management of lamps is due to crushing and breakage during storage and transport. Today's rule adds hazardous waste spent lamps to the universal waste regulations in 40 CFR Part 273. The universal waste rule provides a reduced, or streamlined set of requirements (i.e., the universal waste rule is less stringent than Subtitle C management standards).

The final rule requires universal waste handlers to manage universal waste lamps in a way that prevents releases of the lamps or the components of the lamps to the environment. Spent lamps must be packed to minimize breakage and packaging materials must be designed to contain potential releases due to breakage during transport. universal waste lamps must be stored in containers or packages that remain closed, are structurally sound, adequate to prevent breakage, compatible with contents of lamps, and lack evidence of leakage, spillage, or damage that could cause leakage under reasonably foreseeable conditions. Examples of acceptable packaging could include placing the lamps evenly spaced in double or triple-ply cardboard containers with closed lids. Handlers also must contain any universal waste lamps that show evidence of breakage, leakage, or damage that could cause the release of mercury or other hazardous waste to the environment. An example of such containment could include placing unintentionally broken lamps in closed wax fiberboard drums.

DCN FLEP-00178

COMMENTS General Electric Company

SUBJECT MERC

COMMENT V.HEALTH AND ENVIRONMENTAL RISKS FROM LAMP MANAGEMENT Various studies have demonstrated the low health and environmental risks posed by the controlled

management of spent mercury containing lamps. The risks remain low regardless of the management technique used. The following activities--either separately or in combination--represent the options available for managing spent mercury containing lamps. We have identified the exposure pathways for each activity as well as the best management practices that further reduce potential releases. Lamp Storage. The primary risk from the storage of spent lamps are air emissions from uncontrolled breakage. As pointed out above, the air emissions from lamp breakage under worst case scenarios are minimal. Uncontrolled breakage is significantly reduced when lamps are stored in packaging boxes and when lamps are stored in limited quantities and for a short period of time.

Transportation. Air emissions from lamps that break during transport represent the primary transportation risk. Therefore, long-distance hauling should be avoided to limit uncontrolled breakage during transportation. Segregating lamps during transportation by drumming and boxing can control most unnecessary breakage and further reduce any emissions during transportation. Simple recordkeeping through shipping records would facilitate proper management. Controlled Crushing.

Crushing, which can be performed at the generator's facility or off-site, reduces lamp volume by as much as eighty percent and facilitates both safe landfilling and recycling. Air emissions from crushing are already controlled by OSHA standards. While some crushers may not meet OSHA standards, those units are already subject to enforcement action today. To facilitate regulatory oversight, facilities that crush large amounts of lamps should be required to report such activity to EPA or state agencies. Landfills. The risks from disposal of lamps in well constructed landfills are minimal. EPA's own analysis shows that only 3.8 percent of all the mercury disposed in a landfill comes from lamps. Of that amount, more than 99.99 percent remains in the landfill. There are two potential exposure pathways from landfills: landfill leachate and landfill gas emissions. The average mercury concentration of leachate (from all Hg sources) is .0008 mg/l which is less than the drinking water standard for mercury (.002 mg/l). Mercury in landfill gas is even more negligible. In a 1989 Swedish study of the air emissions above four landfills, mercury emissions ranged from a very negligible .0000062 Mg [per cubic meter] to an almost equally negligible .0000176 Mg [per cubic meter] above natural background mercury levels. [6] [Footnote 6: The Swedish Association of Public Sanitation and Solid Waste Management, Off-Gassing of Mercury

Vapor from Landfills, December 1989.] Additionally, data from landfill gas condensate tests in the United States largely show non-detectable mercury levels. The negligible risk from landfill management is minimized even further when landfills are properly equipped with liners and leachate collection systems. This includes landfill units required to meet the performance standards for new units under 40 CFR part 258 or industrial solid waste facilities meeting the same requirements. Industrial solid waste landfills have even less likelihood of releases due to the absence of landfill gas. Further protection is added when lamps are landfilled in closed drums following crushing, or in segregated boxes and properly covered before being compacted. Finally, recordkeeping at landfills documenting where shipments came from and when and how lamps were disposed would provide additional protection.

#### RESPONSE

The Agency agrees that control of product breakage is critical to minimizing the environmental impacts from the management of spent hazardous waste lamps. Studies show that the greatest threat of mercury releases from the management of lamps is due to crushing and breakage during storage and transport. Today's rule adds hazardous waste spent lamps to the universal waste regulations in 40 CFR Part 273. The universal waste rule provides a reduced, or streamlined set of requirements (i.e., the universal waste rule is less stringent than Subtitle C management standards).

The universal waste standards require that universal waste handlers manage universal waste lamps in a way that prevents releases of the lamps or any component of the lamps to the environment. Hazardous waste lamps must be stored in containers and/or packaging that remain closed, are structurally sound, are adequate to prevent breakage, are compatible with contents of lamps, and that lack evidence of leakage, spillage, or damage that could cause leakage under reasonably foreseeable conditions. Handlers also must contain any universal waste lamps that show evidence of breakage, leakage, or damage that could cause the release of mercury or other hazardous waste to the environment. If a release occurs, handlers of universal waste must immediately contain all releases of universal waste and any residues from universal wastes. In addition, universal waste handlers must determine whether any material resulting from a release is a hazardous waste, and if so, must manage the hazardous waste in compliance with all applicable provisions of 40 CFR parts 260 through 272.

The Agency is convinced that the requirements of the universal waste program can be highly effective in mitigating risks posed by spent lamps during storage and transport. The universal waste requirements for proper packaging and handling of the lamps to avoid breakage during accumulation and transport can prevent releases of mercury to the environment before recycling or other management. The universal waste rule establishes packaging standards to prevent potential mercury emissions during storage and transport. In addition, universal waste transporters remain subject to applicable DOT requirements for the transport of universal waste

lamps.

The current universal waste rule prohibits universal waste handlers from treating universal wastes (40 CFR ' 273.11 and 273.31). The final rule for hazardous waste lamps retains the treatment prohibition for universal waste handlers and applies the prohibition to handlers of hazardous waste lamps. The definition of treatment under RCRA includes Any method, technique, or process...designed to change the physical, chemical, or biological character or composition of any hazardous waste, so as to neutralize such waste, or so as to recover energy or material resources from the waste, or so as to render such waste non-hazardous, or less hazardous; safer to transport, store or dispose of; or amenable for recovery, amenable for storage, or reduced in volume.@ The crushing of hazardous waste lamps clearly falls within the definition of treatment under RCRA (40 CFR 260.10).

Some commenters to the proposed spent mercury-containing lamps rule requested that the Agency allow generators of such lamps to crush them on-site before sending them off-site for treatment or disposal. However, as explained in the preamble to the final universal waste rule (60 FR 25519), the Agency believes that it is not appropriate to allow universal waste handlers to treat universal wastes because the handlers are not required to comply with the Subtitle C hazardous waste management standards for generators (40 CFR Part 262). These hazardous waste generators must obtain EPA identification numbers, are subject to the 90-day (or 180-day) accumulation limit, and must comply with the technical standards of 40 CFR Part 265 for storage and accumulation units. Because these standards are relatively stringent, EPA's policy is that generators may treat hazardous wastes on-site, provided that they comply with all applicable requirements of 40 CFR Part 262 for storage and accumulation of hazardous wastes.

Universal waste handlers, on the other hand, are allowed a much longer accumulation time limit of one year and need not comply with specific technical standards for accumulation and storage units. Instead, they are subject only to the general performance standard of managing universal wastes in a manner that prevents releases@to the environment. In addition, information available to the Agency on drum top crushing systems for lamps indicates that these units may allow significant air emissions of mercury, particularly when the units are not in operation, and emissions often may exceed the OSHA limit of 0.05 mg/m<sup>3</sup>.

The Agency appreciates the commenter's additional information regarding the fate and transport of mercury in landfills. The Agency does not have extensive data characterizing the behavior of mercury released from spent lamps in a landfill environment over long periods of time, although the available data suggest that mercury may stay in a stable, non-mobile state over the shorter term and may not migrate from a landfill environment very quickly. Studies on the evaluation of the fate and transport of TC metals (including mercury) in this context are still ongoing. These analyses include additional study of the MINTEQ model and its application for determining the fate and transport of mercury and other hazardous metals. However, because these studies are not complete, today's final rulemaking does not change the current regulatory limit for mercury (i.e., 0.2 mg/L using the TCLP) and EPA studies show that the majority of hazardous waste lamps exceed this limit.

The Agency believes that the data and information provided to the Agency and the Agency's own studies and analyses that were conducted during the period of time since the mercury-containing lamps rulemaking was proposed provide adequate evidence of the behavior of mercury in the environment and the potential releases of mercury to the environment to support today's final rule. The Agency notes, however, that should sufficient and compelling information related to the behavior of mercury become available in the future, the Agency can always re-evaluate the standards promulgated in today's final rule.

DCN FLEP-00189

COMMENTS National Aeronautics and Space Admin.

SUBJECT MERC

COMMENT Mercury is increasing in the environment globally as result of atmospheric transport. This long distance transport of mercury causes problems because of bioaccumulation. States and countries have taken an aggressive role to reduce mercury emissions. The technology is available. Allowing disposal of the 600 million lamps generated in the United States in Subtitle D, nonhazardous landfills will allow the release of significant levels of mercury to the environment through airborne releases as well as through leachate and ground water contamination.

RESPONSE

The Agency agrees with the commenter's assertion that the main threat of mercury in the environment may be through an air pathway and recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking, which adds hazardous waste lamps to the universal waste program in 40 CFR Part 273, will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

Studies show that the greatest threat of mercury releases from the management of lamps is during storage and transport when uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a format for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

DCN FLEP-00191

COMMENTS Utility Solid Waste Activities Group

SUBJECT MERC

COMMENT B.The Continued Regulation of Mercury-Containing Lamps Under Subtitle C Would Be Inconsistent with the Record and Arbitrary and Capricious. The above groundwater and air emission data demonstrate convincingly that the management of



mercury-containing bulbs in MSWLFs -- as they have been managed for years without resulting in any "significant human exposure" -- will not result in any adverse impact on human health or the environment. First, the disposal of mercury-containing lamps in qualified MSWLFs will not result in the contamination of groundwater at levels exceeding the MCL for mercury; indeed, the majority of data did not detect any measurable level of contamination due to the management of bulbs in MSWLFs. The Agency itself recognizes this point. See 59 Fed. Reg. at 38293 ("The available data on landfill leachate suggests that mercury-containing lamps may not pose a threat to groundwater when placed in a state-controlled municipal landfill due to the low levels of mercury found in landfill leachate"). The only other concern articulated by EPA regarding the management of mercury-containing bulbs in MSWLFs was the potential for air emissions of mercury from the breakage of lamps during transportation or after disposal in a landfill id. at 38293. Here too, the record evidence demonstrates that these practices do not present a threat to human health and the environment warranting the regulation of bulbs as RCRA hazardous wastes. The Tetra Tech report reveals that mercury emissions from the breakage of bulbs with no cover results only in the release of approximately 3 percent of the mercury with far lesser amounts in cases where cover is involved. The Report also confirms the findings in the literature that mercury emissions in the form of landfill gas attributable to the disposal of mercury-containing lamps is de minimis and is orders of magnitude below the applicable OSHA PELs for mercury. Thus, there is no legitimate basis to regulate mercury-containing lamps managed in MSWLFs as hazardous wastes due to air emission concerns.

#### RESPONSE

The Agency does not believe that its proposed conditional exclusion approach would sufficiently protect human health and the environment. EPA gave considerable weight to actions that would minimize mercury emissions to the environment while encouraging the collection and environmentally-sound management of spent lamps. Based upon commenter input and additional information collected and reviewed by the Agency since the publication of the proposed rule, EPA decided to adopt the proposed universal waste approach for controlling potential risks from the management of spent hazardous waste lamps. Today's final rule adds hazardous waste lamps to the universal waste regulations under 40 CFR Part 273. The universal waste rule provides a reduced, or streamlined set of requirements (i.e., universal waste rule is less stringent than Subtitle C management standards).

The Agency does not have extensive data characterizing the behavior of mercury released from spent lamps in a landfill environment over long periods of time, although the available data

suggest that mercury may stay in a stable, non-mobile state over the shorter term and may not migrate from a landfill environment very quickly. Studies on the evaluation of the fate and transport of TC metals (including mercury) in this context are still ongoing. These analyses include additional study of the MINTEQ model and its application for determining the fate and transport of mercury and other hazardous metals. However, because these studies are not complete, today's final rulemaking does not change the current regulatory limit for mercury (i.e., 0.2 mg/L using the TCLP) and EPA studies show that the majority of hazardous waste lamps exceed this limit.

Studies show that the greatest threat of mercury releases from the management of lamps is during storage and transport when uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a framework for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

The Agency believes that the data and information provided to the Agency and the Agency's own studies and analyses that were conducted during the period of time since the mercury-containing lamps rulemaking was proposed provide adequate evidence of the behavior of mercury in the environment and the potential releases of mercury to the environment to support today's final rule. The Agency notes, however, that should sufficient and compelling information related to the behavior of mercury become available in the future, the Agency can always re-evaluate the standards promulgated in today's final rule.

DCN SCSP-00211

COMMENTS Minnesota Pollution Control Agency

SUBJECT MERC

COMMENT Deposition of mercury from the atmosphere has had a profound negative impact on many of Minnesota's lakes and wildlife species. Enclosures 1 and 2 are copies of a couple of studies recently completed documenting some of these impacts. [See hard copy of Comment SCSP-00211 for enclosures]. As you know, these impacts are shared by many other states.

RESPONSE

The Agency thanks the commenter for submitting additional information on the environmental impacts of mercury. The Agency recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking, which adds hazardous waste lamps to the universal waste rule in 40 CFR Part 273, will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

Studies show that the greatest threat of mercury releases from the management of lamps is during

storage and transport when uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a format for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

Simultaneously with the effort to modify the management of hazardous waste lamps, the Agency has been actively pursuing regulation of mercury air emissions from a wide variety of other sources. On December 19, 1995, EPA issued a final rule limiting emissions of mercury and other pollutants from large municipal waste combustors (60 FR 65387). Subsequently, on September 15, 1997, EPA issued a final rule setting emission limits for mercury (and other pollutants) for medical waste incinerators (62 FR 48348) (remanded for further explanation, *Sierra Club v. EPA*, 167 F.3d 658 (D.C. Cir. 1999)). In addition, the Agency finalized a rule that sets performance standards for new municipal solid waste landfills (MSWLF) and emission guidelines for existing MSWLF (61 FR 9905; March 12, 1996). Lastly, on April 19, 1996, the Agency proposed a rule that would limit emissions of various air pollutants including mercury from hazardous waste incinerators, cement kilns, and lightweight aggregate kilns (61 FR 17358, finalized in part, 63 FR 33782 (June 19, 1998)). In the future, EPA is planning to propose two rules to address (1) air emissions from industrial and commercial waste incinerators that burn non-hazardous waste, and (2) boilers that burn hazardous waste.

DCN FLEP-00228

COMMENTS STAPPA/ALAPCO

SUBJECT MERC

COMMENT Environmental Impacts Atmospheric deposition is a pathway of mercury contamination in water bodies. Even small quantities of methyl mercury can accumulate at concentrations thousands of times greater than background levels in aquatic systems, posing neurological and reproductive risks for wildlife and humans consuming fish. Any anthropogenic emissions of mercury should be prevented.

RESPONSE

The Agency agrees with the commenter's assertion that the main threat of mercury in the environment may be through an air pathway and recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking, which adds hazardous waste lamps to the universal waste rule in 40 CFR Part 273, will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

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DCN FLEP-00228

COMMENTS STAPPA/ALAPCO

SUBJECT MERC

COMMENT Mercury, in particular, is receiving national attention through the Clean Air Act-mandated Mercury and Utility Studies to be submitted to Congress next year. Additionally, a national Mercury Task Force, a Region 5 Great Lakes Task Force and Task Forces in Minnesota and Michigan have been established. The Great Lakes Water Quality Agreement, the proposed Great Lakes Water Quality Guidance and the Great Waters Program are committed to reducing loadings of bioaccumulative toxic chemicals to the Great Lakes Ecosystem. Mercury is among the BCCs chosen under a special Virtual Elimination Project undertaken by the Great Lakes National Program Office as a part of a Region 5 Great Lakes Toxic Reduction Effort. The problem, however, extends beyond the Great Lakes. As we noted above, 38 states now have fish consumption advisories for mercury. Internationally, mercury has been recognized as posing a risk and comprehensive reduction efforts are now in place. Denmark, Sweden and Norway have signed an agreement to reduce mercury emissions by 70 percent by the year 1995 (from 1985 levels). Sweden is phasing out all uses of mercury by the year 2000.

RESPONSE

The Agency agrees with the commenter's assertion that the main threat of mercury in the environment may be through an air pathway and recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are

rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking, which adds hazardous waste lamps to the universal waste rule in 40 CFR Part 273, will minimize releases of mercury from the storage and transportation of hazardous waste lamps prior to recycling or disposal.

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DCN FLEP-00229

COMMENTS Global Recycling Technologies, Inc.

SUBJECT MERC

COMMENT 2. Protection of human health and the environment is the main issue.

RESPONSE

The Agency agrees with the commenter regarding the importance of protecting human health and the environment. Mercury is high on the Agency's priority list of toxic pollutants, along with other heavy metals such as cadmium and lead. These metals have been identified as constituents of some waste lamps. The adverse effects of mercury in the environment are primarily due to bioaccumulation. The primary health effects from mercury are on the neurological development of children exposed through fish consumption and on fetuses exposed through their mother's consumption of fish. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking, which adds hazardous waste lamps to the universal waste rule in 40 CFR Part 273, will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

DCN FLEP-00229

COMMENTS Global Recycling Technologies, Inc.

SUBJECT MERC

COMMENT 7. Mercury is volatile at room temperature, so therefore uncontrolled breakage and subsequent release of mercury vapor needs to be controlled. The danger is that the point of breakage is the point of mercury release. This poses danger to human health and makes mercury immediately available to the environment and the ecosystem.

RESPONSE

The Agency agrees with the commenter's assertion that the main threat of mercury in the environment may be through an air pathway and recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking, which adds hazardous waste lamps to the universal waste rule in 40 CFR Part 273, will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

Studies show that the greatest threat of mercury releases from the management of lamps is during storage and transport when uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a format for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

Under the universal waste rule, the Agency is not allowing crushing of hazardous waste lamps. However, generators located in a state with an authorized universal waste program may be allowed to crush, universal waste lamps, if within the state authorization process the Agency determines that a state's program allowing generators to treat lamps under controlled or restricted conditions is equivalent (per RCRA ' 3006) to the federal prohibition.

EPA believes that this approach both ensures protection of human health and the environment while allowing for the development of state regulatory programs that include specific standards for the safe crushing of hazardous waste lamps. Therefore, mercury releases to the environment via an air pathway should be significantly reduced as a result of today's rulemaking.

DCN FLEP-00229

COMMENTS Global Recycling Technologies, Inc.

SUBJECT MERC

COMMENT RELEASE OF MERCURY Uncontrolled mercury releases from fluorescent lamps present two potential dangers; 1). human safety, and 2). environmental impact. Mercury is unique in that it is volatile at room temperature. The effects of lamp breakage

in contained areas is documented to be well in excess of OSHA levels for worker safety.

#### RESPONSE

The Agency agrees with the commenter's assertion that the main threat of mercury in the environment may be through an air pathway and recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. Mercury is high on the Agency's priority list of toxic pollutants, along with other heavy metals such as cadmium and lead. These metals have been identified as constituents of some waste lamps. The primary health effects from mercury are on the neurological development of children exposed through fish consumption and on fetuses exposed through their mother's consumption of fish.

For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking, which adds hazardous waste lamps to the universal waste rule in 40 CFR Part 273, will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal. Studies show that the greatest threat of mercury releases from the management of lamps is during storage and transport when uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a format for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

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EPA believes that this approach both ensures protection of human health and the environment while allowing for the development of state regulatory programs that include specific standards for the safe crushing of hazardous waste lamps. Therefore, mercury releases to the environment via an air pathway should be significantly reduced as a result of today's rulemaking.

DCN FLEP-00282

COMMENTS Michigan Dept. of Natural Resources

SUBJECT MERC

COMMENT Canada and Ontario first entered the "Canada-Ontario Agreement" (COA) in 1971 and has since released subsequent agreements focusing on toxic chemicals. The 1994 COA Agreement seeks a 90% reduction in the use, generation or release of mercury by the year 2000. The ultimate goal of COA is to achieve the virtual elimination of mercury from the Great Lakes Basin Ecosystem by encouraging and implementing strategies consistent with the

philosophy of zero discharge. Mercury is receiving national attention through the Great Waters Study (submitted to EPA May, 1994) and the mercury and utility studies to be submitted to Congress in 1995 as mandated by the 1990 Clean Air Act (CAA) amendments. A national Mercury Task Force has also been established by U.S. The mercury problem, however, extends beyond the Great Lakes. At least thirty-five states now have fish consumption advisories for mercury. Internationally, mercury has been recognized to pose a risk and comprehensive reduction efforts are underway. Denmark, Sweden and Norway have signed an agreement to reduce mercury emissions by 70 percent by 1995 (from 1985 levels), Sweden is currently implementing efforts to phase out all consumer uses of mercury by the year 2000. Atmospheric deposition has been identified as a significant pathway by which mercury enters both inland lakes and the Great Lakes. Even small quantities of methyl mercury can bioaccumulate at concentrations thousands of times greater than aquatic background levels posing neurological and reproductive risks for wildlife and humans consuming fish. It is essential that any anthropogenic source that has the potential to release mercury into the atmosphere be eliminated.

#### RESPONSE

The Agency agrees with the commenter's assertion that the main threat of mercury in the environment may be through an air pathway and recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking, which adds hazardous waste lamps to the universal waste rule in 40 CFR Part 273, will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

Studies show that the greatest threat of mercury releases from the management of lamps is during storage and transport when uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a format for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

Simultaneously with the effort to modify the management of hazardous waste lamps, the Agency has been actively pursuing regulation of mercury air emissions from a wide variety of other sources. On December 19, 1995, EPA issued a final rule limiting emissions of mercury and other pollutants from large municipal waste combustors (60 FR 65387). Subsequently, on September 15, 1997, EPA issued a final rule setting emission limits for mercury (and other pollutants) for medical waste incinerators (62 FR 48348) (remanded for further explanation, *Sierra Club v. EPA*,



167 F.3d 658 (D.C. Cir. 1999)). In addition, the Agency finalized a rule that sets performance standards for new municipal solid waste landfills (MSWLF) and emission guidelines for existing MSWLF (61 FR 9905; March 12, 1996)). Lastly, on April 19, 1996, the Agency proposed a rule that would limit emissions of various air pollutants including mercury from hazardous waste incinerators, cement kilns, and lightweight aggregate kilns (61 FR 17358, finalized in part, 63 FR 33782 (June 19, 1998)). In the future, EPA is planning to propose two rules to address (1) air emissions from industrial and commercial waste incinerators that burn non-hazardous waste, and (2) boilers that burn hazardous waste.

DCN FLEP-00282

COMMENTS Michigan Dept. of Natural Resources

SUBJECT MERC

COMMENT Mercury Emissions The proposal for a conditional exemption is based upon the assumption that very little mercury escapes from landfills. There is limited data to support this conclusion. However, upon re-evaluation of available data from landfill sites in Minnesota, it is clear that mercury emissions from landfills can be significant and landfills have the potential to be significant sources of mercury to the environment. It is true that the data shows relatively little mercury escapes from municipal landfills via the ground water or air after disposal is complete. In Minnesota however, the concentration of mercury in landfill leachate is often a limiting factor in treating leachate collected as part of a remedial action at Superfund sites. In addition, mercury in leachate is the primary reason that waste water treatment plants must turn down requests for disposal of landfill leachate additions. The mercury in this leachate has the potential to cause the discharge from the waste water treatment plant to exceed statewide water quality standards. In summary, mercury emissions and leachate concentrations from landfills have the potential to contribute mercury to the environment. However, the classification of "little" mercury is relative. On page 38292 F.R. vol.59, No. 143, EPA mentions that 30 ng/m<sup>3</sup> of mercury is a very small amount of mercury that could be released from lamps by landfill gas. This amount is still ten times greater than background levels of atmospheric mercury and contributes to elevated environmental mercury levels available for deposition into water bodies and subsequent bioaccumulation in wildlife. A 1993 Michigan report concludes that, "there is a potentially small margin of safety between background (i.e., natural) levels of mercury exposure and concentrations that can cause harm in humans ... Mercury must be taken seriously as a potential threat to public health and the environment." (Mercury in Michigan's

Environment: Environmental and Human Health Concerns, A Science Report to Governor John Engler. Michigan Environmental Science Board, April 1993, x.) Additionally, none of these studies account for the escape of mercury into the air during collection and initial disposal. When lamps break, the mercury inside is available for volatilization, adsorption or reaction. Typical solid waste management practices involve compacting solid waste before covering the material. It is very likely that lamps are broken during compaction or even during transport prior to arriving at the landfill. A U.S. EPA study shows significantly lower mercury emissions caused by the breakage of fluorescent lamps during transport for recycling, than for transport during garbage disposal. (DRAFT Management of Used Fluorescent Lamps: Preliminary Risk Assessment, Final Report Research Triangle Institute, October 1992, 159-160)

#### RESPONSE

The Agency thanks the commenter for the information and additional data on mercury releases from landfills and their potential impacts on the environment. The Agency does not believe that its proposed conditional exclusion approach would sufficiently protect human health and the environment. EPA gave considerable weight to actions that would minimize mercury emissions to the environment while encouraging the collection and environmentally-sound management of spent lamps. Based upon commenter input and additional information collected and reviewed by the Agency since the publication of the proposed rule, EPA decided to adopt the proposed universal waste approach for controlling potential risks from the management of spent hazardous waste lamps. Today's final rule adds hazardous waste lamps to the universal waste regulations under 40 CFR Part 273. The universal waste rule provides a reduced, or streamlined set of requirements (i.e., universal waste rule is less stringent than Subtitle C management standards).

The Agency believes that management controls under RCRA are needed to minimize the release of mercury from lamps into the environment. Although most mercury emissions are associated with combustion, all releases contribute to the mercury reservoirs in land, water and air. In addition, mercury has been shown to be transported in the atmosphere many miles from the source of its release. The deposition of atmospheric mercury into surface waters, its presence in runoff from soil, or the recycling of mercury from sediment into the water column can result in the accumulation of the metal in many animal species, particularly aquatic organisms. The EPA has recently published a Mercury Study Report to Congress (December 1997) that examines many of the health effects resulting from mercury exposure. Examples of mercury-related risks include neurotoxicological problems and developmental effects in fetus and adults (e.g., Mad Hatters-disease), and accumulation of the metal in many animal species, particularly aquatic organisms. For example, fish with high levels of mercury in their tissues have exhibited increased mortality, reduced reproductive success, impaired growth, and behavioral abnormalities.

The Agency does not have data characterizing the behavior of mercury in different types of landfills over long time periods, although available data from shorter-term studies suggest that

mercury can be, and has been released to groundwater and air from municipal landfills. (For a more complete discussion of mercury releases from landfills and fate and transport in groundwater, see the Toxicity Section of this Response to Comments document). Data available to the Agency show that mercury can be found in municipal landfill leachate, and EPA remains concerned that landfill releases may pose threats over the long term. The Agency has concluded that some management controls are essential for these wastes. The Agency published a Notice of Data Availability on July 11, 1997 (62 FR 37183). This notice presented data collected by the Agency and an assessment of potential mercury emissions from the management of hazardous waste-containing lamps under several regulatory approaches.

DCN FLEP-00301

COMMENTS Minnesota Pollution Control Agency/MOEA

SUBJECT MERC

COMMENT 3. Lack of Conclusive Supporting Data and Burden of Proof.

The CE alternative represents a significant and unprecedented deviation from the hazardous waste regulatory framework. The burden of proof should not be with those supporting the UW alternative, which is totally consistent with the Resource Conservation and Recovery Act (RCRA) framework already deemed to be protective of human health and the environment. The burden is with those that support the CE alternative to show, conclusively, that lamps disposed of outside of the RCRA framework will be protective of human health and the environment. Until significant data gaps are credibly filled, we cannot conclude that human health and the environment will be protected under the CE alternative. When all data gaps are credibly filled we believe the data will show that lamps managed under a CE alternative approach represent a significant environmental concern.

RESPONSE

EPA is not adopting the CE alternative and is instead adding hazardous waste lamps to the universal waste regulations in 40 CFR Part 273. The universal waste rule represents a significant cost reduction over Subtitle C management requirements for generators, collectors, and transporters, yet ensures that lamps are recycled or treated in an environmentally protective manner at Subtitle C facilities. Fewer hazardous waste lamps will be managed in the municipal solid waste stream, therefore reducing the number of lamps going to municipal combustors and decreasing the potential for lamps to be crushed and/or broken in uncontrolled environments during storage and transport (e.g., dumpsters and garbage trucks).

The Agency believes that the data and information provided to the Agency and the Agency's own studies and analyses that were conducted during the period of time since the mercury-containing lamps rulemaking was proposed provide adequate evidence of the behavior of mercury in the environment and the potential releases of mercury to the environment to support today's final rule.

DCN FLEP-00301

COMMENTER Minnesota Pollution Control Agency/MOEA

SUBJECT MERC

COMMENT 11. The CE Alternative Allows Lamps to Continue to be a Significant Source. The CE alternative is based on outdated and inaccurate information regarding mercury and its behavior in solid waste facilities and the environment. The CE alternative does not address multimedia issues associated with mercury management and contamination. The CE alternative downplays the significant releases that would undoubtedly happen during the discarding, breakage, storage, on-site crushing, transportation, tipping, and compaction of lamps. Current limited data for landfill leachate, gas emissions, and lamp breakage indicate mercury releases at level of concern. While some argue that annual mercury emissions from individual landfills are insignificant, the true impact must be measured based on the cumulative emissions over time, including long after landfill closure. Landfills incubate methyl mercury. Research shows that direct emissions of methyl mercury are occurring.

RESPONSE

EPA is not adopting the conditional exclusion alternative and is instead adding hazardous waste lamps to the universal waste regulations. The universal waste rule represents a significant cost reduction over Subtitle C management requirements for generators, collectors, and transporters, yet ensures that lamps are recycled or treated in an environmentally protective manner at Subtitle C facilities. Fewer hazardous waste lamps will be managed in the municipal solid waste stream, therefore reducing the number of lamps going to municipal combustors and decreasing the potential for lamps to be crushed and/or broken in uncontrolled environments during storage and transport (e.g., dumpsters and garbage trucks).

The Agency believes that the data and information provided to the Agency and the Agency's own studies and analyses that were conducted during the period of time since the mercury-containing lamps rulemaking was proposed provide adequate evidence of the behavior of mercury in the environment and the potential releases of mercury to the environment to support today's final rule.

DCN FLEP-00301

COMMENTER Minnesota Pollution Control Agency/MOEA

SUBJECT MERC

COMMENT 8. Precedent of CE Alternative for the Toxicity Characteristic Leaching Procedure (TCLP) EPA data concludes that lamps are a hazardous waste under the TCL. [Note 7: U.S. EPA 1993a. Page 70.] The CE alternative would essentially allow any generator to seek an exemption from RCRA if available solid waste landfill data shows that the constituent(s) that caused

their waste to fail the TCLP is not currently present at levels of concern in landfill leachate. In short, the CE alternative casts doubt on the TCLP method for determining whether a waste is hazardous. In this case, a whole separate rulemaking should take place, prior to allowing conditional exemptions. Such a rulemaking would provide an opportunity to consider the need for a broadening of the parameters for determining whether a mercury move is hazardous and to account for other multimedia release pathways in the solid waste management system (e.g., in transportation, incineration, composting, shredding/processing facilities). Until such time, the universal waste alternative, which is totally consistent with the current RCRA program, should be finalized. //END33

9. Mercury Contamination is a National Environmental Problem Mercury contamination is a national environmental concern requiring a strong national response. While there is a need to further define certain issues through scientific research, the properties of mercury, tile level of mercury contamination, tile sources of mercury contamination, and tile impacts of mercury contamination are well documented (including "Management of Used Fluorescent Lamps: Preliminary Risk Assessment," one of the background documents for this proposal). We would like to briefly summarize some of the major points.

A. Properties of Mercury. Mercury is a metal with several unique properties compared to other contaminants of concern. It is volatile at ambient temperatures and can be transported in the atmosphere on a regional and global basis. It can form organic compounds that are taken up by living organisms leading to mercury bioaccumulation in the food chain. It has several organic and inorganic states that allow it to move readily among air, water, and soil. It is a potent neurotoxin that can, in its many chemical forms, be readily absorbed but only slowly excreted by living organisms. Mercury can affect the development of the fetus in the womb. The Minnesota Pollution Control Agency has developed a Hazard Index for rating the toxicity of airborne pollutants. Of the 183 compounds and elements studied, only dioxin has a higher Hazard Index rating than mercury. [Note 8:Pratt, G..et. at. "An Indexing System for Comparing Toxic Air Pollutants Based Upon Their Potential Environmental Impacts. Chemosphere. Vol. 27 (1993). Pages 1359-1379. (Enclosure 6a.) (See hard copy of Comment FLEP-00301 for attachment.)]

#### RESPONSE

EPA is not adopting the conditional exclusion alternative and is instead adding hazardous waste lamps to the universal waste regulations in 40 CFR Part 273. The universal waste rule represents

a significant cost reduction over Subtitle C management requirements for generators, collectors, and transporters, yet ensures that lamps are recycled or treated in an environmentally protective manner at Subtitle C facilities. Fewer hazardous waste lamps will be managed in the municipal solid waste stream, therefore reducing the number of lamps going to municipal combustors and decreasing the potential for lamps to be crushed and/or broken in uncontrolled environments during storage and transport (e.g., dumpsters and garbage trucks).

The Agency believes that the data and information provided to the Agency and the Agency's own studies and analyses that were conducted during the period of time since the mercury-containing lamps rulemaking was proposed provide adequate evidence of the behavior of mercury in the environment and the potential releases of mercury to the environment to support today's final rule.

DCN FLEP-00301

COMMENTER Minnesota Pollution Control Agency/MOEA

SUBJECT MERC

COMMENT E. Impacts of Mercury Contamination. The exposure of humans and wildlife to mercury is almost exclusively from the consumption of methyl mercury in fish. In adult mammals, methyl mercury affects primarily the central nervous system. Prenatal individuals is more susceptible to brain damage from mercury than are adults. There are currently over 1500 lakes in 38 states scattered throughout the nation with fish consumption bans or advisories due to mercury. Ninety-four percent of the lakes tested to date in Minnesota have fish consumption advisories. While the percent in other states may not be as high as in Minnesota due to a number of factors, additional testing across the nation would likely increase significantly the numbers of lakes and numbers of states with advisories. Beyond human impacts, there are fish-eating birds and mammals who are oblivious to fish consumption advisories. Wildlife such as loons, eagles, osprey, otters, mink, and kingfishers consume large quantities of fish and incidentally consume many environmental contaminants including mercury.- For many reasons, it is difficult to assess the degree to which wildlife is negatively affected by mercury contamination. However, it appears that loons in Minnesota are accumulating mercury to the point that reproduction is impaired.[Note 11: Ensor, K.L., D.D. Helwig, and L.C. Wemmer. "Mercury and Lead in Minnesota Common Loons (*Gavia immer*)." Minnesota Pollution Control Agency. St. Paul, MN. 1992. (Enclosure 9.) (See hard copy of Comment FLEP-00301 for attachments.)] Elevated mercury has been documented in Minnesota's mink and otter populations. [Note 12: Ensor, K.L., W.C. Pitt, and D.D. Helwig. "Contaminants in

Minnesota Wildlife 1989-1991." Minnesota Pollution Control Agency. St. Paul, MN. 1993. (Enclosure 10.) (See hard copy of Comment FLEP-00301 for attachments.)] Because mercury is a neurotoxin, it is a particularly insidious toxin for predators, who rely on speed and coordination to obtain food. Even in wilderness areas that receive only atmospheric deposition from global pollution, fish exceed the FDA action level of 1.0 parts per million (ppm) mercury. [Note 10: "Mercury Atmospheric Processes: A Synthesis Report." Expert Panel on Mercury Atmospheric Processes. 1994. Prepared under Research Project 9050, Electric Power Research Institute. Report No. TR-104214. (Enclosure 8.) (See hard copy of Comment FLEP-00301 for attachments.)] Hence, there is already too much mercury in the global environment. Traditional pollution, control efforts regulate local concentration and rely on dilution and/or degradation for ultimate disposal. Mercury does not degrade and mercury can and does reconcentrate to toxic levels even after dilution in the global environment. Currently the global atmospheric mercury concentration is 1 to 2 nanograms per cubic meters (ng/m<sup>3</sup>). [Note 10: "Mercury Atmospheric Processes: A Synthesis Report." Expert Panel on Mercury Atmospheric Processes. 1994. Prepared under Research Project 9050, Electric Power Research Institute. Report No. TR-104214. (Enclosure 8.) (See hard copy of Comment FLEP-00301 for attachments.)] a portion of which is converted to methyl mercury that bioaccumulates in fish and other aquatic organisms to levels that are causing health problems in wildlife such as loon, otter and eagle. It is also possible that fish at the top of the food chain, such as walleye and northern pike, are negatively affected by mercury. The most susceptible stage is neuronal development of the embryo and larvae, which would be affected by the mercury content of the egg yolk of the mother. There is preliminary evidence that reproduction of walleye populations in some lakes may be impaired at current levels of mercury in the environment. [Note 13: Weiner, J.G. and D.J. Spry. "Toxicological Significance of Mercury in Freshwater Fish." In. "Interpreting Concentrations of Environmental Contaminants in Wildlife Tissues." G. Heinz and N. Beyer, editors. Lewis Publishers. Chelsea, MI. In press. (Enclosure 11.) (See hard copy of Comment FLEP-00301 for attachments.)] Beyond health effects, as mercury contamination increases and more restrictions are placed on the consumption of fish, economic impacts will be realized by the commercial fishing and tourism industries. Very little known research has been done to quantify

this specific issue, but the issue must be recognized and considered in the overall analysis.

#### RESPONSE

The Agency thanks the commenter for the additional information regarding the fate and effects of mercury. The Agency agrees with the commenter's assertion that the main threat of mercury in the environment may be through an air pathway and recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking, which adds hazardous waste lamps to the universal waste rule in 40 CFR Part 273, will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

EPA believes that this approach both ensures protection of human health and the environment while encouraging the development of state regulatory programs that include specific standards for the safe crushing of hazardous waste lamps. Therefore, mercury releases to the environment via an air pathway should be significantly reduced as a result of today's rulemaking. Although the destination facilities are subject to these hazardous waste management requirements for treatment and storage activities, the Agency does not have the authority to regulate the specific process of mercury reclamation under the scope of this rulemaking. However, EPA believes that with adequate state oversight, mercury containing lamps can be safely recycled and the mercury reclaimed.

Simultaneously with the effort to modify the management of hazardous waste lamps, the Agency has been actively pursuing regulation of mercury air emissions from a wide variety of other sources. On December 19, 1995, EPA issued a final rule limiting emissions of mercury and other pollutants from large municipal waste combustors (60 FR 65387). Subsequently, on September 15, 1997, EPA issued a final rule setting emission limits for mercury (and other pollutants) for medical waste incinerators (62 FR 48348) (remanded for further explanation, *Sierra Club v. EPA*, 167 F.3d 658 (D.C. Cir. 1999)). In addition, the Agency finalized a rule that sets performance standards for new municipal solid waste landfills (MSWLF) and emission guidelines for existing MSWLF (61 FR 9905; March 12, 1996). Lastly, on April 19, 1996, the Agency proposed a rule that would limit emissions of various air pollutants including mercury from hazardous waste incinerators, cement kilns, and lightweight aggregate kilns (61 FR 17358, finalized in part, 63 FR 33782 (June 19, 1998)). In the future, EPA is planning to propose two rules to address (1) air emissions from industrial and commercial waste incinerators that burn non-hazardous waste, and (2) boilers that burn hazardous waste.

DCN FLEP-00301

COMMENTS Minnesota Pollution Control Agency/MOEA

SUBJECT MERC

COMMENT Conclusion: As mentioned by Dr. Swain in the meeting, mercury's danger is that it bioaccumulates in the food chain and much of



the environment is already saturated with mercury. It would be a shame if great symbols of national pride and wilderness values such as the bald eagle, the osprey, the common loon, the kingfisher, and the Florida panther were saved from other dangers only to be threatened anew by mercury.

#### RESPONSE

The Agency agrees with the commenter's assertion that the main threat of mercury in the environment is from bioaccumulation and biomagnification. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking, which adds hazardous waste lamps to the universal waste rule in 40 CFR Part 273, will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

Simultaneously with the effort to modify the management of hazardous waste lamps, the Agency has been actively pursuing regulation of mercury air emissions from a wide variety of other sources. On December 19, 1995, EPA issued a final rule limiting emissions of mercury and other pollutants from large municipal waste combustors (60 FR 65387). Subsequently, on September 15, 1997, EPA issued a final rule setting emission limits for mercury (and other pollutants) for medical waste incinerators (62 FR 48348) (remanded for further explanation, *Sierra Club v. EPA*, 167 F.3d 658 (D.C. Cir. 1999)). In addition, the Agency finalized a rule that sets performance standards for new municipal solid waste landfills (MSWLF) and emission guidelines for existing MSWLF (61 FR 9905; March 12, 1996). Lastly, on April 19, 1996, the Agency proposed a rule that would limit emissions of various air pollutants including mercury from hazardous waste incinerators, cement kilns, and lightweight aggregate kilns (61 FR 17358, finalized in part, 63 FR 33782 (June 19, 1998)). In the future, EPA is planning to propose two rules to address (1) air emissions from industrial and commercial waste incinerators that burn non-hazardous waste, and (2) boilers that burn hazardous waste.

DCN FLEP-00305

COMMENTS Sierra Club National Solid Waste Comm.

SUBJECT MERC

COMMENT In addition to issues discussed in this docket, EPA should regulate facilities that recover mercuric for lamps to guard health of workers and prevent releases into the environment. Some states, for example Florida, have enacted waste lamp management regulations that are far from stringent.

#### RESPONSE

The Agency appreciates the commenter's concern about occupational exposures to mercury. Although the destination facilities for spent lamps covered under this rulemaking are subject to hazardous waste management requirements for treatment and storage activities, the Agency does not have the authority to regulate occupational exposures under the scope of this rulemaking. EPA believes that with adequate state and Federal (OSHA) oversight, mercury containing lamps

can be safely recycled and the mercury reclaimed.

The Agency agrees with the commenter's assertion that the main threat of mercury in the environment may be through an air pathway and recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking, which adds hazardous waste lamps to the universal waste rule in 40 CFR Part 273, will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

Studies show that the greatest threat of mercury releases from the management of lamps is during storage and transport when uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a format for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

Under the universal waste rule, the Agency is not allowing crushing of hazardous waste lamps. However, generators located in a state with an authorized universal waste program may be allowed to crush, universal waste lamps, if within the state authorization process the Agency determines that a state's program allowing generators to treat lamps under controlled or restricted conditions is equivalent (per RCRA ' 3006) to the federal prohibition.

EPA believes that this approach both ensures protection of human health and the environment while allowing for development of state regulatory programs that include specific standards for the safe crushing of hazardous waste lamps. Therefore, mercury releases to the environment via an air pathway should be significantly reduced as a result of today's rulemaking. Although the destination facilities are subject to these hazardous waste management requirements for treatment and storage activities, the Agency does not have the authority to regulate the specific process of mercury reclamation under the scope of this rulemaking.

DCN FLEP-L0001

COMMENTS Environmental Technology Council

SUBJECT MERC

COMMENT III. MERCURY CONTAMINATION IS A NATIONAL PUBLIC HEALTH AND ENVIRONMENTAL PROBLEM REQUIRING STRONG FEDERAL CONTROLS

"Mercury exposure has had profound effects on human health," according to EPA's own risk assessment. [1] [Footnote 1: Management of Used Fluorescent Lamps: Preliminary Risk Assessment (Final Report), Research Triangle Institute; October, 1992, Revised May 14, 1993; p. 26 ("Risk Assessment").] Abnormally high levels of mercury in food for example, have resulted in multiple

neurological symptoms, atrophy of the brain, and numerous deaths and hospitalizations. [2] [Footnote 2: Id. at 26-27.] Low levels of mercury exposure have been implicated in Alzheimer's disease. [3] [Footnote 3: Id. at 43] Other adverse health effects caused by mercury include reproductive, developmental, neurological, behavioral, immunological and endocrine effects. [4] [Footnote 4: Memorandum from Valduis V. Adamkus, Administrator of EPA Region 4, to Richard J. Guimond, EPA, October 25, 1993, p. 1 (Adamkus Memo)(copy attached). (See hard copy of Comment FLEP-L0001 for attachment)] Obviously, this highly toxic metal must be adequately controlled to prevent significant public health and environmental harm. As a result of high levels of atmospheric mercury, concentrations of mercury in rain has been measured at 20 ng/l, which significantly exceeds the drinking water standard of 12 ng/l. [5] [Footnote 5: Comments of Minnesota Pollution Control Agency on RARA Docket No. F-94- FLEP, at 11 (Nov. 23, 1994).] Mercury is volatile at room temperature, cannot be destroyed, has a long residence time in the atmosphere, and therefore is transported long distances atmospherically. Not surprisingly, these high levels of mercury in the atmosphere and rain are found distant from significant local generation. Mercury in the atmosphere is released to soil and surface waters by rain and direct deposition. Through bioaccumulation, which concentrates mercury in fish at thousands of times background levels, [6] [Footnote 6: Adamkus Memo at 1 (See hard copy of Comment FLEP-L0001 for attachment); 59 Fed. Reg. 38291.] atmospheric mercury becomes a public health and environmental problem. One result of mercury contamination is that over 30 states have been forced to issue 1,550 fish consumption bans or advisories because of fish contaminated with mercury from environmental sources.[7] [Footnote 7: "A National Fish Consumption Advisory Database: A Step Toward Consistency," in Fisheries, published by the American Fisheries Society, Vol. 19, #5, May 1994, p. 21. See also 59 Fed. Reg. at 38291.] Maine, for example, a state that is not a significant generator of mercury, recently issued a public health advisory warning pregnant women, nursing mothers, women who may become pregnant, and children under eight years of Age not to eat any fish from lakes and ponds in the state, because of mercury contamination. [8] [Footnote 8: Maine Department of Human Services, Press Release, "Joint Health Advisory," May 18, 1994.] The same advisory warned all other members of the public not to eat more than 6 to 22 meals per year of fish from Maine lakes and ponds. As another example, mercury causes exceedances of water quality

criteria in all five Great Lakes; And is a Great Lakes Critical Pollutant. [9] [Footnote 9: Adamkus Memo at 1. (See hard copy of Comment FLEP-L0001 for attachment.)] A study by the New Jersey Department of Environmental Protection and Energy concludes that "at current national levels of dietary exposure a significant fraction of women of childbearing age maybe exposed to Me-Hg at levels which pose an unacceptable risk of adverse developmental effects. Thus basic public health principles require that nationally there should be no significant increase in current population to Me-Hg." [10] [Footnote 10: New Jersey Department of Environmental Protection and Energy (NJDEPE), Final Report of the Task Force of Mercury Emissions Standard Setting, July 1993, Vol. II, p. 47 ("NJDEPE Report") (emphasis added).] In contrast to this proposed regulation, EPA clearly recognizes the public health hazard that mercury in the environment currently presents. Thus, EPA is establishing maximum available control technologies for mercury sources under the Clean Air Act, is proposing tightened water quality criteria for mercury in the Great Lakes under the Clean Water Act, and is placing priority on cleaning up mercury-contaminated Superfund sites. [11] [Footnote 11: Adamkus Memo at 2. (See hard copy of Comment FLEP-L0001 for attachment.)]

#### RESPONSE

The Agency agrees with the commenter's assertion that the main threat of mercury in the environment may be through an air pathway and recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking will minimize releases of mercury from the storage and transportation of spent fluorescent lamps prior to recycling or disposal.

Studies show that the greatest threat of mercury releases from the management of lamps is during storage and transport when uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a format for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

Simultaneously with the effort to modify the management of hazardous waste lamps, the Agency has been actively pursuing regulation of mercury air emissions from a wide variety of other sources. On December 19, 1995, EPA issued a final rule limiting emissions of mercury and other pollutants from large municipal waste combustors (60 FR 65387). Subsequently, on September 15, 1997, EPA issued a final rule setting emission limits for mercury (and other pollutants) for medical waste incinerators (62 FR 48348) (remanded for further explanation, *Sierra Club v. EPA*,

167 F.3d 658 (D.C. Cir. 1999)). In addition, the Agency finalized a rule that sets performance standards for new municipal solid waste landfills (MSWLF) and emission guidelines for existing MSWLF (61 FR 9905; March 12, 1996)). Lastly, on April 19, 1996, the Agency proposed a rule that would limit emissions of various air pollutants including mercury from hazardous waste incinerators, cement kilns, and lightweight aggregate kilns (61 FR 17358, finalized in part, 63 FR 33782 (June 19, 1998)). In the future, EPA is planning to propose two rules to address (1) air emissions from industrial and commercial waste incinerators that burn non-hazardous waste, and (2) boilers that burn hazardous waste.

DCN FLEP-L0001

COMMENTS Environmental Technology Council

SUBJECT MERC

COMMENT Many states are concerned about the environmental and public health threat from mercury resulting from fluorescent lamp disposal. In fact, in a recent survey by the Association of State and Territorial Solid Waste Management Officials (ASTSWMO) regarding management of post-consumer wastes, fluorescent lamp management was one of the highest priorities for the majority of state respondents.[30] [Footnote 30: Ibid.]

RESPONSE

Today's final rule adds hazardous waste lamps to the universal waste rule waste regulations under 40 CFR Part 273. The Agency has determined that hazardous waste lamps meet the criteria established for designating a material as universal waste rule waste. The universal waste rule provides a reduced, or streamlined set of requirements (i.e., universal waste rule is less stringent than full Subtitle C management standards).

The Agency agrees with the commenter's assertion that the main threat of mercury in the environment may be through an air pathway and recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking, which adds hazardous waste lamps to the universal waste rule in 40 CFR Part 273, will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

EPA believes that this approach both ensures protection of human health and the environment while encouraging the development of state regulatory programs that include specific standards for the safe crushing of hazardous waste lamps. Therefore, mercury releases to the environment via an air pathway should be significantly reduced as a result of today's rulemaking.

DCN FLEP-L0013

COMMENTS Osram Sylvania

SUBJECT MERC

COMMENT In conjunction with other lamp manufacturers, we have been negotiating with EPA for 4-1/2 years on the issue of lamp disposal. When lamps which pass TCLP, but still contain significant mercury are finally available (projected early 1996), OSI will not be in a position to delay the introduction of similar products. This will effectively bypass RCRA, and the universal waste rule in most states, potentially releasing more mercury into the environment, not less.

RESPONSE

The universal waste regulations only apply to hazardous waste lamps that exhibit a hazardous waste characteristic. However, some states may regulate mercury to a greater extent than the federal program. In addition, the universal waste program allows companies to handle all mercury-containing lamps as universal waste, whether or not they are hazardous, if they so choose.

DCN FLEP-00065

COMMENTER American Fisheries Society

SUBJECT MERC

COMMENT WHEREAS, mercury is contained in fluorescent lamps and typical solid waste management practices involve compaction in landfills or incineration, both practices result in breakage and release of gaseous mercury, these releases pose long-term risk due to regional and global atmospheric transport with ultimate bioaccumulation in fish, and

RESPONSE

The Agency agrees with the commenter's assertion that the main threat of mercury in the environment may be through an air pathway and recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking, which adds hazardous waste lamps to the universal waste rule in 40 CFR Part 273, will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

Studies show that the greatest threat of mercury releases from the management of lamps is during storage and transport when uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a framework for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

DCN SCSP-00131

COMMENTER Monsanto

SUBJECT MERC

COMMENT The first set of criteria used to demonstrate that fluorescent bulbs would negatively impact human health and the environment due to their presence in municipal waste streams, is satisfied in that approximately 400 million fluorescent lamps are discarded in the U.S. each year, and the average four (4) foot fluorescent light tube contains approximately 50-75 milligrams of elemental mercury.

RESPONSE

The Agency thanks the commenter for the information and notes that hazardous waste lamps meet the criteria used to designate a material as a universal waste. Today's rule adds hazardous lamps to the universal waste program in 40 CFR Part 273.

DCN FLEP-00153

COMMENTER Vermont Dept. of Environ. Conservation

SUBJECT MERC

COMMENT b. The behavior of mercury in MSW landfills is not known in great detail. However, mercury does reappear in both landfill leachates and in landfill gas. While the leachate mercury levels cited by EPA appear low with respect to MCLs, these levels are not the levels of environmental concern. Ambient water quality criteria tested on mercury's proven capacity to bioaccumulate in the environment are orders of magnitude lower and should be the basis on which we evaluate potential releases to the environment. Similar concerns arise with respect to mercury emissions from landfill gas (and bulb breakage en route to disposal) and the lack of reliable information about air release, transport, deposition, and exposure pathways from these sources.

RESPONSE

The Agency thanks the commenter for the information and additional data on mercury releases from landfills and their potential impacts on the environment. The Agency does not have extensive data characterizing the behavior of mercury released from spent lamps in a landfill environment over long periods of time. Although available data may support the conclusion that mercury may stay in a stable, non-mobile state over the shorter term and may not migrate from a landfill environment very quickly. EPA remains concerned that landfill releases may pose threats over the long term.

Studies on the evaluation of the fate and transport of TC metals (including mercury) are still ongoing. The regulatory limit for mercury (i.e., 0.2 mg/L using the TCLP) has not changed. EPA studies have determined that the majority of hazardous waste lamps fail the TCLP for mercury and sometimes for lead. Spent lamps that exhibit any of the hazardous waste characteristics are subject to today's rulemaking.

The Agency agrees with the commenter's assertion that the main threat of mercury in the

environment may be through an air pathway and recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking, which adds hazardous waste lamps to the universal waste rule in 40 CFR Part 273, will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

Studies show that the greatest threat of mercury releases from the management of lamps is during storage and transport when uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a framework for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

The universal waste rule represents a significant cost reduction over Subtitle C management requirements for generators, collectors, and transporters, yet ensures that lamps are recycled or treated in an environmentally protective manner at Subtitle C facilities. EPA therefore expects that fewer hazardous waste lamps will be managed in the municipal solid waste stream, thereby reducing the number of lamps going to municipal combustors and decreasing the potential for lamps to be crushed and/or broken in uncontrolled environments during storage and transport (e.g., in dumpsters and garbage trucks).

DCN FLEP-00164

COMMENTS E.I. Du Pont De Nemours and Co., Inc.

SUBJECT MERC

COMMENT Data from EPA studies included in the preamble indicate that mercury does not leach in significant amounts from municipal landfills, thus presenting little or no impact on human health and the environment.

RESPONSE

The Agency does not have extensive data characterizing the behavior of mercury released from spent lamps in a landfill environment over long periods of time, although the available data suggest that mercury may stay in a stable, non-mobile state over the shorter term and may not migrate from a landfill environment very quickly. However, based on data showing mercury in municipal landfill leachate, EPA remains concerned that landfill releases may pose threats over the long term.

Studies on the evaluation of the fate and transport of TC metals (including mercury) in this context are still ongoing. These analyses include additional study of the MINTEQ model and its application for determining the fate and transport of mercury and other hazardous metals. However, because these studies are not complete, today's final rulemaking does not change the current regulatory limit for mercury (i.e., 0.2 mg/L using the TCLP) and EPA studies show that the majority of hazardous waste lamps exceed this limit.



Studies also show that the greatest threat of mercury releases from the management of lamps is due to crushing and breakage during storage and transport. Today's rule adds hazardous waste spent lamps to the universal waste rule waste regulations, in 40 CFR Part 273. The universal waste rule provides a reduced, or streamlined set of requirements (i.e., the universal waste rule is less stringent than Subtitle C management standards), but also allows the Agency to set specific management standards to control potential emissions. Uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a format for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

The Agency believes that the data and information provided to the Agency and the Agency's own studies and analyses that were conducted during the period of time since the mercury-containing lamps rulemaking was proposed provide adequate evidence of the behavior of mercury in the environment and the potential releases of mercury to the environment to support today's final rule.

DCN FLEP-00178

COMMENTS General Electric Company

SUBJECT MERC

COMMENT We are searching for ways to change -- to work better and smarter so that the Agency can deliver high quality results at a reduced cost. Our aim is to treat citizens as customers, improve the service and delivery of our programs, and eliminate waste and inefficiency. (From "Creating a U.S. Environmental Protection Agency that Works Better and Costs Less" EPA's National Performance Review, Phase I Report) It is exactly this type of approach that is needed when addressing the mercury- containing lamp issue. Merely applying old approaches to this issue will not work. Instead, any system for managing spent lamps must be based on a thorough evaluation of the risks and benefits of the use of mercury lamps and different management options and must recognize the unique characteristics of lamps. Accordingly, EPA should consider: -what the current risks are from the life-cycle use of mercury-containing lamps compared with alternative products; -how much risk reduction do different spent lamp management approaches offer; and -what the costs are of different management approaches, including economic and environmental costs.

RESPONSE

EPA appreciates the commenters commitment to improving waste management for spent lamps. The Agency published a Notice of Data Availability on July 11, 1997 (62 FR 37183). This notice presented data collected by the Agency and an assessment of potential mercury emissions from the management of spent hazardous waste lamps under several regulatory approaches. The

Agency does not have extensive data characterizing the behavior of mercury released from spent lamps in a landfill environment over long periods of time. Although available data may support the conclusion that mercury may stay in a stable, non-mobile state over the shorter term and may not migrate from a landfill environment very quickly, based on other data, EPA remains concerned that landfill releases may pose threats over the long term. In addition, studies show that the greatest threat of mercury releases from the management of lamps is during storage and transport. Uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a format for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

DCN FLEP-00228

COMMENTS STAPPA/ALAPCO

SUBJECT MERC

COMMENT Mercury contamination is now recognized as a significant environmental issue. Fish consumption advisories for mercury have been established for different species in lakes in at least 38 states across the country. Direct mercury discharges to the lakes alone are not occurring in levels high enough to cause these problems -- atmospheric deposition contributes substantially to levels of mercury found in the aquatic environment and the human food chain.

#### RESPONSE

The Agency agrees with the commenter's assertion that the main threat of mercury in the environment may be through an air pathway and recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking, which adds hazardous waste lamps to the universal waste rule in 40 CFR Part 273, will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

Studies show that the greatest threat of mercury releases from the management of lamps is during storage and transport when uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a framework for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

Simultaneously with the effort to modify the management of hazardous waste lamps, the Agency has been actively pursuing regulation of mercury air emissions from a wide variety of other sources. On December 19, 1995, EPA issued a final rule limiting emissions of mercury and other pollutants from large municipal waste combustors (60 FR 65387). Subsequently, on September 15, 1997, EPA issued a final rule setting emission limits for mercury (and other pollutants) for

medical waste incinerators (62 FR 48348) (remanded for further explanation, *Sierra Club v. EPA*, 167 F.3d 658 (D.C. Cir. 1999)). In addition, the Agency finalized a rule that sets performance standards for new municipal solid waste landfills (MSWLF) and emission guidelines for existing MSWLF (61 FR 9905; March 12, 1996). Lastly, on April 19, 1996, the Agency proposed a rule that would limit emissions of various air pollutants including mercury from hazardous waste incinerators, cement kilns, and lightweight aggregate kilns (61 FR 17358, finalized in part, 63 FR 33782 (June 19, 1998)). In the future, EPA is planning to propose two rules to address (1) air emissions from industrial and commercial waste incinerators that burn non-hazardous waste, and (2) boilers that burn hazardous waste.

DCN FLEP-00296

COMMENTS State of Ohio EPA

SUBJECT MERC

COMMENT The U.S. EPA reported that 6.51 of the mercury in a lamp could be released if the lamp is broken during collection, storage and transport in garbage trucks. This could be a threat to human health and the environment and, as pointed out by the U.S. EPA, requires further investigation. The U.S. EPA acknowledges that information on biotransformation of mercury into more toxic forms and bioaccumulation of mercury in food chains is scanty. The Ohio EPA likewise lacks such information as well as information on mercury leachate from hazardous and nonhazardous waste landfills and the levels and impacts of mercury gas from municipal solid waste landfills.

#### RESPONSE

The Agency agrees with the commenter's assertion that the main threat of mercury in the environment may be through an air pathway. and recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking, which adds hazardous waste lamps to the universal waste rule in 40 CFR Part 273, will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

The Agency does not have data characterizing the behavior of mercury in different types of landfills over long time periods, although the available data suggest that mercury may stay in a stable, non-mobile state over the shorter term and may not migrate from a landfill environment very quickly. Data available to the Agency show that mercury can be found in municipal landfill leachate, and EPA remains concerned that landfill releases may pose threats over the long term. The Agency has concluded that some management controls are essential for these wastes. Further data and analysis are necessary to evaluate the potential for mercury to be released in landfill leachate as a landfill ages.

Studies on the evaluation of the fate and transport of TC metals (including mercury) in this context are still ongoing. These analyses include additional study of the MINTEQ model and its application for determining the fate and transport of mercury and other hazardous metals. However, because these studies are not complete, today's final rulemaking does not change the current regulatory limit for mercury (i.e., 0.2 mg/L using the TCLP) and EPA studies show that the majority of hazardous waste lamps exceed this limit.

DCN FLEP-00301

COMMENTER Minnesota Pollution Control Agency/MOEA

SUBJECT MERC

COMMENT 10. Lamps are a Significant Source of Mercury Contamination.

The fundamental debate is between two contrasting perspectives on mercury. One perspective holds that mercury is a problem only if release concentrations exceed acute health standards at the local level. The second perspective, while recognizing the importance of acute health standards, holds that even after dilution in the environment, bioaccumulation reconcentrates mercury to toxic levels. We believe that total mercury releases are just as important as local release concentrations. Within this context, lamps represent a significant and expanding use of mercury that cannot be ignored or downplayed.

RESPONSE

The Agency agrees with the commenter's assertion that the main threat of mercury in the environment may be through an air pathway and recognizes the fact that mercury can bioaccumulate and biomagnify in the environment. In addition, because mercury air emissions are rapidly added to the regional or global atmospheric mercury burden, they pose a threat to human health and the environment even in remote locations. For these reasons, EPA also recognizes the need to minimize mercury air releases from all sources. The Agency believes that today's rulemaking, which adds hazardous waste lamps to the universal waste rule in 40 CFR Part 273, will minimize releases of mercury from the storage and transportation of spent hazardous waste lamps prior to recycling or disposal.

Studies show that the greatest threat of mercury releases from the management of lamps is during storage and transport when uncontrolled crushing and breaking of lamps allows mercury to be emitted into the air. The universal waste rule provides a framework for controlling the management of spent lamps during storage and transport, while at the same time providing a more streamlined and less stringent set of standards than the Subtitle C management standards.

Simultaneously with the effort to modify the management of hazardous waste lamps, the Agency has been actively pursuing regulation of mercury air emissions from a wide variety of other sources. On December 19, 1995, EPA issued a final rule limiting emissions of mercury and other pollutants from large municipal waste combustors (60 FR 65387). Subsequently, on September 15, 1997, EPA issued a final rule setting emission limits for mercury (and other pollutants) for medical waste incinerators (62 FR 48348) (remanded for further explanation, *Sierra Club v. EPA*,

167 F.3d 658 (D.C. Cir. 1999)). In addition, the Agency finalized a rule that sets performance standards for new municipal solid waste landfills (MSWLF) and emission guidelines for existing MSWLF (61 FR 9905; March 12, 1996)). Lastly, on April 19, 1996, the Agency proposed a rule that would limit emissions of various air pollutants including mercury from hazardous waste incinerators, cement kilns, and lightweight aggregate kilns (61 FR 17358, finalized in part, 63 FR 33782 (June 19, 1998)). In the future, EPA is planning to propose two rules to address (1) air emissions from industrial and commercial waste incinerators that burn non-hazardous waste, and (2) boilers that burn hazardous waste.