

US EPA ARCHIVE DOCUMENT

DCN FLEP-00015
COMMENTS USPCI
SUBJECT SRED

COMMENT Secondly, EPA reports that the mercury content of lamps was reduced by 14% from 1985 through 1990. EPA estimates that an additional reduction of 35% is estimated by 1995. This trend shows that EPA's current strategy of maintaining hazardous waste status for mercury lamps, and relying on manufacturers to reduce the hazard characteristic of the products is working over the long term. EPA lists source reduction as its most important environmental priority. Yet, the proposed exclusion for mercury lamps as hazardous waste will decrease the incentives lamp manufacturers currently possess to reduce or eliminate mercury from their products. In fact, the proposed exemption could act as an incentive to actually increase mercury content, thereby eliminating many of the gains achieved since 1985 in source reduction.

RESPONSE

The Agency is not finalizing the conditional exclusion option for the management of hazardous waste lamps. Today's final rule adds hazardous waste lamps to the universal 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. 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).

Generators of spent hazardous waste lamps are now subject to reduced regulatory requirements which provide a simple and consistent management scheme to facilitate the proper disposal or recycling of mercury-containing lamps. Universal waste destinations facilities (i.e., recycling facilities and treatment and disposal facilities) must comply with all applicable Subtitle C hazardous waste management requirements, including the permitting requirements of 40 CFR Part 270.

The Agency believes that today's final rule will encourage lamp manufacturers to continue reducing or eliminating the amount of mercury used to manufacture lamps. Because mercury-bearing lamps that fail the TCLP are still considered to be hazardous wastes under the universal waste rule, lamp producers will have an incentive to design lamps with a mercury content below the level that will cause the lamps to fail the TCLP. If lamp manufacturers aggressively pursue source reduction, the contribution of mercury to the environment from lamps will continue to decrease over time.

DCN FLEP-00056
COMMENTS International Paper Company

SUBJECT SRED

COMMENT Rather than regulating waste lamps, a much-more cost effective strategy to provide a margin of safety would be for the EPA, through pollution prevention initiatives, to work with the manufacturers of lamps to reduce the use of pollution causing substances in their products.

RESPONSE

Today's final rule adds hazardous waste lamps to the universal 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. 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 believes that today's final rule will encourage lamp manufacturers to continue reducing or eliminating the amount of mercury used to manufacture lamps. Because mercury-bearing lamps that fail the TCLP are still considered to be hazardous wastes under the universal waste rule, lamp producers will have an incentive to design lamps with a mercury content below the level that will cause the lamps to fail the TCLP. If lamp manufacturers aggressively pursue source reduction, the contribution of mercury to the environment from lamps will continue to decrease over time.

To further EPA's pollution prevention goal, EPA encourages facilities to participate in energy-efficient lighting programs such as Green Lights, which will reduce the amount of air emissions produced by electricity generation plants. The final rule provides incentives to switch to energy-efficient lighting by reducing the costs associated with managing spent lamps. The final rule does not discourage lighting manufacturers from developing low-mercury lamps since facilities will continue to demand low-toxicity lamps due to existing generator liability for releases of hazardous constituents from waste and other pressures to reduce the use of toxics.

DCN FLEP-00088

COMMENTER S.C. Johnson and Son, Inc.

SUBJECT SRED

COMMENT SC Johnson believes that the focus of managing all mercury-containing wastes should be source reduction. Technology and practice have already resulted in a 146% reduction of mercury contained in lamps for the period of 1985 to 1990. Future industry projections of mercury reductions by 1995 show additional declines by 35%. The use of mercury in alkaline batteries is following the same trend, and should be further encouraged due to their significant contribution to the mercury contamination in MSW landfills.

RESPONSE

The Agency believes that today's final rule will encourage lamp manufacturers to continue reducing or eliminating the amount of mercury used to manufacture lamps. Because mercury-bearing lamps that fail the TCLP are still considered to be hazardous wastes under the universal waste rule, lamp producers will have an incentive to design lamps with a mercury content below the level that will cause the lamps to fail the TCLP. If lamp manufacturers aggressively pursue source reduction, the contribution of mercury to the environment from lamps will continue to decrease over time.

DCN FLEP-00090

COMMENTS The Boeing Company

SUBJECT SRED

COMMENT 2. There has been good progress made by mercury lamp manufacturers in source reduction since 1985, and they project further source reduction of 35 % by 1995.

RESPONSE

The Agency agrees with the commenter and believes that today's final rule which adds waste hazardous lamps to the universal waste rule under 40 CFR Part 273, will encourage lamp manufacturers to continue reducing or eliminating the amount of mercury used to manufacture lamps. Because mercury-bearing lamps that fail the TCLP are still considered to be hazardous wastes under the universal waste rule, lamp producers will have an incentive to design lamps with a mercury content below the level that will cause the lamps to fail the TCLP. If lamp manufacturers aggressively pursue source reduction, the contribution of mercury to the environment from lamps will continue to decrease over time.

DCN FLEP-00130

COMMENTS U.S. Department of Energy

SUBJECT SRED

COMMENT II.C. Industry Source Reduction Initiatives (59 FR 38290)

EPA encourages source reduction of mercury in fluorescent lamps and requests comment on industry and other source reduction Initiatives involving the reduction of mercury in fluorescent lamps. EPA believes that source reduction is pursued aggressively by the fluorescent lamp manufacturing industry, the overall contribution of mercury from fluorescent lamps to municipal solid waste could remain constant or decrease over time even as fluorescent lamp usage increases. EPA's risk assessment (Management of Used Fluorescent Lamps: Preliminary Risk Assessment, U.S. EPA, 1993) and Economic Impact Analysis (Technical Background Document: Economic Impact Analysis for the Proposed Rule for Management of Spent Mercury-Containing Lamps, (U.S.EPA, 1994) have not evaluated the impacts of further reducing the mercury content in fluorescent lamps. Before

encouraging additional source reduction by the fluorescent lamp manufacturing industry, EPA should evaluate whether a reduction in the amount of mercury in each tube could lead to shorter bulb life and more frequent change out of bulbs and associated breakage. This could result in a net increase in the amount of mercury entering the waste stream and the environment. Reduction in the mercury content in each fluorescent lamp could also effect the economics and environmental releases associated with recycling. A change in the amount or chemical form to the mercury in the tubes could result in lowering the total amount of mercury recovered through recycling, making it uneconomical to recycle. This could increase the overall amount of mercury released to the environment. For these reasons, DOE recommends the EPA evaluate the impacts of further reduction in the mercury content of lamps before concluding that further source reduction would benefit human health and the environment.

RESPONSE

Although the Agency understands the commenter's argument that reduced levels of mercury in energy-efficient lights may result in shorter life expectancies, the Agency believes that market forces will preclude such results from being widely implemented. Increased labor costs associated with frequent re-lighting programs will reduce demand for lamps with short life expectancies and will discourage lamp manufacturers from implementing source reduction efforts that result in short lamp life.

The Agency believes that today's final rule which adds hazardous waste lamps to the universal waste rule under 40 CFR Part 273, will encourage lamp manufacturers to continue reducing or eliminating the amount of mercury used to manufacture lamps. Because mercury-bearing lamps are still considered to be hazardous wastes under the universal waste rule, lamp producers will have an incentive to design lamps with a mercury content below the level that will cause the lamps to fail the TCLP. If lamp manufacturers aggressively pursue source reduction, the contribution of mercury to the environment from lamps will continue to decrease over time.

DCN FLEP-00136

COMMENTS Wisconsin Dept. of Natural Resources

SUBJECT SRED

COMMENT Finally, in

terms of pollution prevention, we would encourage the USEPA to investigate the availability of fluorescent lighting that contains significantly lower quantities of mercury which we understand is currently available in northern Europe.

Based on our work so far, we offer the following recommendations. These are not listed in order of importance

since they are all important to the effort of reducing and eliminating mercury. 1.Reduce, and eventually eliminate where possible, mercury uses through a phased approach which carefully balances the recycling of mercury currently in use, with the elimination of mercury uses altogether. New additions of mercury must be prevented, and the recovery and recycling of mercury should be encouraged for all essential uses. Towards this goal, the sale of mercury from the U.S. government stockpile should cease. Review of the environmental implications of what are essential uses of mercury and whether this would encourage virgin mining should be analyzed. 2.Eliminate nonessential uses of mercury through the application of the federal Toxic Substances Control Act (TSCA) or through other national legislation. State examples banning such uses have already occurred in Minnesota and Wisconsin, similar bills will be introduced September 1994 in Michigan. 3.Require mandatory controls on all existing, new or modified sources which emit mercury. While pollution prevention is the method of choice to prevent mercury from entering the environment, pollution prevention alone will not accomplish virtual elimination (zero emissions of mercury. Strict standards, including mercury controls, are needed for such significant sources of mercury including electric utilities, incinerators and smelters, to facilitate our march towards zero discharge. Consideration of bioaccumulative effects of mercury should also be considered when promulgating emission standards. 4. Provide incentives that would eliminate the use of existing stocks of banned mercury-containing pesticides from use. Should incentives, or voluntary efforts not succeed, prohibitions should be considered. 5.Implement a national public education/awareness campaign focusing on pollution prevention opportunities and available alternatives related to mercury in consumer products, including labeling requirements for such products. Target audiences for the campaign could include legislators, hospital administrators, dentists and building contractors, as well as consumers. 6. Implement a national public education / awareness campaign focusing on educating the public on mercury prevention opportunities related to energy conservation. This should be coupled with a national recycling or buy- back program for fluorescent lights and switches, possibly in conjunction with the EPA Green Lights Program. Fluorescent lamps are approximately four times as efficient in converting electric

power into light than are the incandescent lamps. However, the mercury in the lamps must be recovered in order for their use to result in a net decrease in mercury released to the environment.

RESPONSE

The Agency appreciates the commenter's extensive suggestions for the implementation of a national source reduction strategy for mercury. However, many of the commenter's suggestions are beyond the scope of the current rulemaking effort for hazardous waste lamps. The Agency is investigating source reduction alternatives for mercury under other EPA efforts, including the Mercury Report to Congress and related studies and is tightening air emission regulation on a number of industrial sources as part of the Clean Air Act.

The Agency believes that today's final rule which adds hazardous waste lamps to the universal waste rule under 40 CFR Part 273, will encourage lamp manufacturers to continue reducing or eliminating the amount of mercury used to manufacture lamps. Because mercury-bearing lamps that fail the TCLP are still considered to be hazardous wastes under the universal waste rule, lamp producers will have an incentive to design lamps with a mercury content below the level that will cause the lamps to fail the TCLP. If lamp manufacturers aggressively pursue source reduction, the contribution of mercury to the environment from lamps will continue to decrease over time.

DCN FLEP-00143

COMMENTS A-TEC Energy Corporation

SUBJECT SRED

COMMENT SOURCE REDUCTION (MERCURY) Representatives from lighting manufacturers stated (Spring, 1994) at the NALMCO conference that effective, efficient lighting products can not be manufactured using current technology which will consistently pass TCLP for mercury (new technology would be required and that is years away).

DCN FLEP-00156

COMMENTS National Electrical Manufacturers Assn.

SUBJECT SRED

COMMENT VIII. COMMENTS ON SOURCE REDUCTION A. BACKGROUND ON MERCURY

CONTENT AND LAMP LIFE Many years of manufacturing experience have conclusively demonstrated to NEMA members that an insufficient level of mercury will result in the premature failure of a fluorescent lamp. This phenomenon is called "mercury starvation" within the industry. More recently, studies completed by NEMA members have clarified the mercury balance within the lamp over its life. Individual F40T12 lamps rated for 20,000 hours of life need about 10 milligrams of mercury to

ensure that the life-limiting mechanism for such lamps is electrode emission mix depletion and not mercury starvation.[29] [Footnote 29: 29 NEMA, "The Management of Spent Electric Lamps Containing Mercury". September 1994, (Enclosure 2).] Variations in the mechanical process used to insert the mercury into a fluorescent lamp generally require that the average dose level be set no lower than 15 milligrams so that the minimum in an individual lamp is no less than 10 milligrams and a foreshortened life due to insufficient mercury is avoided. From a life cycle perspective, lamps that fail prematurely due to mercury starvation result in a greater environmental burden. The level of mercury consumed per 1000 hours of burning will not appreciably change, but early replacement of a lamp that would otherwise operate for many more hours will result in a greater consumption of lamp materials, a greater consumption of energy to produce and transport the incremental lamp, and a resultant environmental burden of incremental pollutants associated with the manufacturing and transportation processes. The environment is best served ultimately by achieving the longest practical economic life cycle per milligram of mercury while at the same time minimizing all other associated releases and material consumption. Enclosure 10 is a curve that depicts the typical fluorescent lamp mortality relationship. Note that to ensure that an average given lamp population reaches an average rated life of 20,000 hours, individual lamps must be dosed with sufficient mercury to achieve a non-mercury limited life of approximately 30,000 hours. This is the basis of the current average dose for U.S. products. In Europe and Japan the rated life times of similar lamps tend to be shorter, typically between 7000 and 10000 hours. Under such a rating system the total amount of mercury per lamp can be proportionately reduced. However, other environmental burdens associated with a more frequent replacement cycle will come into play, and ultimately the same level of mercury per 1000 hours of operation will be consumed. In both the U.S. and Europe, manufacturers are embarked on research and product developments that are aimed at fundamentally reducing the rate at which mercury is consumed over life. As such efforts are successful, the industry will be in a position to further lower the dose, but always with sufficient testing to ensure that a full rated lamp life is delivered to the customer.

B. STATUS OF CURRENT INITIATIVES The

Agency has requested information on source reduction initiatives underway within the mercury-containing lamp industry. The industry, represented by NEMA manufacturers, has continued conscientiously to reduce the mercury content in fluorescent lamps. Data previously shared with Agency officials will be summarized here along with an update on progress. As described in the NEMA Report entitled "The Management of Spent electric lamps Containing Mercury" (Enclosure 2), the industry elected to initiate aggressive source reductions by first concentrating on the highest volume, most popular lamp types. These include the most prevalent four foot rapid start types, both T-12 and T-8 diameters. Projections by the industry several years ago indicated that the following reductions would occur for the highest volume four foot T-12 types: [See hard copy of comment number FLEP-00156 for table of projected mercury content.] As can be seen from the above figures, the industry projects a greater than 58.5 percent reduction in high volume four foot T-12 types by the year 2000. A very recent update by NEMA manufacturers indicates that the actual achieved reductions are ahead of the projected timing. By the end of this year, NEMA manufacturers estimate that the average mercury fill will be 23 milligrams, a reduction of almost 53 percent from the base year 1985. [30] [Footnote 30:30 NEMA, "The Management of Spent Electric Lamps Containing Mercury", September 1994(Enclosure 2).] Additionally the trend toward state of the art reduction techniques will put the average levels closer to 15 milligrams for the fastest, newest, highest volume production lines. The Agency is aware through its Green Lights Program that many locations are changing out T-12 lamp types and group relamping with T-8 types. Since the trend to T-8 generally results in those types being produced on the most modern equipment available, the average mercury fill for this fast growing segment of the lamp industry is already converging on 15 milligrams. To put the impact of this progress in reducing mercury into perspective, one need only consider the volume of the products targeted. NEMA data for 1992 show that linear T-12 rapid start types (four foot T-12 category) accounted for 53.7 percent of the 515,000,000 fluorescent lamps shipped by NEMA manufacturers. In current year terms, this results in a 7.7 ton reduction in mercury when compared to the 1985 base year.

C. FUTURE INITIATIVES Major manufacturers have development programs underway to permit future dose reductions potentially

beyond 15 milligrams, but, as has already been discussed, such reductions will need to be carefully designed so that rated life and life cycle implications are not sacrificed. Data already presented in the NEMA Report entitled "Mercury Content of Residues From Lamp Reclamation", (Enclosure 4) demonstrates that for fluorescent lamp mercury doses to decrease below an average of 15 milligrams, products will need to be redesigned to fundamentally reduce the rate of consumption by the glass and phosphor over life. It may be possible to reduce the average dose to approximately one half of today's state-of-the-art 15 milligrams, but only by adding additional internal barrier coatings, or alternatively, altering the fundamental phosphor and glass compositions. Such investigations are underway by major mercury lamp manufacturers, but practical products that yield equivalent full rated life are not yet available. In its proposal, the Agency requests comment on "lightweighting" and its potential impact. This is not a term generally applicable to the lighting industry. Although the shift to T-8 technology results in a smaller diameter and, therefore, "lighter" lamp for a standard length when compared with a T- 12 lamp, the primary motivation to reduce the diameter was to design more efficient lamp, ballast, and fixture systems. There is no real evidence to suggest that the mercury consumption rate for a T-8 lamp is significantly different than T- 12 lamps of equal rated life. In fact, it is entirely possible to have a smaller diameter, "lighter" weight lamp operated in such a manner so as to require more than the average amount of mercury.

D. ALTERNATE MATERIALS

Experiments have shown that discharge lamps can be made using elements other than mercury. Many of these elements are problematic for the environment, such as cadmium. To date, all research has discovered that every alternative considered is significantly less efficient in producing ultraviolet light than mercury. This means that a lamp without mercury would consume significantly more energy in order to produce the required light levels for lighting applications. Pushing additional energy consumption and its attendant pollutants back toward the electric utility system would not be a good trade-off. Currently, NEMA member research indicates that mercury-free fluorescent lamps would be, at best, 40 percent as efficient as mercury-containing fluorescents, probably lower. This would at least double power plant emissions as well as hasten the

depletion of resources. In addition, utilities would need to invest billions of dollars to site and construct new power plants. Light levels could not be reduced 60 percent to compensate, since reductions that have occurred since the 1970's have already pushed illumination levels to their practical lower limits for human performance and productivity. Although major manufacturers and some universities have active research programs in alternative materials, NEMA contends that the evidence strongly indicates that for the foreseeable future, fluorescent lamps will contain a small amount of mercury. Some research has indicated that it might be easier to replace mercury in lamp types that operate at higher pressures and at higher wattages, but such systems currently require special fixtures, very costly and unique ballasting components, and are most suited for very high ceiling applications. Retrofitting a typical commercial office building with such a system would be very unpractical. In addition, the overall light delivery efficiency would still be significantly less than current fluorescent systems since most commercial indoor space is lit at relatively low (8-12 foot) ceiling heights.

E. OTHER LAMP TYPES

Compact fluorescent lamps (CFLs) represent a fast growing segment within the fluorescent category. Typical mercury levels already average between 5 and 15 milligrams due to the shorter life times (8,000 to 10,000 hours) when compared with the 20,000 hour high volume linear fluorescent lamp types. Additional efforts are expected to generally converge on an average in the vicinity of 5 milligrams for many CFLs. High Intensity Discharge (HID) lamp types also use mercury to produce ultraviolet light. The physics and chemistry of high pressure discharge lamps are significantly different from low pressure fluorescent lamps. HID lamps do not consume mercury over life; the mercury dose is precisely determined to maintain the lamp arc voltage required to ensure electrical compatibility with the ballast system. This means that there is essentially no further opportunity for a dose reduction effort that would be analogous to the source reduction that has occurred for fluorescent lamps. This is not a serious issue since HID lamp volume is small when compared with fluorescent lamps. NEMA data for 1992 place the total NEMA HID volume at only 4 percent when compared to the fluorescent volume in the same year [31] [Footnote 31:31 NEMA, "The Management of Spent Electric Lamps Containing Mercury", September 1994 (Enclosure 2).] Other fluorescent lamp types are a next logical

step once continued reduction in the high volume linear fluorescent types has plateaued. Some lamp types in this "other" category have shorter life and could conceivably result in significant reductions. Others operate under very highly loaded ultraviolet conditions (such as 800 milliamperes, 1500 milliamperes designs) and will require levels of mercury that exceed 15 milligrams to ensure that mercury starvation does not shorten average life. Major manufacturers have prioritized these other fluorescent categories to be addressed after the highest volume types have achieved their targeted objectives. Industry source reduction efforts have delivered impressive results. Alternative materials do not offer much opportunity in the near term to make additional reductions. It is likely that the pace of reduction below 15 milligrams for high volume linear fluorescent types will become less dramatic simply because further reductions must await the investigation of mercury loss mechanisms over the full life cycle of the lamp. Over time the mercury reduction effort will shift to other fluorescent types. Overall, NEMA believes that the voluntary reduction effort has proven extremely successful and is a model for other industries.

RESPONSE

The Agency appreciates the information submitted by the commenter on source reductions efforts undertaken by the lighting industry. The Agency appreciates that further reductions in the amount of mercury necessary in lamp manufacturing may have implications in terms of lamp failure and the expectant life time of lamps.

Although the Agency understands the commenter's argument that reduced levels of mercury in energy-efficient lights may result in shorter life expectancies, the Agency believes that market forces will preclude such results from being widely implemented. Increased labor costs associated with frequent re-lighting programs are expected to reduce demand for lamps with short life expectancies and discourage lamp manufacturers from implementing source reduction efforts that result in short lamp life.

The Agency believes that today's final rule will encourage lamp manufacturers to continue reducing or eliminating the amount of mercury used to manufacture lamps. Because mercury-bearing lamps that fail the TCLP are still considered to be hazardous wastes under the universal waste rule, lamp producers will have an incentive to design lamps with a mercury content below the level that will cause the lamps to fail the TCLP. If lamp manufacturers aggressively pursue source reduction, the contribution of mercury to the environment from lamps will continue to decrease over time.

DCN FLEP-00177

COMMENTS Philps Lighting Company

SUBJECT SRED

COMMENT Mercury containing lamps are the environmental light source of choice. This is demonstrated by the EPA's Greenlights program, a program that would be considerably strengthened by removal of the hazardous waste stigma from these environmentally friendly products. By EPA's own estimates large quantities of greenhouse emissions including would be removed from the environment if the program was more aggressively implemented. The U.S. lighting industry has made a positive commitment to reduce the amount of mercury used in fluorescent lamps to the minimum allowed by current technology. We are proud of the nearly 53% reduction in mercury usage since 1985, in our largest volume product.

RESPONSE

Today's final rule adds hazardous waste lamps to the universal 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. 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).

By reducing the regulatory requirements imposed upon generators and collectors of spent lamps, today's final rule minimizes concerns about decreased participation in energy efficient lighting programs such as EPA's Green Lights Program. Management costs are lower under the universal waste rule since handlers are subject to reduced requirements and hazardous waste transporters and the use of the hazardous waste manifest is not required for off-site shipments of universal waste lamps.

In addition, the universal waste approach may reduce the volumes of spent lamps managed in the municipal waste stream by making the collection of spent lamps for management within the Subtitle C system more economical. If a greater quantity of spent lamps are managed outside of the municipal waste stream, the potential for lamps to be managed at municipal waste combustors decreases, thus reducing a potentially significant source of mercury emissions.

The Agency believes that today's final rule will encourage lamp manufacturers to continue reducing or eliminating the amount of mercury used to manufacture lamps. Because mercury-bearing lamps that fail the TCLP are still considered to be hazardous wastes under the universal waste rule, lamp producers will have an incentive to design lamps with a mercury content below the level that will cause the lamps to fail the TCLP. If lamp manufacturers aggressively pursue source reduction, the contribution of mercury to the environment from lamps will continue to decrease over time.

DCN FLEP-00178

COMMENTS General Electric Company

SUBJECT SRED

COMMENT Under this type of evaluation it is important to recognize the beneficial characteristics of mercury containing lamps. Mercury containing lamps are an integral part of efforts to reduce domestic energy demand. They are a fundamental source reduction strategy. By reducing energy demand, mercury containing lamps reduce the contribution of mercury and other pollutants, such as sulfur dioxide, carbon dioxide, and nitrogen oxides to the environment from power plants.

RESPONSE

The Agency agrees with the commenter that the use of energy efficient lighting contributes to pollution source reduction by decreasing power plant emissions.

DCN FLEP-00179

COMMENTS Environmental Defense Fund

SUBJECT SRED

COMMENT Mercury-Containing Lamp Issues: There are two strategies for reducing mercury entering the environment from fluorescent lamp use: source reduction and environmentally-sound recycling with mercury recover/reuse. Both of these approaches should be used with mercury-containing fluorescent lamps and High Intensity Discharge lamps. Since fluorescent lamps represent the highest efficiency converters of electricity to light, their share of the lighting market is likely to continue to increase; the recent successful mass introduction of compact fluorescent lamps with electronic ballasts is in accord with these expectations.

RESPONSE

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. Second in 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 and less costly 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 ultimately be treated and disposed or recycled in accordance with RCRA Subtitle C hazardous waste management requirements. This provides 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 will decrease over time.

DCN FLEP-00179

COMMENTER Environmental Defense Fund

SUBJECT SRED

COMMENT Source reduction by the fluorescent lamp industry in the form of improved manufacturing, primarily the better control of the mercury fill, [7] [Footnote 7: R. Clear and S. Berman, "Environmental and Health Aspects of Lighting: Mercury," Journal of the Illuminating Engineering Society, volume 23, Number 4, pp. 138-156, Summer 1994.] has reduced the mercury content of these lamps to near their technology limit. Based upon present knowledge, it is not possible to reduce the mercury content of long-life high-efficiency fluorescent lamps below approximately 20 mg/4-foot lamp. Industry's goal is to reach the 20 mg/4-foot lamp goal by the year 2000. [8] [Footnote 8: "The Management of Spent Electric Lamps Containing Mercury," Second Edition, National Electrical Manufacturers Association, Washington, DC, September 1994, p. 6.]

RESPONSE

The Agency believes that today's final rule will encourage lamp manufacturers to continue reducing or eliminating the amount of mercury used to manufacture lamps. Because mercury-bearing lamps that fail the TCLP are still considered to be hazardous wastes under the universal waste rule, lamp producers will have an incentive to design lamps with a mercury content below the level that will cause the lamps to fail the TCLP. If lamp manufacturers aggressively pursue source reduction, the contribution of mercury to the environment from lamps will continue to decrease over time.

DCN FLEP-00195

COMMENTER South Carolina Electric and Gas Company

SUBJECT SRED

COMMENT South Carolina Electric & Gas Company (SCE&G) supports and encourages source reduction initiatives concerning disposal of spent lamps containing mercury. We appreciate this opportunity to comment on the EPA's 7/27/94 proposed rule.

RESPONSE

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. Second in 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 and less costly 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. The Agency believes that today's final rule will encourage lamp manufacturers to continue reducing or eliminating the amount of mercury used to manufacture lamps. Because mercury-bearing lamps that fail the TCLP are still considered to be hazardous wastes under the universal waste rule, lamp producers will have an incentive to design lamps with a mercury content below the level that will cause the lamps to fail the TCLP. If lamp manufacturers aggressively pursue source reduction, the contribution of mercury to the environment from lamps will continue to decrease over time.

DCN FLEP-00228

COMMENTS STAPPA/ALAPCO

SUBJECT SRED

COMMENT Promoting Recycling and Pollution Prevention

We believe that, in the future, mercury should be phased out of use in lamps altogether, eliminating the need for any hazardous waste management provisions for lamps. Inclusion of fluorescent lamps in the UWR would provide more incentives for the lamp industry to continue to seek to reduce mercury in lamps to achieve this goal.

RESPONSE

The Agency agrees that including hazardous waste lamps in the universal waste program provide an incentive to continue to reduce mercury used in the lamps. Today's final rule, which retains requirements for hazardous waste lamps to ultimately be treated and disposed or recycled in accordance with the Subtitle C hazardous waste management requirements, provides 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 the environment should decrease over time.

DCN FLEP-00282

COMMENTS Michigan Dept. of Natural Resources

SUBJECT SRED

COMMENT Pollution Prevention and Recycling Pollution prevention is the method of choice for preventing mercury from being released.

Lamp manufacturers have produced fluorescent lamps that are now being used in Sweden that contain only three mg of mercury. We believe EPA should require lamp manufacturers to continue to phase out the use of mercury in lamps and to push towards "mercury-free" fluorescent lamps. In the interim, mercury containing lamps must continue to be managed in an

environmentally acceptable manner and the mercury from these lights should be reclaimed and recycled to prevent further environmental contamination.

RESPONSE

Today's final rule, which adds hazardous waste lamps to the universal waste rule under 40 CFR Part 273, retains requirements for hazardous waste lamps to ultimately be treated and disposed or recycled in accordance with the Subtitle C hazardous waste management requirements. The Agency believes that today's rule provides 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 the environment will decrease over time.

The Agency believes that less complex and less costly regulations will increase the collection of universal wastes. 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. In addition, as the demand for lamp recycling grows, recycling would become more cost competitive with Subtitle C landfilling. The EPA believes that increased recycling capacity and continued improvements in technologies would push recycling fees lower.

DCN FLEP-00282

COMMENTER Michigan Dept. of Natural Resources

SUBJECT SRED

COMMENT We urge EPA to build in an incentive to encourage lamp manufacturers to manufacture lamps with only three mg of mercury or less. After five to ten years, EPA could re-evaluate the regulations for lamps and other mercury-containing products. If lamp manufacturers continue to reduce the lamps to contain only three mg of mercury or less and these low mercury containing lamps were widely used the conditional exemption option could then be considered as the logical management option.

RESPONSE

Today's final rule, which adds hazardous waste lamps to the universal waste rule under 40 CFR Part 273, retains requirements for hazardous waste lamps to ultimately be treated and disposed or recycled in accordance with the Subtitle C hazardous waste management requirements. The Agency believes that today's rule provides 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 the environment will decrease over time.

The Agency is not including a sunset provision with today's final rule. 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 hazardous waste 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-00296

COMMENTS State of Ohio EPA

SUBJECT SRED

COMMENT In the Federal Register, the U.S. EPA states that aggressive source reduction of mercury by lamp manufacturers will reduce the quantity of mercury disposed of in municipal solid waste landfills. There would not appear to be a strong incentive for lamp manufacturers to reduce the amount of mercury in their products if recycling or hazardous waste requirements are not mandated, especially considering source reduction is voluntary.

RESPONSE

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

The Agency believes that today's final rule will encourage lamp manufacturers to continue reducing or eliminating the amount of mercury used to manufacture lamps. Because mercury-bearing lamps that fail the TCLP are hazardous wastes under the universal waste rule, lamp producers will have an incentive to design lamps with a mercury content below the level that will cause the lamps to fail the TCLP. If lamp manufacturers aggressively pursue source reduction, the contribution of mercury to the environment from lamps will continue to decrease over time.

DCN FLEP-00296

COMMENTS State of Ohio EPA

SUBJECT SRED

COMMENT Source reduction - By allowing disposal of lamps at a Subtitle D landfill, the conditional exclusion is counter to source reduction. The Ohio EPA has sufficient information to show that there is a viable market for recycling fluorescent lamps (see attached list of fluorescent/ballast lamp recyclers). Treatment

and disposal rank low on the source reduction hierarchy.

RESPONSE

Today's final rule adds hazardous waste lamps to the universal 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. 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). In today's rule, the Agency is not finalizing the conditional exclusion option for the management of hazardous waste lamps.

The Agency believes that less complex and less costly regulations will increase the collection of universal wastes. 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. In addition, as the demand for lamp recycling grows, recycling would become more cost competitive with Subtitle C landfilling. The EPA believes that increased recycling capacity and continued improvements in technologies would push recycling fees lower.

The Agency believes that today's final rule will encourage lamp manufacturers to continue reducing or eliminating the amount of mercury used to manufacture lamps. Because mercury-bearing lamps that fail the TCLP are hazardous wastes under the universal waste rule, lamp producers will have an incentive to design lamps with a mercury content below the level that will cause the lamps to fail the TCLP. If lamp manufacturers aggressively pursue source reduction, the contribution of mercury to the environment from lamps will continue to decrease over time.

DCN FLEP-00229

COMMENTER Global Recycling Technologies, Inc.

SUBJECT SRED

COMMENT MERCURY CONTENT IN LAMPS The average mercury content per fluorescent lamp disposed today is approximately 41.6 mg [6].
[Footnote 6: "The Management of Spent Fluorescent Lamps Containing Mercury", NEMA, September 1994. Page 6, Table 1.]
Although NEMA has agreed to source reduction goals of 27.0 mg by 1995, and appears to be on schedule, the 5 year life cycle of lamps will yield a reduced mercury lamp ready for disposal sometime around the year 2000. It should be noted that the annually increasing volume of lamps sold may offset the source reduction.

RESPONSE

The Agency believes that today's final rule will encourage lamp manufacturers to continue reducing or eliminating the amount of mercury used to manufacture lamps. Because mercury-bearing lamps that fail the TCLP are hazardous wastes under the universal waste rule, lamp

producers will have an incentive to design lamps with a mercury content below the level that will cause the lamps to fail the TCLP. If lamp manufacturers aggressively pursue source reduction, the contribution of mercury to the environment from lamps will continue to decrease over time.

DCN SCSP-00118

COMMENTS Robert M. Quintal

SUBJECT SRED

COMMENT LAMP MANUFACTURER INITIATIVES

Source reduction by the lamp

manufacturers is helpful, but yields a net negative impact. Lamp life and efficiency are dependent on the amount of mercury in the lamp. Therefore, source reduction comes at the expense of lamp life and efficiency. NEMA, on behalf of the lamp manufacturers, has proposed legislation which would amend RCRA.

[5] [Reference 5: "The Management of Spent Electric Lamps Containing Mercury" - NEMA, July 1992.] The NEMA position would prohibit incineration of spent mercury containing lamps within 12 months after enactment. NEMA also suggested to the EPA a proposed regulatory solution which closely parallels the legislative proposal.

RESPONSE

Although the Agency understands the commenter's argument that reduced levels of mercury in energy-efficient lights may result in shorter life expectancies, the Agency believes that market forces will preclude such results from being widely implemented. Increased labor costs associated with frequent re-lighting programs will reduce demand for lamps with short life expectancies and will discourage lamp manufacturers from implementing source reduction efforts that result in short lamp life.

The Agency believes that today's final rule will encourage lamp manufacturers to continue reducing or eliminating the amount of mercury used to manufacture lamps. Because mercury-bearing lamps that fail the TCLP are hazardous wastes under the universal waste rule, lamp producers will have an incentive to design lamps with a mercury content below the level that will cause the lamps to fail the TCLP. If lamp manufacturers aggressively pursue source reduction, the contribution of mercury to the environment from lamps will continue to decrease over time.

DCN SCSP-00022

COMMENTS MRT System

SUBJECT SRED

COMMENT NEMA has also declared their intention to

mercury in lamps with to goal to reach 27.0 mg by 1995 in a 4ft 1 2" dia. lamp. But this will certainly not be enough and we strongly believe that all sources of mercury pollution should be

targeted in parallel. Another concern is, of course, that tubes with a much higher content will remain on the market for several years to come.

RESPONSE

The Agency believes that today's final rule will encourage lamp manufacturers to continue reducing or eliminating the amount of mercury used to manufacture lamps. Because mercury-bearing lamps that fail the TCLP are hazardous wastes under the universal waste rule, lamp producers will have an incentive to design lamps with a mercury content below the level that will cause the lamps to fail the TCLP. If lamp manufacturers aggressively pursue source reduction, the contribution of mercury to the environment from lamps will continue to decrease over time.

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).

DCN SCSP-00137

COMMENTS Utility Solid Waste Activities Group

SUBJECT SRED

COMMENT The forfeiture of pollution prevention benefits from this isolated example are significant. Specifically, the public would forego annual emissions savings from this single company of approximately 0.5 tons of SO₂, five tons of NO_x, and 140 tons of CO₂. Id. The amount of forfeitures in emission savings from coal-fired electric utilities are even more dramatic. For example, one coal-fired utility estimates that a comparable 35% reduction in units qualifying for Green Lights would result in forfeiting annual emissions savings of 8.7 tons of SO₂, 3.7 tons of NO_x, and 1,013 tons of CO₂. See Attachment G. [See hard copy of Comment SCSP-00137 for Attachments]. Obviously these losses are even more significant when the cumulative emission savings forfeited by the entire electric industry are taken into account.

RESPONSE

By reducing the regulatory requirements imposed upon generators and collectors of spent lamps, today's final rule minimizes concerns about decreased participation in energy efficient lighting programs such as EPA's Green Lights Program. Management costs are lower under the universal waste rule since handlers are subject to reduced requirements and hazardous waste transporters and the use of the hazardous waste manifest is not required for off-site shipments of universal waste lamps.

In addition, the universal waste approach may reduce the volumes of spent lamps managed in the municipal waste stream by making the collection of spent lamps for management within the Subtitle C system more economical. If a greater quantity of spent lamps are managed outside of the municipal waste stream, the potential for lamps to be managed at municipal waste combustors decreases, thus reducing a potentially significant source of mercury emissions as well as reducing the emission of other metals and contaminants.

DCN SCSP-00186

COMMENTER Nine West Technologies, Inc.

SUBJECT SRED

COMMENT These energy savings will result in reductions in the amount of mercury which would otherwise be released into the atmosphere when fuel is burned to melt virgin glass or aluminum.

RESPONSE

By reducing the regulatory requirements imposed upon generators and collectors of spent lamps, today's final rule minimizes concerns about decreased participation in energy efficient lighting programs such as EPA's Green Lights Program. Management costs are lower under the universal waste rule since handlers are subject to reduced requirements and hazardous waste transporters and the use of the hazardous waste manifest is not required for off-site shipments of universal waste lamps.

Today's final rule, which adds hazardous waste lamps to the universal waste rule under 40 CFR Part 273, retains requirements for hazardous waste lamps to ultimately be treated and disposed or recycled in accordance with the Subtitle C hazardous waste management requirements. The Agency believes that today's rule provides 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 the environment will decrease over time.

DCN FLEP-00281

COMMENTER Michigan Dept. of Natural Resources

SUBJECT SRED

COMMENT Industry information also indicates that over the last 10 years the amount of mercury in lamps has been reduced by at least half and continues to drop. This seems to contradict the claim that this is a problem which will continue to grow. It is also our understanding that while the Europeans are using some low mercury lamps, the lamps have a much shorter life which results in the use of more low level lamps as opposed to fewer higher level lamps.

RESPONSE

Today's final rule, which adds hazardous waste lamps to the universal waste rule under 40 CFR Part 273, retains requirements for hazardous waste lamps to ultimately be treated and disposed or recycled in accordance with the Subtitle C hazardous waste management requirements. The Agency believes that today's rule provides 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 the environment will decrease over time.

Although the Agency understands the commenter's argument that reduced levels of mercury in energy-efficient lights may result in shorter life expectancies, the Agency believes that market forces will preclude such results from being widely implemented. Increased labor costs associated with frequent re-lighting programs will likely reduce demand for lamps with short life expectancies and will discourage lamp manufacturers from implementing source reduction efforts that result in short lamp life.