Responsible Use of Mercury-Containing Lamps in Entertainment Lighting: A Position Paper

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Mercury is a component vital for the operation of many lamps used in the entertainment industry, but it is also a toxic element that should be carefully managed to avoid environmental pollution. Model legislation has been promoted to eliminate mercury from products, to encourage product recycling, and to minimize mercury releases into the air and water. This position paper offers critiques of these legislative proposals and offers practical alternatives for achieving the environmental goals while preserving the benefits of mercury-containing lamps for the entertainment lighting industry and the environment.

Legislative Proposals

Model legislation has been offered that attempts to eliminate mercury from the waste stream with four main requirements that apply to lamps used in entertainment lighting:

I Mandating reductions in mercury content

Model legislation would require reductions in the amount of mercury used in lamps in three steps. The first step would eliminate products containing more than 1 gram of mercury. The second step would eliminate products containing more than 100 milligrams of mercury. The final step would eliminate products containing more than 10 milligrams. Exemptions would be available for various reasons, but are not guaranteed, and would be for a limited time-period of no longer than two years.

Problems with this approach

A. Mercury-containing lamps are essential for many entertainment lighting applications. Mercury-containing metal halide lamps are used because of their small source size, high output with minimal power input, high color temperature, and high color rendering. Mercury-containing fluorescent lamps are used because of their large source size (which produces soft shadows) low power consumption, and low heat production. Mercury-containing ultraviolet lamps are used for black-light effects.

   There are currently no non-mercury or reduced mercury lamps that are practical substitutes for high-output, high color rendering lamps or for ultraviolet lamps – and nothing is on the development horizon. No other lamp technology available now or in development offers the same photometric performance. Elimination of mercury-

containing lamps will adversely effect the following by either making the lighting for them impossible or impractical or by vastly increasing the power consumption:

- Television studio lighting
- Motion picture studio lighting
- On-location film production
- Night-time broadcast of sporting events
- On-site news reporting
- Rock concerts
- Night clubs
- Stage productions
- Church pageants
- Amusement park attractions

B. Two-year exemptions are not exemptions at all for practical purposes. No manufacturer will develop or support a product line that may only have a life of two years. No user will invest in lighting equipment for which replacement lamps may not be available.

C. Eliminating mercury-containing lamps will make a huge, industry-wide investment in luminaires prematurely obsolete. Non-mercury lamps generally cannot be substituted for mercury-containing ones in luminaires. If mercury-containing lamps are removed from the market, the luminaires will become unusable. These luminaires range in cost from several hundred dollars to several thousand dollars. The loss to individual lighting companies will run from hundreds of thousands of dollars into the millions. Manufacturers will have to redesign entire luminaire product lines and retool at enormous expense.

D. Switching to luminaires that use incandescent lamps rather than mercury-containing lamps, if this can be done, will

1. increase power consumption three to twelve times. Incandescent lamps consume far more power than mercury-containing lamps to produce the same amount of light. It takes a 2,000 watt incandescent lamp to equal the light output of a 575 watt metal halide lamp. If the incandescent lamp must produce light that is the same color, a blue filter will have to be used, which loses 75% of the light. A 2,000 watt incandescent lamp isn't enough then; 8,000 watts will be needed – and all to duplicate the output of a 575 watt metal halide lamp.

2. increase emissions of particulates and greenhouse gases from power plants due to the increased power required.

3. increase the amount of mercury released into the environment. Power plant emissions are by far the largest source of mercury in the environment. Coal, America's most abundant fuel, contains mercury. When it is burned, mercury

goes up the smokestack into the air and then rains down on the countryside. More than 2 milligrams of mercury are released for every thousand lumens produced per hour using incandescent lamp technology. Less than 0.5 milligrams are released with metal halide technology.

II Requiring lamp labeling

Model legislation would require manufacturers to label lamps for each jurisdiction in which they are sold regarding their mercury content and disposal requirements. The intent is to encourage people to use lamps with little or no mercury and to inform the user of disposal requirements.

Problems with this approach

A. This will encourage users to avoid luminaires that use fluorescent and HID lamps and encourage them to purchase ones using incandescent lamps. However, mercury containing fluorescent and HID lamps are three to four times more energy efficient than incandescent lamps. The negative message of a mercury label will discourage use of energy-efficient products.

1. Use of energy-efficient lamps reduces power plant emissions of carbon dioxide that causes global warming, nitrogen oxides that form smog, sulfur dioxide that produces acid rain, and soot.

2. Use of energy-efficient mercury containing lamps over less efficient incandescent lamps reduces mercury emissions from power plants, actually reducing net emissions of mercury into the environment.

B. Labels will not effectively inform end-users about proper disposal methods.

1. Laws about waste disposal and recycling, plus the services that are available for disposal or recycling, vary locally. No blanket statements can be made by a lamp manufacturer about what must or can be done in any locality.

2. Any attempt to send specially marked lamps to one state would significantly increase inventory and transportation costs since everyone involved in the distribution chain would have to maintain multiple types of lamps for different states.

3. Production equipment used to manufacture and label lamps is not capable of meeting unique, state-by-state, informational labeling requirements.

4. The necessary monogram, marketing information, model code text, and Federal Energy Policy Act labeling already consume most of the possible labeling space on lamps.

III Requiring manufacturer take-back of used lamps

Model legislation would require manufacturers to use their distribution network to take back used lamps for disposal or recycling.

Problems with this approach

A. In both Europe and in the United States, third-party recycling networks have developed to recycle lamps. These independent third-party recycling networks allow businesses or governments to contract with one of several recycling companies. These systems are in place and have been demonstrated to work for lamp recycling.

   1. Businesses and governments buy lamps from several different lamp sources, but third-party recycling allows for one pick-up, regardless of the original source, which encourages recycling.

   2. Businesses and governments contracting directly with third-party recyclers for lamp recycling needs allows them to get bids from more than one recycler, assuring that they are receiving lamp recycling services at the most economical rate. Competition encourages efficiency improvements, which result in lower recycling costs.

   3. Laws governing the transportation of waste are usually different from the regulations governing the transportation of new products. Trucks from distributors of new products may not be able to transport waste in the reverse direction.

B. Lamp manufacturers are lamp <u>manufacturers</u>.

   1. Lamp manufacturers are not particularly skilled in waste collection and processing.

   2. Lamp manufacturers could subcontract the waste collection and processing work to specialist firms, but this would add a layer of administrative overhead and increase the cost of recycling.

IV Requiring reporting mercury content to state agencies

Model legislation would require manufacturers to notify state agencies of the mercury content of each mercury-containing lamp sold in the state. Some legislation also would require manufacturers to report the mercury content in all their products, including those sold out of the state.

Problems with this approach

This requirement is an attempt to discourage the sale of mercury-containing products by putting a costly, pointless paperwork burden on manufacturers, which will be passed on to consumers in the form of higher prices. Some lamp types simply are not possible without mercury, and lamps that do not contain mercury use more power to create light less effectively.

ESTA's Environmentally Responsible Alternative

Mercury-containing lamps are vital to the entertainment industry. Mercury-containing metal halide lamps are the light sources for most automated luminaires and for many studio luminaires and some stage lighting instruments. Metal halide lamps are used in automated luminaires because of their high output per watt consumed and their small light source size, and are used in stage and studio luminaires because of their high output and daylight-like color. Metal halide sources are also the primary sources used for creating ultra-violet light for black light effects. Fluorescent lamps are also important to the entertainment lighting industry because they produce a large quantity of relatively shadowless light while using a small amount of power.

The use of energy-saving mercury-containing lamps should be encouraged as a way to reduce environmental pollution. The vast majority of mercury pollution comes from burning fossil fuels to generate power; reduced fuel burning more than compensates for the mercury used in lamps. Reduced power consumption also reduces the amount of greenhouse gases, nitrogen oxides, sulfur dioxide, and soot released into the air.

The risk to the environment from the mercury contained in lamps can be mitigated by effective product stewardship. Product stewardship can be encouraged by states adopting the U. S. Environmental Protection Agency's Universal Waste Rule. ESTA, therefore, encourages:

I. Product Stewardship

Product stewardship programs should be developed and used by all users and distributors of mercury-containing lamps. Product stewardship programs would

A. train people to appropriately contain and clean spills from broken lamps, and

B. train people to appropriately dispose of spent lamps.

ESTA has models for developing mercury-containing lamp product stewardship programs available on its website at http://www.esta.org/mercury/.

II. Uniform package labeling for all NAFTA markets

Uniform package labeling noting mercury content will help lamp distributors and users identify mercury-containing lamps and implement product stewardship programs effectively. Uniform labeling for all NAFTA markets will not burden lamp manufacturers with special labeling for each separate governmental jurisdiction.

III. Adoption of the EPA's Universal Waste Rule by states

The Universal Waste Rule has universal appeal because it

A. eases regulatory burdens on businesses,

B. promotes proper recycling or disposal of hazardous waste lamps, as well as batteries, pesticides, and thermostats, which will reduce the amount of hazardous waste items in the municipal solid waste stream, and

C. provides for a variety of collection options for communities and businesses.