Fluorescent Lamp Risks & Recycling

"Under an EPA rule, which became effective January 6, 2000, commercially used mercury-containing fluorescent, mercury vapor, sodium vapor, and metal halide lamps can be treated as 'universal waste' if destined for recycling. The rule falls under the Universal Waste Regulations *(see below),* which are designed to encourage recycling of wastes, that if disposed of, would be classified as hazardous waste. Universal wastes can be transported and disposed of without special precautions as long as they are recycled."

Below are some interesting statistics you should consider:

- "In America, one-in-six children born every year have been exposed to mercury levels so high that they are potentially at risk for learning disabilities, motor skill impairment and short-term memory loss.
- The Mercury from one fluorescent bulb can pollute 6,000 gallons of water beyond safe levels for drinking.
- 100 four-foot long fluorescent lamps contain about 4 grams of mercury. It only takes 1 teaspoon of mercury (68 grams) to contaminate a 20-acre lake **FOREVER**.
- In 1992, mercury-containing lamps were added to the United States' Environmental Protection Agency's (EPA) list of hazardous substances. (The EPA's regulatory threshold of two mg. /liter is usually exceeded by mercury-containing lamps).
- Mercury was number three on the 1997 list of hazardous substances as outlined by the Agency for Toxic Substances and Disease Registry (ATSDR) and the EPA.
- **Each year, an estimated 600 million fluorescent lamps are disposed of in U.S. landfills amounting to 30,000 pounds of mercury waste.**
- The Environmental Protection Agency reports that 187 incinerators nationwide emit approximately 70,000 total pounds of mercury into the environment each year.
- In the states of California, Minnesota, Ohio, Illinois, Indiana, Michigan, and Wisconsin, it is unlawful for anyone to dispose of fluorescent bulbs as universal waste."

"70.8% of the mercury-lamps used by business and 98% of the lamps used in homes are not being recycled."

Example: If a fluorescent lamp is thrown into your waste stream, picked up by a waste provider, the mercury potentially may be released into the atmosphere from landfill vapor or leachate. It is highly probable, the mercury will vaporize if the trash is incinerated. Consider where your vendor dumps your trash load. If mercury is flushed through a city wastewater system, the mercury will likely stick to the wastewater sludge, where it has the potential to become unstable, and be deposited elsewhere.

Mercury has the tenacity to enter the atmosphere through various means, because it disperses effortlessly, as it travels in a vaporized state through the atmosphere. Once mercury is deposited into lakes and streams, bacteria convert some of the mercury into an organic form called methylmercury. (*This is the form of mercury that humans and other animals ingest when they eat some types of fish.)* Methylmercury is particularly dangerous because it bio-accumulates ("*enters the organism through respiration, food intake, epidermal (skin) contact with the substance, and/or other means. The sequestering results in the organism having a higher concentration of the substance than the concentration in the organism's surroundings")* in your environment. Bio-accumulation occurs when the methylmercury in fish tissue which concentrates as larger fish eat smaller fish.

These concentrations are significant, when you consider the potential toxic effect methylmercury has, where it interferes within the human body's nervous system, where it can result in a decreased ability to walk, talk, see or hear. In extreme cases, high levels of methylmercury consumption have resulted in death or comma.

As you can see, fluorescent lamps should be recycled, and you can play a part.

Recycling of fluorescent lamps and tubes can be somewhat misleading, in that a definition of fluorescent lamps and tubes includes compact fluorescent lamp, neon lamps, metal halide lamps and sodium vapor lamps. Below is a brief explanation for each:

- **Compact Fluorescent Lamp** - (CFL) is also known as a compact fluorescent light bulb or tube (CFT). Most are designed to replace incandescent lamps, and can fit in the existing light fixtures that formally housed the incandescent.

  The spiral type compact fluorescent lamp has a slightly reduced efficiency, due to its excessive thick layer of phosphor (*a substance that exhibits a sustained glow after exposure to oxygen or energized particles*) on the "lower side of the twist."

  CFL's use less energy, reduce electricity costs, emit fewer air pollutants (mercury, lead, nitrogen oxides and sulfur dioxides) and reduce greenhouse gases. Even though fluorescent lamps contain mercury, when managed properly, they have less impact on our environment than conventional incandescent lamps.

- **Neon Lamps** - is a gas discharge lamp (*artificial light sources that generates light by sending an electrical discharge through an ionized gas*) containing primarily neon gas at low pressure. The term is sometimes used for similar devices filled with other noble gases *(rarely react with other elements since they are already stable)*, usually to produce different colors.

- **Metal Halide Lamps** - is a member of the high-intensity discharge (HID) family of lamps, which produce high light output for their size. This makes them compact, powerful and a proficient light source. These lamps operate under high temperature and pressures, and require special fixtures to operate safely. These normally require specific UV or blue-frequency light and are used indoors for growing plants or "intelligent" *(lies with the programmer)* lighting sources.

- **Sodium Vapor Lamp** - is a gas discharge lamp, (*generates light by sending an electrical discharge through ionized gas)* which uses sodium in an excited state to produce light. There are two varieties: low pressure and high pressure. These lamps are normally used for outdoor (streets) and security lighting, where the color interpretation is less important.

Fluorescent lamps and high-intensity discharge (HID) lamps, including mercury vapor, high-pressure sodium, and metal halide lamps from business, should be set-aside from regular trash disposal for commercial business across the United States, because they contain mercury. Even low-level mercury lamps sold as TCLP *(Toxicity Characteristic Leaching Procedure)* should not be included in the regular trash streams, but also recycled.

Mercury poisoning is caused by sufficient exposure to elemental mercury or mercury compounds. Wikipedia says, "Exposure to mercury can occur from breathing contaminated air, or from improper use or disposal of mercury and mercury-containing objects, for example…improper disposal of fluorescent light bulbs."

Restaurants can contribute to a cleaner environment, but you must manage a program properly. Keep in mind, fluorescent lamps present the single greatest risk of mercury exposure in the work place, because when you discard a fluorescent lamp into the trash stream, the bulb will be broken when your trash hauler picks up your waste and eventually disposes that into a landfill. It may or may not affect your worker when throwing out the bulb, but it can affect the workers handling the waste materials at the materials recovery facility or landfill.

Looking to Stay in Compliance/Want to Recycle

Determine what you want out of a program by accessing the following:

- How many fluorescent lamps are in your restaurant? Where are they located?
- How often do you change your fluorescent lamps?
- How many fluorescent lamps are you disposing of each month; each year? Be sure to refer to state requirements.
- What type of fluorescent lamps are you purchasing? Are they high-energy efficient lamps? *See above.*
- How are you currently handling the storage of your spent lamps?
- Do all of your employees know what to do when a fluorescent light bulb burns or breaks? *See below for instructions.*
- Are you in compliance with local, state and federal hazardous waste regulations?

Looking for a Vendor – follow these guidelines

- Check out no less than two/three vendors, or hire SLM Waste & Recycling Services Inc, to do it for you, for they have the experience, wherewithal, and vendors assuring you that all permits, recycling technologies, transportation, operating, and bookkeeping practices meet every state and federal regulation, as well as fit your lamp recycling needs.
- Ask what processes the vendor uses to reclaim the mercury, and whether they reclaim the mercury on-site, or whether they ship it to another contractor for processing. Some recyclers normally charge extra if they ship off site.
- Ask what the means for disposal is, and the type of shipping containers used, preferably you want DOT or U.N. approved shipping containers.
- What is the protocol for broken lamps; do they require special handling?
- Prices vary; compare prices and call several different recyclers to get price estimates for your facility.

Broken Lamp Handling Practices

- Before Clean-up: Ventilate the Room.
  - Open a window and leave the room for 15 minutes or more.
  - Shut off the central-forced air heating/conditions system.
- Clean-Up Steps for Hard Surfaces
  - Carefully scoop glass fragments and powder using stiff paper or cardboard, and place them in a sealed glass jar with a metal lid or a sealed plastic bag.
  - Use sticky tape, such as duct tape, to pick up any remaining small glass fragments and powder.
  - Wipe the area clean with damp paper towels (using disposable gloves) or disposable wet wipes and place them in the glass jar or plastic bag.
  - Do not use a vacuum or broom to clean up the broken bulb on hard surfaces.
- Disposal of Clean-up Materials
  - Immediately place all clean up materials outside the restaurant in a trash container.
  - Wash your hands immediately after disposing of the jar or plastic bags containing the contaminants.
  - Check with your municipality or local state government about disposal requirements in your specific area. Some states prohibit trash disposal, and require that broken and unbroken mercury-containing bulbs be taken to a local recycling center.

Standard Recycling Practices

- **4 Foot Fluorescent Recycle Container** – Obtain a 4-foot lamp recycling carton that can holds lamps ranging from (36) T12 or (72) T8 4-foot fluorescent tubes, dimensions are 9-3/8" x 9-3/8" x 48".
- **8 Foot Fluorescent Recycle Container** – Secure an 8-foot lamp recycling carton, that holds approximately (15) T12 or (30) T8 8-foot fluorescent tubes, dimensions are 9" x 5" x 96".
- **5 Gallon Compact Fluorescent Container** – Look for a 5 gallon plastic container designed to hold up to 50 lbs of compact fluorescents (CFLs), approximate capacity is 90 CFLs.
- **Compact Fluorescent Container** – Obtain a compact fluorescent box, designed to accommodate approximately 15 small CFLs. The container should be 6.5"x6.5"x7.0".
- **2' U-Bend Lamp Container** – Secure a lamp carton that will house U-Bent Lamps. The carton should hold approximately (24) T12 or (48) T8 U-Bent fluorescents. Dimensions include 18"x18"x24".
- **2' Misc. Lamp Container** – Located a miscellaneous lamp carter for a HID and compact fluorescent lamps. The carton you secure, should hold approximately 20-50 HID or 50-150 compact lamps, as sizes vary.

In all cases, be sure to obtain a recycling certificate from your vendor.

Refer to the web-site below for information on Universal Waste Rule Requirements : .

www.epa.gov/epaoswer/hazwaste/id/univwast/statespf.htm#why

Under the EPA Universal Waste rule, it is suggested, a fluorescent lamp that does not pass the TCLP test and is broken, must be cleaned up and placed into a specified container. The unit must be “closed, structurally sound, compatible for lamps, and lacking any evidence of spillage”. Be sure to check with your municipality, state or federal government for the latest update in regulatory compliance.

Below is a list of your state agencies, should you wish to inquire further about individual recycling requirements for fluorescent lamps.

- Alabama - www.adem.state.al.us
- Alaska - http://www.dec.state.ak.us/air/
- Arizona - www.adeq.state.az.us
- Arkansas - www.adeq.state.ar.us
- California - www.calepa.ca.gov
- Colorado - www.cdphe.state.co.us/hm/
- Connecticut - www.dep.state.ct.us
- Delaware - www.dnrec.state.de.us
- Florida - www.dep.state.fl.us
- Georgia - www.dnr.state.ga.us/dnr/environ
- Hawaii - www.hawaii.gov/dlnr/
- Idaho - www.state.id.us/deq
- Illinois - www.epa.state.il.us
- Indiana - www.state.in.us/idem/
- Iowa - www.iwrc.org
- Kansas - www.kdhe.state.ks.us
- Kentucky - www.nr.state.ky.us/nrepc/dep/dep2.htm
- Louisiana - www.deq.state.la.us
- Maine - www.state.me.us/dep
- Maryland - www.mde.state.md.us
- Massachusetts - www.magnet.state.ma.us.dep
- Michigan - www.michigan.gov/deq
- Minnesota - www.dnr.state.mn.us

- Mississippi - www.deq.state.ms.us
- Missouri - www.dnr.state.mo.us
- Montana - www.deq.state.mt.us
- Nebraska - www.nrc.state.ne.us
- Nevada - www.ndep.nv.gov/recycl/hotline.htm
- New Hampshire - www.des.state.nh.us
- New Jersey - www.state.nj.us/dep
- New Mexico - www.state.nm.us
- New York - www.dec.state.ny.us
- North Carolina - www.enr.state.nc.us
- North Dakota - www.health.state.nd.us/wm/faq/tubes.htm
- Ohio - www.epa.ohio.gov/
- Oklahoma - www.deq.state.ok.us
- Oregon - www.deq.state.or.us
- Pennsylvania - www.dep.state.pa.us
- Rhode Island - www.state.ri.us/dem
- South Carolina - www.scdhec.net/eqc
- South Dakota - www.state.sd.us/denr
- Tennessee - www.state.tn.us
- Texas - www.tnrcc.state.tx.us
- Utah - www.eq.state.ut.us
- Vermont - www.anr.state.vt.us
- Virginia - www.deq.state.va.us
- Washington - www.wa.gov/dnr
- West Virginia - www.dep.state.wv.us
- Wisconsin - www.dnr.state.wi.us
- Wyoming – www.deq.state.wy.us

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