

Mercury Risk in CFLs: The Facts

July 31, 2007 | Posted by John Balbus in Health, Technology

The author of today's post, John Balbus, M.D., is Chief Health Officer at Environmental Defense.

Compact Fluorescent Light Bulb Compact fluorescent light bulbs (CFLs) use dramatically less energy than incandescent bulbs and reduce greenhouse gas emissions. But they also contain mercury - a dangerous toxin.

What if you drop a CFL and it breaks? How much trouble are you in?

Despite some alarming news reports, you don't have much to worry about. If a CFL breaks, some of the mercury that's contained in the bulb will evaporate into the air. How much? It's hard to be certain, but one study [PDF] looking at long tubular fluorescent bulbs found that over a two week period, only 17 to 40 percent of the mercury in the bulb evaporated. The rest remained stuck in the bulb. Roughly one-third of the mercury that evaporated did so in the first eight hours after the breakage; the rest seeped out slowly over the remainder of the study period.

The amount of mercury in a CFL is very small, only 4-5 milligrams. This is almost one thousand times less than what was in mercury thermometers! So, let's assume that what happens with CFLs is comparable to what happens with tubular fluorescents. If a bulb breaks, only 0.67 milligrams of mercury (one-third of 40 percent of 5 milligrams) might become airborne in the room during the first eight hours, and only a fraction of that would be breathed in. In short, the exposure from breaking a compact fluorescent bulb is in about the same range as the exposure from eating a can or two of tuna fish. (See our list of "Best and Worst Seafood Choices" for more on mercury in fish.)

The tiny amount of mercury you're exposed to when breaking a CFL is extremely unlikely to cause any ill effects, noticeable or otherwise. But how do you minimize even this tiny amount of risk?

Remove children and pets from the room, and then clean up the broken bulb as quickly as possible. First, increase the ventilation in the room where the bulb broke by opening windows and doors. Then use index cards or other stiff paper to pick up the broken pieces of glass and any visible mercury. Don't use your bare hands, and don't use a vacuum cleaner because this can disperse the mercury more widely. Once you've gotten up the big pieces, use something sticky like duct tape to get up smaller pieces and dust. To be extra safe, stay out of the area for a few hours to let any remaining mercury disperse.

So what does mercury poisoning do to you, anyway? The symptoms are primarily neurological. A low level exposure (like if you broke a dozen CFLs in your house every day for a couple of weeks) would cause insidious symptoms - fatigue, memory

problems, difficulty concentrating, and perhaps some mild clumsiness. Higher exposures could give tremors, and mood or emotional disturbances. But this is never going to happen from dropping one CFL!

Because they contain mercury, it's best to recycle CFLs (Earth911.org can tell you how), or bring them to your local Household Hazardous Waste (HHW) collection site. I've got five bulbs wrapped in bubble wrap in my basement, waiting for me to get a chance to take them to the county HHW site. But if you can't do that, you should seal used bulbs in a plastic bag before placing them in your regular trash.

And if despite your best efforts the bulbs end up breaking in a landfill, using CFLs should still cause a net decrease in mercury in the environment. Why? Because they so dramatically reduce energy use, and coal-generated electricity releases much more mercury than a CFL ever could.

The phrase "contains mercury" sounds alarming, but there is very little risk in the tiny amount of mercury in CFLs, and the benefit to the environment of using them is huge. To learn more about switching to CFLs, visit our guide to making the switch.

6 Responses

Comment from KristinaMRichardson
October 7th, 2007 at 11:08 pm

I found lots of useful information on CFLs including what to do if one breaks, how to dispose of them, and the difference between color temperatures at www.nvisioncfl.com

Pingback from Climate 411 » Dangerous CFLs? Don't Believe Everything You Read - Blogs & Podcasts - Environmental Defense
February 6th, 2008 at 12:01 pm

[...] should avoid exposing themselves to the mercury from a CFL if it breaks (see my previous post for how to properly dispose of CFLs), the exposure from a single broken bulb is comparable to the mercury in a few cans of tuna, and [...]

Pingback from Blogs » Blog Archive » A GREEN SIDE TO EVERYTHING: About CFLs :: PostStar.com
February 21st, 2008 at 11:33 am

[...] What if it breaks? If your CFL crashes to the floor, remove pets and children from the room and open a window. Use a stiff piece of paper or cardboard to scoop up the broken pieces. Do not use your bare hands, a vacuum or a broom. Use tape or a rag to clean up any remaining fragments. Place everything in a bag. For more guidelines, check out the EPA Web site. Above all though, remain calm — the chief health doctor at the environmental defense Web site points out that the exposure to mercur... [...]

Pingback from Live Wire » Blog Archive » I have an idea!

March 5th, 2008 at 4:39 pm

[...] sources of information on CFLs include GE, which makes 'em; the chief health officer of the Environmental Defense Fund (he's a fan); and the Department of [...]

Comment from lees

March 13th, 2008 at 6:54 pm

>>Because they so dramatically reduce energy use, and coal-generated electricity releases much more mercury than a CFL ever could.<<

This, unfortunately, is where Mr. Balbus strays into "I-read-it-somewhere" territory.

The figure often cited (the EPA, more than one coal industry group, and various researchers) for coal plant mercury pollution is .0234 milligrams/kWh of *coal* generated power (http://www.popularmechanics.com/blogs/home_journal_news/4217864.html). Coal contributes slightly over 50% of our energy needs in the US. The burden nationwide, on average, is then .0117 mg/kWh. Yes, you may burn 80% or 90% coal in your light bulbs, but as a nation, the .0117 number is the one to use when evaluating widespread adoption. This means a 22W CFL (about equivalent to a 100W incandescent in light emission) with a rated life of 6000 hours will, on average, represent about 1.5mg of mercury emissions from a coal plant in its rated lifetime. A 100W incandescent will represent an emission of about 7mg in the same time period. At the end of that life, the CFL will put around 4mg (perhaps much higher in some brands and lower in others) plus 1.5mg into the environment. We can argue all day about which form of mercury is worse, but first lets look at the myth that CFL's use less mercury.

To produce purified mercury in a CFL, the extraction process releases about .4mg for every milligram produced into the waterways, atmosphere, and soil as waste. This is a well-established worldwide average that includes many processes, both crude and hi-tech. This means that the 4mg in the CFL actually represents 5.6mg of mercury that enters our environment. Adding the coal energy contribution means the CFL's account for 7.1mg versus 7mg for incandescents.

Add to this the Lawrence Livermore Laboratories study that concluded that the average CFL life is reduced by 50% where they are turned on and off every hour and the mercury contribution goes up to a whopping 13.6mg or so. The reduction in incandescent life for the same use model (20%) does not affect its mercury consumption and it remains at 7mg or so. The same study concluded that a 30 minute use model reduced the CFL life by 85%...which would mean CFL's would use ..gulp.. 38.8mg of mercury by the time the rated life of the CFL was reached...compared to the 7mg used by the incandescents.

These are real numbers. CFL's can offer significant energy savings in general. However, the thrust of a lot of pro-CFL articles in addressing mercury emissions is completely unfettered by reality by claiming less mercury pollution is generated through

CFL adoption. CFL's will use a lot more mercury than incandescents, period. How unhealthy that mercury is is a valid debate, however.

Pingback from GREENer HOUSE » Quicksilver
April 9th, 2008 at 4:29 am

[...] to a source of dangerous mercury in their homes. John Balbus, M.D., the Chief Health Officer at Environmental Defense, writes The exposure from breaking a compact fluorescent bulb is in about the same range as the exposure [...]

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