The European Network of Arson Practitioners

Response to Request for Information/Assistance

Original Query:

I have received a request for information related to the potential for an infection to be caused by mercury contained within energy saving light bulbs. The specific query is shown in blue text below.

I have received a request from a colleague in Malta. He has recently come across information regarding the possibility of illness and/or serious infection being caused by the mercury contained within energy saving light bulbs. He has identified two resources which have provided further information about this potential safety risk to fire investigators and those responding to fires.

The specific request to the network is: Are you aware of any incidents where this kind of infection has occurred? If so, could you provide some summary information concerning what happened?

Date responses were collated: 17th November 2011

Below are the responses to the query. Responses have been divided according to country. Text has been copied from email correspondences and, where provided, documents and weblinks have been included. All emails have been made anonymous unless somebody has specifically stated that they are happy for their contact details to be made available. Some documents have been provided as separate attachments within the response email. Please be aware that no liability can be accepted by the European Commission or Northumberland Fire and Rescue Service for any reliance upon, or use of, any information contained within this document.

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1. United Kingdom (1) – Fire Investigation Expert

To be honest I think this is a fake.

Lamps contain minimal mercury per lamp, and also mercury acts systemically not locally.

I don't think Wes Trac published that safety memo – I checked their web site and couldn't find it plus it just looks like a fake.

The injury is way, way too big for a piece of globe glass.

Also: http://www.hoax-slayer.com/mercury-exposure-foot-injury.shtml

It looks like someone who has a massive infection and being treated for gangrene. Happens to people who catch certain bacteria and also those with poor circulation – feet

and hands being particularly vulnerable. I've seen a few dozen cases like this – mostly diabetics with bad circulation who cut their feet.

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2. New Zealand – Hazardous Substance Advisor

I think the storey is a hoax as presented.

"A 31-yr-old man presented to his general physician complaining of pain and swelling in the soft tissue of both hips. He initially denied knowledge of the etiology, but after elemental mercury droplets were expressed from the skin wounds by manual manipulation, he admitted that the source was self-administered sc injections. He did not provide a reason for this or give the time-frame of the injections"

(Source U.S National Library of Medicine)

CFL bulbs have very low amounts of mercury about 3 mg which is about the size of a pin head. I am unware in all my years in the chemical industry including with colleagues working with (very large amounts of) mercury in the Chlorine generation industry of this type of reaction.

Due to the number of domestic Mercury thermometer spills notifications from the NZ Fire Service in the last few months, has resulted in the following MoH Guidance sheet being updated two weeks ago. MoH is still willing to take advice over this guidance sheet.

http://www.moh.govt.nz/moh.nsf/indexmh/environmentalhealth-mercuryspills

This advice is up residents dealing with spills up 450,000mg!! I am not sure where your average resident would find that much mercury, but still mercury contact is not raised in a way the attachments would attempt to claim. The advice around spill clean up is sort of reasonable, I find the pictures are not. I am not the squeamish type, but I would suggest these pictures are completely inappropriate for further circulation.

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3. United Kingdom (2) – Police Service in North East Region

I have circulated this to staff and have their replies back - no-one has any knowledge of such incidents within our area.

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4. United Kingdom (3) – Fire and Rescue Service in the Midlands Region

NO the most common health effects is with the brain hence the term 'mad as a hatter' as they use to lick the mercury in hat making production years ago.

This is not common. The levels have been assessed for the waste disposal industry and are safe. I've smashed a few in my time too. This is from the royal society of chemistry (UK based).

Your document may not be an urban myth but it would not be common for this to affect people in this way.

Q and A: Mercury in energy-saving light bulbs

07 January 2008

Old-fashioned tungsten light bulbs are due to be phased out in Australia, the UK, and the US over the next five years, and the spotlight has fallen on their low-energy replacements. The new light bulbs contain mercury, which has triggered a rash of concerned media stories - but is there any fact behind the fear? *Chemistry World* investigates.

Why do low-energy light bulbs contain mercury?

It's essential to the way they work. Compact fluorescent lightbulbs (CFLs) are tubes containing mercury and noble gases (typically argon). When the bulb is switched on, electrons stream from a tungsten-coated coil. They collide with mercury atoms, exciting their electrons and creating flashes of ultraviolet light. A phosphor coating (typically composed of metal oxides or phosphates) on the inside of the tube absorbs this light and re-emits it at visible wavelengths. This is also how fluorescent strip lights work.

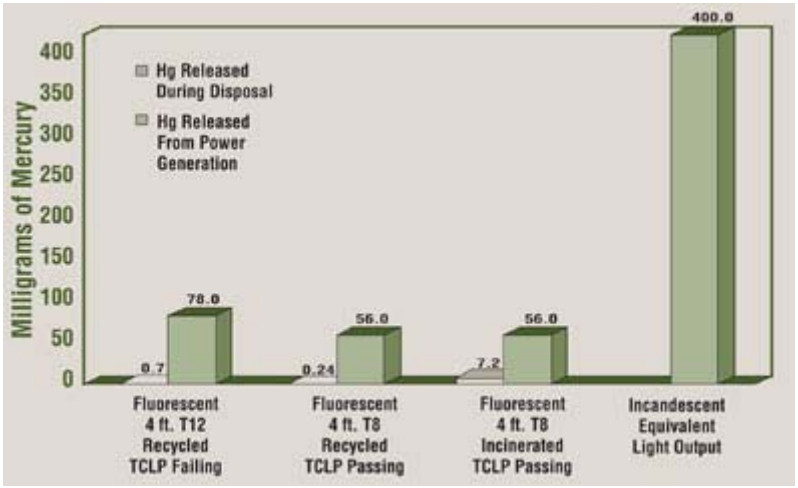
How much mercury do CFLs contain?

Up to 5 milligrams - a tiny amount when compared to the 3 grams in a mercury thermometer, says Adrian Westwood, from the UK Environment Agency. Fluorescent strip lights contain similarly tiny amounts, reduced from the 100 milligrams present in first-generation CFL bulbs.

Couldn't we do without mercury in household lighting?

Not in a fluorescent light. Light-emitting diodes (LEDs) don't contain mercury, but they're still costly, and researchers have only just begun working out how to diffuse their focused light to suit household lamps.

Old-fashioned incandescent tungsten filament bulbs don't contain mercury either. But more mercury is emitted by fossil-fuel fired power plants when producing electricity for the incandescent lights, than for the energy-saving CFLs.



The amount of mercury released while powering and disposing of CFL bulbs is much smaller than is emitted for old-fashioned filament bulbs.

© NEMA

What danger is there if a CFL breaks?

'No amount of mercury is good for you, but the very small amount contained in a single modern CFL is unlikely to cause any harm, even if the lamp should be broken,' says the UK Department for environment, food and rural affairs (Defra).

Their advice for cleaning up a broken bulb:

Vacate the room and ventilate it for at least 15 minutes. Do not use a vacuum cleaner, but clean up using rubber gloves and aim to avoid creating and inhaling airborne dust. Sweep up all particles and glass fragments and place in a plastic bag. Wipe the area with a damp cloth, then add that to the bag and seal it. Mercury is hazardous waste and the bag should not be disposed of in the bin. All local councils have an obligation to make arrangements for the disposal of hazardous household waste.

A US public information campaign helped to raise awareness about how to dispose of CFLs

© California Integrated Waste Management Board

Why didn't we know about this before?

The presence of mercury in fluorescent lights, though well known, seems not to have been well communicated to the public in the UK. But as Steve Poole, laboratory manager for the UK trade body The Lighting Association, points out, 'fluorescent technology has been around for years without this being worthy of comment before.' Now that CFLs are seeing widespread use in households, the mercury issue has been rediscovered, leading to calls for advice on light bulb disposal to be printed on CFL packaging. The disposal advice itself has not changed.

According to the Environment Agency's Adrian Westwood, a more important issue that people should be focusing on is how to recycle CFLs.

So how should I recycle a CFL?

CFLs are classified as Waste Electrical or Electronic Equipment (WEEE); meaning that their manufacturers and importers are required to pay for CFL treatment and recycling (for more on the WEEE Directive, see *Chemistry World*, June 2007, p44). Defra says that any retailer selling a CFL bulb either has to take back a waste one, or advise on how to take it to a 'Designated Collection Facilities' set up for the purpose. There are over 1400 DCFs in the UK.

Can this fledgling recycling system cope with vastly increased numbers of CFLs, though? According to Defra, 'appropriate handling and disposal is not difficult, and what is now a relatively new disposal system will become more fully developed.'

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5. Lithuania – Fire Investigation Expert

No data recorded for similar events in Lithuania.

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6. United Kingdom (3) – Scientific Adviser for a Fire and Rescue Service in the Midlands Region

I'm not convinced that the mercury in a CFL could have caused this or the fact that there is mercury in a CFL is a massive risk.

1) standard fluorescent tube also contain mercury, it's how they work. There is a small heater in the tube that vaporises the mercury that enables a current to flow down the tube energising the gas in the tube which produces UV light. This UV light then interacts with the phosphor coating (the white stuff) to glow and produce light. I can't see why the CFL are a bigger risk than normal fluorescent tubes.
2) CFL seem to typically contain 4-5 mg mercury, the old mercury medical thermometers contained about 500mg so any mercury released will be 1/100th the amount from a mercury thermometer
3) In this case the CFL was hot the likelihood is that when broken hot, most of the mercury would probably be a vapour and disperse in the environment, as it cools to room temperature it would obviously condense on surface but the concentration is likely to very low.
4) If a CFL broke in a 25m3 room and all 5mg instantly dispersed in the room you would have an immediate concentration of 0.2mg/m3, this would fall off very rapidly as the room is ventilated and probably approach zero within an hour or two. The occupational exposure level for mercury is 0.025 mg/m3 over and 8 hour period. So you are going to be way below this level.
5) I don't recall mercury causing any major infection (strictly speaking infection is really from bacterial infection not chemical) hell we use to play with it as kids by rolling it from hand to hand and back in South Africa the witchdoctors use to prescribe a teaspoon of mercury to be swallowed as a remedy for a whole load of stuff (definitely not recommended) but don't recall infections as a result. Mercury tends to have neurological effects and some possibility of skin redness/irritation but would not expect this massive necrosis.

If I had to hazard a guess I would suspect he somehow got infection into the wound created by the glass cut. We don't know details of whether he went to hospital when the foot was cut or only after it got infected. There is no mention of the state of hygiene in the property; the floor could have been loaded with bacteria ready to infect the wound. Also

no mention if the patient was immune system compromised which may mean that an infection that the body would normally be able to fight off, managed to take hold. Or maybe even a diabetic with poor circulation.

Whilst I would never say never, however bottom line I think that this infection as a result of mercury in a broken CFL is highly unlikely. I certainly not wish to see us developing any specific protocols or procedure for dealing with broken CFL over an above the normal risk assessment that would be done for handling broken glass. The mercury content is minimal from a single bulb. Obviously if it was something at a CFL recycling/disposal facility we may want to the quantity into account but these situations would be extremely low frequency events.

END