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From: Graham Smith <gmsabingdon@btinternet.com>

Sent: Wednesday, April 20, 2022 7:58 AM

To: 'Neil Chapman' <neil@chapmanconsulting.ie>

Cc: Nicole Martinez <nmarti3@clermson.edu>

Subject: RE: LNT (again)

Hello Neil,

Nice to get your enquiry!

I was aware of it and earlier brassica.

My understanding is that this is a one-sided view. The HPS has been largely taken over by people with that view (Nicole, cc'd, will correct me here and below, I hope.)

It will be quite interesting to see how this develops... the main science folks still take a different view, that LNT is *an appropriate assumption for protection purposes*.

Some of the debate is not as polite as it should be. A polite attempt in the attached... my co-author is on ICRP Committee 4.

The challenge is that both sides are arguing the toss about risks at very low doses and dose-rates where the uncertainties are great and the direct scientific evidence of effects is not available. By low dose/rate I mean less than about 5 mSv/y which, of course, is 5 times the public annual dose limit and so not a low dose at all. But UNSCEAR/ICRP define low dose as below 100 mGy (<100 mSv for photons), so words like low are totally f**ked up in the correspondence. (See the attached again which discusses this with references.)

But there is plenty of indirect evidence to support something like LNT, and some other evidence that contradicts it. The issue is a difference of opinion on what to assume for protection purposes.

Interestingly, the epidemiologists had expected to have resolved the issue by now, or at least, to be able to have better evidence, say, down to 1 mSv/y. But pressure to reduce doses (without any consideration of whether that produces any benefit) has meant that monitored populations no longer get enough dose to support the epidemiology – you cannot detect an excess of a cancer and attribute that to a dose, if there is no dose. And the biologists continue to fail to find the needle in the haystack, maybe because it is not there.

My science level is not really up to being able to judge either the epidemiological studies nor the biological science... but I am able to enjoy conversations with those who do (and I do at every opportunity) and I am able, I think, to appreciate the levels and types of health and other risks that we are talking about. And therein lies a solution. These guys are really sweating the small stuff. If you take a holistic view of the issues affecting, say, management of radioactively contaminated land,

waste disposal, but also use of ionising radiation in medicine, then below about 5 mSv/y you are wasting your time looking at small risks when there are clear bigger risks to be concerned about that deserve anyone's attention first. And this is true whether you agree with applying LNT, or disagree. So until those other risks are quantified on the same metrics as the radiation risks (or vice versa), the LNT debate is just a calculated wind-up. (Just saying...) But until that happens, I think we should stick with LNT. Apart from anything else, if NRC were forced to abandon it, I understand that, following other practice on how they do these things, they would be required to set a threshold, and it would probably be lower than current dose limits. But at least I guess you'd not then have to optimise below those limits.

Of course this above is just my opinion. I can support it with some detailed but quite narrow examples linked to decommissioning waste and how the chem risks are handled cf the rad risks. Would love to see it analysed in a wider range of different exposure situations by some intelligent young people! Results could then feed into an update of:

Chapman N A and Smith G M (1990). Explaining Deep Geological Disposal of Radioactive Waste in Everyday Terms. Nuclear Europe Worldscan. Journal of the ENS, No.3/4 March/April 1990.

In the meantime:

- Still working for NDA/RWS on chems in radwaste that might go to a deep repository. Meeting in Harwell Friday.
- Am working (at a distance!) on a couple of projects checking out the Chernobyl Exclusion Zone after the Russians left. Of course my role is miniscule, but quite an interesting risk management challenge as well as taking me back on some basic RP considerations. Also nice to see that the authorities there do have some sort of a handle on things. Your scenario has not panned out yet...
- I attend a consultants meeting in IAEA early May, on developing guidance on Existing Exposure Situations

Regards,

Graham

PS Nicole: Neil is a very high-level adviser on geology and wider aspects of radwaste disposal, having worked just about everywhere.

From: Neil Chapman <neil@chapmanconsulting.ie>

Sent: 20 April 2022 11:13

To: Graham Smith <gmsabingdon@btinternet.com>

Subject: LNT (again)

Hi Graham,

Just came across this magnum opus of mini-documentaries. Had you seen it? I'd be interested in your views.