Submission
No 10

FORMER URANIUM SMELTER SITE, HUNTER'S HILL

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Submission to NSW Legislative Council inquiry into the Former uranium smelter site, Hunter's Hill

by Friends of the Earth, Australia

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Introduction

This submission addresses just one aspect of the controversy over radioactive contamination in Hunters Hill – misleading claims that the site is 'safe' because estimated radiation doses fall below certain levels.

The weight of scientific opinion holds that there is no threshold below which ionising radiation poses no risk, but that is the assumption underpinning claims that the Hunters Hill site is 'safe'.

It would be plausible to state that the risks are low because estimated exposures are low. However that would assume that thorough studies have been conducted and credible radiation exposure estimates have been obtained. It appears that studies of the site by government agencies have been superficial and are at odds with the recent findings of Australian Radioactive Services.

Radiation protection agencies establish dose limits for radiation exposure from nuclear facilities but there is no pretence (from radiation protection agencies, at least), that radiation doses below these levels are without risk.

Moreover, as scientific understanding of the effects of ionising radiation has advanced, permitted dose limits have been dramatically reduced. For workers, the permitted dose has decreased by no less than 2500%:
* 500 millisieverts (mSv) p.a. in 1934
* 150 mSv in 1950
* 50 mSv in 1956
* 20 mSv (averaged over five years) in 1991.

In Australia, the maximum permitted dose is 1 mSv for members of the public (in addition to background radiation which is typically of the order of 2 mSv p.a.)

Linear no-threshold risk model

Radiation protection agencies around the world, including the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), all base regulations on the linear no-threshold model which assumes that there is no threshold below which radiation exposure is safe.

Notwithstanding growing scientific confidence in the linear no-threshold model, uncertainties will always persist because of methodological difficulties. In circumstances where people are exposed to low-level radiation, epidemiological studies are unlikely to be able to demonstrate increased cancer rates because of the 'statistical noise' in the form of widespread cancer incidence from many causes, as well as other methodological difficulties. A report from the Committee on the Biological Effects of Ionising Radiation (BEIR 2005) illustrates the point. It estimated that one out of 100 people exposed to 100 mSv of radiation over a lifetime would probably develop cancer as a result of that exposure, but that 42 cancers can be expected in the same group from causes other than radiation exposure.

The methodological difficulties are addressed by Dr Sue Wareham (2007):

"Firstly, health effects such as cancer due to radiation exposure often take decades to develop. Secondly, cancers due to radiation exposure are indistinguishable from any other cancer. Thirdly, radioisotopes can travel great distances. Therefore epidemiological studies investigating the effects of a particular radiation exposure are necessarily very long, they may involve many countries if not continents, and they are extraordinarily complex.

"Add to this the fact that cancer is a common disease in any event, and the result is that a small percentage increase in cancer rates due to radiation exposure can readily be overlooked, even when the absolute number of cancers caused by radiation exposure may be very large.

"A further source of misleading research results is the mixing, inadvertently or knowingly, of data for populations exposed to quite different levels of radiation, for example after a nuclear accident. The results for heavily exposed populations may then be 'diluted' by results for much less exposed populations and the results overall will appear reassuringly low.

Committee on the Biological Effects of Ionising Radiation

Notwithstanding the methodological problems, there is growing scientific confidence in the linear no-threshold model. An important recent study was the 2005 report of the Committee on the Biological Effects of Ionising Radiation of the US National Academy of Sciences (BEIR 2005). The BEIR report comprehensively reviewed available data and supports the linear no-threshold risk model.

The BEIR Committee stated:

"The Committee judges that the balance of evidence from epidemiologic, animal and mechanistic studies tend to favor a simple proportionate relationship at low doses between radiation dose and cancer risk."

"... the risk of cancer proceeds in a linear fashion at lower doses without a threshold and ... the smallest dose has the potential to cause a small increase in risk to humans."

Richard Monson, Chair of the BEIR Committee and professor of epidemiology at the Harvard School of Public Health, said:

> "The scientific research base shows that there is no threshold of exposure below which low levels of ionizing radiation can be demonstrated to be harmless or beneficial. The health risks - particularly the development of solid cancers in organs - rise proportionally with exposure. At low doses of radiation, the risk of inducing solid cancers is very small. As the overall lifetime exposure increases, so does the risk."

The 2005 BEIR report noted that uncertainty remains because of the unavoidable methodological difficulties:

> "It should be noted however, that even with the increased sensitivity the combined analyses are compatible with a range of possibilities, from a reduction of risk at low doses to risks twice those upon which current radiation protection recommendations are based."

Misinformation arising from methodological problems

The difficulty of demonstrating health impacts from low-level radiation exposure is used by nuclear proponents as the basis for an endless stream of self-serving, disingenuous and scientifically-indefensible statements.

For example, ANSTO states:

> "Radiation effects may appear following exposure to large amounts of radiation ... it would take a very large dose to kill sufficient numbers of your cells to cause your death ... typically several thousand times as large as the radiation dose you receive normally each year from the environment. Note also that to cause your death, you would need to be exposed more or less in one hit, not spread out over a year. (Compare with sunlight: spread out over a year it gives you a suntan, but in one day of sunbaking it could cause your death by sunstroke.)" (ANSTO, 'Ionising Radiation' pamphlet.)

The following Q&A illustrates a variation in which ANSTO wants to have its yellowcake and eat it too, claiming that low-level radiation is both hazardous and safe at one and the same time:

> Question. You state that radiation levels from low-level waste are "minimal and safe", implying that there is no risk from low-level radiation. Is that ANSTO's view? If so, how does ANSTO reconcile that view with the weight of contrary scientific opinion, e.g. as expressed clearly in the 2005 BEIR report?
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> ANSTO: The statement made was that radiation levels from low-level waste are minimal and safe. That does not imply there is no risk, it implies the risk is minimal and below the level that would be of any safety concern. Radiation levels are set by regulatory bodies based on recommendations from ICRP, to which groups such as BEIR contribute, to ensure that both workers and the public can be assured of a safe environment. (ANSTO Chief of Operations, 20/6/07).

Literacy in science including nuclear science is not in short supply at ANSTO yet the Organisation repeatedly makes indefensible statements such as those above. The Committee inquiring into the Hunters Hill situation certainly should not treat ANSTO as a source of credible scientific advice.

The industry-funded Uranium Information Centre (UIC-1) ignores predicted deaths from low-level radiation to claim that nuclear power is far safer than alternative energy sources including hydro. Yet the United Nations Scientific Committee on the Effects of Atomic Radiation (1994) estimated the collective effective dose to the world population over a 50-year period of operation of nuclear power reactors and associated nuclear facilities to be two million person-Sieverts. (21) Applying the standard risk estimate to that level of radiation exposure gives an alarming total of 80,000 fatal cancers. Of course, applying risk estimates (with their uncertainties) to dose estimates (with their margin of error) is less than precise. But the nuclear industry's solution - to pretend that its emissions have no impact whatsoever - is dishonest.

Likewise, the UIC ignores cancer deaths from routine nuclear fuel cycle emissions to state that: "The risks from any conceivable nuclear plant (advanced reactor type) in Australia would be even less than those from other

Western plants operating worldwide since the 1960s, which have not caused any loss of life in almost 12,000 reactor years of operation." (UIC-2)

Likewise, the UIC states: "Low levels of radiation comparable to those received naturally in some places (up to 50 mSv/yr) are not harmful." (UIC-3)

And to give one further example, the UIC states: "According to authoritative UN figures, the Chernobyl death toll is 56 (31 workers at the time, more since and 9 from thyroid cancer)." (UIC-3) In fact, a 2005 UN report estimates the total death toll at about 9,000, with a large majority of the fatalities arising from exposure to low levels of radiation, and there are credible scientific studies estimating a far greater death toll. Using a standard risk estimate from the International Commission on Radiological Protection (0.04 cancer deaths per person-Sievert of low-dose exposure to ionising radiation) and the International Atomic Energy Agency's (1996) estimate of total exposure (600,000 person-Sieverts) gives an estimated 24,000 cancer deaths from Chernobyl.

Hunters Hill

A spokesperson for NSW Health is quoted in the SMH on 12/4/08 saying: "Overall, the results indicate that people living in Nelson Parade should have no health concerns. Exposure levels fall within ARPANSA [Australian Radiation Protection and Nuclear Safety Agency] recommendations for general public exposure."

A spokesperson for the NSW Minister for the Environment is quoted in the SMH on 3/3/08 stating: "Findings indicate that there is no risk to human health posed by the site."

However, claims from NSW Health, ANSTO, the Minister's spokesperson or anyone else that the radioactive contamination at Hunters Hill poses no risk, or that the site is 'safe', are flying in the face of the available evidence on the health risks of low-level radiation.

It would be plausible to state that the risks are low because estimated exposures are low. However that would assume that thorough studies have been conducted and credible radiation exposure estimates have been obtained.

It appears that studies of the site by government agencies have been superficial and are at odds with the recent findings of Australian Radioactive Services.

Friends of the Earth (FoE) understands that NSW Health may wish to classify contaminated material as being below regulatory limits for management as low-level radioactive waste. FoE does not have the data to assess the validity of such claims, but it should be noted that, in general, there is a history of reclassifying material to suit political (rather than environmental or public health) objectives. For example, the federal government's National Store Advisory Committee issued a paper in 2001, 'Safe Storage of Radioactive Waste, The National Store Project: Methods for Choosing the Right Site', which twice states that long-lived radioactive waste, whether considered low-level or intermediate-level "is not suitable for near-surface disposal." Yet the government simply ignored its own criteria to allow long-lived radioactive waste to be dumped in shallow, unlined pits at Maralinga. That subterfuge was the subject of a detailed complaint by nuclear engineer Alan Parkinson (2004).

The above example is directly relevant to Hunters Hill given that long-lived radioactive waste is involved.

The above example may also be relevant in the sense that the Maralinga subterfuge was driven by a cost-cutting agenda.

Another concern is that contaminated soil will be diluted such that it falls below regulatory criteria for management as radioactive waste. This is not a responsible approach.

References

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United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), 1994, "Ionising Radiation: Sources and Biological Effects", New York: UNSCEAR.

UIC-1 <www.uic.com.au/nip14.htm>

UIC-2 <www.uic.com.au/nip44.htm>

UIC-3 <www.uic.com.au/nip43.htm>

Wareham, Sue, 2007, EnergyScience Coalition Briefing Paper #20, <www.energyscience.org.au>.