Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

CMD 22-H7.62

File / dossier : 6.01.07
Date: 2022-04-09
Edocs: 6757736

Oral presentation

Written submission from Ken Chaplin

Exposé oral

Mémoire de Ken Chaplin

In the Matter of the

À l'égard des

Canadian Nuclear Laboratories (CNL)

Laboratoires Nucléaires Canadiens (LNC)

Application from the CNL to amend its Chalk River Laboratories site licence to authorize the construction of a near surface disposal facility

Demande des LNC visant à modifier le permis du site des Laboratoires de Chalk River pour autoriser la construction d'une installation de gestion des déchets près de la surface

Commission Public Hearing
Part 2

Audience publique de la Commission
Partie 2

May and June 2022

Mai et juin 2022

Canada

Near Surface Disposal Facility (NSDF)

Ken Chaplin, Intervenor on behalf of license change for CNL to allow construction of NSDF.

The NSDF is an appropriate way to dispose of an immense volume of low-level waste. It presents no risk from the primary source of concern, radiation. In addition, it minimizes risks and pollution from what are actually larger, conventional concerns including transportation.

My comments hopefully reduce public fears of the NSDF, but first some personal background.

In 1970 while investigating air pollution I read that 50,000 Americans died annually due to the burning of fossil fuels. In 1975 I started work at Chalk River Labs during the OPEC crisis. These experiences led to my interests in conservation, and renewable energy, and energies' environmental and strategic issues. I left AECL in 1979 and obtained a post graduate degree in Applied Mathematics from Waterloo. My thesis was on computer modelling of solar energy. When I graduated, I worked in the environmental industry on air pollution and oil spill computer models. Eventually I realised that nuclear was the solution to many problems, so I returned to Chalk River Labs where I worked till retirement.

The benefits of nuclear technology were obvious to me, so I investigated the basis for the opposition to nuclear in general and radiation in particular. I have been investigating the risks of radiation for many years and have given several presentations on how the risks of radiation were over-estimated in the media and misunderstood by scientific studies.

During the Ban the Bomb movement the scientific and regulatory position became that radiation damage in people is not repaired and so any level of radiation is harmful. Called Linear No Threshold (LNT), this idea became a powerful argument to stop weapons testing. However, life evolved constantly exposed to radiation, and for long geologic periods of time radiation levels were much higher than current levels. Mechanisms evolved to repair damage from radiation. Currently, some regions have 100 times more naturally occurring radiation than other regions. There is no evidence showing regions with high levels of radiation have more cancer than regions with low levels. Often the opposite is true. Toxins typically have thresholds below which there is no harm. There is no reason to believe that radiation does not have a threshold.

Even using "worst-case" assumptions, the effects of radiation are negligible. For example, there is no doubt that Fukushima was an enormous accident, but the UN and World Health Organization (WHO) concluded there will be no detectable increase in cancer, even to the workers, even though they assumed that no level of radiation is safe. This shows that estimated radiation risks are low, even when risk is over-estimated. It is important to understand that the doses to the most exposed Fukushima workers were typically 1000's of times higher than the doses that will occur to the most exposed members of the public from the NSDF. Furthermore the workers would have been exposed to hourly dose rates hundreds-of-thousands of times higher than the most exposed members of the public from the NSDF.

To repeat this, even when over-estimated, the WHO and UN concluded there is no detectable harm to the most exposed workers from this enormous accident. How does this apply to the NSDF? The NSDF will produce doses that are thousands of times lower than the Fukushima workers were exposed to and

dose rates that are up to a million times lower. There is no reason to believe that there is any risk from radiation from the NSDF.

The misunderstandings of risk result from a few tragic situations that gave people huge doses that caused harm, and then believing that if many people were exposed to very small doses then they would also be harmed. This is not true, and I will provide some examples of this and other misunderstandings.

It has been claimed that radiation from the NSDF would increase genetic damage. Wrong. A report presented on the 35th anniversary of Chernobyl concluded there was no genetic damage. This reinforces the studies showing no genetic damage from Hiroshima/Nagasaki.

It has been claimed that radiation from the NSDF could increase birth defects. Wrong. Chernobyl and Hiroshima/Nagasaki caused some birth defects, but only from large doses in short periods of time (acute doses). When I say large, I mean many thousands of times more annual dose and millions of times more hourly dose rates than anyone will receive from the NSDF.

It has been claimed that radiation from Cobalt-60 would give off intense radiation from the NSDF mound. Wrong. Of course, workers will be shielded to lower their annual doses from all the radioactive materials they are directly working with. However, the debris and the many layers of the mound shields the radiation. Cobalt-60 has a half life of just over 5 years, so 50 years after the end of the closure phase, the radiation levels from the mound will drop from barely detectable to less than 1/10 of 1% of that.

It has been claimed that radiation from the NSDF could increase cancer. Wrong. Chernobyl and Hiroshima/Nagasaki caused cancer in people who received high doses and dose rates. For example, radioactive iodine from Chernobyl is considered to have caused increased thyroid cancer, however, only for large thyroid doses in short periods of time. Again, the NSDF will cause insignificant doses and dose rates by comparison.

It has been claimed that plutonium from waste sites is dangerous. Wrong. American and Soviet workers were very heavily exposed to plutonium in the 1950'and 1960's, but even groups with very large doses had very low levels of harm. For example, a large group of Soviet workers, who worked in very risky conditions, only had three cases of bone cancer. This data shows workers with less than a dose threshold did not get cancer. The NSDF will not cause harm from plutonium.

It has been claimed that long lived radioisotopes are dangerous for long periods of time. Wrong. Long lived radioisotopes release radioactivity slowly. Radioactivity is much more dangerous when the dose rate is high. Long lived radioisotopes typically are alpha emitters that have thresholds as discussed earlier with plutonium and as seen with the radium dial painters. In addition, alpha emitters are big atoms meaning their propagation in the environment is slow. As a result, these leave the mound only very slowly.

It has been claimed that the proposed site is unsuitable. Wrong. The site was chosen to minimize risks, for example, water will flow away from Ottawa river.

It has been claimed that metals from the NSDF pose a threat. Wrong. Metals, and radiation, are everywhere. Aluminum makes up 8% of the earths crust and Canadian uranium ore deposits have similar concentrations. The NSDF has much lower concentrations of these and other metals.

It has been claimed that the proposed design does not meet international standards. Wrong. The CNSC is responsible for determining this and has found that the design does meet international standards.

Some people want significant changes to the direction of the project. I am reminded of a talk by a nuclear engineer who managed a design team. He said there had been times in his career where he and his group thought that they had ideas that would greatly improve a reactor system. After weeks and months of hard work, they often found that the proposed improvement made things worse and so it was rejected. We must not enter into another long design phase only to find out years from now that this current design was better. The public can rest assured they are at no risk from radiation. Workers will receive much higher doses and dose rates than the public, but experience has shown these are also not dangerous.