

SECOND OPEN LETTER TO PRIME MINISTER JUSTIN TRUDEAU

July 28, 2021

Prime Minister Justin Trudeau
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Re: US experts concerned that Canadian support for extracting plutonium from spent nuclear fuel is undermining the global nuclear-weapons nonproliferation regime

Dear Prime Minister Trudeau,

In our [open letter](#) to you, dated 25 May, we urged a nonproliferation review of the decision by Canada's government to fund a proposal by Moltex to separate plutonium from CANDU spent fuel in New Brunswick.

On 23 June, we received an e-mail response from K. Bentsen in your office telling us that our letter had been referred to the Ministers of Foreign Affairs and of Natural Resources.

In the meantime, Moltex published two documents on its website: [a response to our letter](#) and [claims](#) about Moltex's technology by Ian Scott, its chairman and chief scientist.

We write today because of our concern about the misleading claims that Moltex continues to publish.

As we noted in our May letter, Canada's support of Moltex's proposal to chemically separate plutonium by reprocessing spent Candu fuel could undermine the fragile global nuclear-weapon nonproliferation regime. Some of us have written a similar letter of concern to the Biden Administration about the US Department of Energy's invitation of proposals for research and development on reprocessing of spent fuel from "advanced" reactors.

It is as if the nuclear-energy establishments in both countries have forgotten the painful lessons of the 1970s.

We focus on three arguments offered by Moltex:

1. "Civilian reprocessing is up to each country to assess and pursue if they so choose, as long as it is under International Atomic Energy Agency (IAEA) supervision."

Although that is legally true, Canada and the United States have discouraged reprocessing ever since India's first nuclear-weapon test in 1974 used plutonium produced in a Canada-supplied research reactor and separated with US-supplied reprocessing technology. Our two countries immediately co-organized and became founding members of the [Nuclear Suppliers Group](#). There has been no export of reprocessing technology to non-possessors since. It is imperative to uphold this decades-long norm of not reprocessing, lest we find ourselves in a world of many states with latent nuclear-weapon capabilities.

2. "The main output of [Moltex's proposed] WATSS [Waste to Stable Salt] process is an impure extraction of the minor actinides (including plutonium) which is suitable as fuel... If someone wished to use this material for other purposes, a conventional reprocessing facility would be required..."

This argument is identical to one made twenty years ago by advocates of pyroprocessing at the US Department of Energy's Argonne National Laboratory. They claimed, as Moltex does today, that the minor transuranic elements ("actinides") and lanthanide fission products that remain mixed with plutonium separated out of a molten salt solution would make the plutonium unusable for nuclear weapons and therefore "proliferation resistant." A 2009 [study](#), done by safeguards experts from six US national laboratories including Argonne, found this claim to be incorrect. The [radiation barrier created by the transuranic elements and lanthanide fission products](#) is only one thousandth that provided by the radioactive fission products in spent fuel. As a result, purifying the plutonium would require only the capabilities of a relatively cheap and small laboratory hot cell, not a multi-billion dollar "conventional reprocessing plant" as Moltex asserts.

3. Finally, Ian Scott argues "the 'higher actinides' of plutonium, americium and curium are... both highly radioactive and long lived. Between 300 years and one million years they dominate the radioactivity of the spent fuel and largely create the need for enormously expensive 'deep geological repositories' to keep the fuel safe for millennia... Because it burns these higher actinides, and not just plutonium, the [Stable Salt Reactor – Wasteburner] can radically clean up the nuclear waste left by today's generation of nuclear reactors. This is vitally important to giving nuclear energy the 'social licence' to expand beyond its current limits."

This claim is frequently made by advocates of fast-neutron reactors such as Moltex's SSR. But it too has long been discredited. Although [Scott's graph](#) shows that "actinides," i.e. plutonium and the other reactor-made transuranic elements in spent fuel, dominate its heat output after 300 years, *his implication that they would dominate the hazard to the population living above a radioactive waste repository is not correct*. This is because the transuranics have low solubility and a relatively low uptake by the human food chain and gut.

This was pointed out in 1996 in [a major US National Academy of Sciences study](#) that concluded, "none of the dose reductions [from fissioning plutonium and the other transuranics] seem large enough to warrant the expense and additional operational risk of transmutation" (Executive Summary, p. 3). The "operational risks" discussed were safety and "the proliferation risks that could result from the commercial use of plutonium in recycle fuels" (ES, p. 10).

Subsequently, France's Nuclear Safety Authority also [concluded, as did SKB](#), the company responsible for Sweden's spent fuel repository, that transuranics do not dominate the hazard from buried spent fuel.

Thus, Moltex's proposal would not significantly reduce the risk from radioactive waste but would dramatically increase the risk of nuclear weapons proliferation.

We urge again that Canada's government conduct an expert review of the proliferation and radioactive waste implications of Moltex's proposal, as well as of its economic prospects, about which we also are skeptical. If requested, we are available to provide input for that review.

Signatories to this letter are listed on the following page with affiliations and former US government positions. Contact: Frank von Hippel, Princeton University, fvhippel@princeton.edu

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