

24 November 2021

Prime Minister Justin Trudeau
justin.trudeau@parl.gc.ca

Re: Request for a proliferation assessment of a Canadian-government-funded proposal to separate plutonium from CANDU spent fuel

Dear Prime Minister Trudeau,

Congratulations on your re-election.

Out of concern that the issue may have been lost during the transition to your new government, I am writing to remind you and to inform relevant members of your new cabinet of the request made on May 25 in an open letter to you and your previous cabinet by a group of senior US nonproliferation experts.¹

We asked for a proliferation assessment of the \$50.5 million funding your government provided to support Moltex, a startup that proposes to reprocess spent fuel from the Point Lepreau CANDU power reactor in New Brunswick to recover plutonium to fuel a molten-salt cooled fast-neutron reactor it proposes to build on the same site. An overlapping group of nonproliferation experts sent a letter to the Biden Administration on June 20 asking for a proliferation assessment of funding the US Department of Energy began to provide for spent fuel reprocessing R&D during the Trump Administration.²

Our letters expressed concern that the Canadian and US governments have forgotten the important lessons both countries learned 50 years ago when their Atoms for Peace assistance facilitated the launch of India's nuclear-weapon program. That experience led the administrations of US President Carter and Canadian Prime Minister P.E. Trudeau to oppose the separation of plutonium from spent fuel.

That policy was reinforced by an assessment by the Carter Administration that exotic fast-neutron reactors such as the one Moltex proposes could not compete with water cooled reactors and that fuel made with reactor-grade but weapon-usable plutonium recovered by the chemical "reprocessing" of power-reactor spent fuel would cost far more than the non-weapon-usable low-enriched uranium fuel that it replaced. That judgement was subsequently confirmed when fast-neutron reactor programs failed in the UK, Germany, France and Japan, and plutonium fuel (mixed oxide fuel, called MOX) recycled in conventional reactors in France and Japan was found to cost ten times more than the low-enriched uranium fuel it replaced. This history suggests strongly that, in addition to undermining the global nonproliferation regime, the Moltex project would be a waste of precious time and funds in the global efforts to combat climate change.

On June 23, we received a response to our letter from your office informing us that the matter had been referred to the offices of then Foreign Minister Marc Garneau and Minister of Natural Resources O'Regan. But we did not receive any communications from those Ministers prior to their departures from your cabinet.

In the meantime, Moltex responded to our public letter by posting an article on the internet claiming that, since the process it was proposing to use to separate plutonium from CANDU spent fuel would produce impure plutonium, a multi-billion dollar "conventional

reprocessing facility” would be required to further purify it for weapons use. We therefore sent you, Mr. Prime Minister, a follow-on letter on July 27 explaining that a conventional reprocessing facility would not be required by a potential proliferator, as the radiation level would be quite low from the impure product produced by pyroprocessing CANDU fuel and pure plutonium could be extracted from the product in a low-cost "hot cell" – the same type of facility that Moltex would require to fabricate the material into fuel.³ Terrorists willing to accept a small increase in their lifetime cancer risk would not require a hot cell.

Since we sent those letters, you have appointed a new Minister of Foreign Affairs, Mélanie Joly, and a new Minister of Natural Resources, Jonathan Wilkinson. I am therefore copying them in this letter.

I am also copying your new Minister of Environment and Climate Change, Steven Guilbeault, because of refuted environmental claims by Moltex for its reprocessing technology that should also be considered in your government’s expert review. As detailed in our letter to you of 27 July, the claim repeated by Moltex that the radioactive waste from its reprocessing of CANDU fuel would pose a hazard of significantly lesser longevity than that of the original CANDU fuel has been refuted by comprehensive studies by the US National Academies and SKB the company responsible for Sweden’s spent fuel repository. We note also that the Idaho National Laboratory, which developed the pyroprocessing technology that Moltex proposes to use, has, after decades of effort, yet to demonstrate the conversion of the radioactive salt waste into a stable form suitable for disposal.⁴

I hope to hear from your government on this matter. If requested, our group can provide additional relevant background information. For example, I co-authored a proliferation assessment of pyroprocessing in 2005.⁵ Its conclusion was confirmed in 2009 by a joint assessment by experts from six US national laboratories.⁶ It have also recently co-authored an overview book on the issues involved in plutonium recycle.⁷ Some of my co-signatories have also done significant work on the subject. Two are no longer available as independent analysts because one has joined the State Department and another a national nuclear laboratory.

Given the gravity of the issues involved, this is a public letter, as were the 25 May and 27 July letters to you from our group. I will share this follow-up with my co-signatories on those previous letters as well as any responses received from your government.

Sincerely,



Frank N. von Hippel, Professor of Public and International Affairs, emeritus
Program on Science and Global Security, Princeton University (for identification only)
fvhippel@princeton.edu

cc. Mélanie Joly, Minister of Foreign Affairs, melanie.joly@parl.gc.ca
Jonathan Wilkinson, Minister if Natural Resources jonathan.wilkinson@parl.gc.ca
Steven Guilbeault, Minister of Environment and Climate Change, Steven.Guilbeault@parl.gc.ca.

¹ “US experts concerned that Canadian support for extracting plutonium from spent nuclear fuel is undermining the global nuclear-weapons nonproliferation regime,” 25 May 2021, <https://sgs.princeton.edu/sites/default/files/2021-06/Open-Letter-to-Prime-Minister-Letter-Trudeau-May-2021.pdf>.

² “13 US Nonproliferation Experts Request a Review of the Department of Energy’s Promotion of Civilian Plutonium Separation,” 20 June 2021, <https://sgs.princeton.edu/sites/default/files/2021-11/letter-to-biden.pdf>.

³ “Re: US experts concerned that Canadian support for extracting plutonium from spent nuclear fuel is undermining the global nuclear-weapons nonproliferation regime,” 27 July 2021, <https://sgs.princeton.edu/sites/default/files/2021-11/second-letter-to-trudeau.pdf>.

⁴ Michael Patterson, “Update on EBR-II Used Fuel Treatment,” presentation to the National Academy of Sciences Committee on Merits and Viability of Different Nuclear Fuel Cycles and Technology Options and the Waste Aspects of Advanced Nuclear Reactors, 29 Sept 2021, slides 14 and 17, <https://www.nationalacademies.org/event/09-28-2021/merits-and-viability-of-different-nuclear-fuel-cycles-and-technology-options-and-the-waste-aspects-of-advanced-nuclear-reactors-meeting-10-september-28-29-2021-public-sessions>.

⁵ Jungmin Kang and Frank von Hippel, “Limited Proliferation-Resistance Benefits from Recycling Unseparated Transuranics and Lanthanides from Light-Water Reactor Spent Fuel,” *Science & Global Security*, Vol. 13:169–181, 2005, <https://scienceandglobalsecurity.org/archive/sgs13kang.pdf>.

⁶ R. Bari et al, “Proliferation Risk Reduction Study of Alternative Spent Fuel Processing,” Brookhaven National Laboratory, BNL-90264-2009-CP, 2009, <https://www.bnl.gov/isd/documents/70289.pdf>.

⁷ Frank von Hippel, Masafumi Takubo and Jungmin Kang, *Plutonium: How Nuclear Power’s Dream Fuel Became a Nightmare* (Springer, 2019) <https://link.springer.com/book/10.1007/978-981-13-9901-5>.