NUCLEAR PROLIFERATION
PREVENTION PROJECT

August 30, 2023

Willettia Amos
U.S. Department of Energy
Idaho Operations Office
1955 Fremont Avenue
Idaho Falls, Idaho 83415-1235
Email: MCRE@id.doe.gov

Re: Proposed FONSI for the MCRE Violates Environmental Law and Nonproliferation Policy

Dear Ms. Amos,

This submission responds to the announcement by the Department of Energy (DOE) on August 1, 2023, of a public comment period for the "Final Environmental Assessment (EA) for the Molten Chloride Reactor Experiment (MCRE) Project" (DOE/EA-2209, Revision 0), dated August 2023, and its related, "Proposed Finding of No Significant Impact (FONSI)," under which the Department would not prepare an Environmental Impact Statement.

The Final EA includes a response (pp. 78-80) to the comments that I had submitted to the Draft EA, in which I had opposed the MCRE's planned use of weapons-grade, highly enriched uranium (HEU) fuel, and called for a halt to the project until preparation of an Environmental Impact Statement and Nonproliferation Impact Assessment.[1] The final EA offers three arguments for why the MCRE should proceed with the planned use of more than 600 kilograms of HEU, which would contravene longstanding U.S. nonproliferation policy. None of these arguments is persuasive, as I explain below.

First, the EA argues that, "Nuclear nonproliferation and the preparation of a Nonproliferation Impact Assessment are issues that are considered beyond the scope of this EA" (p. 78). This ignores decades of U.S. government precedent, as documented in my preceding submission that had cited six instances in which the DOE prepared a nonproliferation assessment in conjunction with an environmental evaluation of a proposed action that, like the MCRE, would increase risks of nuclear proliferation.[2]

[1] Letter from Alan J. Kuperman to Willettia Amos, "Proposed Idaho Reactor (MCRE) Violates U.S. Nonproliferation Policy of HEU Minimization," April 13, 2023, https://sites.utexas.edu/nppp/files/2023/04/MCRE-EA-comment-2023-April.pdf.

[2] U.S. Department of Energy, Office of Arms Control and Nonproliferation, "The National Ignition Facility (NIF) and the Issue of Nonproliferation," December 1995, https://www.osti.gov/biblio/187216. U.S. Department of Energy, Office of Arms Control and Nonproliferation, "Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Excess Plutonium Disposition Alternatives," DOE/NN-0007, January 1997, https://www.osti.gov/biblio/425259. U.S. Department of Energy, Office of Arms Control and Nonproliferation, "Nonproliferation Impacts Assessment for the Management of the Savannah River Site Aluminum-based Spent Nuclear Fuel," DOE/NN-99001919, December 1998, https://www.osti.gov/biblio/319653. U.S. Department of Energy, Office of Arms Control and Nonproliferation, "Nonproliferation Impacts Assessment for the Treatment and Management of Sodium-Bonded Spent Nuclear Fuel," DOE/EIS-0306D, July 1999. U.S. Department of Energy, Office of Arms Control and Nonproliferation "Nuclear Infrastructure Nonproliferation Impact Assessment," DOE/NE-0119, September 2000, https://sites.utexas.edu/nppp/files/2023/04/NPIA-FFTF-2000-optimized.pdf. U.S.

Second, the EA argues that the MCRE's proposed HEU fuel would not violate longstanding U.S. nonproliferation policy to minimize domestic and foreign use of HEU fuel, on grounds that "MCRE is not a research reactor but will be an experimental reactor that is planning to operate for a limited time, after which it will be decommissioned" (p. 78). This is unpersuasive for several reasons. Most obviously, the MCRE is a reactor intended mainly to research and test fuel and materials for potential use in future reactors, which means it is a research reactor. The EA itself says the project will, "conduct applied research and engineering development activities" (p. 8), and that this "research is still needed to generate data on key phenomena" (p. 56). Such research and testing of fuels and materials is the main function of research and test reactors, which the U.S. government for 45 years has required to convert from HEU to LEU fuel on nonproliferation grounds. Indeed, since 1978, the flagship U.S. HEU minimization program has been named the Reduced Enrichment for Research and Test Reactors program. The MCRE's relatively short, six-month planned duration of operation does not change the fact that it is a research reactor, and the MCRE would actually use more HEU than did most research reactors over their entire lifetimes prior to implementation of the HEU minimization policy. Moreover, the U.S. government in recent years has expanded its HEU minimization policy to apply to other land-based nuclear activities too, including experimental reactors for Army mobile reactors,[3] experimental reactors for space reactors,[4] and targets for production of medical isotopes,[5] so even if MCRE were not a research reactor, its use of HEU fuel still would violate this U.S. nonproliferation policy.

Third, the EA argues that HEU fuel is necessary to reduce the size and cost of the reactor, by claiming that, "if MCRE was fueled with high assay low enriched uranium (HALEU) instead of HEU, the reactor core would be roughly three times taller, three times wider, and contain 40 times the volume of fuel salt. This would significantly increase not only the construction cost, but also the source term and volume of irradiated fuel salt requiring storage until future reuse." The EA provides no documentation or peer review of these claims, which must be examined in an Environmental Impact Statement and associated Nonproliferation Impact Assessment, which also should compare the proliferation consequences of the MCRE using HEU versus LEU. Even if such claims were correct, they would not justify violating U.S. nonproliferation policy by using HEU fuel in the MCRE. Indeed, foreign and domestic operators of research reactors frequently have tried to resist converting from HEU to LEU fuel by claiming that conversion would increase the mass of uranium in their reactor core, the volume of their spent fuel, and their operating costs.[6] The U.S. government repeatedly has rejected such arguments on nonproliferation grounds.

If a foreign country today announced that it were going to build and operate a reactor using over 600 kg of weapons-grade uranium fuel, and attempted to justify it by saying that HEU would reduce costs and that the reactor would operate only for six months, the U.S. government would staunchly oppose it on

---

Department of Energy, Office of Nonproliferation and International Security, "Draft Nonproliferation Impact Assessment for the Global Nuclear Energy Partnership Programmatic Alternatives," December 2008, https://curie.pnnl.gov/system/files/documents/not%20yet%20assigned/gnep_npia.pdf.

[3] U.S. Secretary of Defense, "Request for Solutions: Pele Program Phase 1," May 2019.

[4] Alan J. Kuperman, "Avoiding HEU in Space Reactors: An Emerging Consensus," in *NETS - 2021, Nuclear and Emerging Technologies for Space, Conference Proceedings* (American Nuclear Society, Aerospace Nuclear Science and Technology Division, 2021), https://sites.utexas.edu/nppp/files/2021/04/Space-Reactors-NPPP-2021-April.pdf.

[5] U.S. Department of Energy, "NNSA's Molybdenum-99 Program: Establishing a Reliable Domestic Supply of Mo-99 Produced Without Highly Enriched Uranium," https://www.energy.gov/nnsa/nnsas-molybdenum-99-program-establishing-reliable-domestic-supply-mo-99-produced-without (accessed April 12, 2023).

[6] Alan J. Kuperman, "Nuclear Nonproliferation via Coercion and Consensus: The Success and Limits of the RERTR Program (1978–2004)," in *International Cooperation on WMD Nonproliferation*, ed. Jeffrey W. Knopf (Athens, GA: University of Georgia Press, 2016): 46-71.

nonproliferation grounds. Thus, the U.S. government must avoid setting this dangerous precedent, which would make it harder to prevent other countries from doing likewise.

Earlier this year, on May 30, 2023, some 20 nonproliferation experts – including three former U.S. Assistant Secretaries of State for nonproliferation, and three former commissioners of the U.S. Nuclear Regulatory Commission – sent a letter to the Secretary of Energy and Under Secretary for Nuclear Security, warning that proceeding with the current MCRE design "would undermine the longstanding U.S. policy of HEU minimization, and thereby increase risks of nuclear proliferation and nuclear terrorism." The letter urged them instead "to suspend further work on the MCRE until your department's Nuclear Energy office develops an alternative LEU design."[7]

The current HEU design of the MCRE, by raising risks of nuclear proliferation and nuclear terrorism, would increase the risk of nuclear weapons actually being used, which obviously would have massive environmental consequences. The final EA and proposed FONSI ignore entirely these environmental consequences of the MCRE, so they are deficient and non-compliant with the National Environmental Policy Act.

Thank you for this opportunity to provide public comment.

Sincerely,

Alan J. Kuperman
Coordinator, Nuclear Proliferation Prevention Project

[7] Letter from nonproliferation experts to Jennifer M. Granholm and Jill Hruby, May 30, 2023, https://sites.utexas.edu/nppp/files/2023/05/MCRE-group-letter-2023-May-FINAL.pdf.