SRS WATCH

Savannah River Site Watch

August 11, 2020

Dan Brouillete, Secretary
United States Department of Energy
1000 Independence Ave., SW
Washington, D.C. 20585
The.Secretary@hq.doe.gov

Lisa E. Gordon-Hagerty, Administrator
National Nuclear Security Administration
United States Department of Energy
1000 Independence Ave., SW
Washington, D.C. 20585
Lisa.Gordon-Hagerty@nnsa.doe.gov

William I. White
Senior Advisor for Environmental Management to the Under Secretary for Science
Office of Environmental Management
United States Department of Energy
1000 Independence Ave., SW
Washington, D.C. 20585
William.White@em.doe.gov

Need for Programmatic EIS on Plutonium Processing and Disposition via Dilute & Dispose; Must be Coordinated with PEIS on Plutonium Pit Production for Nuclear Weapons

Dear Secretary Brouillette, Administrator Gordon-Hagerty and Senior Adviser White:

I am writing to you to request a commitment by the U.S. Department of Energy to prepare a Programmatic Environmental Impact Statements (PEIS) on potential complex-wide technical and environmental impacts related to the disposition of surplus plutonium via the "dilute and dispose" technique.

While the Savannah River Site has to this point been selected as the site where the dilute & dispose (D&D) process would take place and Los Alamos has been designated the site where purified plutonium oxide for D&D would be produced, via the Actinide Recovery and Integrated

Extraction System (ARIES), circumstances are apparently changing regarding the roles of those and other DOE sites with the project. Those changing circumstances dictate that a new National Environmental Policy Act (NEPA) assessment be conducted on all aspects of D&D and that new NEPA document would initially be in the form of a PEIS.

It is of highest significance that a National Academies of Sciences panel recommended in its April 2020 report on *Disposal of Surplus Plutonium at the Waste Isolation Pilot Plant* that a PEIS be prepared, involving both DOE's Office of Environmental Management (EM) and the National Nuclear Security Administration (NNSA). SRS Watch concurs with the NAS recommendation:

> RECOMMENDATION 5-5: The Department of Energy should implement a new comprehensive programmatic environmental impact statement (PEIS) to consider fully the environmental impacts of the total diluted surplus plutonium transuranic (DSP-TRU) waste inventory (up to an additional 48.2 MT) targeted for dilution at the Savannah River Site and disposal at the Waste Isolation Pilot Plant (WIPP). Given the scale and character of the diluted surplus plutonium inventory, the effect it has on redefining the character of the WIPP, the involvement of several facilities at several sites to prepare the plutonium for dilution, a schedule of decades requiring sustained support, and the environmental and programmatic significance of the changes therein, a PEIS for the whole of surplus plutonium that considers all affected sites as a system is appropriate to address the intent and direction of the National Environmental Policy Act and would better support the need for public acceptance and stakeholder engagement by affording all the opportunity to contemplate the full picture. (page 9)

As the PEIS would examine preparation of purified plutonium oxide for D&D, this aspect dovetails with the mandated PEIS that will have to be prepared on the proposed expansion of production of plutonium pits for nuclear weapons. In draft environmental documents on pit production, the method of plutonium purification for pits has not been revealed in the detail required. Neither has there been a discussion of how plutonium purification methods and schedules could overlap between D&D, pit production and production of purified plutonium for the proposed Versatile Test Reactor (VTR).

Though her exact comments are not yet available, it is understood that Ms. Virginia Kay of NNSA's Office of Material Disposition stated at the recent International Nuclear Materials Management (INMM) conference that DOE was reconsidering its NEPA strategy because of the NAS recommendation that DOE conduct a PEIS for D&D. We anticipate that this new strategy will be a decision by DOE to conduct a PEIS.

In a May 2018 presentation by Ms. Kay, entitled *Surplus Plutonium Disposition (SPD) Life-Cycle Cost Estimate (LCCE)*, she indicated that a Notice of Intent for an EIS on plutonium disposition via D&D would be issued in Fiscal Year 2018, but that still has not happened. No site-specific EISs should be prepared until the overarching PEIS has concluded. That neither the PEIS nor site-specific EIS documents have been prepared will severely impact the D&D timelines NNSA has presented, raising serious doubts about D&D at SRS being fully operational by 2028.

Given a host of other questions and unknowns concerning both plutonium oxide production and downblending rates, the PEIS is clearly the NEPA approach the NNSA must take. Issues supporting the PEIS include:

1. **Questions concerning capacity of WIPP of TRU waste streams, as discussed in the NAS report**

As the NAS study affirms, the DOE's Waste Isolation Pilot Plant (WIPP) in New Mexico receives or may receive transuranic (TRU) waste from various processes involving plutonium, including from D&D and from production of plutonium pits for nuclear weapons. The report affirms that the volume of WIPP is legally capped: "WIPP is the nation's only operational deep geologic repository for nuclear waste. It is licensed to receive only defense TRU waste and has a capacity established by law of 175,564 cubic meters." (page 2)

The NAS report includes a recommendation on the capacity of WIPP:

> RECOMMENDATION 3-1 (modified from Interim Report RECOMMENDATION 1): Capacity at the Waste Isolation Pilot Plant (WIPP) should be treated as a valuable and limited resource by the Department of Energy (DOE). DOE is able to prioritize national security mission waste streams for WIPP (i.e., pit production TRU waste). Because emplacement in WIPP is critical to both DOE's Office of Environmental Management's (DOE-EM's) and DOE's National Nuclear Security Administration's (DOE-NNSA's) dilute and dispose plans, the DOE-NNSA Administrator, in consultation with the DOE-EM Assistant Secretary, should prioritize and reserve Land Withdrawal Act capacity in WIPP for the full amount of DSPTRU waste (2,057 cubic meters). Otherwise, the DOE-NNSA and DOE-EM programs are at risk of not being able to disposition the full amount of 48.2 MT of surplus plutonium via dilute and dispose. (page 7)

The NAS report also states a host of facts of importance, including these:

> The K-Area at SRS has the capacity to stage about 600 CCOs [*Criticality Control Overpacks*] with options to expand as needed (SRNS, 2018c). The plans indicate that about 6,000 CCOs will be staged each year at maximum production, and interim safe storage space will be needed for 6,000 to 7,000 CCOs (about 1 year of production) to accommodate possible delays in shipments to WIPP." (page 53)

> Pantex's role is to provide 26.2 MT of pit material in classified amounts in a licensed Type B package under a classified schedule to the Los Alamos National Laboratory (LANL). This step is unchanged from the previous plan to dispose of surplus plutonium using irradiated mixed-oxide fuel. (page 143)

> DOE-NNSA currently estimates that it will take 31 years to dilute and dispose of all 34 MT of surplus U.S. plutonium, beginning with conceptual process design in 2018 and ending with completion of emplacement of diluted plutonium at WIPP in 2049. (page 157)

Additionally, as DOE is aiming to produce 80 or many more pits per year the maximum amount of TRU waste from pit production is unknown. At 80 or less pits per year, would WIPP have volume for pit TRU waste? At 80 pits per year? At more than 80 pits per year would there be enough volume for the TRU waste? The PEIS must analyze a range of pit production TRU waste generation in competition for WIPP volume along with D&D plutonium and other TRU waste.

Also, the DOE's Office of Nuclear Energy, evidently working on a Memorandum of Understanding with NNSA on VTR plutonium supply, could process plutonium pits to remove plutonium to be used as VTR nuclear fuel. The by-product TRU waste from fuel fabrication would likely go to WIPP. There is not a listing of TRU waste from proposed VTR fuel production in the NAS report, a matter of importance to WIPP volume as unrecoverable scrap from VTR fuel fabrication could be significant. This matter must be discussed in the PEIS on plutonium disposition as VTR fuel waste would compete with volume assigned to D&D TRU waste, pit TRU waste and other TRU waste being shipped from various DOE sites to WIPP.

2. Plutonium downblending rate at SRS before 2028 remains unknown

The DOE's Fiscal Year 2021 budget request to Congress states that the goal is to ramp up to the downblending of plutonium at a rate of 1500 kilograms per year (in 3 gloveboxes) and that downblending activities in the Surplus Plutonium Disposition Project will begin in 2028 and end in 2048. If that production goal and schedule are met, the SPD Project would operate for 20 years at a rate of 1500 kg/year, meaning 4 MT of plutonium have to be packaged prior to 2028.

In a report entitled *Surplus Plutonium Disposition Dilute and Dispose Option Independent Cost Estimate (ICE) Report*, from April 2018, DOE suggested a rapid ramp up in plutonium downblending in the new facility from 2025-2028, from zero to 1640 kg/year. As this production schedule and volume lacks verification this document needs updating.

The Exchange Monitor publication reported on February 22, 2019 in an article entitled *Savannah River Ramps Up Non-MOX Plutonium Downblending* that SRS had downblended only 25.7 kg of plutonium and had started two 12-hour shifts/day seven days a week. But nothing is known about the current downblending rate or how the production rate per year will ramp up to the stated 1500 kg/year goal in 2028.

An article in the May 2020 newsletter of Savannah River Nuclear Solutions (SRNS), entitled *Project complete, Three–phase KIS Process Optimization Outage adds efficiencies to expedite plutonium down-blend*, mentions upgrades to downblending but does not inform us about the quantitative impact of those efficiencies on the current or future downblending rates.

To be clear, a NEPA approach would consist of first a PEIS and then site-specific EISs, such as impacts of bringing an additional 22.5 MT or more plutonium to South Carolina for processing and potentially long-term storage. Both the PEIS and site-specific EIS for SRS must consider

what would happen if new plutonium were to be stranded at SRS due to problems with or changes to the D&D program. And, pit production would mean yet more plutonium to SRS.

While the Department of Energy's FY 2021 congressional budget request for NNSA contains the following language concerning a NEPA analysis, this may no longer be valid particularly if plutonium purification or D&D operations shift to other DOE sites. Most importantly, this does not cover the total amount of plutonium facing D&D and does not clearly answer the question about how much EM and NNSA plutonium would be processed in the SPD Project at SRS.

> In accordance with DOE Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, an appropriate National Environment Policy Act (NEPA) review is required to support the Project. DOE Order 413.3B requires final NEPA documentation prior to CD-2 for the project with a Record of Decision after CD-2 approval but prior to CD-3. In April 2015, DOE issued the *Surplus Plutonium Disposition Supplemental Environmental Impact Statement* (SPD SEIS, DOE/EIS-0283-S2). Although the SPD SEIS ROD does not contain a reference to installation of any specific number of gloveboxes for the purpose of implementing the Dilute and Dispose approach for the 6 metric tons (MT) of non-pit plutonium, the information contained in the *Savannah River Site and Los Alamos National Laboratory Timing and Throughput Assumptions Used for the Surplus Plutonium Disposition Supplemental EIS* (April 2015) clearly indicates that installation and operation of three (3) additional glovebox lines were analyzed as part of the development of the SPD Supplemental EIS. Because the installation of three (3) additional glovebox lines for implementing the Dilute and Dispose strategy for the 6 MT of non-pit plutonium was previously analyzed and is consistent with the conceptual design for the SPD Project, no additional NEPA analyses or decisions are required to design, procure, and construct the SPD Project. (pages 660-661)

While 34 MT of plutonium is currently under discussion for processing in the D&D project the amount to be disposed of in WIPP could end up be far more than that amount as almost 60 MT have been declared surplus. The PEIS must take into account amounts greater than 34 MT to be disposed of in WIPP. Of course, the larger the amount of surplus plutonium proposed to be disposed of in WIPP the greater the strain placed on the Land Withdrawal Act volume cap.

3. Production of plutonium oxide for D&D and pits remains unclear

As highlighted in the October 2019 Government Accountability Office (GAO) report entitled *NNSA's Long-Term Plutonium Oxide Production Plans Are Uncertain*, the GAO outlines the amount of surplus plutonium awaiting disposition (though these numbers may not now be up to date):

> Of the Department of Energy's (DOE) inventory of surplus plutonium, about 43.8 metric tons (MT), or 77 percent, is plutonium metal that could be converted to plutonium oxide for dilution and disposal. Of this amount, the National Nuclear Security Administration (NNSA) manages 33.3 MT in the form of pits, DOE's Office of Environmental Management (EM) manages 6.5 MT, and DOE's Office of Nuclear Energy manages 4 MT in the form of

reactor fuel. EM manages another 11 percent, or 6.4 MT, of DOE's surplus plutonium that is already in oxide form. Most of this is suitable for dilution and disposal at the Waste Isolation Pilot Plant (WIPP), a repository in New Mexico. An additional 12 percent, or 7 MT, of DOE's surplus plutonium is contained in spent nuclear fuel that is planned for disposal in a geologic repository. ("Finding" on "highlights" page, page 2 pdf)

The GAO report goes on to point out various things about the disposition plan:

NNSA's 2018 conceptual plan calls for converting 26.2 MT of this surplus plutonium into oxide by 2045. In September 2019, NNSA approved the production of about 1.2 MT of plutonium oxide through 2025 at its Los Alamos National Laboratory (LANL) located in New Mexico. However, plans for converting additional surplus plutonium into plutonium oxide are uncertain because of two issues. These issues include NNSA's still-developing plans for new pit production, which will also take place at LANL, and issues surrounding the agency's ability to ship newly produced plutonium oxide for dilution to DOE's Savannah River Site (SRS) in South Carolina. According to agency officials, NNSA and DOE are taking several actions that, if successfully implemented, are designed to allow NNSA to meet its long-term plutonium oxide production goals. These actions include continuing to review plutonium oxide and pit production plans, increasing plutonium storage at LANL, reducing the amount of SRS's surplus plutonium, and accelerating the shipment of diluted plutonium from SRS to WIPP. ("Finding" on "highlights" page, page 2 pdf)

In February 2019, NNSA officials said that they were reevaluating the agency's long-term plutonium oxide production goals in the 2018 conceptual plan because of two key issues. These issues are space constraints relating to (1) the agency's mission to produce new pits in PF-4 and (2) requirements to remove plutonium from SRS. (page 16)

NNSA officials told us in February 2019 that as a result of pit production requirements, the agency might need to use a portion of the processing areas in PF-4 for pit production that the agency had planned to use for plutonium oxide production. Pit production requirements also may use more space in the high-security vault in PF-4 where plutonium must be temporarily stored. Also in February 2019, NNSA officials said that PF-4's high-security storage space is already near full capacity and that pit production may demand storage space that NNSA had planned to use for plutonium oxide production. (page 18)

The GAO report affirms potential conflicts between pit production and D&D and underscores that it is unlikely that more plutonium would be shipped to South Carolina until a dispute over removal of plutonium from SRS is resolved with the State of South Carolina and the public. GAO goes on to say that DOE "continues to work on refining the long-term plutonium oxide production goals in its 2018 conceptual plan. However, NNSA officials said that establishing firm long-term plutonium oxide production plans now would be premature and that the agency would use the next several years to balance plutonium oxide production, pit production, and shipment issues as they refine long-term production plans." (page 22)

Yet, despite the need to clarify plutonium oxide production plans for both pits and D&D, DOE has failed to do so. In the draft Supplement Analysis on expanded pit production at Los Alamos and the draft EIS on pit production at SRS, NNSA failed to clarify both the chosen production methods and production rates for plutonium oxide for pits (and D&D). Likewise, NNSA did not mention the possibility of the "sanitization" of pits for the plutonium portion of the fuel supply for the Versatile Test Reactor's metallic fuel. ("Sanitization" is a strange term presented in a July 2020 SRNL document entitled *Conceptual Assessment of VTR Add-on Processing Capability*.)

4. Public demands removal of 11.5 MT of plutonium currently stored at SRS before more plutonium comes in to South Carolina; pace of this removal must be clarified

According to a recent report from the Savannah River National Lab, 11.5 metric tons of plutonium continue to be stored in the K-Area at SRS. That report, *Conceptual Assessment of VTR Add-on Processing Capability* (SRNL-TR-2020-00171, Rev. 1, July 6, 2020), mentions details about that material:

> Allender (2020) reports the current inventory in KAMS (K-Area Materials Storage facility) is 11.5 MT Pu, of which, approximately 7.9 MT is weapons grade, and 3.7 MT is fuel grade. Additional sources of domestic plutonium include 0.7 MT of Pu as unirradiated FFTF (Fast Flux Test Facility) fuel (stored in casks at SRS) and approximately 4 MT of Pu as ZPPR (Zero Power Physics Reactor). Figure 2.1 shows a breakdown of the domestic inventory. Approximately 2.8 MT of the KAMS plutonium inventory is oxide that remains under International Atomic Energy Agency (IAEA) safeguards. (In Allender, J. S., "*Plutonium Inventory Summary for K-Area SRS*," M3-SR-20-0009, Revised March 17, 2020, for which a Freedom of Information Act request was filed by SRS Watch on July 27, 2020.)

As mentioned above, the operative policy is no additional plutonium shipments to South Carolina before the current stockpile is removed, and this is what the public in South Carolina expects of DOE. DOE must promptly outline how the current plutonium stockpile will be removed from South Carolina and at what annual rate. It is troubling that DOE has not or cannot outline plans to the public for removal of the current 11.5 MT stored at SRS.

Receipt of additional plutonium at SRS for either D&D or pits will face challenges. Failure to remove all the plutonium now stored in KAMS before receipt of yet more plutonium for D&D or pit production could negatively impact proposed plans for both expanded D&D and pit fabrication in the abandoned plutonium fuel (MOX) building and will face public opposition.

While the bulk of plutonium for pit production at SRS would come from pits, non-pit plutonium would also be involved. The amount of this material needs clarification, which prompted a SRS Watch FOIA request on July 27, 2020 for this document: *Savannah River Plutonium Processing Facility (SRPPF): Potential Non-Pit Feed Materials for SRPPF*, SRNL-TR-2019-00206, September 2019.

5. Senate report on National Defense Authorization Act (NDAA) for Fiscal Year 2021 on moving ARIES to "alternative locations," including SRS

The Senate report accompanying the NDAA for Fiscal Year 2021, passed by the full Senate on July 23, 2020, included language, in a section entitled "Responsibility for Los Alamos Plutonium Facility 4 and Technical Area 55," that stated that relocation of the ARIES plutonium oxide production system to another DOE site, possibly SRS, should be reviewed:

> Given competing demands on space in PF–4 and the cost of and risk inherent in shipping plutonium, the committee believes that the NNSA should consider alternative locations for the oxide production mission, including at the SRS.
>
> Therefore, the committee directs the Administrator of the NNSA to provide a report to the congressional defense committees no later than March 1, 2021, on options for continued plutonium oxide operations, including continuing the mission in PF–4 and moving it to the SRS. In the analysis of continuing operations in PF–4, the Administrator shall list estimated annual costs as well as the expected impact to the priority PF–4 mission of plutonium pit production of 30 pits per year and at a surge level of 50 pits per year. In the analysis of moving the ARIES mission to the SRS, the Administrator shall include the estimated timeline and costs for doing so and estimated annual cost of operations. Either option should also include consideration of the need to meet the requirements to remove a certain amount of plutonium from the state of South Carolina by the end of next year. (page 416)

While this language is not yet legally binding it reflects support for the possible relocation of ARIES to another site, which could include SRS or perhaps Pantex, where over 15,000 plutonium pits are stored. (Reuse of those pits must be substantively reviewed in the required pit PEIS.)

A formal proposal by DOE to consider relocation of ARIES to an "alternative location" would trigger a PEIS and then, once a Record of Decision were issued, require a site-specific EIS on the ARIES process and on the accompanying relocation of D&D, if that were the proposal.

6. Suggestions to review transfer of ARIES from Los Alamos to Pantex, along with D&D

The chronic problems in handling plutonium at PF-4 at Los Alamos and the fact that Pantex is where the plutonium supply is located may well indicate Pantex as an obvious site to evaluate for the ARIES and D&D missions. A paper was presented at the recent INMM meeting that focused on this new option.

In any proposed shift of ARIES and/or D&D to Pantex or any other site, a comparison of impacts of the security risks involving transportation of plutonium long distances must be considered in the PEIS.

If relocation of ARIES and D&D to Pantex or another site is being seriously considered by DOE, as it surely must be, planning at SRS for the D&D mission would be impacted and those financial, staffing and technical impacts must be analyzed as soon as possible, first in a PEIS and then in site-specific EISs.

In conclusion, given the evolving nature of the program, DOE must begin a Programmatic EIS on its plutonium disposition program, including on the rate of purified plutonium from ARIES, options for the relocation of ARIES, options for the relocation of the dilute & dispose process and impacts of 34+ MT of surplus plutonium to WIPP. This PEIS must be coordinated with the required PEIS on pit production as efforts with plutonium disposition and pit fabrication overlap in a number of areas. Along with the PEIS, preparation and public release of updated support documents on disposition costs, technical aspects and scheduling would be necessary. Additionally, planning and funding for the SPD Project at SRS should be slowed until such time as it becomes clear if an "alternative location" for ARIES and D&D is selected and analyzed.

Thank you very much for a response to this letter and the requests in it.

Sincerely,

Tom Clements

Tom Clements
Director, Savannah River Site Watch (SRS Watch)
1112 Florence Street
Columbia, SC 29201
tomclements329@cs.com, tel. 803-834-3084, https://srswatch.org/

CCs:

Mr. Bruce M Diamond, General Counsel, National Nuclear Security Administration, bruce.diamond@nnsa.doe.gov

Ms. Nicole Nelson-Jean, Manager of NNSA's Savannah River Field Office, Nicole.Nelson-Jean@nnsa.srs.gov

Ms. Virginia V. Kay, NNSA Office of Material Disposition, virginia.kay@nnsa.srs.gov

Mr. Mark Senderling, Deputy Assistant Secretary for Waste and Materials Management, Office of Environmental Management, mark.senderling@em.doe.gov

Mr. Michael D. Budney, Manager of the Department of Energy's Savannah River Site, michael.budney@srs.gov

Ms. Jennifer Nelson, for record of *Draft Environmental Impact Statement on Plutonium Pit Production at Savannah River Site; Aiken, South Carolina,* Jennifer.Nelson@nnsa.srs.gov, NEPA-SRS@srs.gov