SRS WATCH

Savannah River Site Watch

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Comments by Savannah River Site Watch (SRS Watch) on the Draft Environmental Impact Statement for the Surplus Plutonium Disposition Program (SPDP EIS) (DOE/EIS–0549: https://www.energy.gov/nepa/doeeis-0549-surplus-plutonium-disposition-program)

I submit these comments by Savannah River Site Watch for the official draft EIS record and expect each point raised in them and the appendix to be addressed in the final EIS. SRS Watch is a duly registered 501c3 non-profit organization and a registered business with the State of South Carolina.

Please confirm receipt of these comments and make sure that SRS Watch is on any distribution list for the final EIS and any Record of Decision that might be issued: srswatch@gmail.com.

I reserve the right to submit additional comments on the draft EIS and to submit comments before any ROD is issued. If I do submit post-EIS, pre-ROD comments, I request that they be addressed in the ROD as it appears in any Federal Register notice.

I underscore that I have been involved in the matter of "disposal" of surplus plutonium managed by the Department of Energy since the National Academy of Sciences issued the reports on *Management and Disposition of Excess Weapons Plutonium* in 1994 and 1995 and am thus very familiar with the matter at hand.

As a backdrop to disposition of "surplus" plutonium, it should be pointed out that during the madness of the Cold War, the United States produced about 103 metric tons of weapon-grade plutonium. About 67 MT were produced at the Hanford site in Washington State and about 36 MT were produced in five non-power heavy water reactors at the Savannah River Plant in South Carolina. Details about plutonium production, storage and disposition were outlined in the important 1996 document by DOE, *Plutonium: The First 50 Years*

(https://www.osti.gov/servlets/purl/219368). Release of that document was perhaps at the pinnacle of DOE openness and public participation, which currently is unfortunately in retreat.

Plutonium Immobilization was the best option, immobilization option should be reviewed

From the start, I supported the plutonium immobilization option - mixing plutonium with high-level nuclear waste (HLW) to go into canisters being filled at the Defense Waste Processing Facility (DWPF) at the Savannah River Site (SRS) - as the best option for plutonium disposal. Unfortunately, due to the political influence of those who supported the fabrication of surplus plutonium into mixed uranium-plutonium oxide (MOX) as fuel for purported use in commercial nuclear power plants, the "can in canister" immobilization option was terminated in 2002. Little explanation was given about why immobilization was terminated, and the "all MOX" option was then pursued. Immobilization was not terminated due to cost reasons as it was cheaper than MOX, which was proven true when the cost of MOX blew through the roof, causing the MOX boondoggle to be terminated after billions of dollars of taxpayer money were wasted.

The draft EIS affirms the can-in-canister immobilization project was terminated, though gives a questionable reason for its termination, and indicates that R&D on it was halted:

> The program was cancelled in 2002 because of budgetary constraints. Subsequently, further refinement of the technology was stopped, and DOE infrastructure and expertise associated with this technology have not evolved or matured.

Termination of the plutonium immobilization option was a monumental and costly mistake by DOE and that incorrect decision has never been properly explained or investigated by DOE or Congress. Why not? Likewise, pursuit and termination of the costly MOX project and the role of DOE and contractors in mismanaging that project and in its termination have not been investigated by Congress or DOE's Office of Inspector General. Perhaps one day there will be a full accounting of mismanagement of the MOX project and the resultant waste of billions of dollars in taxpayer money.

Thus, plutonium disposition via dilute & dispose has emerged without the benefit of information that would have been yielded if necessary investigations into the MOX project had been conducted and if proper "lessons learned" analyses had been conducted.

While DOE has presented various disposition alternatives in the draft EIS, the best option for disposal of surplus plutonium would have been the immobilization option. While DOE terminated research & development of this option and lacks infrastructure to quickly carry it out, the final EIS must address what happened to this option and why it was terminated and why it is not currently well on the way to disposing of surplus plutonium (if it had been implemented 15 years ago).

The summary document of the draft EIS states: "NNSA needs to disposition 34 MT of surplus plutonium in a safe and secure manner and in a reasonable time frame at a cost consistent with fiscal realities." Really? I question the sincerity of the latter part of this statement.

Please define what the terms "reasonable time frame" and "cost consistent with fiscal realities" mean. Are these terms defined under DOE's NEPA regulations or generally used in DOE NEPA documents? How does the plutonium disposition project meet the definition of the terms?

If DOE had sought disposal of plutonium in a safe, secure and cost-efficient manner it would have never killed the immobilization option and never would have pursued the MOX debacle and we would now be 15 years into a plutonium disposition program. When terminated, immobilization would have been cheaper than MOX. Now, the draft EIS says immobilization option can't be implemented as it's "expensive and disruptive." Expense never stopped DOE from pursuing MOX, but now DOE claims to be concerned about cost when it suits it to do so.

What DOE did - pursuit of MOX - was the exact opposite of the "safe, secure and cost-efficient" statement above. Thus, what is said in the draft EIS by DOE must be taken with extreme caution as decisions are often made to maximize costs and maximize contractor profit. Or not?

The dubious termination of immobilization, in favor of the all-MOX alternative, remains a stain on DOE's management of plutonium disposition and demands further explanation about why it wasn't carried out and why it was eliminated right when it was about to move forward

Including the immobilization option in this NEPA review will give DOE a platform to explain why the project can't be revived, a discussion which is excluded from the draft EIS. The termination of the MOX project and continued storage of plutonium constitute, in fact, a "significant new circumstance(s) or information that would change the results of the previous evaluations."

Though the draft EIS states that the immobilization option was "eliminated as viable alternative", I request that it be included as an alternative in the final EIS.

Just how much plutonium does DOE plan to dispose of?

Clarify disposal of plutonium beyond the 40 MT now being addressed. How will more plutonium be added to the 34 MT of plutonium covered in the draft EIS?

As pointed out in the draft EIS, DOE decided in a 2016 Record of Decision to dispose of 6 MT via dilute & dispose. That 6 MT is not part of the 34 MT that has been analyzed in the draft EIS now before us. The final EIS must clarify that there are currently formalized plans to dispose of 40 MT of surplus in the Waste Isolation Pilot Plant, which will put strains on the WIPP volume cap under the Land Withdrawal Act.

DOE must clarify which DOE office manages all or part of the 6 MT as well as all or part of the 34 MT and which of those quantities will be given priority in disposal at WIPP or in a second TRU repository.

I note that the U.S. has declared 61.5 metric tons of plutonium to be surplus to defense needs, via two declarations - a 1994 declaration declaring 52.5 MT surplus and a 2007 declaration adding an additional 9 MT to that amount. What is the disposition pathway for the entire 61.5 MT of surplus plutonium?

If DOE is actually now considering disposal of 40 MT of plutonium in WIPP, which includes the 34 MT under review in the draft EIS, what happens to the 21.5 MT of plutonium for which there is apparently no disposal plan? If the 21.5 MT, or a portion of it, were to be processed at SRS (or another site) and go to WIPP, how does this relate to the current draft EIS, to infrastructure needs at SRS and WIPP and to the WIPP volume cap? What type of NEPA analysis would be needed to address an amount of plutonium to be disposed of beyond the 34 MT now being considered in the draft EIS? Would analysis of any amount beyond 34 MT, or 40 MT, be done in the form of a "supplement analysis" to the EIS now under consideration? Or a stand-alone EIS?

If an environmental analysis is in the near future conducted to dispose of more plutonium, beyond 34 MT or 40 MT, will that mean there has been segmentation of the NEPA process? Why isn't the total amount that will eventually be disposed of being analyzed now, as much of that amount can be recognized?

SRS currently stores about 11.5 MT of plutonium in the old K-Reactor. Of that 11.5 MT, 9.5 MT may be covered under an agreement with the State of South Carolina that such an amount will be removed. Please clarify which DOE agency or office manages portions of the 11.5 MT and how much of it is slated for disposal for dilute & dispose? How much is slated for production of pits for nuclear weapons? Which DOE office or agency is responsible for safe storage of portions this material prior to its processing?

Will a technology be needed at SRS to oxidize plutonium already at the site? Or, can such plutonium be pulverized and downblended without oxidation?

Review of disposal of unirradiated DOE fuel containing plutonium?

Also, some of the plutonium slated for disposition may be in the form of unirradiated fuel elements, such as that of the Fast Flux Test Facility (FFTF) or the Zero Power Physics Reactor (ZPPR). Where is such material stored, how will such material be disposed of and where is the environmental analysis of such disposal? Is any of that reactor fuel part of the 34 MT being now considered for disposal?

Additionally, what will happen to the unirradiated test MOX fuel (for lead test assemblies, LTAs)? That MOX fuel was fabricated in France as part of a MOX irradiation test back starting in 2005, in the Catawba reactors in South Carolina. Those unirradiated MOX assemblies were

shipped back to the US along with the LTAs that were irradiated and are evidently now stored at in FS65 containers at Los Alamos National Lab. How much plutonium is in the unirradiated MOX - 28 kilograms? - and how will that plutonium be disposed of? Will it be disposed of via direct placement in WIPP or will there be some sort of pre-disposal processing of the MOX pellets? Will the unirradiated MOX be saved for any future testing purposes?

A 2015 Los Alamos document - *FS65 Disposition Options Report* - (https://permalink.lanl.gov/object/tr?what=info:lanl-repo/lareport/LA-UR-15-26533)- reviewed disposition options for the unirradiated MOX at LANL but that document was pre-MOX-termination and is dated. This option in the document: "Option 2: Ship fuel rods as waste to WIPP" considered packaging of the rods in overpacks with shipment to WIPP. Review of disposal of that material is needed, including in the EIS.

Schedule for downblending, shipments to and from SRS, and risks of more plutonium being stranded at SRS?

Please provide details of the schedule for downblending plutonium at SRS. Such a schedule should include the amounts of plutonium coming into SRS on an annual basis, how much plutonium scheduled for downblending will be at SRS at any one time and what the schedule is for shipping Criticality Control Overpacks from SRS to WIPP.

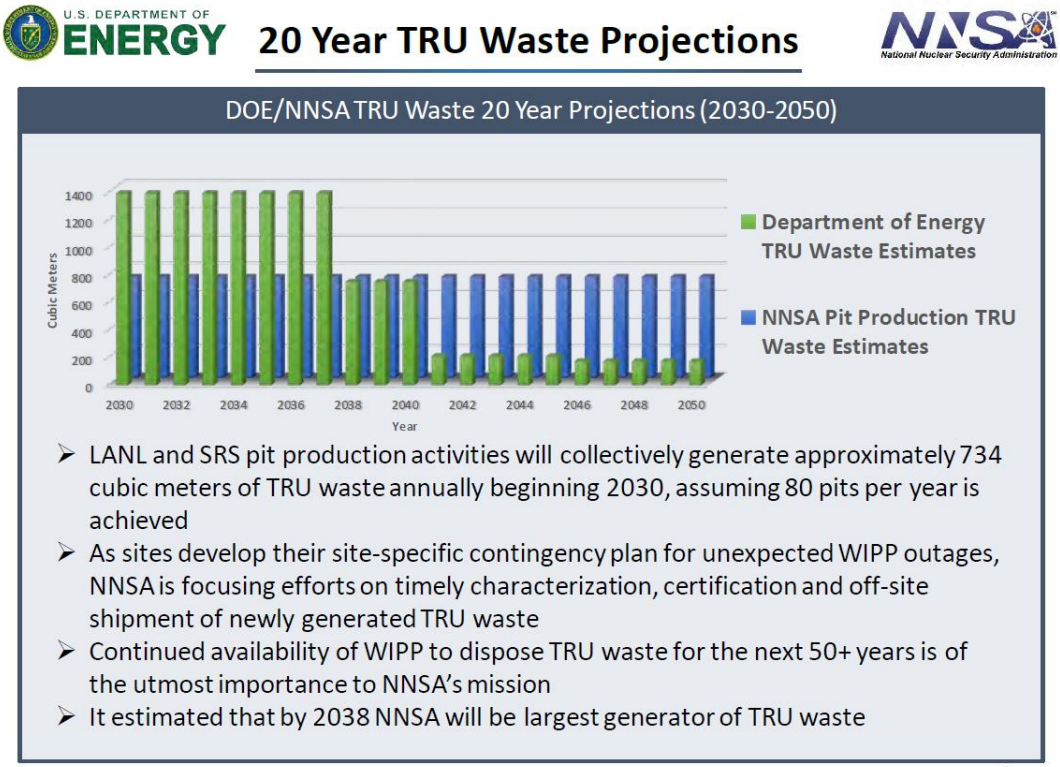
The draft EIS says that 113,400 CCO will be packaged over the life of the project (well, the part of the project involving 34 MT of plutonium). How many TRU shipping containers will be needed to move this material? Will disposal of this material receive priority at WIPP or will shipment be dependent on a schedule set by WIPP?

In an EM update of January 17, 2023, entitled "EM Waste Generator Sites Ramp Up Shipments to WIPP," DOE says "Between Nov. 20 and Jan. 1, the nation's only repository for the disposal of transuranic waste received 70 shipments from DOE waste generator sites." The EIS needs to better address how many annual and total shipments will be needed for the plutonium disposition project and if shipping and disposal capability will be adequate to address the estimated number of shipments.

The draft EIS says that "NNSA has chosen to use fiscal year 2050 as a planning assumption for this EIS and has estimated operational durations based upon anticipated throughputs (as discussed in Appendix B) to complete the 34 MT mission before fiscal year 2050." Why was the year 2050 chosen? "Operational durations" of WIPP will be well beyond 2050 if DOE disposes of 40 MT or up to 61.5 MT of plutonium in WIPP and makes new plutonium pits for around 4000 nuclear weapons (which will generate a large amount of TRU), correct? NNSA will need WIPP, according to what it has said, to 2080 (or later), correct? All timelines will be extended if the Versatile Test Reactor of NE goes forward as the TRU waste from fuel would be significant.

DOE has indicated that it is planning for WIPP to be open beyond 2050 (in spite of no guarantee it will have a permit allowing that from the New Mexico Environment Department). Here is one

indication of DOE's thinking about WIPP TRU disposal running up 2050, with post-2050 implications, at which time plutonium waste from nuclear weapons fabrication takes over:



From RadWasteSummit 2020 - *National Nuclear Security Administration Prioritization Approach*, by James J. McConnell Associate Administrator for Safety, Infrastructure and Operations, September 9, 2020. Obtained by SRS Watch via a FOIA request: https://srswatch.org/wp-content/uploads/2023/01/Doc-1-Radioactive-Waste-Summit-NA-50-Briefing-Final-9-4-20-2-1.pdf

According to a June 27, 2022 DOE (Carlsbad Field Office) letter ("Response to the Referenced Technical Incompleteness Determination–Asterisked Items, Waste Isolation Pilot Plant Hazardous Waste Facility Permit Number: NM4890139088-TSDF") to the New Mexico Environment Department, DOE anticipates that WIPP could be open until 2083: "The ATWIR [Annual Transuranic Waste Inventory Report] indicates that waste streams categorized as WIPP-bound will be generated up to 2070. Based on the potential category waste stream inventory estimates in the 2021 ATWIR, final facility closure could begin no earlier than CY 2083. Regardless of the generation date, the volume of TRU waste emplaced in the repository cannot exceed the WIPP Land Withdrawal Act total capacity limit of 6.2 million ft3 (175,564 m3)."

So, the EIS needs to address the date by which all surplus plutonium will be shipped to WIPP and if 2050 is an accurate date for planning assumptions.

Though future rates will be dependent on various and differing factors, is the anticipated shipping rate enough to get all the SRS CCOs into WIPP? What shipping rate will be needed for shipment of SRS CCOs? How many CCOs will be in one shipment? What is anticipated to be the yearly shipping rate from TRU from all DOE sites over the next 50 years and what is the relationship between those shipment and surplus plutonium disposal?

What guarantees will be given to the State of South Carolina that any "new" plutonium coming in for downblending will be removed and that only small amounts of "new" plutonium will be at SRS at any one time?

If problems occur with downblending and the process is halted, what guarantees will be given to the State of South Carolina that no plutonium will be stranded at SRS? If new plutonium is stranded at SRS please explain how it will be removed.

Concerning the 11.5 MT of plutonium now at SRS, will part of this material be downblended first? What form is that plutonium in? How much is oxide and how much is metal? When will it be removed from the state of South Carolina?

If the program does not go forward, what would happen to the 11.5 MT of plutonium at SRS?

The EIS says that "Some of the capabilities at LANL and SRS are in an early planning stage." What does this mean? When will such stages be finalized? Present the schedule for finalizing the stages and for processing, packaging, shipment and placement of the CCOs in WIPP. What happens if WIPP closes again due to an accident? Please address plans in the EIS for a WIPP "incident."

DOE research documents indicate 3013 plutonium storage cans at SRS could face pitting or corrosion. What is the storage life of a 3013 can? What happens if a can significantly corrodes? Will the SRS 3013 surveillance program catch corroded 3013 containers before they cause problems and/or before they ae scheduled for downblending? Please address 3013 issues and surveillance of those cans.

Volume of WIPP under Land Withdrawal Act

Please clarify exactly what percentage of the Land Withdrawal Act volume cap at WIPP will be filled with Criticality Control Overpacks packaged with surplus plutonium.

The LWA caps the volume of transuranic (TRU) was going into WIPP, form all programs, at 175,564 cubic meters. How much of this volume will be CCOs from the 34 MT and 40 MT? How much of WIPP volume will be taken up by additional plutonium beyond the current 34 MT or by plutonium-bearing materials (such as unirradiated fuel as mentioned above)?

In the draft EIS, is DOE saying that 1500 cubic meters per year at WIPP will be taken up by CCOs? This only includes the inner container and does not include the volume of any additional overpack or packaging drum? Please clarify.

The draft EIS says this about supposedly unsubscribed WIPP volume (page 2-24):

> The WIPP facility had sufficient capacity to accommodate dispositioning of the entire amount of surplus plutonium based on the Annual Transuranic Waste Inventory Report – 2012 (DOE 2012a), published after the Draft SPD SEIS was issued; therefore, a secondary repository was not necessary and the 2015 SPD SEIS WIPP Alternative was revived. Further, as a result of a WIPP facility permit change that separates the volume of disposal containers from the TRU waste volume allowed by the WIPP Land Withdrawal Act (NMED 2018), the apparent lack of unsubscribed disposal capacity at the WIPP facility is no longer a constraint. Therefore, in this SPDP EIS, NNSA is evaluating the impacts of disposing diluted plutonium oxide as CH-TRU waste at WIPP

In order to back up the claim that WIPP volume can handle "the entire amount of surplus plutonium," which could be up to 61.5 MT, DOE must provide evidence. Is no pursuit of a second repository the current position of the New Mexico Environment Department, as far as DOE understands it, or not? Given TRU from plutonium disposition, TRU from pits, legacy TRU, newly generated TRU from other projects and possibly TRU from fuel fabrication for the Versatile Test Reactor, please provide evidence and documentation to support the claim that the volume cap under the Land Withdrawal Act "is no longer a constraint."

The analysis in the 2020 National Academies of Sciences final report *Disposal of Surplus Plutonium in the Waste Isolation Pilot Plant*, on page 179, says: "A special 2017 TRU waste inventory analysis, NNSA Surplus Plutonium Disposition Performance Assessment Inventory Report 2017, was produced by Los Alamos National Laboratory in response to a request by Sandia National Laboratories (LANL 2017). The inventory report included future wastes from the generating sites, was extended through 2050, and included 42.2 MT of surplus plutonium for disposal in WIPP. The inventory analysis notes that WIPP does not have sufficient statutory disposal capacity for all of DOE's surplus plutonium given the volume of TRU waste already emplaced or likely to be emplaced in the repository (LANL 2017)." The EIS must respond to the NAS analysis which questions if there is sufficient volume in WIPP for surplus plutonium.

Is the DOE claim that the LWA volume cap not an issue only because the amount of surplus plutonium would only be 34 MT? Or 40 MT? Is DOE considering of disposing of 42.2 MT of plutonium in WIPP, as stated in the NAS report? Or more?

Including other TRU, especially from pit production and legacy TRU, does WIPP have sufficient volume? Is DOE planning to attempt to get Congress to raise the volume cap now stipulated under the Land Withdrawal Act? Such a controversial move will face push back by politicians and the public in New Mexico and perhaps by the permitting authority, the New Mexico Environment Department. Please discuss.

New permit conditions on WIPP by New Mexico Environmental Department

NMED announced on December 20, 2022 that it's reviewing a new draft hazardous waste operating permit for WIPP: https://www.env.nm.gov/public-notices/wp-content/uploads/sites/32/2022/12/2022-12-20-HWB-WIPP-Renewal-Draft-Permit-Public-Notice-English-Spanish-Final.pdf.

As NMED says, "The permittees are currently operating the WIPP facility under an expired permit that is administratively extended until a new operating permit is issued." A new permit is expected to be issued to DOE in 2024. A renewal of 10 years will not get DOE to the 2050 date by which it claims all plutonium would be disposed of in WIPP. How will DOE deal with a license issued only to 2034? Or only another 10 years beyond that?

In a December 8, 2022 fact sheet on that new permit - https://www.env.nm.gov/wp-content/uploads/2022/12/2022-12-08-COMMS-NMED-Issues-Fact-Sheet-for-the-Waste-Isolation-Pilot-Plant-Draft-Operating-Permit-Final.pdf - NMED proposed new WIPP permit conditions, including:

1. Prioritizing the disposal of legacy DOE wastes at WIPP that are generated from New Mexico clean-up activities.

2. Tying WIPP's closure to the end of the permit term (i.e., 10 years after the new permit is issued) unless the permittees can provide an accurate inventory of all remaining wastes awaiting clean-up and emplacement in WIPP.

3. Revoking the permittees state operating permit should the U.S. Congress change the federal Land Withdrawal Act to allow for increased waste emplacement at WIPP.

4. Suspending any and all waste shipments to WIPP if there are allegations or evidence of a threat to human health or the environment. The Environment Department's mission is to protect and restore the environment and to foster a healthy and prosperous New Mexico for present and future generations.

5. Requiring the DOE to submit a new annual report detailing steps toward siting another geologic repository in a state other than New Mexico.

Thus, based on NMED concerns, DOE must provide an accurate inventory of the volume of surplus plutonium in CCOs going to WIPP, plus other TRU. The EIS must give details about those volumes.

Likewise, if it appears that if DOE were to violate the Land Withdrawal Act volume cap that the permit could be revoked by NMED. As stated earlier, the EIS must clearly detail what volumes of plutonium will go into WIPP, including TRU apart from surplus plutonium, and explain in detail how the LWA volume cap will not be violated. If WIPP were to administratively or otherwise close, please explain what would happen with surplus plutonium disposition.

And, per a possible NMED permit condition, DOE must detail how pursuit of a 2nd repository beyond the current "pilot plant" is proceeding. A statement in the draft EIS that a second repository is not needed may be inaccurate and DOE must clarify this.

In comments on May 18, 2020, on the SRS pit production draft EIS, NMED said:

> Legacy waste, particularly from LANL, must remain a high priority for disposal at the WIPP.
>
> The disposal of SRS TRU waste at the WIPP site must conform to the following requirements:
>
> a. Future waste streams must meet requirements in the DOE WIPP Waste Acceptance Criteria, the WIPP Hazardous Waste Facility Permit Waste Analysis Plan, and the WIPP Transportation Safety Plan Implementation Guide;
>
> b. DOE must adhere to the limits on types and quantity of waste imposed by the 1992 WIPP Land Withdrawal Act, as amended by Public Law No. 104–201 (1996); and
>
> c. Legacy waste, particularly from LANL, must remain a high priority for disposal at the WIPP.

As surplus plutonium is not legacy waste and would not be from LANL (beyond processing into oxide), please explain how surplus plutonium will be disposed of in WIPP if it is not a "high priority" for TRU going into WIPP. Please explain if NNSA/DOE sees a difference between disposal of legacy TRU waste and "new" TRU from plutonium disposition and pit production. Will DOE challenge a NMED permit condition prioritizing legacy waste? How will waste disposal prioritization impact plutonium disposal rates? If, in the new NMED permit, surplus plutonium is not given a priority for disposal in WIPP how will DOE adjust to such a condition?

NMED and the public are concerned that WIPP is being turned into a dump for new plutonium waste streams and with disposal of pit TRU WIPP may well simply become an arm of NNSA nuclear weapons production.

As they would have environmental impacts, I urge DOE not to avoid addressing in the EIS the very real range of permit conditions that NMED might impose on WIPP operation.

Alternative of carrying out program at Pantex must be an option

The draft EIS states that DOE/NNSA considered and rejected a "Pantex Greenfield" alternative in Section 2-2. The draft EIS claims there is no infrastructure at Pantex to carry out plutonium disposition and no funding for it.

The shipment of pits to LANL for plutonium oxide production and shipment of that oxide cross country to SRS makes no sense. Such shipments greatly magnifies the environmental and terrorism risks of transporting weapon grade plutonium, both in the metal and oxide forms. That NNSA liberally tossed billions of tax payer dollars at the failed MOX project, which was a zombie before it was actually terminated, belies claims that DOE is lacking in funds. We can also see that the plutonium pit project is being inundated with money, including an additional $500 million to the SRS pit plant in Fiscal Year 2023, money that the administration did not even request, bringing the SRS pit plant funding to a stunning $1.25 billion.

As Pantex is where the bulk of plutonium to be downblended is located it makes the most sense to implement the plutonium disposition project at Pantex. While the number of pits and total amount of plutonium at Pantex is classified, Pantex could be storing 20,000 pits or near to 60 MT of plutonium.

I therefore request that Pantex be thoroughly considered as an alternative for the plutonium disposition project. If the SRS workforce can learn how to fabricate plutonium pits, a “mission” never done before at SRS, and the equipment and facilities can be provided at SRS, such can be done at Pantex.

Disposal of Rocky Flats plutonium in the Waste Isolation Pilot Plant

When the Rocky Flats pit-production site was permanently closed in the early 2000s, around 4.5 MT of plutonium had been shipped from the site for disposal in WIPP.

I note that the US report to the International Atomic Energy Agency (IAEA) about plutonium management, in IFCIRC 549 of October 14, 2022 - https://www.iaea.org/sites/default/files/publications/documents/infcircs/1998/infcirc549a6-24.pdf - states that 4.5 MT of plutonium “has been disposed to waste after termination of safeguards.” This implies that 4.5 MT of weapon-grade plutonium from Rocky Flats, and some from Hanford or other sites, has been processed for disposal in WIPP and thus safer to handle from a security perspective. (Also see this International Panel on Fissile Materials blog on amounts of plutonium sent to WIPP: https://fissilematerials.org/blog/2016/09/disposition_of_plutonium_.html)

Please clarify how much plutonium from Rocky Flats was sent to WIPP and what form it was in for disposal. When was this material shipped?

How similar was preparation of the Rocky Flats plutonium in WIPP to the dilute and dispose method being used at SRS? Was it downblended? Was it mixed with an inert material such as "stardust?" was it packed into CCOs or POCs?

What is the status of the RF plutonium now in WIPP? Does its containerization remain intact? Has any RF plutonium leaked from where it was placed in WIPP? What are the lessons learned from disposal of the RF plutonium as it compares to the proposal now before us?

Beyond plutonium now at SRS and pits stored at DOE's Pantex site in Texas, what other plutonium in the DOE complex might be disposed of via downblending (or any other process)?

Please set the record straight on downblended shipments from SRS to WIPP

DOE and the EIS needs to publicly clarify the issue of plutonium already shipped from SRS to WIPP.

On January 13, 2023, NNSA issued a news release entitled *NNSA and DOE-EM complete first shipment of downblended surplus plutonium transuranic material to WIPP*. The news release states that "The Department of Energy's National Nuclear Security Administration and Office of Environmental Management completed the first shipment of downblended surplus plutonium transuranic (TRU) material from K-Area at the Savannah River Site to the Waste Isolation Pilot Plant in New Mexico in December."

The statement also says that "This shipment marks a milestone as the first shipment to include defense TRU material from NNSA's Surplus Plutonium Disposition Program. After plutonium is downblended at SRS, it becomes TRU material by definition and can be permanently disposed at WIPP."

DOE's disposal of plutonium from SRS at WIPP merits closer scrutiny. Was the stated shipment in January 2023 the first shipment of downblended surplus weapon-grade plutonium from SRS to WIPP? No, it was not. It may have been the first DOE shipment from the K-Area and the first shipment to WIPP under the commitment to the State of South Carolina to remove plutonium from the state but that shipment occurred almost a decade after the first surplus plutonium was shipped from SRS to WIPP.

Plutonium downblended into "pipe overpack containers" (POCs) and placed into drums were shipped from SRS to WIPP in 2013 and later. In March 2015, I and other NGO colleagues stood outside the storage building in E-Area at SRS where containers of downblended plutonium were said to be stored in concrete culverts that we viewed. That material was being held at SRS as WIPP was temporarily closed due to accidents in February 2014.

The Office of External Affairs at SRS communicated to me on March 20, 2014 that "Savannah River Site has begun shipments of non-moxable plutonium to WIPP and to date, approximately 55 kgs of down blended plutonium has been shipped to WIPP. SRS has approximately 260 pipe overpack containers of down blended plutonium awaiting shipment to WIPP as soon as it reopens." Thus, is it accurate to say that ~94 kilograms of SRS plutonium (55 kilograms + 260 POCs x ~0.15 kg/POC) had already been shipped or was ready to be shipped at the time that WIPP closed for 3 years starting in February 2014?

Just before that observation in E-Area, we had been shown the type of containers into which downblended plutonium was mixed, a "pipe overpack container" as well as the larger capacity "criticality control overpack" (CCO).

Currently the CCO is the preferred container into which surplus plutonium is packaged. Such relatively pure plutonium "surplus to defense needs" is to be contrast with "legacy plutonium" related to "clean up" of DOE projects. Are containers with more capacity than a CCO being considered for use in the future? What are environmental considerations of such a container?

To state for the record, in October 1, 2015, I and some of the same NGO colleagues stood next to TRU drums containing SRS POCs as they sat stranded on the surface in the Waste Handling Building at WIPP, awaiting disposal underground, which we then toured. (Below is a photo of me standing beside the drums containing the SRS plutonium - see the photo linked here).

According to the WIPP Data System, checked by a colleague at the time, the drums containing SRS POCs were taken underground in January 2017, as part of the effort to clear the backlog in the Waste Handling Building prior to the first new TRU shipments being received at WIPP on April 17, 2017.

The SRS plutonium shipped to WIPP prior to February 2014 and after WIPP reopened in January 2017 was authorized by DOE under an "Interim Action Determination" (IAD) entitled "Disposition of Certain Plutonium Materials Stored at SRS" and dated October 17, 2011.

(https://www.srs.gov/general/pubs/envbul/documents/Interim_Action_500kg_to_WIPP_10-17-11.pdf)

That "determination" allowed for disposal of approximately 500 kilograms of SRS plutonium in WIPP in "pipe overpack containers." The material was to be prepared in the now-closed HB-Line located in the H-Canyon reprocessing plant. The IAD said the POCs prepared in the HB-Line would be "staged for shipment" in the E-Area before shipment to WIPP.

The IAD was signed by Dave Moody, the SRS site manager (and former WIPP manager), a position under the DOE's Office of Environmental Management and not under NNSA. This monumental plutonium-disposal decision, which set the stage for the current consideration of disposal of huge amounts of SRS plutonium in WIPP and signaled that MOX was in trouble, should have been the subject of a full-scale Environmental Impact Statement and not a mere bureaucratic decree.

The IAD was perhaps the initial effort to process at SRS and dispose of tens of tons of additional surplus weapons plutonium in WIPP. This effort was pursued long before the plutonium fuel (MOX) debacle was officially terminated in 2018 but when storm clouds were gathering over the ill-fated MOX project. Even in 2011, it was seen that there was a cheaper and quicker option for plutonium disposal than making MOX fuel of it. The colossal DOE error in 2002 to terminate the project to immobilize plutonium in high-level nuclear waste at SRS loomed in the background then, as it still does.

Though the plutonium involved was part of the program to dispose of surplus plutonium, the highly significant IAD is left out of the timeline and not discussed in the draft EIS on the *Surplus Plutonium Disposition Program* currently reviewing disposal of 34 MT of plutonium in WIPP. Why is the IAD not covered in the draft EIS? Please include a discussion of the plutonium shipped from SRS to WIPP under the IAD.

I assume that the ~94 kg of downblended SRS plutonium may have been all that was shipped under the IAD decision from SRS to WIPP prior to the WIPP accidents in February 2014 and prior to downblending starting in the K-Area in 2016. DOE must break its silence and officially reveal in the EIS just how much SRS plutonium was shipped to WIPP under the campaign that resulted from the IAD. Please discuss this in the EIS.

Risk of corrosion of plutonium storage cans

Plutonium can't be stored forever, especially when mixed with contaminants such as chloride salts. Various DOE documents review corrosion of 3013 plutonium storage cans and stress issues with welds.

I list the following documents as examples of DOE research into the matter of can integrity over time, something that merits more discussion in the EIS:

Comparison of Residual Stress in SRS and LANL-welded 3013 Inner, 2020, https://permalink.lanl.gov/object/tr?what=info:lanl-repo/lareport/LA-UR-20-21971

Please discuss impact of stress on 3013 welds.

Characterization of Representative Materials in Support of Safe, Long Term Storage of Surplus Plutonium in DOE-STD-3013 Containers, 2013, https://permalink.lanl.gov/object/tr?what=info:lanl-repo/lareport/LA-UR-12-23790

I note that this documents says "The performance of the 3013 containers has been shown to depend on moisture content and on the levels, types and chemical forms of the impurities. The oxide materials that present the greatest challenge to the storage container are those that contain chloride salts. Other common impurities include oxides and other compounds of calcium, magnesium, iron, and nickel."

Please discuss impact of moisture and the stated impurities on can integrity.

3013 Surveillance and Monitoring Annual Program Review, 2017, https://permalink.lanl.gov/object/tr?what=info:lanl-repo/lareport/LA-UR-17-30653

What 3013 monitoring program will be implemented over the life of the plutonium disposition program? What are the environmental, health and safety implications of can integrity?

3013 DE Inner Container Closure Weld Corrosion Evaluation, 2013, https://sti.srs.gov/fulltext/SRNL-STI-2013-00527.pdf

The document says "As a result of 3013 DE additional analysis, the area near the inner container closure weld has been identified as being a region of increased corrosion susceptibility, which may provide a pathway for corrosive gases to the outer container. This area has a higher residual stress, an altered microstructure, and less corrosion resistant weld oxides as a result of the welding process as well as a lower temperature than other areas of the container, which may increase the absorption of moisture on the surface. The deposition of moisture in this stressed region could lead to pitting and stress corrosion cracking."

In the EIS, please discuss the mentioned pitting and stress corrosion cracking and the risks it might pose on 3013 cans.

Determination of the Airborne Release Fraction of a 3013 Container Subjected to a Fire, 2022, https://sti.srs.gov/fulltext/SRNS-STI-2022-00025.pdf

Please discuss risks of airborne release of plutonium from a 3013 canister subjected to fire. What could cause a canister fire? Or, a fire during downblending?

Comparison of Residual Stress in SRS and LANL-welded 3013 Inner Containers, 2020, https://permalink.lanl.gov/object/tr?what=info:lanl-repo/lareport/LA-UR-20-21971

The documents says "The Department of Energy's 3013 Standard for packaging plutonium-bearing materials for storage up to fifty years specifies a minimum of two individually welded, nested containers, referred to as the 3013 outer and the 3013 inner. Stress corrosion cracking (SCC), which is dependent on the residual stress in the container, has been identified as a potential failure mechanism for 3013 inner containers which could result in the integrity of the Safety Class outer container being considered indeterminate."

Will any cans older than 50 years be used in the plutonium disposition program? Please discuss failure mechanisms in older 3013 cans, such as residual stress. Such failure would have environmental implications. Will material in older cans be repackaged?

Relationship to disposal of TRU from the Versatile Test Reactor (VTR) fuel fabrication?

If the Office of Nuclear Energy's Versatile Test Reactor project, with fuel fabrication possible at SRS or Idaho National Lab, how will the by-product plutonium be processed for disposal? Would there be an overlap in equipment used for VTR TRU and in downblending of surplus plutonium at SRS?

For the record, I note that a DOE document presents options for VTR fuel fabrication: *Fabricating Fuel for the Versatile Test Reactor*, September 2022, https://inldigitallibrary.inl.gov/sites/sti/sti/Sort_63719.pdf

Though Congress has defunded the VTR twice over the past two years, some in NE seem to hope the project will be revived. The Biden budget proposal for Fiscal Year 2024 does not contain VTR funding.

In the EIS, please discuss any relationship between VTR fuel fabrication - which, according to the EIS on the project, could be from 34 MT of plutonium (likely from pits) - and preparation of the VTR waste for packaging for disposal into WIPP. Discuss any commonalities in equipment and facilities, including storage of container before shipment to WIPP.

Thus, there are three big DOE projects that would need large amounts of plutonium: 1) downblending, 2) pit production and 3) VTR fuel fabrication. All the relationships between there programs, as far as processing of the plutonium and disposal in WIPP, must be discussed in the EIS. In reality, is there really "enough" plutonium - mostly from surplus pits - for all of these "big three" plutonium projects? If they all were to go forward, would we face a "plutonium shortage?!"

Congress required a study on moving ARIES to SRS or Pantex – where is it?

Is moving the ARIES process to produce plutonium oxide for downblending from Los Alamos to Pantex or SRS being considered? If not, why not? As we see in the case of pit production, pursuing a mission never undertaken by SRS has not stopped DOE from the major challenge and financial cost of promoting SRS for pit production. Moving ARIES to Pantex would likely not be as challenging as establishing pit production at SRS.

The draft EIS rules out Pantex as a site for downblending but utilizing Pantex would greatly reduce the shipment of plutonium across the southwest US. Thus, Pantex should be considered as an alternative for the location of ARIES and for the downblending project.

The National Defense Authorization Act for Fiscal Year 2021, as passed by the Senate included language on relocating ARIES from LANL:

> **Responsibility for Los Alamos Plutonium Facility 4 and Technical Area 55**
>
> Plutonium Facility 4 (PF–4) at Los Alamos National Laboratory's Technical Area 55 is the primary plutonium handling facility within the National Nuclear Security Administration (NNSA). PF–4 is currently undergoing major modifications to produce war reserve plutonium pits, with a production goal of 30 pits per year by 2026. Given the limited space and high cost of operations in PF–4, coordination of programmatic efforts within the facility are paramount.
> At the same time, PF–4 is used for a number of other missions involving the handling and processing of plutonium. The second largest requirement for space in the facility is the Advanced Recovery and Integrated Extraction System (ARIES) program, which converts excess plutonium, shipped from the Pantex Plant in Texas, to oxide powder. The powder is then shipped to the Savannah River Site (SRS), in South Carolina, to be packaged and then shipped back to the Waste Isolation Pilot Plant (WIPP) in New Mexico. The committee notes that the Government Accountability Office's October 2019 report titled ''Surplus Plutonium Disposition: NNSA's Long Term Plutonium Oxide Production Plans Are Uncertain'' (GAO–20–166) found that the NNSA was planning to increase oxide production in PF–4 through the 2020s, requiring additional space and even a new entrance to the facility. Both of these changes would almost certainly increase risk to plutonium pit production goals in the same time period.
> 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)
(at: https://www.congress.gov/116/crpt/srpt236/CRPT-116srpt236.pdf)

Please discuss and provided the required document on "options for continued plutonium oxide operations, including continuing the mission in PF–4 and moving it to the SRS" or Pantex (from LANL). In July 2020, I filed a FOIA for the document directed by Congress but DOE will not provide me a date by which the document will be delivered and has not recently given me an update about this, revealing there are problems with FOIA responsiveness. The document should be made part of the EIS record.

Other points to be addressed in the EIS:

Beyond plutonium now at SRS and pits stored at DOE's Pantex site in Texas, what other plutonium in the DOE complex might be disposed of via downblending (or any other process)?

Relatively pure plutonium "surplus to defense needs" is to be contrast with "legacy plutonium" related to "clean up" of DOE projects. Please explain the difference between these two types of plutonium and their origin. Will disposal of purer plutonium via surplus plutonium disposal undermine the role of WIPP to dispose of legacy TRU?

Has a Nuclear Non-proliferation Impact Assessment (NPIA) been prepared as part of the EIS process and concerning the plutonium downblending program? If not, why not? Please make a NPIA a part of the EIS record. Such a document was prepared on the MOX project and should be prepared on plutonium disposition.

Please explain the relationship between the plutonium downblending program and the preparation and packaging of TRU waste from plutonium pit production (for nuclear weapons)

at SRS. Will any gloveboxes, equipment, storage facilities or staging facilities be used in common for the two TRU programs? If there are any shared facilities how can a NEPA analysis of only part of use of such facilities be analyzed in a stand-alone NEPA document? Will any EM staff working on dilute & dispose also work on TRU management from pit production?

Given the "swarms" of earthquakes in the Midlands of South Carolina in 2022, has a new earthquake analysis been done for the K-Reactor building, the downblending gloveboxes and other plutonium-downblending support facilities?

What happens to any isotopes, such as americium or other decay products, be removed when surplus plutonium is oxidized purified? What is the management and disposal of such material? If the plutonium oxide is not purified so as to remove decay products, what are dose implications for downblending and dose implications for handling that material at WIPP?

What will happen to downblended plutonium once it is placed in WIPP? What research will be done about the stability of this material? Disposal in WIPP is not the end of the environmental story. Evidently DOE is looking into oxidation of plutonium disposed of at WIPP, as revealed in this LANL research report of January 2023: *Plutonium Oxidation State Distribution under WIPP Relevant Conditions.* Could downblended plutonium migrate out of WIPP? Will the downblended material "stardust" impede or facilitate plutonium movement in WIPP or impact COC integrity?

The above-named report states in the abstract (below) for the report that migration of plutonium in WIPP is possible in the event of drilling into the repository – will this be considered or reviewed in the EIS? If not, why not?

> The Waste Isolation Pilot Plant (WIPP), a deep geologic repository located 660 meters underground in bedded salt, is designed to isolate U.S. defense-related transuranic waste from the accessible environment. Plutonium isotopes are the most important radionuclides in WIPP waste. Plutonium solubility in WIPP brines (ionic strengths from 5.3 to 7.4) is strongly dependent on its oxidation state, with much lower solubilities associated with Pu(III) and Pu(IV) than with the higher Pu(V) and Pu(VI) oxidation states. The large quantity of metallic iron in WIPP waste and waste containers is expected to undergo anoxic corrosion, producing strongly reducing conditions and high hydrogen gas pressures after repository closure and brine intrusion. Because reducing conditions will prevail in the WIPP repository, the most important long-term oxidation states will be Pu(III) and Pu(IV). We performed a literature review to evaluate the effects of WIPP chemical and physical processes (not colloidal) on plutonium oxidation states that included reactions with reducing agents such as iron solids and aqueous species and radiolysis of solids and aqueous species. The results of this review indicate that equilibrium between Pu(III) solids and aqueous species will control dissolved plutonium concentrations in WIPP brines. We also performed geochemical modeling calculations using the ThermoChimie database to support this assessment of plutonium oxidation states

> in the long-term WIPP repository. Control of plutonium solubilities by Pu(III) solid instead of Pu(IV) solid may lead to higher predicted plutonium concentrations in brines potentially released to the ground surface by an inadvertent drilling intrusion into the long-term WIPP repository. The results of this study demonstrate that Pu(III) solid solubilities provide a reasonable upper bound for dissolved plutonium concentrations in WIPP brines.

Please clarify what the "multi-component adulterant" (aka "stardust") is and how it may impede 1) plutonium mobilization in WIPP and 2) recovery of plutonium if the CCOs are ever taken from WIPP? Does stardust hinder plutonium removal and purification via some form of (re)processing? How? The draft EIS says that "The multi-component adulterant is designed to impede recovery of the surplus plutonium (NNSA 2022)." In this usage, what does "impede recovery" mean? Is this term defined under NEPA? Is "impede" the best that can be done to protect plutonium from being recovered? What are strengths and weaknesses in success of "impeding" plutonium removal from the CCOs before and after placement in WIPP?

The draft EIS states that "DOE's purpose and need for action is to safely and securely disposition plutonium that is surplus to the Nation's defense needs so that it is not readily usable in nuclear weapons." How is "readily usable" defined?

As 34 MT or more of plutonium would be disposed of in WIPP under the proposed plan, would WIPP in the future pose a risk as a "plutonium mine?" Please provide an assessment of this.

When will safeguards be terminated on plutonium downblended into CCOs? Will safeguards be terminated on downblending, on storage at SRS on a pre-transport pad, on loading of containers onto trucks bound for WIPP, or upon arrival or disposal at WIPP?

Some plutonium at SRS is being monitored by the International Atomic Energy Agency. Will that plutonium be downblended or go to pits?" How much is being monitored by the IAEA? Will plutonium being downblended at SRS be under some form of IAEA monitoring? How will the IAEA monitor "termination of safeguards" and at what point?

The draft EIS says that "The CH-TRU waste that is disposed at the WIPP facility is tracked by Nuclear Quality Assurance-approved procedures and processes." Please explain what such procedures and processes are and why they matter.

What is the "job control" waste from plutonium processing at LANL and SRS? How much such waste will there be and what part of it is TRU?

Could plutonium metal at SRS or Pantex be pulverized and downblended without going through the oxidation step? What are the risks of plutonium metal vs plutonium oxide being downblended and disposed of? Is one form more stable over the long run?

How will pits be chosen at Pantex to go into the downblending program? Will older pits or pits of a certain composition be selected on an established schedule? Are pits that might be considered for "judicious reuse" (a NNSA term) in nuclear weapons excluded from the downblending program? Is there a schedule to empty the pit storage bunkers at Pantex? Has Pantex reached its capacity to store around 20,000 pits?

The Defense Nuclear Facilities Safety Board has pointed out in its report *Pantex Plant Pit Inventory Review* – at https://www.dnfsb.gov/sites/default/files/document/25061/Pantex%20Pit%20Inventory%20%5B2022-100-011%5D.pdf – said "that many pits at Pantex are not staged in the most protective staging configuration; i.e., the AL-R8 Sealed Insert container." What implications does this have for use of such plutonium in the plutonium disposal program? Will pits in these unsealed containers have priority to be downblended, or not?

What is the rate of oxidation of plutonium via ARIES (at LANL)? How much oxide has been processed at ARIES and shipped to SRS? What is the schedule for shipments of plutonium oxide from LANL to SRS? What happens if ARIES goes out of operation temporarily or permanently? Is there consideration to locate facilities at SRS to make plutonium oxide? Where would such an oxide-preparation facility be located?

I note that in this LANL document - *ARIES team achieves major milestone in support of nonproliferation*, 2020-02-03 - https://permalink.lanl.gov/object/tr?what=info:lanl-repo/lareport/LA-UR-20-21087 - that the following was stated about plutonium oxide production at LANL: "ARIES recently met a major milestone of producing 1 metric ton of plutonium oxide from material removed from surplus pits. The milestone was celebrated in an awards ceremony at LANL on January 28….In the next year, ARIES intends to produce 150kg of plutonium oxide, steadily working toward the longer term goal of 2 MT".

The document continues: "So from 2012 to November 2019, the program both completed startup and readiness activities as required for operations, and exceeded production of 1 MT of plutonium as oxide. All of this material has been processed to meet the DOE 3013 Standard and packaged in 3013 containers, the nested stainless steel containers that safely hold plutonium-bearing materials for up to 50 years."

Please discuss the plutonium oxide production rate at Los Alamos. Please discuss safety of "nested steel containers" over their lifetime, including beyond 50 years.

This 2018 LANL document - *ARIES Oxide Production Program Dilute and Dispose LCCE Overview, Material Management and Minimization Program* - (https://permalink.lanl.gov/object/tr?what=info:lanl-repo/lareport/LA-UR-18-28648) - Indicates that "The overall schedule was developed to meet the overall throughput levels to achieve completion of LANL Dilute and Dispose operations by 2045." A 1500 kg installed

capacity (per year) would be reached by 2030, with “operations complete” by 2045. Is that information and those dates accurate? Please discuss in the EIS.

How much of the 34 MT (or 40 MT) might be plutonium from commercial and DOE spent fuel reprocessed at the West Valley, New York reprocessing plant that operated from 1966-1972?

Finally, I request that the “storage” of plutonium in a ceramic form be examined. The US and UK have been engaged in research related to Hot Isostatic Pressing (HIP) as a form in which to embed plutonium and this research should continue.

In 2020, a UK Government webpage entitled “Hot Isostatic Pressing (HIP) for plutonium” indicates the status of US-UK collaboration. (See: https://www.gov.uk/government/case-studies/hot-isostatic-pressing-hip-for-plutonium)

> Hot Isostatic Pressing (HIP) is a heat-plus-pressure treatment which has been used in industrial processes for a number of decades, including the nuclear industry, and can convert various materials into a glass-ceramic or ceramic form. HIP technology offers a potential future immobilisation solution if it can be successfully adapted and deployed on large-scale basis.
>
> The US Department of Energy (DoE) is currently experimenting with HIP equipment to process an inactive simulant of calcined (heat-treated) waste. The NDA has been able to collaborate with the DoE to develop a key aspect of the HIP process: filling the HIP cans.
>
> NDA Research Manager Rick Short observed the US trials in progress and noted the successes of the work to date. He also emphasised that continued progress and modifications are needed, for example to ensure that no residue would remain outside the canister.
>
> Developing these key process steps on an industrial scale is a key step towards identifying a process as a potential final solution for plutonium immobilisation.
>
> The US trials were partially successful but further modifications are required to ensure the integrity of the process so that no residue remains outside the canister. Developing these steps on an industrial scale is key towards identifying a process as a potential final solution for plutonium immobilisation.
>
> The US trials will contribute to identifying the best technical solutions for immobilising the plutonium. Current research projects are focused on HIP technologies…..

I request that the ceramic immobilization option - for plutonium storage - be reviewed in the EIS. And, that information on status of the HIP R&D cooperation between the US and UK be discussed.

Conclusion

K-Area downblending at SRS, using plutonium oxide prepared via ARIES (Advanced Recovery and Integrated Extraction System) at Los Alamos National Lab, was authorized by a Record of Decision addressing 6 MT of surplus plutonium, as stated in a Federal Register notice of April 5, 2016. That 6 MT is not part of the 34 MT that has been analyzed in the draft EIS now before us, so DOE is actually now actively looking at sending 40 MT of surplus plutonium to WIPP. As crazy as such cross-country shipment sounds, most of that 40 MT, mostly from weapons "pits" stored at DOE's Pantex site in Texas, would be processed into oxide at LANL and shipped cross country to SRS.

As the draft EIS states: "In 1994, after the end of the Cold War, the President of the U.S. declared 52.5 metric tons (MT) of plutonium to be surplus to the defense needs of the Nation. In 2007, the U.S. declared an additional 9 MT of plutonium to be surplus." And, further, "The 34 MT of surplus plutonium evaluated for disposition in this SPDP EIS is a subset of the 61.5 MT of surplus plutonium described above (52.5 MT plus 9 MT)." (page S-1) DOE makes no mention of what might happen to the quantity of surplus plutonium beyond 40 MT and that must be addressed in the EIS.

Thus, DOE has not presented a disposition option for the other 21.5 MT of plutonium declared surplus (and beyond the 40 MT now being planned to be sent to WIPP) and seems to prefer that such disposition not be mentioned. In the EIS, DOE must reveal the long-term plan for the management and disposal of that 21.5 MT. If 61.5 MT of surplus plutonium were to be sent to WIPP (or to a second repository), this would be on top of the 4.5 MT in WIPP from Rocky Flats and other DOE sites. Thus, is the real goal could be to get 66 MT of plutonium into a TRU dump? If not this amount, how much plutonium will be disposed of it WIPP? How would this plutonium disposal and other TRU disposal impact WIPP volume as capped under the Land Withdrawal Act?

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Appendix A

This appendix was posted on the SRS Watch website as a stand-alone document and most points in it are contained in the comments above. The points in this appendix should be considered as comments and responded to in the EIS. This "Plutonium Pondering" appendix is posted here:
https://srswatch.org/wp-content/uploads/2023/01/Plutonium-Pondering-Jan-23-2023.pdf

SRS WATCH
Savannah River Site Watch

Plutonium Pondering

January 23, 2023

The Department of Energy must fully reveal how much surplus plutonium it has already sent from the Savannah River Site (SRS) and other DOE sites to the Waste Isolation Pilot Plant (WIPP). And, DOE must reveal how much plutonium it plans to send to WIPP.

The current effort to send more surplus plutonium from SRS to WIPP took shape in 2011.

On January 13, 2023, the U.S. Department of Energy's National Nuclear Security Administration issued a statement (https://www.energy.gov/nnsa/articles/nnsa-and-doe-em-complete-first-shipment-downblended-surplus-plutonium-transuranic) that said "The Department of Energy's National Nuclear Security Administration and Office of Environmental Management completed the first shipment of downblended surplus plutonium transuranic (TRU) material from K-Area at the Savannah River Site to the Waste Isolation Pilot Plant in New Mexico in December." No amount of plutonium shipped was given.

The statement also says that "This shipment marks a milestone as the first shipment to include defense TRU material from NNSA's Surplus Plutonium Disposition Program. After plutonium is downblended at SRS, it becomes TRU material by definition and can be permanently disposed at WIPP." DOE's plutonium disposal at WIPP merits closer scrutiny. Was the stated shipment in January 2023 the first shipment of downblended surplus weapon-grade plutonium from SRS to WIPP? No, it was not. It was the first DOE shipment from the K-Area and the first shipment to WIPP under the commitment to the State of South Carolina to remove plutonium from the state but that shipment occurred a decade after the first surplus plutonium was shipped from SRS to WIPP.

Plutonium downblended into "pipe overpack containers" (POCs) and placed into drums were shipped from SRS to WIPP in 2013 and later. In March 2015, I and other NGO colleagues stood

outside the storage building in E-Area at SRS where containers of downblended plutonium were said to be stored in concrete culverts that we viewed. That material was being held at SRS as WIPP was temporarily closed due to accidents in February 2014. (I can provide a photo of the culverts in E-Area on request.)

The Office of External Affairs at SRS communicated to me on March 20, 2014 that "Savannah River Site has begun shipments of non-moxable plutonium to WIPP and to date, approximately 55 kgs of down blended plutonium has been shipped to WIPP. SRS has approximately 260 pipe overpack containers of down blended plutonium awaiting shipment to WIPP as soon as it reopens." Thus, ~94 kilograms of SRS plutonium (55 kilograms + 260 POCs x ~0.15 kg/POC) had already been shipped or was ready to be shipped at the time that WIPP closed for 3 years starting in February 2014.

Just before that observation in E-Area, we had been shown the type of containers into which downblended plutonium was mixed, a "pipe overpack container" as well as the larger capacity "criticality control overpack" (CCO). (I can provide photos of those mockup POCs and CCOs on request.) Currently the CCO is the preferred container into which surplus plutonium is packaged. Such relatively pure plutonium "surplus to defense needs" is to be contrast with "legacy plutonium" related to "clean up" of DOE projects.

Then, on October 1, 2015, I and some of the same NGO colleagues stood next to TRU drums containing SRS POCs as they sat stranded on the surface in the Waste Handling Building at WIPP, awaiting disposal underground, which we then toured. (I can provide a photo of me standing beside the drums containing the SRS plutonium on request or see the photo linked here).

According to the WIPP Data System, checked by a colleague at the time, the drums containing SRS POCs were taken underground in January 2017, as part of the effort to clear the backlog in the Waste Handling Building prior to the first new TRU shipments being received at WIPP on April 10, 2017.

The SRS plutonium shipped to WIPP prior to February 2014 and after WIPP reopened in January 2017 was authorized by DOE under an "Interim Action Determination" (IAD) entitled "Disposition of Certain Plutonium Materials Stored at SRS" and dated October 17, 2011. (https://www.srs.gov/general/pubs/envbul/documents/Interim_Action_500kg_to_WIPP_10-17-11.pdf)

That "determination" allowed for disposal of approximately 500 kilograms of SRS plutonium in WIPP in "pipe overpack containers." The material was to be prepared in the now-closed HB-Line located in the H-Canyon reprocessing plant. The IAD said the POCs prepared in the HB-Line would be "staged for shipment" in the E-Area before shipment to WIPP.

The IAD was signed by Dave Moody, the SRS site manager (and former WIPP manager), a position under the DOE's Office of Environmental Management and not under NNSA. This

monumental plutonium-disposal decision, which set the stage for the current consideration of disposal of huge amounts of SRS plutonium in WIPP, should have been the subject of a full-scale Environmental Impact Statement and not a mere bureaucratic decree. The IAD was the initial effort to process at SRS and dispose of tens of tons of additional surplus weapons plutonium in WIPP. This effort was pursued long before the plutonium fuel (MOX) debacle was officially terminated in 2018 but when storm clouds were gathering over the ill-fated MOX project. Even in 2011, it was seen that there was a cheaper and quicker option for plutonium disposal than making MOX fuel of it. The colossal DOE error in 2002 to terminate the project to immobilize plutonium in high-level nuclear waste at SRS loomed in the background, as it still does.

Though the plutonium involved was part of the program to dispose of surplus plutonium, the highly significant IAD is left out of the timeline and not discussed in the draft EIS on the *Surplus Plutonium Disposition Program* currently reviewing disposal of 34 MT of plutonium in WIPP.

I assume that the ~94 kg of downblended SRS plutonium may have been all that was shipped under the IAD decision from SRS to WIPP prior to the WIPP accidents in February 2014 and prior to downblending starting in the K-Area in 2016. DOE must break its silence and officially reveal in the EIS just how much SRS plutonium was shipped to WIPP under the campaign that resulted from the IAD.

In my opinion, of the entire processing, transportation and disposal cycle, the greatest risks to workers and the public occur during plutonium processing related to plutonium oxide preparation and the mixing and packaging of the downblended material into the disposal containers.

K-Area downblending at SRS, using plutonium oxide prepared via ARIES (Advanced Recovery and Integrated Extraction System) at Los Alamos National Lab, was authorized by a Record of Decision addressing 6 MT of surplus plutonium, as stated in a Federal Register notice of April 5, 2016. That 6 MT is not part of the 34 MT that has been analyzed in the draft EIS now before us, so DOE is actually now actively looking at sending 40 MT of surplus plutonium to WIPP. Crazy as it sounds, all of that 40 MT, mostly from weapons "pits" stored at DOE's Pantex site in Texas, would be processed into oxide at LANL and shipped cross country to SRS.

As the draft EIS states: "In 1994, after the end of the Cold War, the President of the U.S. declared 52.5 metric tons (MT) of plutonium to be surplus to the defense needs of the Nation. In 2007, the U.S. declared an additional 9 MT of plutonium to be surplus." And, further, "The 34 MT of surplus plutonium evaluated for disposition in this SPDP EIS is a subset of the 61.5 MT of surplus plutonium described above (52.5 MT plus 9 MT)." (page S-1) DOE makes no mention of what might happen to the quantity of surplus plutonium beyond 40 MT.

Thus, DOE has not presented a disposition option for the other 21.5 MT of plutonium declared surplus (and beyond the 40 MT now being planned to be sent to WIPP) and seems to prefer that it not be mentioned. In the EIS, DOE must reveal the long-term plan for the management and disposal of that 21.5 MT. If 61.5 MT of surplus plutonium were to be sent to WIPP (or to a

second repository), this would be on top of the 4.5 MT in WIPP from Rocky Flats and other DOE sites, meaning that the real goal could be to get 66 MT of plutonium into a TRU dump.

Note that the US report to the International Atomic Energy Agency (IAEA) about plutonium management, in IFCIRC 549 of October 14, 2022 - https://www.iaea.org/sites/default/files/publications/documents/infcircs/1998/infcirc549a6-24.pdf - states that 4.5 MT of plutonium "has been disposed to waste after termination of safeguards."

This means that 4.5 MT of weapon-grade plutonium from Rocky Flats, and some from Hanford or other sites, has been processed for disposal in WIPP and thus safer to handle from a security perspective. (Also see this International Panel on Fissile Materials blog on amounts of plutonium sent to WIPP: https://fissilematerials.org/blog/2016/09/disposition_of_plutonium_.html)

In conclusion, disposal of SRS plutonium in WIPP did not start in 2023 but began in 2013 or earlier, stimulated by a 2011 decision. And, well before 2011, WIPP had already received a large quantity of DOE plutonium. Now, does DOE intend, if the plutonium-disposal program is ever finished, to dump 66 metric tons of surplus plutonium in WIPP (or another TRU facility)? We'll see what the New Mexico Environment Department, Congress, technical challenges and the public have to say about that.

Stay tuned over the next 240,000 years for updates.

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