



Savannah River Site Watch

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**Comments on Permit Renewal Draft Hazardous Waste Facility Permit for  
the Waste Isolation Pilot Plant (EPA ID Number: BNM4890139088-TSDF)**

I am submitting these comments on behalf of the non-profit, public-interest organization Savannah River Site Watch (SRS Watch), based in Columbia, South Carolina. SRS Watch monitors a host of activities at SRS, including generation of transuranic waste planned to be shipped to the Waste Isolation Pilot Plant.

These comments are intended to provide a non-governmental perspective from near a U.S. Department of Energy site - the Savannah River Site - that will produce a massive quantity of TRU that is planned for disposal in WIPP. That TRU would be from preparation of surplus plutonium for disposal, TRU from fabrication of plutonium pits for nuclear weapons and possibly TRU from fabrication of plutonium fuel for the Versatile Test Reactor (VTR).

In general, I support the New Mexico Environment Department's placement of new conditions in the WIPP permit as it pertains to regulation of the site. As it pertains to TRU generated at SRS, I strongly support permit conditions that require DOE and the National Nuclear Security Administration (and DOE's Office of Nuclear Energy) to provide a full inventory of amounts of plutonium to be managed for disposal in WIPP and the volume of such TRU. This information must be provided for the life of TRU-generating projects.

Likewise, I support strict adherence to the volume limits in the current Land Withdrawal Act and support a requirement for full revelation by DOE of such amounts and volumes as they apply to the volume cap. In no instance should the LWA volume cap be exceeded. If that were anticipated to be the case to be the case, it is incumbent on DOE to curb and then halt TRU volumes slated for disposal and/or to open a second TRU repository.

Given TRU that would arise from activities at the Los Alamos National Lab, I agree that NMED can give priority to TRU generated in New Mexico. If excavation of TRU from G-Area at LANL were to take place it should receive top priority for disposal in WIPP.

NMED should view with extreme caution DOE's cost-cutting effort to redefine high-level nuclear waste as something else, which could result in it being redefined as TRU and dumped in WIPP. The ~8500 HLW canister to be filled at SRS - around half of those canisters have already filled - are just that: high-level nuclear waste, as defined by law and in practice.

As DOE is now pursuing disposal of yet more plutonium in WIPP, I agree more than ever with what NMED wrote to the SRS Citizens Advisory Board on October 22, 2020: "DOE Environmental Management must satisfy the requirements in NMED's Hazardous Waste Facility Permit, Part 2 and Attachment C, in order for this waste to be eligible for disposal at the WIPP facility. To date, it has not specifically been articulated how DOE Environmental Management will ensure compliance with the Permit's Waste Acceptance Criteria. DOE must engage with NMED to demonstrate such waste will meet the WIPP Waste Acceptance Criteria." In addition to EM, other DOE offices generating TRU must also satisfy the specified permit requirements.

Whatever NMED requires in the permit of DOE's Office of Environmental Management (EM) must also be applied to DOE's National Nuclear Security Administration and DOE's Office of Nuclear Energy (in charge of the unfunded but apparently still alive Versatile Test Reactor project, which was said by NE in a March 22, 2023 budget briefing to the American Nuclear Society - *An Inside Look at the FY 2024 Budget* - to be "on hold," with the hope that it be revived in the future).

All DOE entities seeking to dispose of TRU in WIPP must be named in or covered by the permit. It's clear that NNSA and EM are trying to claim that TRU waste generation or management by each of those offices doesn't overlap, which isn't accurate. The NMED permit must be clear that various DOE entities aim to use WIPP. In particular, NNSA and EM may deny knowing anything about NE plans for WIPP.

As it's clear that WIPP is becoming a disposal site for new TRU from NNSA projects - vs disposal of legacy TRU from "clean up" of DOE sites - just which DOE entity is in control of WIPP and waste going into WIPP needs to be further defined and the entirety of DOE needs to be covered by the permit in a clear way. As new TRU from NNSA will soon be the largest share of TRU going into WIPP, NNSA must be in the permit and face conditions placed in the permit.

I note that the EM budget request for Fiscal Year 2024 - <https://www.energy.gov/sites/default/files/2023-03/doe-fy-2024-budget-vol-6-em-v1.pdf> - it is admitted that EM and NNSA share plutonium disposition: "K-Area provides for the handling and interim storage of excess plutonium and other special nuclear materials and fulfills the U.S. commitment to international nonproliferation efforts in a safe and environmentally sound manner. The K-Area Material Storage Facility, built in the 1950s, was one of the five production reactors at the Savannah River Site. It was repurposed at the end of the Cold War to be the DOE

Complex consolidated storage location for stabilized non-pit plutonium materials, which were declared surplus to the nation's defense needs, pending final disposition. The facility also receives and stores plutonium from foreign countries to support the National Nuclear Security Administration's Nuclear Nonproliferation Initiative and serves as an International Atomic Energy Agency control protocol facility for plutonium oxide. It is DOE EM's only Category 1 storage facility designated for interim safe storage of plutonium. It currently has a capacity for approximately 8,500 drums of special nuclear materials. In FY 2016, the capability to down blend, dilute through blending with an inert material, and package plutonium was established. The final disposition path for this material after down blend is the Waste Isolation Pilot Plant in Carlsbad, New Mexico." (page 321 pdf)

But the division of responsibilities concerning surplus plutonium disposition are not publicly defined between NNSA and EM and DOE has been careful at meetings not to be specific about the roles of EM and NNSA. NMED must determine just who is responsible for what plutonium disposition activities as it involves TRU packaging and disposal.

**A permit condition must require DOE - EM, NNSA & NE - to reveal amount of surplus plutonium it intends to dispose of in WIPP**

DOE must clarify plans for disposal of plutonium beyond the 40 MT of plutonium now being addressed. How will more plutonium be added to the 34 MT covered in the current *Draft Environmental Impact Statement for the Surplus Plutonium Disposition Program (SPDP EIS)*?

As pointed out in the draft EIS, DOE decided in a 2016 Record of Decision to dispose of 6 MT via dilute & dispose, the technique being used to prepare TRU for WIPP. That 6 MT is not part of the 34 MT that has been analyzed in the draft EIS now before us. Thus, 40 MT of separated plutonium are now headed to WIPP. Along with other DOE TRU slated for disposal, this amount may well 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 covered in the draft EIS and which of those quantities might be given priority in disposal at WIPP or in a second TRU repository.

*See SRS Watch's 27-page comment on NNSA's draft EIS on plutonium disposition, March 16, 2023; possible NMED permit conditions for WIPP are mentioned:*

<https://srswatch.org/wp-content/uploads/2023/03/Comments-on-Pu-disposition-draft-EIS-Clements-March-16-2023.pdf>

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? NMED must require DOE to stipulate just how much of the 61.5 MT is planned for disposal over time in WIPP. And, DOE must spell out which DOE office is in charge of the full 61.5 MT and its management and disposal.

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 will this be addressed in a new NMED permit and how will the full amount of plutonium to eventually be slated for disposal impact the WIPP volume cap?

SRS currently stores about 11.5 MT of plutonium in the old K-Reactor. Of that 11.5 MT, 9.5 MT is covered under an agreement with the State of South Carolina that such an amount will be removed. DOE must clarify how much of the 11.5 MT will be processed into TRU for disposal in WIPP and how much is planned to be fabricated into pits for nuclear warheads. How much TRU will result from that pit production?

NMED is correct in requiring DOE to spell out pursuit of a second repository and the timeline for all steps in locating and opening it. But it appears that DOE wants to use WIPP until at least after 2080, which means more new drifts to accommodate ever-expanding NNSA missions. DOE/NNSA/EM/NE must not be allowed to use the NMED permitting process to continue to expand the mission of WIPP and increase the amount of TRU to go into WIPP.

Recall that the plutonium pit mission at the Savannah River Site, which has no pit-production experience, is not required by law but is a choice of NNSA to locate pit production there in order to meet the challenging goal of 80 pits per year. Thus, there is no legal obligation to produce pit TRU in South Carolina and, in parallel, perhaps disposal of SRS pit TRU at WIPP will not be prioritized.

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

As it has implications on future management of downblended surplus plutonium, DOE and NMED need 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-movable 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, it may be 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. Will NMED allow containers with more capacity than a CCO be considered for use in the future? What are environmental and security considerations of such a larger-capacity container?

To state for the record, 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. We thus documented the new role of WIPP in disposal of surplus plutonium.

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](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 plutonium fuel (MOX) project was in trouble, should have been the subject of a full-scale Environmental Impact Statement and not a mere bureaucratic decree. While EM was earlier in charge of plutonium disposition at SRS, it is now unclear if NNSA or EM is in charge though NNSA is, in name, conducting the current EIS process on plutonium disposition.

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 MOX debacle was officially terminated in 2018 but when storm clouds were gathering over the ill-fated MOX project. 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.

Terminating plutonium immobilization in high-level waste at SRS now means tens of tons of plutonium are slated to go into WIPP. Thus, a huge and costly error on DOE’s part has increased pressure on WIPP and increased regulatory oversight by NMED. And yet, nobody in DOE is being held responsible for this situation. NMED is right to be cautious about the DOE decision-making process and impacts of it and right to include conditions in the permit to put a check on DOE decisions. What will be NMED’s role the next time DOE makes major decisions impacting WIPP - should a role be built into any new permit?

Though the plutonium involved was part of the program to dispose of surplus plutonium, the highly significant IAD is left out of the timeline in DOE’s draft EIS and is not discussed in that draft EIS on the [Surplus Plutonium Disposition Program](#) which is currently reviewing disposal of an additional 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. It must be revealed just how much SRS plutonium was shipped to WIPP under the campaign that resulted from the IAD.

### **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 apparently 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 perhaps 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](https://fissilematerials.org/blog/2016/09/disposition_of_plutonium_.html))

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 or other containers? How has the NMED permitting process changed, if at all, since it allowed RF plutonium into WIPP?

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)?

### **Safety of plutonium disposal containers**

Will the permit address research into or action about potential movement of plutonium in WIPP (or related to canister explosion or breaching)?

DOE must clarify if plutonium being processed for disposal via dilute and dispose is being done with plutonium oxide - prepared via ARIES at Los Alamos National Lab - or via plutonium metal that is pulverized before being mixed with “stardust” (the dilute and dispose adulterant). This may have implications related to possible plutonium “events” in WIPP.

What will happen to downblended plutonium once it is placed in WIPP? What research will be DOE pledge to do concerning the stability of this material? Will such research be required by the NMED permit? 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*. (<https://permalink.lanl.gov/object/tr?what=info:lanl-repo/lareport/LA-UR-23-20189>) 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 that migration of plutonium in WIPP is possible in the event of drilling into the repository - will this be considered or reviewed in the permit?

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.

In the NMED permit, require DOE to clarify how the make-up of downblended plutonium may impede 1) plutonium mobilization in WIPP and 2) recovery of plutonium if the POCs and CCOs are ever taken from WIPP. Can the NMED permit be used to extract a guarantee from DOE that WIPP will never be used as a “plutonium mine?”

### **Possible disposal of plutonium in a ceramic form must be covered by the NMED permit**

The US and UK have been engaged in research related to Hot Isostatic Pressing (HIP) as a form in which to embed plutonium.

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.....

Will the NMED permit allow disposal of such ceramic material (or other plutonium-bearing materials) in WIPP, if requested by DOE? Will the permit guarantee such materials meet the WIPP WAC?

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

DOE's Office of Nuclear Energy has indicated that fuel fabrication for the Versatile Test Reactor project at SRS or Idaho National Lab. It is assumed that the waste from plutonium fuel fabrication would be TRU.

This DOE document presents options for VTR fuel fabrication: *Fabricating Fuel for the Versatile Test Reactor*, September 2022, [https://inldigitalibrary.inl.gov/sites/sti/sti/Sort\\_63719.pdf](https://inldigitalibrary.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.

VTR fuel fabrication - which, according to the EIS on the project, could be from 34 MT of plutonium (likely from pits) - would likely result in preparation of the VTR waste for packaging for disposal into WIPP. How will this NE TRU be dealt with in the NMED license?

For the 34 MT figure, see VTR EIS summary - [https://www.energy.gov/sites/default/files/2022-05/EIS-0542\\_Summary\\_0.pdf](https://www.energy.gov/sites/default/files/2022-05/EIS-0542_Summary_0.pdf) - page S-13, footnote 15: "Accounting for additional material that

ends up in the waste during the reactor fuel production process, up to 34 metric tons of plutonium could be needed for startup and 60 years of VTR operation.”

Thus, to reiterate, there are three big DOE projects that would yield large amounts of TRU bound for WIPP: 1) downblending of surplus plutonium, 2) pit production and 3) VTR fuel fabrication. NMED must require DOE to account for these “new” TRU waste streams and how much volume they would yield.

**Will DOE be stipulated to provide access by the International Atomic Energy Agency for disposal of surplus plutonium?**

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 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](https://fissilematerials.org/blog/2016/09/disposition_of_plutonium_.html))

In disposing of up to 61.5 MT of surplus weapons plutonium, safeguards will likely be terminated once the packaged TRU leaves SRS. Or, it could be at the gates of WIPP. DOE must provide access to WIPP facilities by the IAEA if a safeguards-termination check is done at WIPP. How will IAEA access be dealt with in the NMED permit?

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## Appendix A

This appendix was attached to my comment on DOE's draft EIS on plutonium disposal and was posted on the SRS Watch website as a stand-alone document and points in it should be considered for the NMED permit. This "Plutonium Pondering" appendix is posted here:

<https://srswatch.org/wp-content/uploads/2023/01/Plutonium-Pondering-Jan-23-2023.pdf>



### 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](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](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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