SRS WATCH

Savannah River Site Watch

6 March 2017

To: Umweltausschuss des Bundestags,
Endlager-Kommission
--for 8 March 2017 meeting

From: Tom Clements
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**Re: Public opposition to export of AVR (Jülich), THTR (Ahaus) spent fuel to US Department of Energy's (DOE) Savannah River Site (SRS); Return of large volumes of assorted wastes to Germany required if export loophole allowed in German waste law**

**Summary of problems facing export of AVR and THTR spent fuel to SRS & shipment back to Germany of waste by-products:**

- Citizens' groups, the public, governor of South Carolina and SRS Citizens Advisory Board continue to oppose import of AVR and THTR spent fuel to the Savannah River Site for reprocessing and "final disposition;"

- If a new proposal is pursued - to reprocess AVR and THTR and return the by-product waste to Germany - a lengthy new environmental review will be necessary, with public meetings and public comments; the possible export of byproduct waste to Germany has not been mentioned by DOE either in public meetings or in documents;

- Reprocessing of AVR and THTR spent fuel, with return of by-product waste to Germany, will arouse public concern and further expose efforts to turn SRS into a waste-processing and disposal site;

- As now planned, radioactive gas, such as noble gases and cardon-14 (released as CO2), would be discharged into the environment at SRS; with the "return all waste to Germany" proposal, the U.S. DOE and German plan to capture radioactive gas for return to Germany is unknown but facility modification to capture these gases will be costly;

- Based on the types of "carbon digestion" and uranium/thorium processing chosen, waste to be packaged and returned to Germany would possibly include the forms below, listed in DOE's draft "environmental assessment"[1] on the import, reprocessing and dumping of the waste (packages for some of these waste forms are unknown and ability to ship is unknown):

  2320+ cubic meters low-level nuclear waste (LLW);
  15-101 canisters vitrified high-level nuclear waste (HLW);
  Up to 280,000 liters liquid low-level nuclear waste;
  3,700,000+ liters of "grouted" waste (mixed with concrete);
  Up to 2,800,000 liters liquid nonhazardous waste;
  Ingots of separated, contaminated low-enriched uranium (LEU)/thorium;
  LEU downblended from separated highly enriched uranium (HEU);
  Other liquid and solid waste materials;
  Contaminated equipment;
  451 CASTOR casks.

- U.S. DOE said in a memo in August 2013 that the AVR spent fuel "is not attractive to sub-state/terrorist entities in its current state. Since the material is stored in a secure environment in a politically stable country, it is not of a proliferation concern."[2] This remains the DOE position and, thus, the shipment is not being pursued for non-proliferation reasons (as was originally claimed by DOE).

- "Technology Development and Pilot Scale Testing" on the unproven technology would take over five years from the time it begins. A new proposal to repackage waste for shipment back to Germany and preparation of accompanying environmental documents would change this timeline. Also, attempts by U.S. DOE to import CASTOR casks before any reprocessing and waste packaging technologies (for export to Germany) are proven will be met with legal and public resistance.

- Any proposal to export AVR and THTR spent fuel to SRS and re-export the by-product waste to Germany will be complicated, if not impossible, costly and will face public opposition and legal challenges.

- The proposal to export AVR and THTR spent fuel to SRS for reprocessing should be abandoned and the spent fuel managed in Germany.

[1] U.S. DOE, Draft Environmental Assessment on the "ACCEPTANCE AND DISPOSITION OF SPENT NUCLEAR FUEL CONTAINING U.S.-ORIGIN HIGHLY ENRICHED URANIUM FROM THE FEDERAL REPUBLIC OF GERMANY," DOE/EA-1977, January 2016, http://sro.srs.gov/docs/GermanProject/Draft_DOE_EA.pdf

[2] U.S. DOE's National Nuclear Security Administration memo on "Proliferation Attractiveness of Jülich Graphite Spheres," 1 August 2013, http://www.srswatch.org/uploads/2/7/5/8/27584045/doe_no_proliferation_risk_august_1_2013.pdf

**New Public Process Must be Reopened if Processed Waste is to be Returned to Germany**

On 4 June 2014, via publication in the U.S. Federal Register,[3] the U.S. Department of Energy began the public process to prepare an "environmental assessment" (EA) on the shipment of AVR and THTR spent fuel to the Savannah River Site (SRS) in South Carolina for processing and "final disposition."

As part of the EA process, a public meeting was held on 24 June 2014 and a 6-week public comment period was allowed. At the public meeting, held near SRS, a majority of comments were against the import of the AVR and THTR spent fuel. It was clear that most of those in support of the import proposal were contractors with a financial interest in the matter.

One and a half years after the public meeting, a "draft Environmental Assessment"[4] was issued in January 2016. The document was entitled the "ACCEPTANCE AND DISPOSITION OF SPENT NUCLEAR FUEL CONTAINING U.S.-ORIGIN HIGHLY ENRICHED URANIUM FROM THE FEDERAL REPUBLIC OF GERMANY."

Though DOE claimed in early 2016 that a final EA would be issued by mid-2016, no such final document has yet been issued and every month results in another delay.[5] It is believed that public opposition and technical, political and legal problems in both countries have resulted in the inability of the process to move further. SRS officials have stopped talking about the matter at public meetings but oral comments by members of the public in opposition to the proposal have continued.

Additionally, a spokesman for new governor of South Carolina, Governor Henry McMaster, who replaced former Governor Nikki Haley, now ambassador to the United Nations, said in a 17 February 2017 article that "our state will not stand by and become a dumping ground for nuclear waste."[6] This position continues the policy of former Governor Haley against more nuclear waste coming into the Savannah River Site with no exit strategy.

Reflecting public opinion near SRS, the SRS Citizens Advisory Board (SRS CAB), a duly established federal advisory panel on SRS clean-up, adopted a position in July 2016 against

[3] U.S. Federal Register, Notice of Intent to prepare an "Environmental Assessment for the Acceptance and Disposition of Used Nuclear Fuel Containing U.S.-Origin Highly Enriched Uranium From the Federal Republic of Germany," 4 June 2014, https://www.gpo.gov/fdsys/pkg/FR-2014-06-04/pdf/2014-12933.pdf

[4] U.S. DOE, Draft Environmental Assessment on the "ACCEPTANCE AND DISPOSITION OF SPENT NUCLEAR FUEL CONTAINING U.S.-ORIGIN HIGHLY ENRICHED URANIUM FROM THE FEDERAL REPUBLIC OF GERMANY," DOE/EA-1977, January 2016, http://sro.srs.gov/docs/GermanProject/Draft_DOE_EA.pdf

[5] U.S. DOE's "Environmental Impact Statements (EISs) and Environmental Assessments (EAs) Involving the Savannah River Site (SRS) January 2017, released 24 February 2017, "A date for issuance of the final EA was not available at the time this status report was prepared.", http://www.srswatch.org/uploads/2/7/5/8/27584045/jan_17_status_report_-_approved_for_public_release__24feb17_.pdf

[6] Nuclear Deterrence Monitor, "S.C. Governor Wants State to File New $100M Claim in MOX Legal Battle," 17 February 2017

import of the AVR and THTR spent fuel.[7] The advisory board concluded that "the SRS Citizens Advisory Board opposes the proposal to receive the German SNF for treatment and storage in the U.S. and supports the "No Action" alternative." The "No Action" alternative if for the spent fuel to remain in Germany.

The CAB concluded that taking the AVR and THTR spent fuel to SRS "represents an unwarranted additional environmental risk to citizens in the Central Savannah River Area" and that "the proposal will unnecessarily add to an already large burden of indefinite SNF and high-level radioactive waste storage at SRS with no established path for disposal."

Public interest groups near SRS have spoken against the receipt of the spent fuel, including the Conservation Voters of South Carolina, South Carolina League of Women Voters, South Carolina Chapter of the Sierra Club, Georgia Women's Action for New Directions, Don't Waste Aiken and Savanah River Site Watch.

**Conclusion:** The public near SRS, in South Carolina and Georgia, remain opposed to import of the AVR and THTR spent fuel for reprocessing and dumping. Likewise the governor South Carolina does not want SRS to become an international nuclear waste dump. If there is any modification in the current proposal by DOE and FZJ/JEN, such as return of waste to Germany, the public will demand a new public comment period and at least one public meeting. Given that packaging and management of waste for return to Germany is a significant change in the current proposal and will pose additional environmental and health risks, we will demand that an "environmental impact statement" (EIS) - more comprehensive that an "environmental assessment" - be prepared. This process could add significant additional time to the schedule.

**Draft Environmental Assessment and Waste Forms after Processing of AVR, THTR Spent Fuel – Much Material to be Returned to Germany**

If the Bundestag allows the AVR and THTR spent fuel to be exported to SRS for reprocessing, as long as waste is returned to Germany, there will be a large volume of waste to package and return. Some waste forms will not be available to be immediately returned, such as vitrified high-level waste, and some waste will likely never leave SRS.

In the draft Environmental Assessment, the "proposed action" is as follows: **"**DOE is considering the feasibility of accepting this spent nuclear fuel containing U.S.-origin highly enriched uranium (HEU) at DOE's Savannah River Site (SRS) for processing and disposition." Thus, there is no mention of processing and packaging for return to Germany in the draft EA.

The draft EA goes on to confirm that "Under the action alternatives, the spent nuclear fuel would be transported from Germany and processed at SRS for <u>final disposition</u> as a proliferation-resistant waste form."

[7] SRS Citizens Advisory Board, "CAB Position Statement on the Proposed Acceptance and Disposition of Spent Nuclear Fuel (SNF) Containing US-Origin Highly Enriched Uranium from the Federal Republic of Germany," 26 July 2016, http://www.srs.gov/general/outreach/srs-cab/library/positions/Receipt%20of%20German%20Spent%20Nuclear%20Fuel.pdf

As the plan is now preparation for "final disposition" either at SRS or other sites in the U.S., the possible return to Germany has not even been considered in the draft EA. Likewise, there has been no mention of the return-to-Germany option at public meetings or in DOE documents reviewing reprocessing at SRS. This means that DOE has produced no documentation analyzing all the additional steps necessary to contain and package waste for return to Germany.

The draft Environmental Assessment considers various options for reprocessing of the CASTOR casks containing the AVR and THTR spent fuel pebbles. Two forms of "carbon digestion" and processing of the separated uranium (and thorium) result in a host of waste forms. As now proposed and considered in the draft Environmental Assessment, the low-level waste would be disposed of in the earth at SRS and the high-level waste would await shipment to a geologic repository, as required by US law.

Reprocessing of the AVR and THTR spent fuel digestion of graphite from spent nuclear fuel could, according the draft EA, "result in increased emissions of tritium, carbon-14, chlorine-36, cesium-137, iodine-129, and krypton-85 to the air." The draft EA goes on to say that "off-gas from the digester…would be treated to remove cesium, strontium, actinides, and entrained particulates. These materials would be processed and disposed along with similar SRS wastes in the liquid and solid waste management systems."

Radioactive off-gases, including carbon-14 - as carbon dioxide - and noble gases would be discharged directly into the atmosphere. Unfortunately, this discharge is allowed by DOE, which is not regulated by the U.S. Nuclear Regulatory Commission (NRC). Such discharge would not be allowed by a commercial U.S. facility regulated by the NRC. The question begs: why is Germany considering shipment of its nuclear waste to facilities at SRS which have less rigorous environmental standards than those in Germany?

These radioactive gas discharges obviously would not be captured for return to Germany. This aerial discharge constitutes a significant amount of radiation into the environment near SRS and clearly demonstrates that not all the by-product waste from processing the AVR and THTR spent fuel could be returned to Germany.

The reprocessing of the AVR and THTR spent fuel would result in a variety of solid wastes according to the draft EA. No matter what reprocessing technologies were chosen at SRS – either molten salt digestion process or a vapor digestion process – there would be an assortment of waste types.

According to the draft Environmental Assessment, this table shows what DOE considers some of by-product waste of the reprocessing of the AVR and THTR spent fuel – all of these waste

would have to be returned to Germany.[8] Separated, contaminated uranium would also be returned.

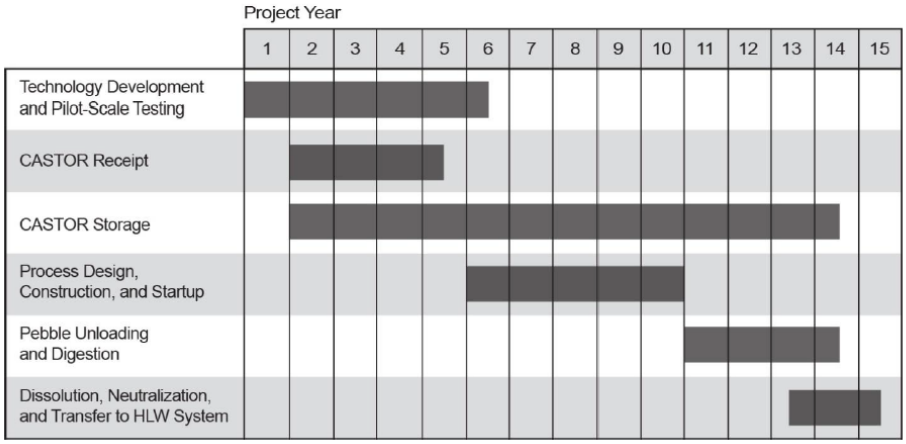
**Table 4-23: Waste Generation and Percent of SRS Waste Management Facility Capacity**

| Waste Type | H-Area Alternative[a] | | | L-Area Alternative[a] |
|---|---|---|---|---|
| | Vitrification Option | LEU Waste Option | LEU/Thorium Waste Option | |
| ***Construction*** | | | | |
| Solid LLW (cubic meters) | 320 (0.1) | 320 (0.1) | 320 (0.1) | 390 (0.1)[b] |
| Solid hazardous (cubic meters) | 0.15 (0.02) | 1.7 (0.3) | 1.7 (0.3) | NG |
| Liquid hazardous (liters) | 190 (0.02) | 570 (0.1) | 570 (0.1) | NG |
| Solid nonhazardous (cubic meters) | 110 (0.0009) | 340 (0.004) | 340 (0.004) | NG |
| Liquid nonhazardous (liters) | 9,500 (0.0002) | 32,000 (0.001) | 32,000 (0.001) | NG |
| ***Operations*** | | | | |
| Solid LLW (cubic meters) | 2,000 (0.7) | 2,300 (0.8) | 2,500 to 2,900 (0.9 to 1.0)[c] | 2,000 (0.7) |
| Liquid LLW (liters) | NG | 280,000 (0.03) | 280,000 (0.03) | NG |
| Hazardous (cubic meters) | NG | 0.15 (0.03) | 0.15 (0.03) | NG |
| Solid nonhazardous (cubic meters) | NG | 75 (0.001) | 75 (0.001) | NG |
| Liquid nonhazardous (liters) | NG | 2,800,000 (0.1) | 2,800,000 (0.1) | NG |
| HLW canisters or MCOs (number) | 101 (2) | 32 (0.7) | 15 (0.3) | 82 (NA)[d] |
| Saltstone grout (liters)[e] | 5,500,000 (16-24) | 6,200,000 (18-27) | 6,200,000 (18-27) | 3,700,000 (5-8) |

HLW = high-level radioactive waste; LEU = low-enriched uranium; LLW = low-level radioactive waste; MCO = multi-canister overpack; NA = not applicable; NG = not generated in meaningful quantities.

The draft EA presents a general timeline for "Technology Development and Pilot Scale Testing" for the option to process the AVR and THTR spent fuel and leave the waste at SRS.[9] For the new option to package and return the waste to Germany, this timeline would likely be extended significantly and not fir the timeline for decision-making in Germany.

**Draft EA for the Acceptance and Disposition of Spent Nuclear Fuel Containing U.S.-Origin Highly Enriched Uranium from the Federal Republic of Germany**




[8] Draft Environmental Assessment, page S-55
[9] Draft Environmental Assessment, page 2-13

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