DOE/EIS-0082-S-SA-01

Supplement Analysis for Defense Waste Processing Facility Failed Melter Aboveground Storage

Introduction

The Department of Energy (DOE) has prepared this supplement analysis (SA) to evaluate the existing environmental impact statement (EIS) (listed below) in light of changes that could have bearing on the potential environmental impacts previously analyzed. The Council on Environmental Quality, (CEQ) National Environmental Policy Act (NEPA) regulations direct agencies to prepare a supplement to either a draft or final EIS when a major Federal action remains to occur and either the "agency makes substantial changes to the proposed action that are relevant to environmental concerns" or there are "significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts" (40 CFR 1502.9(d)(1)(i)–(ii))[1]. DOE's NEPA regulations state that when it "is unclear whether or not an EIS supplement is required, DOE shall prepare a Supplement Analysis" (10 CFR 1021.314(c)). This SA provides sufficient information for DOE to determine whether (1) to supplement an existing EIS, (2) to prepare a new EIS, or (3) no further NEPA documentation is required (10 CFR 1021.314(c)(2)(i)–(iii)).

Existing EIS(s) evaluated in this SA:

- *Final Supplemental Environmental Impact Statement Defense Waste Processing Facility* (Final SEIS) (DOE/EIS-0082-S), https://www.energy.gov/node/1191601

Changes to the Proposed Action or New Circumstances or Information[2]

This SA was prepared to assess the environmental impacts as analyzed in the existing NEPA document referenced above to the potential impacts considering changes to the proposed action.

The existing NEPA document referenced above evaluated constructing underground Failed Equipment Storage Vaults (FESVs) in S-Area near the Defense Waste Processing Facility (DWPF) to provide safe interim storage of equipment (e.g., failed melters, process vessels, and miscellaneous smaller failed equipment) until a permanent disposal facility can be identified. The proposed action is to construct an interim aboveground storage facility for immediate relocation and storage of two DWPF failed melters (Melter Nos. 1 and 2) in lieu of underground storage units. The aboveground storage facility will be located southeast of the current FESVs. The facility

[1] On May 1, 2024, the CEQ published National Environmental Policy Act Implementing Regulations Revisions Phase 2. Under 40 CFR 1506.12 of that rule, "The regulations in this subchapter apply to any NEPA process begun after July 1, 2024." Since this SA was started prior to July 1, 2024, it was prepared under the previous CEQ NEPA regulations.

[2] Throughout this document, the phrase "changes to the proposed action or new circumstances or information" refers to a substantial change to the proposed action that may be relevant to environmental concerns or significant new circumstances or information that may be relevant to environmental concerns and have bearing on the proposed action or its impacts consistent with 40 CFR 1502.9(d).

will be a newly constructed passive structure, with an approximate footprint of 34-foot x 78-foot, constructed on-grade, consisting of an approximately 2-foot-thick reinforced concrete pad with approximately 2-foot-thick concrete block shielding walls covered by a pre-manufactured steel weather cover with roof extending to an approximate height of 27 feet. Like the FESVs, the aboveground storage facility will be located in a remote part of S-Area (DWPF) and is not physically connected to the DWPF or any other facility.

Background

As described in the Final SEIS, in 1982, DOE decided that failed equipment that could not be repaired was to be decontaminated, packaged, and transferred to the Savannah River Site (SRS) burial facilities (DOE 1982). However, DOE was concerned that melters, and possibly other equipment, potentially could not be decontaminated to levels that would allow them to be handled or even repaired without resulting in unacceptable radiation doses to workers. Therefore, DOE has constructed two underground vaults in S-Area near the DWPF to provide safe interim storage of this equipment until a permanent disposal facility can be identified. Failed equipment is first placed into containers (e.g., Melter Storage Box (MSB)) before being put into interim storage facilities.

Currently, two DWPF failed melters (Melter Nos. 1 and 2) are stored underground in two operational FESVs. In the Final SEIS, DOE assumed that approximately 14 vaults would be required for underground storage of failed melters and other large equipment due to their highly radiological nature. The life expectancy of the DWPF melters has been extended based on current performance. The current Liquid Waste System Plan (SRMC 2023a) assumes one melter changeout, which would be Melter No. 3 replaced by Melter No. 4. As such, storage for up to four melters is projected to be required for the life of DWPF, not fourteen. Storage for fourteen melters is no longer considered a requirement. Construction of the aboveground storage facility should provide the required additional failed melter storage space for the life expectancy of DWPF. Actual radiation dose calculations for Melter Nos. 1 and 2 have been determined to be far lower than what was analyzed in the Final SEIS (SRMC 2024). Consequently, the low radiological nature of Melter Nos. 1 and 2 would allow for storage in a properly constructed aboveground storage area. Moving Melter Nos. 1 and 2 from the FESVs to aboveground storage will allow space for storage of two melters with a higher radiological nature to be stored in the FESVs in the future.

Design capabilities were described in the Final SEIS for the FESVs. Table 1 below identifies analogous aboveground FESV storage configurations that conform to inground FESV design criteria requirements. The same design criteria outlined in the existing Final SEIS has been applied to the design of the aboveground storage facility. The results are shown in Table 1, which show that the aboveground storage facility design will provide the same form, fit, and function of the underground FESVs.

Table 1 FESV Configuration	
FESV Design Capability Criteria in DOE/EIS-0082-S	**MSB Aboveground Storage FESV Analog**
Remote transport, handling, storage, and retrieval of boxes containing failed equipment	MSBs 1 and 2 will be stored on a concrete pad with walls for radiation shielding and a roof for weather protection. Remote transport, handling, storage, and retrieval design is based on the radiation dose of MSBs. The MSBs have a maximum radiation dose of 200 mRem/hr, which does not require any special remote handling. As such, a portable crane may be used to satisfy this criterion.
Monitoring of vault air and possible liquid effluents to prevent releases of radioactivity into the environment	The MSBs are equipped with passive HEPA filters to control any insignificant radioactive emissions from natural environmental heating and cooling cycle of the MSB. The MSB does not contain any liquids so there is no potential for liquid release. Portable airborne radioactivity samplers, as well as radiation dose instruments will be used to monitor the aboveground storage area. The aboveground storage area will be periodically inspected.
Design of the vaults and covers to resist the effects of earthquake and tornado pressure	MSBs will be stored on a concrete pad with walls for radiation shielding and a roof for weather protection. The aboveground storage is not designed for seismic or tornado impacts. However, at the reduced curie loading of MSBs 1 and 2 their contribution to the consequences from aboveground storage is comparable to or lower than glass contaminated equipment stored in Sealand containers as evaluated in U-CLC-S-00019 (SRMC 2023b), which showed no significant release to the environment from an earthquake or tornado. Therefore, the aboveground facility design resists the effects of earthquake and tornado pressure as do the FESVs.
Design of vaults and covers to reduce occupational radiation levels	MSBs will be stored on a concrete pad with walls for radiation shielding and a roof for weather protection. Design of vaults and covers is based on the radiation dose of MSBs. The MSBs have a maximum radiation dose rate of 200 mRem/hr. Temporary wall design will provide radiation shielding to control the surrounding area as a Controlled Area/Radiological Buffer Area. The aboveground storage area will be posted as a Radiation Area.

Resource Areas Not Analyzed in Detail in this SA

The following SRS operations originally analyzed in DOE/EIS-0082-S are not analyzed in this SA because the operations will not be significantly affected by the changes to the proposed action or new circumstances or information:

- DWPF and Saltstone operations will not be analyzed in this SA because they will not be affected by the FESVs. The FESVs are not connected physically to the DWPF and Saltstone operational facilities. Operations at the FESVs are conducted independent of facility operations.

Resource Areas Analyzed in Detail in this SA

The resources areas in Table 2 are analyzed in this SA:

Table 2 Comparison of Potential Environmental Impacts

Resource Area	Summary of Potential Impacts in DOE/EIS-0082-S *Final Supplemental Environmental Impact Statement Defense Waste Processing Facility*	Summary of Potential Impacts as a Result of Changes to the Proposed Action or New Circumstances or Information	Difference in Potential Impacts
Geologic Resources	There are no unique geologic features or minerals of economic value near S-Area (DWPF) and associated facilities. Impacts are associated with erosion and sediments from stormwater runoff and occasional spills from construction and operation activities. Impacts are controlled via Best Management Practices implemented by a Stormwater Pollution Prevention Plan, a Spill Prevention, Control, and Countermeasure Plan, and a Best Management Practices Plan.	Like the FESVs, the aboveground storage facility impacts are associated with erosion and sediments from stormwater runoff and occasional spills from construction and operation activities. Impacts are controlled via Best Management Practices implemented by a Stormwater Pollution Prevention Plan, a Spill Prevention, Control, and Countermeasure Plan, and a Best Managements Practices Plan.	No difference in potential impact
Groundwater	No impact is expected to groundwater resources, although there is a potential for inadvertent spills which are mitigated by Best Management Practices implemented by a Stormwater Pollution Prevention Plan, a Spill Prevention, Control, and Countermeasure Plan, and a Best Management Practices Plan.	Like the FESVs, no impact is expected to groundwater resources from the aboveground storage facility, although there is a potential for inadvertent spills which are mitigated by Best Management Practices implemented by a Stormwater Pollution Prevention Plan, a Spill Prevention, Control, and Countermeasure Plan and a Best Management Practices Plan.	No difference in potential impact

Surface Water	Construction: Construction activities are covered by the South Carolina Department of Health and Environmental Services[3] (SCDES) General Stormwater Permit (SCR100000). Stormwater runoff from the construction site is in included in a Construction Stormwater Management and a Sedimentation Control Plan prepared during the construction phase. The area where the FESVs are sited does not drain to a stormwater retention pond. Site specific Best Management Practices will be deployed during construction to control sediment. Operation: During operation the FESVs are not expected to generate wastewater. Any water accumulated in the structure would not be directly discharged to surface waters, therefore there would be no impact on surface waters. Any water accumulated would be managed using DWPF and support facilities.	Construction: Like the FESVs the aboveground storage facility construction activities are covered by SCDES General Stormwater Permit (SCR100000, https://des.sc.gov/programs/bureau-water/stormwater/stormwater-management/construction-activities). Stormwater runoff from the construction site is included in a Construction Stormwater Management and a Sedimentation Control Plan prepared during the construction phase. The area where the aboveground storage facility is sited drains to the surrounding area where it is dispersed. The drainage is not directed to a specific outfall. Site specific Best Management Practices will be deployed during construction to control sediment. Operation: Like the FESVs, during operation the aboveground storage facility is not expected to generate wastewater. The roof and sloping of floor will eliminate any potential for water to be accumulated in the structure.	Construction: Negligible difference in potential impact Operation: Negligible difference in potential impact

[3] South Carolina Department of Environmental Services (SCDES) was known as South Carolina Department of Health and Environmental Control (SCDHEC) prior to July 1, 2024.

Air Resources and Climate Change	Construction: Air emissions from construction include dust and exhaust emissions proportional to the construction area. The FESVs construction area is small, which results in minimal air emissions. Operation: The FESVs have no installed ventilation system. The only emissions would be from a HEPA filter installed in the MSB into the FESV. Any radiological and non-radiological emissions would be minimal and well within Federal and state ambient air quality regulations. Greenhouse Gas (GHG): Not previously assessed. This item was not addressed in previous NEPA documents. A small amount of greenhouse gasses are associated with FESV construction and none are associated with operation. This amount is negligible with respect to greenhouse gas emissions at SRS.	Construction: Air emissions from construction include dust and exhaust emissions proportional to the construction area. The aboveground storage facility construction area size is comparable to that of the FESVs. Both are small, resulting in minimal air emissions. Operation: Like the FESVs, the aboveground storage facility area has no ventilation system installed. The only emissions would be from a HEPA filter installed in the MSB into the atmosphere. Any radiological and non-radiological emissions would be minimal and well within Federal and state ambient air quality regulations. GHG: FESV and aboveground storage construction efforts are similar. A small amount of greenhouse gasses are associated with FESV construction, and similarly aboveground storage. No GHGs are associated with aboveground storage operation. The construction amount is negligible with respect to greenhouse gas emissions at SRS.	Negligible difference in potential impact
Cultural Resources	No cultural or archaeological resource impact the FESVs. The DWPF site was surveyed prior to construction (1978 - 1979). No archaeological or historical artifacts were found within the DWPF area.	The aboveground storage facility site is alongside the FESVs, as such, there would be no cultural or archaeological impact, based on original archaeological survey.	No difference in potential impact

Aesthetics and Scenic Resources	The FESVs have no impact on aesthetic or scenic resources as they are not visible from off the Site or from public access roads. FESV operation does not produce emissions to the atmosphere that would be visible.	Like FESVs, the aboveground storage facility has no impact on aesthetic or scenic resources as it will not be visible from off the Site or from public access roads. Aboveground storage operation does not produce emissions to the atmosphere that would be visible.	No difference in potential impact
Traffic and Transportation	Projected increases in traffic from the construction and operation of the FESVs is minimal and was shown not to exceed road capacities.	Projected increases in traffic from the construction and operation of the aboveground storage facility like the FESVs are minimal and are not expected to exceed road capacities.	No difference in potential impact
Radiological Health Effects from Normal DWPF Operations	The increase in the probability of a radiation-induced fatal cancer death from normal DWPF operations, including the FESVs, is 5 in 10 billion per year of operation and 1.2 in 100 million over 24 years of DWPF operation. FESV operation is an insignificant contributor to radiation-induced fatal cancer estimates.	The aboveground storage facility design will provide radiation shielding to control the surrounding area as a Controlled Area/Radiological Buffer Area, which is the same radiological posting as the area surrounding the FESVs. Like the FESVs, the aboveground storage area is an insignificant radiological contributor to personnel. The aboveground storage facility inside access will be controlled as a Radiation Area. Inside access for personal will be very infrequent and will be controlled with existing radiological control practices. Based on the aboveground storage facility design described above, like the FESVs, the aboveground storage facility is an insignificant contributor to the overall fatal radiation-induced cancer estimates.	No difference in potential impact

Nonradiological Health Effects from Normal DWPF Operations	The only nonradiological health impact expected from construction and operation was exposure to benzene from normal DWPF operations. The FESVs do not generate benzene, as such, there is no impact on nonradiological health effects from the FESVs.	Like the FESVs, the aboveground storage facility does not generate benzene and the design does not include use of any chemicals. As such, there would be no impact on nonradiological health effects from the aboveground storage facility.	No difference in potential impact
Worker Radiological Health	Operation of the DWPF, including the FESVs, for 24 years could result in a total incremental risk from occupational exposure to radiation of approximately 1 fatal cancer. This value is less than 1 percent of the fatal cancers expected in worker population from non-SRS causes.	The aboveground storage facility design will provide radiation shielding to control the surrounding area as a Controlled Area/Radiological Buffer Area, which is the same radiological posting as the area surrounding the FESVs. Like the FESVs, the aboveground storage area is an insignificant radiological contributor to personnel. The aboveground storage facility inside access will be controlled as a Radiation Area. Inside access for personal will be very infrequent and will be controlled with existing radiological control practices. Based on discussion above the dose to the worker associated with the aboveground storage facility is comparable to that of FESV operation. As such, worker health is not impacted.	No difference in potential impact
Worker Nonradiological Health	DWPF, including FESV operation, does not place demands on worker which would subject them to the adverse effects of unique or high hazards, during operation. Industrial injuries occur very infrequently and are expected to be minor such as bruises, minor cuts, or mild skin irritation.	The aboveground storage facility operation is similar in demands to FESV operation. Therefore, workers are not expected to be subjected to adverse effects of high hazards during operation.	No difference in potential impact

Radiological Accident Analysis	In DOE/EIS-0082-S, "The reasonably foreseeable accidents, identified by reviewing existing safety documentation, were screened to select accidents within each frequency range that present the greatest consequences and risk. These accidents, which bound other accidents within the same frequency range, are referred to as "maximum reasonably foreseeable" accidents and were selected for further evaluation in this Supplemental EIS." None of these selected accidents involved FESV.	Potential accident probability and consequence are similar for the aboveground storage facility and FESV operation. Accordingly, no potential accidents at the aboveground storage facility would be selected as the "maximum reasonably foreseeable" accident within a given frequency range under the Final SEIS analysis and therefore, would not affect the quantitative accident analysis.	No difference in potential impact
Chemical Hazards	In DOE/EIS-0082-S, "The reasonably foreseeable accidents, identified by reviewing existing safety documentation, were screened to select accidents within each frequency range that present the greatest consequences and risk. These accidents, which bound other accidents within the same frequency range, are referred to as "maximum reasonably foreseeable" accidents and were selected for further evaluation in this Supplemental EIS." None of these selected accidents involved FESV.	Potential accident probability and consequence are similar for the aboveground storage facility and FESV operation. Because of this, no potential accidents at the aboveground storage facility would be selected as the "maximum reasonably foreseeable" accident within a given frequency range under the Final SEIS analysis and thus would not affect the quantitative accident analysis.	No difference in potential impact
Waste Generation	The volume of waste generated from FESV operation will have a minimal impact on the total volume of waste generated by DWPF during construction and operation. Waste management programs are in place to disposition waste generated.	The volume of waste generated from FESV, and the aboveground storage facility operation are similar and will have a minimal impact on the total volume of waste generated by DWPF during construction and operation. Waste management programs are in place to disposition waste generated.	No difference in potential impact

Decontamination and Decommissioning (D&D)	D&D operations at the DWPF, include 25 buildings (including the two FESVs). There are over 6,000 buildings at SRS for D&D. The FESV does not have any special design features that make it more difficult than other buildings for D&D.	The aboveground storage facility does not have any special design features that make it more difficult than other buildings for D&D at SRS. The level of effort for aboveground storage D&D is less than the FESVs since they are aboveground.	No difference in potential impact
Unavoidable Adverse Impacts	Construction of FESVs will generate dust during land clearing that is unavoidable but are controlled as necessary using dust suppressants.	Construction of the aboveground storage facility will generate dust during land clearing that is unavoidable but can be controlled as necessary using dust suppressants. Level of effort for construction of aboveground storage is less than FESVs.	No difference in potential impact
DWPF Organic Waste Treatment Options	FESV construction and operation is independent of this impact.	The aboveground storage facility construction and operation is independent of this impact.	No difference in potential impact
Noise	A small amount of noise is associated with FESV construction, and none is associated with operation. The FESV construction site is very remote from the public and is not adjacent to onsite personnel work areas. This amount is negligible with respect to noise emissions at SRS.	As with the FESVs, a small amount of noise is associated with aboveground storage construction, and none is associated with operation. As with the FESVs, the aboveground storage construction site is very remote from the public and is not adjacent to onsite personnel work areas. This amount is negligible with respect to noise emissions at SRS.	No difference in potential impact
Land Use and General Site Description	None of the activities associated with the construction and operation of the FESVs would impact SRS land use because they take place within the boundary of S-Area.	As with the FESVs, none of the activities associated with the construction and operation of the aboveground storage facility would impact SRS land use because they take place within the boundary of S-Area.	No difference in potential impact

Biological Resources	Impacts to surrounding waterways are associated with erosion and sediments from stormwater runoff and occasional spills from FESV construction and operation activities. Impacts are controlled via Best Management Practices implemented by a Stormwater Pollution Prevention Plan, a Spill Prevention, Control, and Countermeasure Plan, and a Best Managements Practices Plan. The potential for effects on aquatic biota is considered to be minimal.	As with the FESVs, impacts to surrounding waterways are associated with erosion and sediments from stormwater runoff and occasional spills from aboveground storage facility construction and operation activities. Impacts are controlled via Best Management Practices implemented by a Stormwater Pollution Prevention Plan, a Spill Prevention, Control, and Countermeasure Plan and a Best Managements Practices Plan. The potential for effects on aquatic biota is considered to be minimal.	No difference in potential impact
Floodplain/Wetland	The FESVs are not located within a floodplain or wetland.	Like the FESVs, the aboveground storage facility is not located within a floodplain or wetland.	No difference in potential impact
Socioeconomic Resources	There will be a temporary increase in jobs during the FESV construction phase, however, DOE expects a negligible overall impact from SRS employment changes on the demand for community resources and services from FESV operation and construction. Environmental Justice: Not previously assessed.	There will be a temporary increase in jobs during the aboveground storage facility construction phase, however, just as with the FESVs with similar construction and operation demands, negligible overall impact from SRS employment changes on the demand for community resources and services from FESV operation is expected. Environmental Justice: The proposed action will not result in offsite impacts; therefore, there would be no disproportionate and adverse effects on communities with environmental justice concerns.	No difference in potential impact

Existing Facilities	Construction impacts of the DWPF, including FESVs, were evaluated with respect to impacts of existing onsite and offsite facilities as well as reasonably foreseeable onsite facilities construction and operation. No adverse cumulative impacts were identified.	FESV construction and operation scope is similar to aboveground storage since construction and operating footprints are similar in size. Cumulative impacts will be similar.	No difference in potential impact
Cumulative Impacts	Construction of DWPF, including FESVs, impact was evaluated with respect to impact of existing onsite and offsite facilities as well as reasonably foreseeable onsite facilities construction and operation. No adverse cumulative impacts were identified.	FESV construction and operation scope is similar to aboveground storage since construction and operating footprints are similar in size. Cumulative impacts will be similar.	No difference in potential impact

Mitigation

The proposed activity circumstances are similar in nature to the existing potential impacts. Based on this analysis, DOE determined, consistent with the Final SEIS, that no additional mitigation measures are anticipated.

Conclusion

The 1994 Final SEIS, identified in this SA, evaluated the potential impacts of constructing vaults in S-Area near the Vitrification Facility to provide safe interim storage of melters and possibly other equipment until a permanent disposal facility can be identified. DOE prepared this SA in accordance with 10 CFR 1021.314, which requires a supplemental EIS be issued when "there are substantial changes to the proposal" or there are "significant new circumstances or information relevant to environmental concern." In accordance with DOE regulations, this SA provides sufficient information to enable DOE to determine whether the 1994 Final SEIS identified in this SA should be supplemented, a new EIS be preprepared, or no further NEPA documentation is required.

Determination

In accordance with DOE's NEPA implementing regulations, and consistent with the NEPA Recommendations for the Supplement Analysis Process, 2nd Edition, DOE prepared this SA to evaluate whether the aboveground storage of failed melters require supplementing the existing Final SEIS or preparing a new EIS. DOE concludes that the proposed change and information discussed in this SA are not significant and therefore do not require a supplement to the *Final Supplemental Environmental Impact Statement Defense Waste Processing Facility* (DOE/EIS-

0082-S), consistent with 40 CFR 1502.9(d)(4). No further NEPA documentation is required; however, DOE may amend the existing Record of Decision.

Reference

1. DOE (U.S. Department of Energy), 1982, *Final Environmental Impact Statement, Defense Waste Processing Facility, Savannah River Plant, Aiken, SC,* DOE/EIS-0082, Assistant Secretary for Defense Programs, Office of Defense Waste and Byproducts Management, Savannah River Plant, Aiken, South Carolina. https://www.energy.gov/node/301045

2. SRMC (Savannah River Mission Completion), 2024, *Dose Rate Profile and Shielding Evaluation for the Proposed Above Ground Storage of Melter Storage Box Nos. 1 and 2,* SRMC-RPE-2024-0001, Revision 0

3. SRMC, 2023a, *Liquid Waste System Plan*, SRMC-LWP-2023-0001, Revision 23-P, https://www.savannahrivermissioncompletion.com/_files/ugd/b25c55_fe81b4d54a684b6e8fc21f1f346ac837.pdf

4. SRMC, 2023b, *Dose Calculations for Glass and Sludge Waste Storage Accidents Associated with the Failed Equipment (FESV) and Decontaminated/Rad-Reusable Equipment Storage (DRRES) Sealand Containers*, U-CLC-S-00019, Revision 2

5. SRMC, 2023c, *Above Ground Storage of Defense Waste Processing Facility Melter Storage Boxes*, LWO-S-2023-00011, Revision 1

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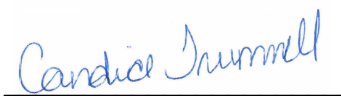

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