



**STATEMENT OF BASIS**  
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BAQ Air Permitting Division

<b>Company Name:</b>	USDOE – Savannah River Nuclear Solutions, LLC	<b>Permit Writer:</b>	Robert Mahoney
<b>Permit Number:</b>	0080-0041-C5	<b>Date:</b>	February 4, 2022

**DATE APPLICATION RECEIVED:** October 20, 2021

**FACILITY DESCRIPTION (SIC CODES - 2819/NAICS CODES - 325180)**

The Savannah River Site (SRS) is a key Department of Energy industrial complex dedicated to the stewardship of the environment, the enduring nuclear weapons stockpile and nuclear materials. More specifically, the SRS processes and stores nuclear materials in support of the national defense and U.S. nuclear non-proliferation efforts. The site also develops and deploys technologies to improve the environment and treat nuclear and hazardous wastes left from the Cold War.

The SRS complex covers 198,344 acres, or 310 square miles encompassing parts of Aiken, Barnwell and Allendale counties in South Carolina, bordering the Savannah River. The site is owned by DOE and is managed and operated by Savannah River Nuclear Solutions, LLC (SRNS). Under the contract that went into effect August 1, 2008, SRNS is responsible for the site's nuclear facility operations; environment, safety, health and quality assurance; and most of the site's administrative functions. DOE has other prime contractors such as Savannah River Remediation, LLC (SRR) which is responsible for the liquid waste operations at SRS. Another contractor, Ameresco Federal Solutions for the Ameresco Biomass Cogeneration Facility (TV-0080-0144), has ongoing collocated activities that have required construction and operating permits.

**PROJECT DESCRIPTION**

The Defense Waste Processing Facility (DWPF) is located in S-area and is Emission Unit 16 in the facility's Title V permit. High-Level Radioactive Waste (HLW) is vitrified by mixing HLW with silica sand, melting the mixture, and pouring the glass mixture into stainless steel canisters.

The current DWPF Chemical Process Cell (CPC) operation uses nitric acid to neutralize HLW, which results in the destruction of hydroxides and carbonates. This is followed by the addition of formic acid to reduce mercury into elemental mercury, allowing the metal to be steam stripped out of the feed stream before entering the Melter. This project proposes to switch from formic acid to glycolic acid. The glycolic acid should be more effective at reducing mercury while minimizing hydrogen gas generation.

The DWPF process conversion to glycolic acid will utilize existing process equipment. The current process utilizes 28 tanks. After the switch to glycolic acid, four of tanks will be abandoned in place (AIP) (103S, 129S, 131S, & 132S). In addition, six of the tanks will no longer emit a regulated air pollutant and will be removed from the permitted equipment list.

**COLLOCATION DETERMINATION**

Ameresco Biomass Cogeneration Facility (TV-0080-0144), Salt Waste Processing Facility and the Research and Development (R & D) Activities performed at leased facilities within the Savannah River Research Campus maintained by Aiken County are co-located facilities/activities. The Salt Waste Processing Facility and the R&D Activities are exempt sources. The Three Rivers Solid Waste Authority Regional Landfill is not co-located with SRS.

**SOURCE TEST REQUIREMENTS**

An initial source test of Emission Point - SDP007 for nitrogen oxides is being required. The source test will be used to verify emission estimates. The Sludge Receipt and Adjustment Tank (SRAT) (Equip. ID 267S) and the Melter (Equip. ID 270S) must be in operation during the testing. The test plan must explain how the process will be operated during the source test and the process information that will be recorded.



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**SPECIAL CONDITIONS, MONITORING, LIMITS**

Condenser (CD-J 0005) – The condenser is used to control formic acid and mercury. Under the current Title V permit, in order to demonstrate compliance with SC Regulation 61-62.5, Standard 4, SRS monitors process system parameters and leak detection systems as required by facility operating and emergency procedures to detect leaks from the condenser and take actions as necessary to isolate and correct the leak as specified in WSRC Letter ESH-ECS-2002-00284. Quarterly reports of incidences identified in WSRC Letter ESH-ECS-2002-00284 are submitted. After the switch to glycolic acid, the condenser will be considered a voluntary control device and no monitoring will be required.

**EMISSIONS**

EMISSIONS COMPARISON - TPY								
Source	PM	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	Pb
<b>Projected Emissions after modification</b>								
S-Area	0.33	0.33	0.33	--	64.3	8.6	1.05E-04	5.82E-06
<b>Existing Emissions</b>								
S-Area	0.33	0.33	0.33	--	24.7	0	5.58E-02	5.82E-06
<b>Net Emissions Increase</b>	0.0	0.0	0.0	0.0	39.6	8.6	-5.57E-02	0.0
<b>SER</b>	25.0	15.0	10.0	40.0	40.0	100.0	40.0	0.6
<b>Exceeds</b>	No	No	No	No	No	No	No	No
<b>Increase &gt; 50% of SER</b>	No	No	No	No	<b>YES</b>	No	No	No

PROJECT EMISSIONS <sup>1</sup>						
Pollutant	Uncontrolled		Controlled		PTE	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
PM	0.12	0.33	0.12	0.33	0.12	0.33
PM <sub>10</sub>	0.12	0.33	0.12	0.33	0.12	0.33
PM <sub>2.5</sub>	0.12	0.33	0.12	0.33	0.12	0.33
SO <sub>2</sub>	--	--	--	--	--	--
NO <sub>x</sub>	24.9	64.3	24.9	64.3	24.9	64.3
CO	2.5	8.6	2.5	8.6	2.5	8.6
VOC	2.40E-05	1.05E-04	2.40E-05	1.05E-04	2.40E-05	1.05E-04
Lead	1.69E-06	5.82E-06	1.69E-06	5.82E-06	1.69E-06	5.82E-06
Manganese (H, T)	4.57E-06	2.00E-05	4.57E-06	2.00E-05	4.57E-06	2.00E-05

1 – This project is a semi-batch process, which limits PTE to less than 8,760 hours per year. The Chemical Process Cell (CPC) operates in an assembly-line, semi-batch fashion. That is, while one vessel is processing one sequence, the vessels ahead and behind are processing the previous and next sequences respectively. The postulated time for a portion of waste to travel through the CPC and into glass is assumed 115 hours, which is a conservatively quick time.



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FACILITY WIDE EMISSIONS						
Pollutant	Prior to Construction			Post Construction		
	Uncontrolled	Controlled	PTE	Uncontrolled	Controlled	PTE
	TPY	TPY	TPY	TPY	TPY	TPY
PM	2730	274	274	2730	274	274
PM <sub>10</sub>	2040	270	270	2040	270	270
PM <sub>2.5</sub>	2010	248	248	2010	248	248
SO <sub>2</sub>	2840	597	597	2840	597	597
NO <sub>x</sub> <sup>1</sup>	1050	883	883	1070	905	905
CO	807	806	807	815	814	815
VOC	280	280	280	280	280	280
Lead	0.36	0.24	0.24	0.36	0.24	0.24
Total HAPs	298	284	284	295	280	280

1 - The prior to construction NO<sub>x</sub> emission rate was estimated to be 42.9 TPY for the Vitrification Process. This was a maximum potential estimate. The 40.0 TPY increase limit is based on prior actuals.

**OPERATING PERMIT STATUS**

Operating Permit Type	Type of modification required	Issue Date	Expiration Date	Renewal Receive Date	Covered under an Application Shield?
Title V	Minor	January 19, 2021	March 31, 2026	N/A	N/A

**REGULATORY APPLICABILITY REVIEW**

Explanation of Synthetic Minor Limits					
Permit ID	Equipment ID	Permit Issue Date	Pollutant	Emission Limit (TPY)	Explanation
C5	EU 16	Issuance of this permit	NO <sub>x</sub>	< 40.0 increase	Estimated emission increase of 39.6 tpy of NO <sub>x</sub> . Limit needed to avoid PSD.

Regulations	Comments/Periodic Monitoring Requirements
Section II(E) – Synthetic Minor	Production data and mass balance calculations will be used to calculate NO <sub>x</sub> emissions on a twelve-month rolling sum. Approved source test results may be used if available. The permit limits Emission Unit 16 to 64.3 tons per year of NO <sub>x</sub> . As shown above, Projected emissions (64.3 tpy) minus past actuals (24.7 tpy) equals 39.6 tons of NO <sub>x</sub> per year.



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Standard No. 4 Allowable					
Process	Max Process Weight Rate (tons/hr)	PM Allowable at Max (lb/hr)	Uncontrolled Emissions PM (lb/hr)	Controlled Emissions PM (lb/hr)	Monitoring
EU 16	0.24	1.57	0.33	N/A	Uncontrolled emissions are less than allowable, so no monitoring is required.

Regulations	Comments/Periodic Monitoring Requirements
Standard No. 4	EU 16 (S-Area) is subject to the 20% opacity standard.

Regulations	Comments/Periodic Monitoring Requirements
Standard No. 3 (state only)	<b>Not Applicable.</b> This project does not involve waste combustion or combustion to reduce wastes.
Standard No. 5	<b>Not Applicable.</b> This facility does not have any process operations that are specified by this regulation and therefore this standard does not apply.
Standard No. 5.2	<b>Not Applicable.</b> The NOx emissions are not generated from fuel combustion.
61-62.6	<b>Applicable.</b> Section III – Statewide.
40 CFR 60 and 61-62.60	<b>Not Applicable:</b> This project does not operate any of the pollutant-specific processes regulated. Subpart CC (Glass Manufacturing Plants) does not apply to all electric melters nor glass melting furnaces designed to produce less than 5 tons of glass per day.
40 CFR 61 and 61-62.61	<b>Applicable.</b> <b>Subpart H – National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities:</b> The facility is subject to this regulation. The SDP0007 stack is currently categorized as a Potential Impact Category (PIC3) stack per ANSI/HPS N13.1. This project does not impact the PIC of the SDP0007 stack as described in ANSI/HPS N13.1.
40 CFR 63 and 61-62.63	<b>Not Applicable:</b> This project does not operate any of the pollutant-specific processes regulated.
61-62.68	<b>Not Applicable.</b> SRS does not exceed the threshold levels in this regulation.
40 CFR 64 (CAM)	<b>Not Applicable.</b> This project does not meet the applicability requirements of this regulation. The control device is used to control mercury and uncontrolled emissions are not above major source threshold.

AMBIENT AIR STANDARDS REVIEW	
Regulations	Comments/Periodic Monitoring Requirements
Standard No. 2	<b>Applicable.</b> The facility demonstrated compliance with the standard. See modeling summary dated December 21, 2021.
Standard No. 8 (state only)	<b>Applicable.</b> The facility demonstrated compliance with the standard. See modeling summary dated December 21, 2021.



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**PUBLIC NOTICE**

This construction permit has undergone a 30-day public notice period, in accordance with SC Regulation 61-62.1, Section II(N) and, to establish a SC Regulation 61-62.1, Section II(E) limit. The comment period was open from January 5, 2022 to February 3, 2022 and was placed on the BAQ website during that time period. No comments were received during the comment period.

**SUMMARY AND CONCLUSIONS**

It has been determined that this source, if operated in accordance with the submitted application, will meet all applicable requirements and emission standards.