Appendix C: ~~Draft~~
GERMAN AVR/HTGR FUEL PROCESSING

Regulatory Framework and

Environmental Compliance Conditions, Requirements, and Associated Costs

Purpose of Document

This document outlines the regulatory framework and identifies environmental permits and/or other regulatory documents needed to support the repatriation and processing of German AVR/HTGR Fuel at the Savannah River Site. It also identifies interface considerations with existing regulatory agreements and documents, and environmental permits required for the construction and operation of the AVR/HTGR Processing Facility.

The interface considerations are presented separately from the permitting and compliance strategy. The repatriation of the AVR/HTGR fuel requires careful consideration regarding the impacts either negative or positive on the SRS and its current and planned missions. Outlining these impacts will enable informed decisions and provide a platform for effective communication with stakeholders.

The permitting and compliance process section (Section 2) is to be used to assist in the identification of key project regulatory activities. Information contained in this section is based on permitting approaches, requirements and processes that have been in place with the regulatory agencies and are mature. It also provides a basis for costs associated with support of obtaining documentation required to operate the facility at SRS.

1.0 REGULATORY INTERFACE CONSIDERATIONS

1.1 Introduction

Impacts of AVR/HTGR fuel repatriation on SRS current and planned mission range from very specific and quantifiable to unknown. The early phases of the project require routine tasks to evaluate and prepare for project initiation to those evaluations that require significant research and development. Within the DOE complex, the SRS has existing operations in nuclear fuel research and development (R & D); operational and robust nuclear facilities designed for safe and secure storage (e.g., L Area) and chemical processing (e.g., H Canyon). SRS operations also manage various types of nuclear waste (low level waste, transuranic waste, and high level waste).

1.2 Regulatory Interfaces

DOE announced its intent to prepare an Environmental Assessment (EA) to analyze the potential impacts from the proposed project on 4 June 2014. The development of the EA is underway. Recently, an Amended Record of Decision (AROD) was issued that outlined the Departments decision to focus operations on conventional processing in favor of what had been previously proposed as an alternative processing technology,

specifically referred to as “Melt and Dilute”. The basis for the decision was presented in the Federal Register (Vol. 78, No. 66/Friday April 5, 2013) and remains viable for the conditions they were developed to address. The ability to evaluate and perform comparative analysis of enhanced processing techniques while not impeding the accomplishment of the Environmental Management clean up mission is centric to the evaluation of the interfaces with current and planned missions.

The EA will address the potential impacts to various activities and conditions. One of the most visible areas of interface is related to the disposition path in use during conventional chemical separations at H Canyon. The DOE has committed in the Federal Facility Agreement (FFA) to reduce the environmental risk posed due to the storage of high level radioactive waste in underground storage tanks. Resulting in part from funding constraints within the federal budget, some of the legally binding milestones are in jeopardy of not being met. Specifically, the FFA (Statement of Dispute Resolution Concerning Extension of Closure Dates for Savannah River Site High-Level Radioactive Waste Tanks 19 and 18 – Appendix L) high-level waste tank closure milestones are:

- DOE shall complete operational closure of Tanks 19 and 18 by 12/31/12
- DOE shall complete operational closure of 4 tanks by 9/30/15
- DOE shall complete operational closure of 2 tanks by 9/30/17
- DOE shall complete operational closure of 2 tanks 9/30//19
- DOE shall complete operational closure of 5 tanks 9/30//21
- DOE shall complete operational closure of 7 tanks 9/30//22

The first milestone has been satisfied. Tanks 5 and 6 have been closed meeting two of the required four closures for FY15. Tanks 12 and 16, to meet the remaining two operational closures in 2015, are in the closure process, however, are not anticipated to be closed by the 9/30/15 commitment date. DOE submitted an extension request that has been denied by Environmental Protection Agency (EPA) Region 4 and South Carolina Department of Health and Environmental Control (SCDHEC). DOE is invoking the dispute resolution process. The balance of these milestones (FY17-22) will also be renegotiated based on Salt Waste Processing Facility (SWPF) startup delays.

Key considerations in determining the feasibility of receiving, processing and dispositioning the German AVR/HTGR used nuclear fuel is the impact on existing DOE Environmental Management mission completion. The range of options for processing and disposition this material are such that previously initiated and reviewed R&D in processing approaches, management of resulting off gas, and effective waste form development provides a strong foundation to build upon.

1.3 National Environmental Policy Act (NEPA)

The EA that is underway will evaluate to alignment with previous EA's and existing Records of Decisions and will result in DOE issuing either a Finding of No Significant Impact (FONSI) or announce its intent to prepare an Environmental Impact Statement.

The proposed receipt and processing of the German AVR/HTGR fuel will benefit from the development that was underway to support a safe and efficient management strategy which included preparing aluminum-clad SNF and target material stored at SRS, or expected to be shipped to SRS fur ultimate disposition offsite. This research and development was subsequently suspended as a result of the decision to use conventional processing approaches.

The ongoing programmatic drivers that require the use of conventional processing locations and resources are costly to maintain, complex in nature and are resource intensive. DOE has the potential to develop additional capabilities and capacities are beneficial to reducing the duration of the material management lifecycle necessary to satisfy that U.S. non-proliferation policy and goals.

The conventional processing resources are directly linked to DOE's commitment outlined in FFA milestones found in Appendix L and outlined above. The inclusion of additional locations and processes in the detailed analysis in the EA further supports the Departments need to continue to develop robust approaches to enhanced off-gas systems, most cost effective approaches to processing material using advanced technology and developing innovation approaches that result in environmental risk reduction.

1.4 Permitting and Compliance Interfaces

The permits and regulatory compliance activities required to be addressed for construction and operation of the new process are listed in section 2 of this appendix. This estimated duration and need for modified or new permits is explained without the consideration of development and deployment of enhanced off-gas management systems in parallel with the existing conventional off-gas management system. The previously completed R &D into the off-gas resulting from the processing of used nuclear fuel will be reviewed, continued, and used to provide input to the design of enhanced effluent management systems that will satisfy current regulatory requirements. This work is necessary based on the current system designs and the predicted effluent form processing.

2.0 PERMITTING AND COMPLIANCE PROCESS

2.1 Introduction

The permitting protocol and regulatory documents identified in this plan are necessary to comply with environmental laws and regulations, DOE Orders, and SRS procedures.

2.2 Regulatory Drivers

Environmental protocols will be established once a processing selection has been chosen by the project team. Environmental permitting is driven by the following governing agencies: 1) EPA Regulations, 2) South Carolina Department of Health and Environmental Control, 3) DOE Orders, and SRS Procedures. Some permits and approvals are required prior to procurement or significant project related spending. All permits, except specific operating permits requiring inspection of constructed facilities, are required before the start of construction for the activity.

2.3 Permitting

Environmental permitting activities will be performed during conceptual design to minimize impacts to the start of construction for the project. Calculations will be performed once a selection has been chosen by the project team. Potential air emissions associated with processing German AVR/HTGR Fuel will have the greatest environmental permitting impact to the Project.

SRS currently has three permitting programs 1) the Clean Water Act (CWA), 2) the Clean Air Act (CAA), and the 3) Resource Conservation and Recovery Act (RCRA). RCRA and CWA will have very limited impacts to processing the material. It is anticipated that CAA permitting will comprise the majority of preconstruction environmental permit planning.

2.4 National Environmental Policy Act

Processing AVR/HTGR in H Canyon and L Area will require NEPA approval granted by an Environmental Evaluation (EA), Supplement Analysis (SA), or Environmental Impact Statement (EIS), and an Environmental Evaluation Checklist (EEC). An Environmental Evaluation and Supplement Analysis will require a Record of Decision (ROD).

2.5 Permits and Compliance Activities

Environmental permit and compliance activities are identified in this review for the facilities:

2.5.1 Site Use/Site Clearance Permit

2.5.2 Environmental Monitoring

2.5.3 Waste Certification and Characterization Plans

2.5.4 Nuclear Criticality and Safety DSA Review

2.5.5 Environmental Evaluation Checklist

2.5.6 Industrial Storm Water General Permit

2.5.7 Industrial Storm Water Construction Permit

2.5.8 NPDES Industrial Wastewater Permit

2.5.9 Pollution Prevention and Waste Minimization Plan

2.5.10 Air Quality Permitting

A) Prevention of Significant Deterioration/ New Source Review (PSD/NSR)

SRS is currently in an Attainment Area and new construction or modifications to existing facilities must be evaluated if the emissions from these planned activities exceed one of the significant level thresholds. A PSD permit will generally take 2 years to obtain and places strict control technology requirements on the facility. Preparation of a PSD permit typically takes 1 to 1½ man-years to develop and gain approval of the regulatory agencies. Preparation of a PSD permit typically takes 1 to 1½ man-years to develop and gain approval of the regulatory agencies. It is anticipated that a PSD permit will not be required but remains to be confirmed when the project design progresses. If a PSD permit is required, meeting the PSD requirements could impact the project schedule.

Criteria Pollutants	**Significant Emission Rate (Tons/year)**
Carbon Monoxide	100
Nitrogen Oxides	40
Sulfur dioxide	40
PM10	15
Particulate matter	25
Ozone	40
Lead	0.6
Fluorides	3
Sulfuric Acid Mist	7

B) Construction Permitting

A construction permit or an exemption must be obtained from SCDHEC before modifying or constructing any project which emits or has the potential to emit a regulated air pollutant, except sources which are specifically exempted by the regulations. In some cases if the source of pollutants has a federal regulation which is applicable to it, i.e., New Source Performance Standard or National Emission Standards for Hazardous Air Pollutants, then the construction permit must be obtained prior to award of the contract. The Project will need to evaluate the air emissions from proposed operations to determine if a modification is required to the SRS Title V Operating Permit. Modifications to the permit may take up to 9 months for regulatory approval.

C) NESHAP – Radiological Air Emissions

EPA under 40 CFR 61, Subpart H, regulates the release of radionuclides into the atmosphere. A National Emission Standards for Hazardous Air Pollutants (NESHAP) evaluation must be performed for any new construction or modification of an existing source. The results of the evaluation will determine if a NESHAP approval to construct and operate is required as well as requirements for air emissions monitoring. The evaluation process is defined in 40 CFR 61 Subpart H, Appendix D. The evaluation is based upon the annual material throughput in the process (source term - inventory in curies), the physical state of the material, the control devices used for air effluent treatment, and the use of the CAP-88 computer model to obtain the calculated effective dose equivalent (EDE) to the maximally exposed offsite individual. Both an estimated EDE and a Potential EDE (PEDE) are determined in the evaluation. The PEDE is found as the emissions that would result from normal operations assuming control equipment is not present.

D) Greenhouse Gas Tailoring Rule

On May 13, 2010, the U.S. Environmental Protection Agency (EPA) issued a final rule that establishes a common sense approach to addressing greenhouse gas emissions from stationary sources under the Clean Air Act (CAA) permitting programs.

- SRS has a Title V Permit
- SRS is a major source of air pollution; therefore, it would be subject to GHG under Title V.
- Facilities emitting at least 100,00 tpy CO_{2e}
- EPA proposing no requirements for < 50,000 tons/year

2.6 Conclusion

Table 1 lists environmental permits, plans, and regulatory documents that are required for design, construction, and operation. The table identifies: (1) whether a permit is "New" or "Modification" of an existing permit; (2) when in the project life cycle the permit is required; and (3) the duration or length of time typically required for SRS to develop permit application packages and to secure regulatory approvals. The permits and plans will provide a blueprint for the continuing environmental activities required by the Project as construction is initiated.

Table 2 lists potential Environmental Engineer FTE Costs (burdened) associated with development of environmental documentation, reviews/approvals and submittals of any required permit applications to the appropriate Regulators. The costs captured in this table are for a single facility. Not captured in this table are costs associated with GHGs and extensive NEPA development (i.e. SA, EA, or EIS).

Table 1
Environmental Permits/Approvals and Plans

PERMIT/PLAN	REQUIRED NEW/MOD.	REQUIRED PRIOR TO	DURATION*
SITE UTILIZATION PERMITS AND PLANS			
Environmental Evaluation Checklist	New	Construction	15 days
Site Utilization Permit	New	Construction	60 days
Site Clearance Permit	New	Construction	60 days
SURFACE WATER PROTECTION PERMITS AND PLANS			
NPDES Industrial Wastewater Discharge Permit	Mod	Construction	180 days
NPDES Storm Water Discharge Permit	Mod	Construction	30 days
Grading Permit	New	Construction	30 days
Storm Water Pollution Prevention Plan	New	Construction	30 days
Storm Water Notice of Intent	New	Construction	10 days
Storm Water Notice of Termination	New	Operation	15 days
Storm Water Pollution Prevention Plan	New	Operation	30 days
NPDES Permit Minor Modification	Mod	Construction	60 days
AIR QUALITY PROTECTION PERMITS AND PLANS			
NESHAP Alternate Calculation/Exemption	New	Procurement/ Construction	180 days
BAQ Construction Permit/Exemption	New	Construction	270 days
Construction Emissions Control Plan	New	Construction	90 days
PSD Review (assure PSD not required)	New	Construction	60 days
Title V Permit Modification	Mod	Operation	90 days
WASTE MANAGEMENT PERMITS AND PLANS			
Pollution Prevention and Waste Minimization Plan	New	Construction	120 days

*The 'DURATION' describes the amount of time needed to obtain the Permit, Approval, or Complete a Plan. This doesn't include the time necessary to provide design work and technical input normally included as a part of a Permit package. The 'DURATION' starts after the sponsoring program has provided an acceptable package to the Environmental Services group for processing through the appropriate Regulator for approval.

Table 2
Environmental Engineer FTE Costs (Burdened)

Element: AIR	*Activity*	*Duration*	*Hours/ Week*	*Total Hours*	*Factor SME Time*	*Costing Rate (per hour)*	*Total Cost*
	NESHAP						
	Evaluation / Calculation	8 weeks	25	200	1.3	(b)(5)	
	Formal Project Description	3 weeks	20	60	1.3		
	Peer Review	3 weeks	20	60	1.3		
	SME Review	4 weeks	20	80	1.3		
	EC&ACP Management Review	2 weeks	15	30	1.3		
	DOE Review & Concurrence	4 weeks	20	80	1.3		
	STI Review	2 weeks	20	40	1.3		
	Submit to SCDHEC	1 week	10	10	1.3		
	Air Permitting						
	Prepare Construction & Operating Permit	4 weeks	15	60	1.3		
	SME Review	4 weeks	20	80	1.3		
	SRNL Input Required	2 weeks	15	30	1.3		
	Modeling for Criteria Pollutants	2 weeks	15	30	1.3		
	SME Complete SCDHEC Forms	2 weeks	10	20	1.3		
	EC&ACP Management Review	2 weeks	10	20	1.3		
	DOE Review & Concurrence	4 weeks	20	80	1.3		
	STI Review	2 weeks	20	40	1.3		
	Submit to SCDHEC	1 week	10	10	1.3		
Element: CERCLA	***Activity***	***Duration***	***Hours/ Week***	***Total Hours***	***Factor SME Time***		
	O&M Plan Development	1 week	20	20	1.3		
	ECA Manager Approval	1 week	5	5	1.3		
	FM Approval	1 week	5	5	1.3		

Table 2 (cont.)
Environmental Engineer FTE Costs (Burdened)

Element: NEPA	*Activity*	*Duration*	*Hours/ Week*	*Total Hours*	*Factor SME Time*	*Costing Rate (per hour)*	*Total Cost*
	Prepare EEC for Lay-Down Area / ECA & DNC Approvals	2 weeks	20	40	1.3	(b)(5)	
	Obtain SME Approval	1 week	15	15	1.3		
	Obtain DOE Approval	1 week	15	15	1.3		
	Prepare IA for Lay-Down Area / ECA & DNC Approvals (if applicable)	3 weeks	20	60	1.3		
	Obtain SME Approval	1 week	25	25	1.3		
	Obtain DOE Approval	1 week	25	25	1.3		
	Prepare EEC for Facility-Specific Modifications	2 weeks	20	40	1.3		
	Obtain SME Approval	1 week	15	15	1.3		
	Obtain DOE Approval	1 week	15	15	1.3		

Element: RCRA	*Activity*	*Duration*	*Hours/ Week*	*Total Hours*	*Factor SME Time*
	Solid/Liquid Waste	4 weeks	35	140	1.3

Element: WATER	*Activity*	*Duration*	*Hours/ Week*	*Total Hours*	*Factor SME Time*
	Grading Permit (if applicable)	4 weeks	20	80	1.3

Note 1: Only costs associated with a single facility are captured in this table.
Note 2: Costs associated with GHG or extensive NEPA development (SA, EA, or EIS) are not captured in this table.