

**ACHIEVING THE TIMELY RECEIPT OF FOREIGN RESEARCH REACTOR SPENT  
NUCLEAR FUEL AT THE SAVANNAH RIVER SITE**

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## **ABSTRACT**

The May 1996 Record of Decision on a Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel states that the United States will accept spent nuclear fuel containing uranium of U.S.-origin from foreign research reactors through the year 2009. The best information available indicates that approximately 13,000 assemblies of Material Test Reactor (MTR) spent nuclear fuel from 29 countries are expected to be shipped to the Savannah River Site during the 13 years of the program.

As of July 1998, 1,371 spent nuclear fuel assemblies from 12 foreign research reactors have been received at the SRS. That is, after more than two years of the FRR program (approximately 15 percent of the program time), 11 percent of the total assemblies have been received at SRS. Current projections show that most of the assemblies can be received by 2009, however if some of the eligible, non-participating countries decide to rejoin the program, a bottleneck would occur at the end of the program. Also adding to the potential for the bottleneck is a trend of shipments being moved out in the timeline.

The Savannah River Site is working to be proactive in avoiding a bottleneck at the end of the program, but cooperation is required from all program participants to be successful. Activities currently in progress include inventory/information questionnaires, verifying fuel against cask(s) certificate of compliance (C. of C.), and collecting Appendix A information well in advance of shipping the SNF.

The inventory/information sheets have been distributed to a select number of reactor facilities in the past, but work is in progress to refine the process. Information requested in the questionnaire includes inventory numbers, preferred shipping dates, and cask preferences. This information allows for improved shipment planning and helps to ensure that we are working to meet the needs of the reactor facilities. Current plans are to send the questionnaires to all participating facilities on an annual basis to ensure that our information is up to date.

Verifying fuel against cask C. of C.'s will require obtaining detailed fuel information from all participating reactor facilities. In the past, insufficient fuel data has resulted in delaying shipment of SNF assemblies, and has jeopardized shipments because C. of C.'s required an amendment at the last minute. By matching the fuel information to cask C. of C.'s, it will be known well in advance which casks are certified to handle the fuel, and if a C. of C. amendment is necessary, there will be plenty of time to acquire the change.

Appendix A information acceptance is often a "long-pole" in the receipt of SNF assemblies. By submitting Appendix A information as early as possible, shipment time can be optimized in two ways. First, shipment dates will not require postponement due to a delay in this critical area of information. Second, the Appendix A data can be held on file at SRS and should a slot open up in a shipment, it would be possible to slip in a shipment from someone that already has their shipping data pre-approved.

This paper will review the current projections of FRR SNF shipments to the SRS, including different scenarios regarding assumed participation of countries. Details on the activities mentioned above would be provided, along with guidance to the reactor operators for any assistance that may be required from them. In summary, the FRR program has achieved real successes and continues to improve, however teamwork and coordination among all the participants is required if all the expected SNF assemblies are to be shipped in the time allotted.



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**The 21st Meeting on Reduced Enrichment for  
Research and Test Reactors**

**Sao Paulo, Brazil**

**October 18-23, 1998**

**Mr. Jay Thomas, WSRC, Presenter**

**Ms. Cindy Brizes, DOE-SR**



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## FRR SNF Program

- **Policy: Return Highly Enriched Uranium Spent Nuclear Fuel (SNF) from Foreign Countries**
- **Ten Year Policy with 13 Year Implementation**
- **Record of Decision Recognizes Receipts from 41 Countries with 22,743 Assemblies**
  - **17,803 Assemblies to the Savannah River Site (SRS)**
- **France, Belgium, and several other countries with small inventories have indicated that they do not wish to participate at this time. Canada is still considering.**
  - **Changes the Expected Number of Assemblies Shipped to SRS to as low as 12900 (w/Canada).**



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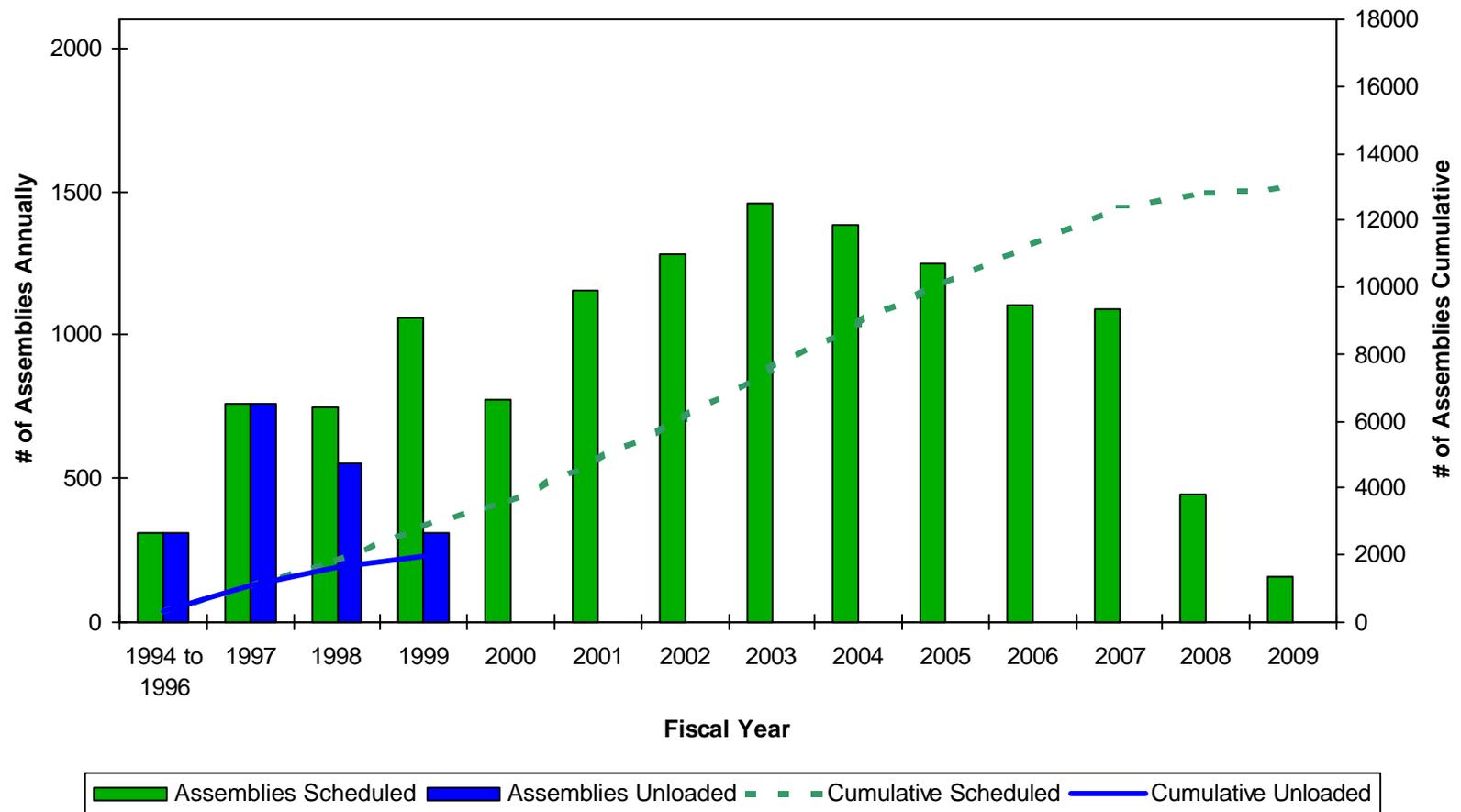
## Receipts to Date

- **Eight Shipments to SRS Totaling 1680 Assemblies**
- **SNF Received from:**
  - **Europe (10 reactor facilities in 7 countries)**
  - **Canada**
  - **South America (4 reactor facilities in 4 countries)**
  - **Japan (2 reactor facilities)**
  - **Australia**
- **Shipments to Date Represent 15% of the Total Expected Receipts**



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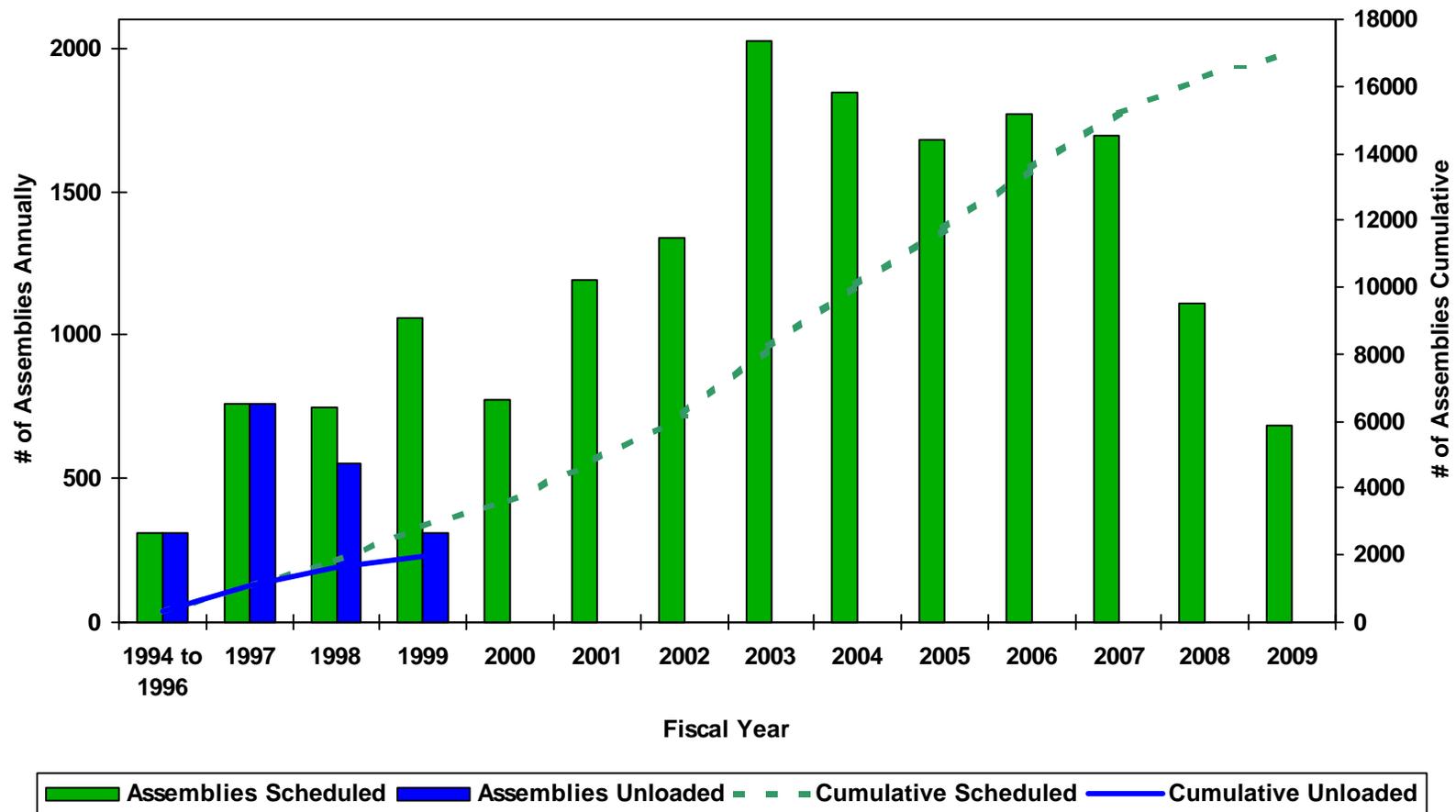
## Projected Outyear Receipts





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## Projected Outyear Receipts (all participants)





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## Program Improvements

- **Spent Fuel Inventory and Information Sheets**
  - Better shipment planning and coordination
- **Advance Submittal of Appendix A Data**
  - Reduces a long lead time component of the schedule for the receipt of SNF assemblies
- **Verify SNF against cask Certificates of Compliance**
  - Reduces need for last minute certificate amendments



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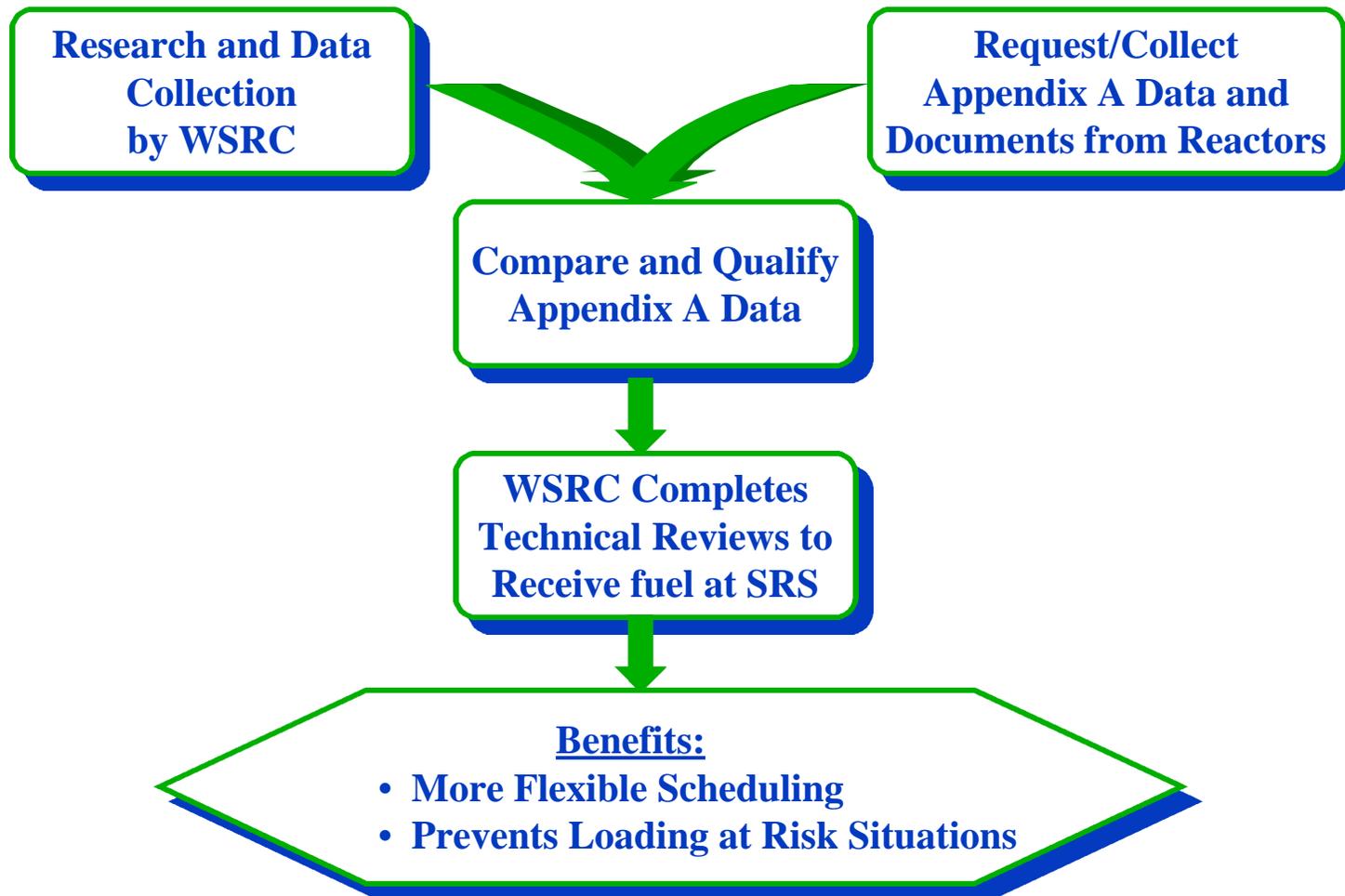
## Spent Fuel Inventory and Information Sheet

<b>Facility Title:</b>											
<b>Reactor Name:</b>											
<b>Cumulative number of spent fuel assemblies (HEU/LEU) available as of 1/99, with &gt; 3 years of cooling time.</b>				<u>HEU:</u>				<u>LEU:</u>			
<b>Estimated total # of spent fuel assemblies discharged as of 2006.</b>				<u>HEU:</u>				<u>LEU:</u>			
<b>Estimated # of unirradiated fuel assemblies.</b>				<u>HEU:</u>				<u>LEU:</u>			
<b>Suspected number of assemblies with defects, significant corrosion, or structural integrity problems (explain):</b>											
<b>Provisional Plan for fuel cooled &gt; 3 years.</b>											
	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
<b>Estimated number of shipments</b>	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:
	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:
<b>Number of casks per shipment</b>	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:
	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:
<b>Number of assemblies per cask</b>	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:
	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:
<b>Preferred month(s) for shipment</b>	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:	HEU:
	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:	LEU:
<b>Cask Preference(s):</b> (please list all potential casks, ranking them in order of preference)											
<b>Remarks/Concerns:</b>											
<b>Facility Point of Contact (POC):</b>			<u>POC Phone</u>			<u>POC FAX</u>			<u>POC E-mail</u>		



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## Appendix A Data



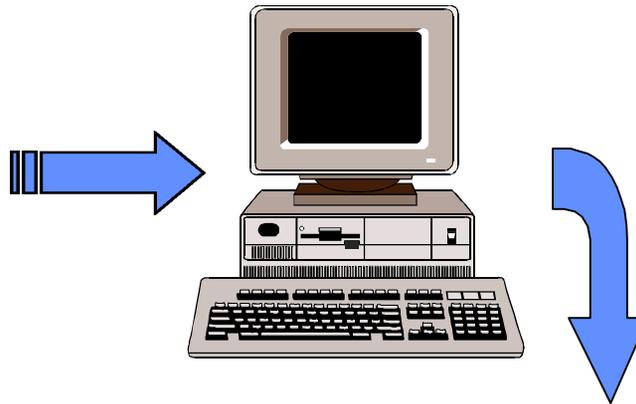


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## Verifying SNF to C. of C.'s

### Input Parameters:

- Reactor
- Unique Assembly Number
- Dimensions
- Isotopics
- Cooling Time
- Decay heat
- C. of C. Categories and limits



### Output Results (example):

<u>Reactor</u>	<u>Assembly #</u>	<u>Authorized Casks</u>	<u>Non-Auth. Casks</u>	<u>Reason</u>
SRS	XX-001	GNS-11 NAC-LWT	IU-04 GNS-16	Cooling Time Length



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## Summary/Conclusions

- **15% of the Expected SNF has been Received at SRS**
- **Current Projections Indicate Potential for a Bottleneck at the End of Program**
- **Assistance Needed from Reactor Operators**
  - Data requests
  - Shipment plans
  - Shipments as soon as possible
- **Programs Success Continues to Improve with Coordination and Teamwork**