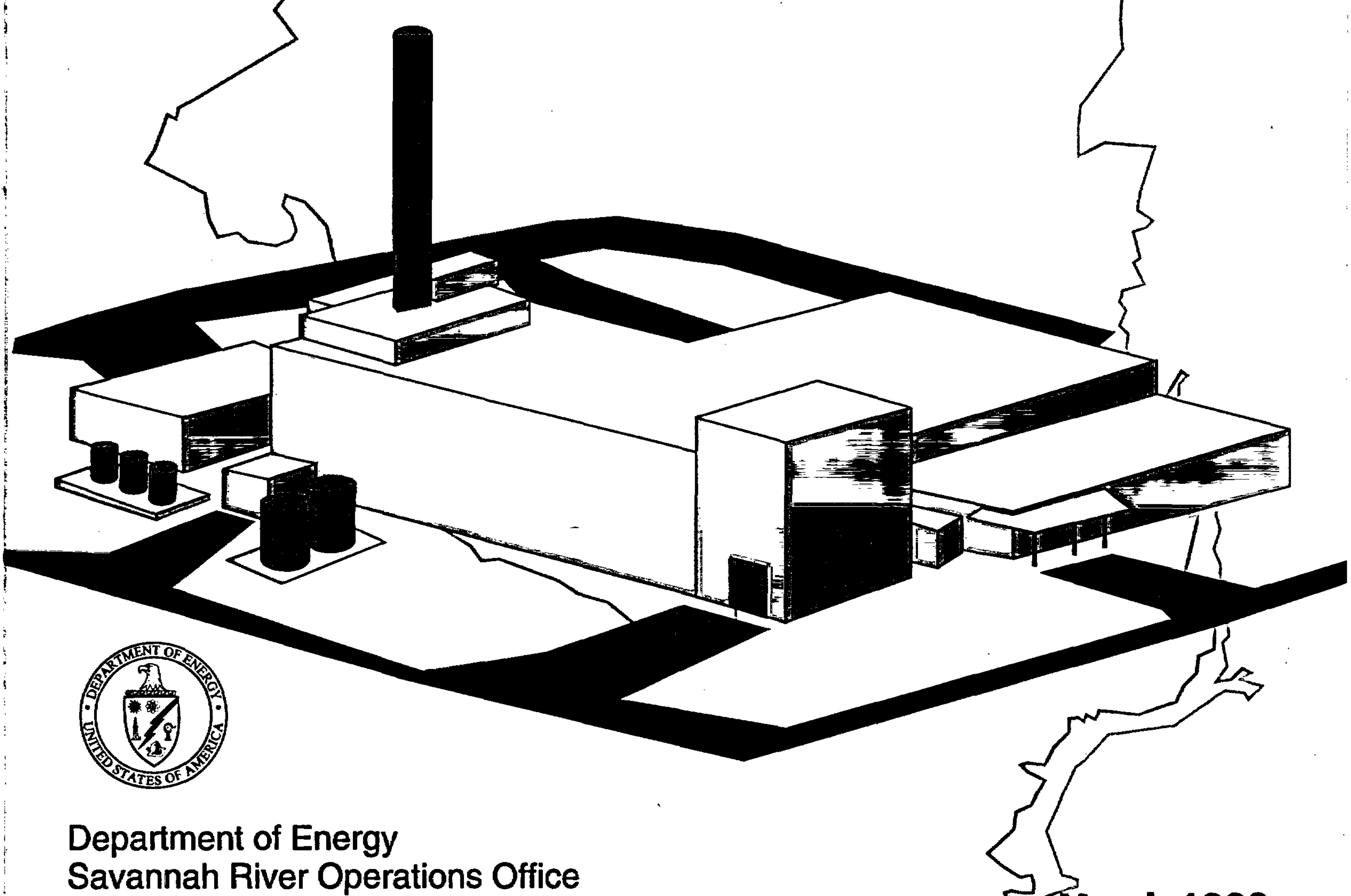
DOE/EIS-0271

Final Environmental Impact Statement

Construction & Operation of a Tritium Extraction Facility at the Savannah River Site



Department of Energy
Savannah River Operations Office
Aiken, South Carolina

March 1999

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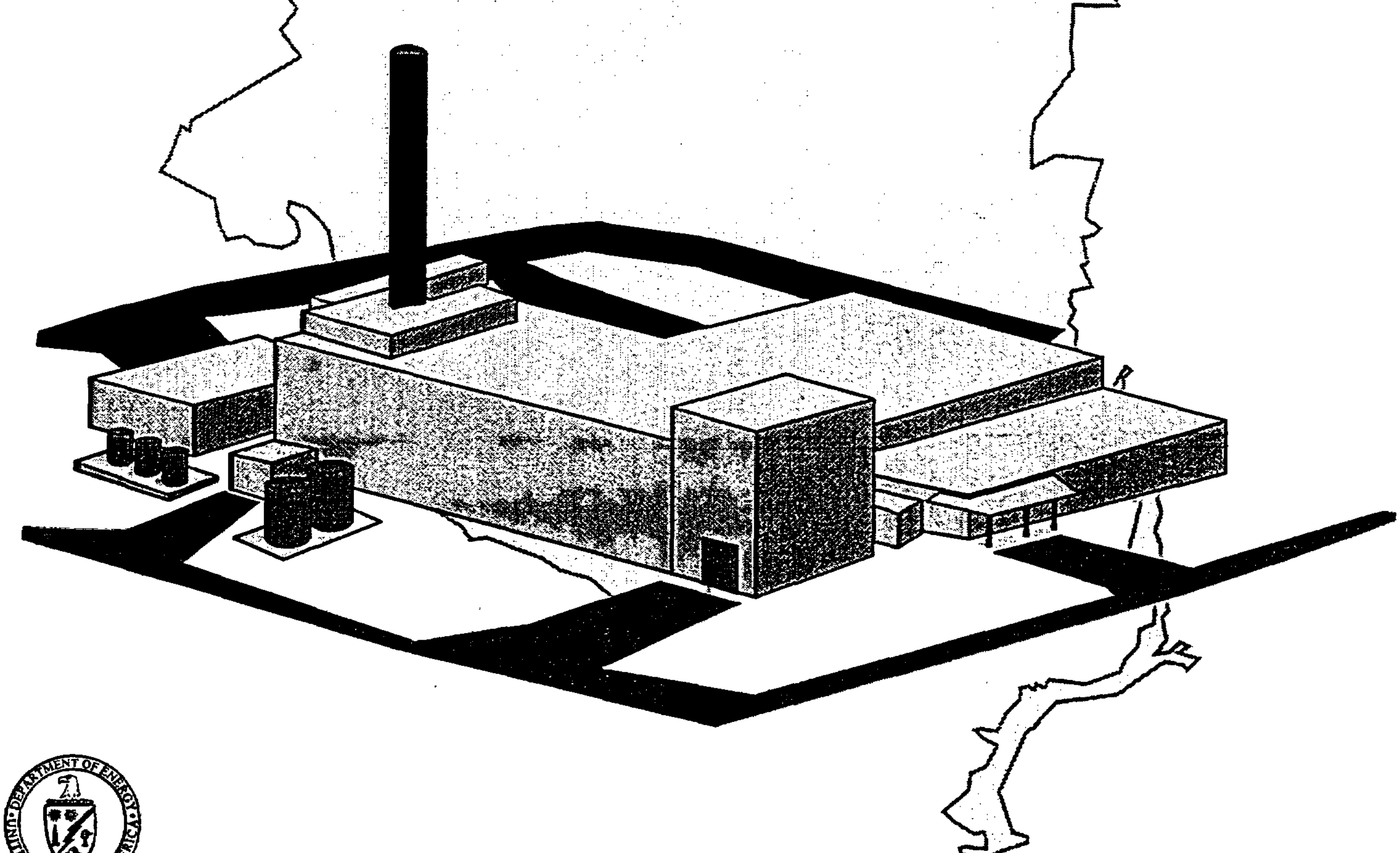

Department of Energy
Savannah River Operations Office
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COVER SHEET

RESPONSIBLE AGENCY: U.S. Department of Energy (DOE)

TITLE: Final Environmental Impact Statement: Construction and Operation of a Tritium Extraction Facility at the Savannah River Site (DOE/EIS-0271)

LOCATION: Aiken and Barnwell Counties, South Carolina

CONTACT: For additional information on this environmental impact statement (EIS), write or call:

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For a complete package, the Draft TEF EIS is needed alongside the Final TEF EIS and these may be obtained by contacting Andrew R. Grainger at the address above.

For general information on the DOE National Environmental Policy Act (NEPA) process, write or call:

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ABSTRACT: DOE proposes to construct and operate a Tritium Extraction Facility (TEF) at H Area on the Savannah River Site (SRS) to provide the capability to extract tritium from commercial light water reactor (CLWR) targets and from targets of similar design. The proposed action is also DOE's preferred alternative. An action alternative is to construct and operate TEF at the Allied General Nuclear Services facility, which is adjacent to the eastern side of the SRS. Under the no-action alternative DOE could incorporate tritium extraction capabilities in the accelerator for production of tritium. This EIS is linked to the *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling* (DOE/EIS-0161), from which DOE determined that it would produce tritium either in an accelerator or in a commercial light water reactor. The purpose of the proposed action and alternatives evaluated in this EIS is to provide tritium extraction capability to support either tritium production technology. The EIS assesses the environmental impacts from the proposed action and the alternatives, including the no action alternative.

PUBLIC COMMENTS: In preparing the Draft EIS, DOE considered comments received by letter and voice mail, and comments given at public meetings in Savannah, Georgia, and Aiken, South Carolina, on December 3 and 5, 1996, respectively. A summary of public comments was made available on April 28, 1997, and may be obtained by contacting Andrew R. Grainger at the address above.

A 45-day comment period on the Draft TEF EIS began with publication of a Notice of Availability in the *Federal Register* on May 8, 1998. A public meeting to discuss and receive comments on the Draft EIS was held on June 9, 1998, at the North Augusta Community Center, 101 Brookside Drive, North Augusta, South Carolina. The Draft EIS public comment period ended June 22, 1998. Comments were submitted at the public meeting and by voicemail, e-mail, or regular mail at the address provided above. The comments received were considered in the preparation of this Final EIS.

PREFACE

The Tritium Supply and Recycling Final Programmatic Environmental Impact Statement (PEIS) (DOE/EIS-0161), which was completed in October 1995, assessed the potential environmental impacts of technology and siting alternatives for the production of tritium for national security purposes. On December 5, 1995, DOE issued a Record of Decision (ROD) for the Tritium Supply and Recycling PEIS that selected the two most promising alternative technologies for tritium production and established a dual-track strategy that would, within 3 years, select one of those technologies to become the primary tritium supply technology. The other technology, if feasible, would be developed as a backup tritium source. Under the dual-track strategy, DOE would: (1) initiate the purchase of an existing commercial reactor (operating or partially complete) or irradiation services with an option to purchase the reactor for conversion to a defense facility; and (2) design, build, and test critical components of an accelerator system for tritium production. Under the PEIS ROD, any new facilities that might be required, i.e., an accelerator and/or a Tritium Extraction Facility to support the commercial reactor alternative, would be constructed at DOE's Savannah River Site (SRS) in South Carolina.

The PEIS described a two-phase strategy for compliance with the National Environmental Policy Act (NEPA). The first phase included completion of the PEIS and subsequent ROD. The second phase included the preparation of site-specific NEPA documents tiered from the PEIS. These EISs address the environmental impacts of specific project proposals. As a result of the PEIS and the ROD, DOE determined to prepare three site specific EISs: the Accelerator Production of Tritium at the Savannah River Site (APT) (DOE/EIS-0270), the Production of Tritium in a Commercial Light Water Reactor (CLWR) (DOE/EIS-0288), and the Tritium Extraction Facility at Savannah River Site (TEF) (DOE/EIS-0271). Each of these EISs presents an analysis of alternatives which do not effect the alternatives in the other EISs with one exception. This exception is one alternative in the TEF EIS which would require the use of space in the APT. For this alternative to be viable, the APT would have to be selected as the primary source of tritium.

On December 22, 1998, Secretary of Energy Bill Richardson announced that commercial light water reactors (CLWR) will be the primary tritium supply technology. The Secretary designated the Watts Bar Unit 1 reactor near Spring City, Tennessee, and Sequoyah Unit 1 and 2 reactors near Soddy-Daisy, Tennessee as the preferred commercial light water reactors for tritium production. These reactors are operated by the Tennessee Valley Authority (TVA), an independent government agency. The Secretary designated the APT as the "backup" technology for tritium supply. As a backup, DOE will continue with developmental activities and preliminary design, but will not construct the accelerator. Finally, selection of the CLWR reaffirmed the December 1995 Tritium Supply and Recycling PEIS ROD to construct and operate a new tritium extraction capability at the SRS.

DOE has completed the final EISs for the APT, CLWR, and TEF. No sooner than 30 days after publication in the Federal Register of the Environmental Protection Agency's Notice of Availability of the final EISs for CLWR, APT, and TEF, DOE intends to issue a consolidated Record of Decision to: (1) formalize the programmatic announcement made on December 22, 1998; and (2) announce project-specific decisions for the three EISs. These decisions will include, for the selected CLWR technology, the selection of specific CLWRs to be used for tritium supply, and the location of a new tritium extraction capability at the SRS. For the backup APT technology, technical and siting decisions consistent with its backup role will be made.

FOREWORD

Introduction

This *Final Environmental Impact Statement for Construction and Operation of a Tritium Extraction Facility at the Savannah River Site* (TEF EIS) has been prepared in a manner consistent with the President's Council on Environmental Quality regulations (40 CFR Part 1500-1508) and Department of Energy Procedures (10 CFR Part 1021). Because DOE received few comments on the Draft EIS (DOE/EIS-0271D), it is not preparing a modified draft as the Final EIS, as is typically done. Rather, DOE is finalizing the TEF EIS by reference to the Draft EIS and is issuing this Final EIS as a record of changes made according to a process described in 40 CFR Part 1503.4 and to the recommendation in 40 CFR Part 1500.4(m), which encourages agencies to publish only the changes to the draft when changes are minor. This document focuses on changes that are of importance to the decision maker and the public. Specifically, modifications to finalize the TEF EIS were made for the following reasons:

- To incorporate responses to comments received during the public comment period
- To correct or clarify factual information presented in the Draft EIS
- To reflect TEF, commercial light water reactor, and accelerator production of tritium design concepts developed since the Draft EIS was issued

Document Modification

Modifications to the Draft EIS are presented as follows. Text or elements of tables in the Draft EIS have been modified and shown as **bolded text**. The change is preceded by a text box that explains the change, states why the change was made, and references the pertinent section of the Draft EIS. The text box is followed by the applicable modification. As mentioned, changes to text and table information are **bolded** and reproduced with an adequate amount of the applicable material in the Draft EIS to place the change in context. As a result, the reader needn't refer to the Draft EIS to understand the change.

Comment Identification

Comments received by DOE on the Draft EIS, both verbal and written, appear in Section 1 of this document. If a comment prompted a modification to the EIS, DOE has noted the change and directs the reader to that change.

Comments are noted by one of the following letter codes:

- M1 – M2 (comments submitted in either session 1 or 2 of the public meeting)
- L1 – L4 (comments received by letter or email)
- V1 – V2 (comments submitted by telephone to DOE's message line)

DOE numbered the specific comments in each letter or verbal presentation sequentially (e.g., V1-01, V1-02, etc.) to provide unique identifiers. The meeting comments are organized in categories, which are discussed below. Appendix C contains transcripts of sessions 1 and 2 of the public meeting held on June 9, copies of written comments submitted at the public meeting, copies of the letters acknowledged receipt of the Draft EIS but did not require comment responses for DOE, and a copy of a letter and enclosed forms from the South Carolina Office of State Budget.

DOE extends its gratitude to all the individuals and agencies who showed an interest and took the time to provide comments.

Public Meetings

The public meetings consisted primarily of informal discussions and questions and answers related to the TEF. As can be seen from the transcripts prepared by a court reporter (reproduced with comments marked and numbered as Appendix C of this document), a number of public comments and concerns were raised and discussed with DOE officials during the meetings. The responses in this document focus on those comments or questions which were not answered during the meeting, or need elaboration or clarification.

Comment Categories

Most of the comments and issues discussed in the meetings fall into the following broad categories:

- Presentation of costs in an EIS
- Comparison of differences between alternatives
- U.S. nuclear nonproliferation policy
- Worker health and safety, and emergency preparedness
- Contaminant releases and relative severity of impacts of a combination facility
- Effect of this facility on the ongoing cleanup of SRS waste sites
- Legality of TEF as a DOE defense nuclear facility and the implications thereof

Organization of the Final EIS

The Final EIS is composed of this Foreword, the Summary, two sections, one appendix, and relevant front and back material. DOE has provided the Summary in its entirety with modifications identified by bold text and the rationale for modifying the EIS explained in a text box. Section 1 provides public comments and DOE responses. Section 2 presents modifications to the Draft EIS, incorporates responses, clarifies factual information, and reflects design concepts developed for the tritium supply program. This document also includes the List of Preparers; Organizational Conflict of Interest Representation Statement; Glossary; Distribution List; and Appendix C, Transcripts, Letters, and Forms. Letters included in Section 1 are letters that offered comments for DOE to address. Letters included in Appendix C are letters that had no comments for DOE to address.

Interested persons may obtain a copy of this document or the Draft EIS by calling 1-800-881-7292, or writing to: Andrew R. Grainger, U.S. Department of Energy, Savannah River Operations Office, Building 742A, Room 183, Aiken, South Carolina 29802.

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ACRONYMS AND ABBREVIATIONS

AAQS	Ambient Air Quality Standard
AGNS	Allied General Nuclear Services
ALARA	As low as reasonably achievable
APSF	Actinide Packaging and Storage Facility
APT	Accelerator Production of Tritium
AQCR	Air Quality Control Region
ARF	Airborne release fraction
AWQC	Ambient water quality criteria
BA	Biological Assessment
BLS	Bureau of Labor Statistics
CCDF	Complementary Cumulative Distribution Function
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CIF	Consolidated Incineration Facility
CLWR	Commercial light water reactor
CO	Carbon monoxide
CPA	Cask Processing Area
CSRA	Central Savannah River Area
CSWTF	Central Sanitary Wastewater Treatment Facility
D&D	Decontamination and decommissioning
dB	Decibel
dBA	A-weighted decibel
DOE	U.S. Department of Energy
DOI	U.S. Department of Interior
DOT	U.S. Department of Transportation
DR	Damage ratio
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
EPD	Environmental Protection Department
ETF	Effluent Treatment Facility
FFCA	Federal Facilities Compliance Act
FG-Evac	Flush-gas evacuation

FR	Federal Register
gpd	Gallons per day
gpm	Gallons per minute
gpy	Gallons per year
GRP	Gross Regional Product
HEPA	High efficiency particulate air
HSV	Hydride storage vessel
HVAC	Heating, ventilation, and air conditioning
HWR	Heavy water reactor
IBA	In-bed accountability
ICRP	International Commission on Radiological Protection
JCW	Job control waste
kW	Kilowatt
LCF	Latent cancer fatality
LHS	Latin Hypercube Sampling
LLRW	Low-level radioactive waste
LPF	Leak path factor
LTR	Lower Three Runs
MACCS	MELCOR Accident Consequence Code System
MAR	Material at risk
MEI	Maximally exposed individual
msl	Mean sea level
MW	Megawatt
NAAQS	National Ambient Air Quality Standard
NCRP	National Council on Radiation Protection and Measurements
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NOI	Notice of Intent
NO_x	Oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPH	Natural phenomena hazard
NWI	National Wetlands Inventory
NWSM	Nuclear Weapons Stockpile Memorandum

O_3	Ozone
OSHA	Occupational Safety and Health Administration
P-Evac	Product evacuation system
PEIS	Programmatic Environmental Impact Statement
PEL	Permissible Exposure Limit
PIDAS	Perimeter Intrusion Detection Assessment System
PM_{10}	Particulate matter less than or equal to 10 microns
$PM_{2.5}$	Particulate matter less than or equal to 2.5 microns
PRA	Probabilistic Risk Assessment
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
rem	Roentgen equivalent man
RF	Respirable fraction
RHA	Remote Handling Area
RHSS	Receiving, Handling, and Storage System
ROD	Record of Decision
SCDHEC	South Carolina Department of Health and Environmental Control
SCE&G	South Carolina Electric and Gas Company
SHPO	State Historic Preservation Officer
SNL	Sandia National Laboratories
SO_2	Sulfur dioxide
SO_x	Sulfur oxides
SRS	Savannah River Site
START	Strategic Arms Reduction Treaty
SWMD	Solid Waste Management Department
SWMS	Solid Waste Management System
SWPPP	Stormwater Pollution Prevention Plan
TDS	Total dissolved solids
TEF	Tritium Extraction Facility
TFM&C	Tritium Facilities Modernization and Consolidation Project
TPBAR	Tritium-producing burnable absorber rod
TRP	Target rod preparation
TSP	Total suspended particulates
TWA	Time-weighted average

USC	United States Code
USGS	U.S. Geological Survey
UTR	Upper Three Runs
VOC	Volatile organic compound
WSRC	Westinghouse Savannah River Company
Z-bed	Zeolite bed

Metric Conversion Chart

To convert into metric			To convert out of metric		
If you know	**Multiply by**	**To get**	**If you know**	**Multiply by**	**To get**
Length					
inches	2.54	centimeters	Centimeters	0.3937	inches
feet	30.48	centimeters	Centimeters	0.0328	feet
feet	0.3048	meters	Meters	3.281	feet
yards	0.9144	meters	Meters	1.0936	yards
miles	1.60934	kilometers	Kilometers	0.6214	miles
Area					
sq. inches	6.4516	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.092903	sq. meters	sq. meters	10.7639	sq. feet
sq. yards	0.8361	sq. meters	sq. meters	1.196	sq. yards
acres	0.0040469	sq. kilometers	sq. kilometers	247.1	acres
sq. miles	2.58999	sq. kilometers	sq. kilometers	0.3861	sq. miles
Volume					
fluid ounces	29.574	milliliters	Milliliters	0.0338	fluid ounces
gallons	3.7854	liters	Liters	0.26417	gallons
cubic feet	0.028317	cubic meters	cubic meters	35.315	cubic feet
cubic yards	0.76455	cubic meters	cubic meters	1.308	cubic yards
Weight					
ounces	28.3495	grams	Grams	0.03527	ounces
pounds	0.4536	kilograms	Kilograms	2.2046	pounds
short tons	0.90718	metric tons	metric tons	1.1023	short tons
Temperature					
Fahrenheit	Subtract 32 then multiply by 5/9ths	Celsius	Celsius	Multiply by 9/5ths, then add 32	Fahrenheit

Metric Prefixes

Prefix	Symbol	Multiplication Factor
Exa-	E	1 000 000 000 000 000 000 = 10^{18}
Peta-	P	1 000 000 000 000 000 = 10^{15}
Tera-	T	1 000 000 000 000 = 10^{12}
Giga-	G	1 000 000 000 = 10^{9}
Mega-	M	1 000 000 = 10^{6}
Kilo-	k	1 000 = 10^{3}
Centi-	c	0.01 = 10^{-2}
Milli	m	0.001 = 10^{-3}
Micro-	μ	0.000 001 = 10^{-6}
Nano-	n	0.000 000 001 = 10^{-9}
Pico-	p	0.000 000 000 001 = 10^{-12}
Femto-	f	0.000 000 000 000 001 = 10^{-15}
Atto-	a	0.000 000 000 000 000 001 = 10^{-18}

SUMMARY

S.1 Introduction and Background

The U.S. Department of Energy (DOE) is responsible for ensuring that the nation has a supply of materials sufficient to maintain its nuclear weapons stockpile at levels directed by the President of the United States. One of these materials is tritium – a gaseous isotope of hydrogen that increases the yield of nuclear weapons. None of the weapons in the nuclear arsenal would be capable of functioning as designed without tritium. As long as the United States chooses to maintain a nuclear deterrent – of any size – it will need tritium.

There are two factors that dictate the timing regarding the nation's need for tritium. The first is that the U.S. no longer has the operating facilities needed to produce tritium. DOE has shut down the government-owned reactors that previously irradiated the base material from which tritium was derived. The second is that tritium has a relatively short half-life and decays at a rate of about 5.5 percent per year. This means that present supplies will be cut nearly in half before 2010 (Figure S-1). Therefore, it is essential that the U.S. develop a new source of tritium.

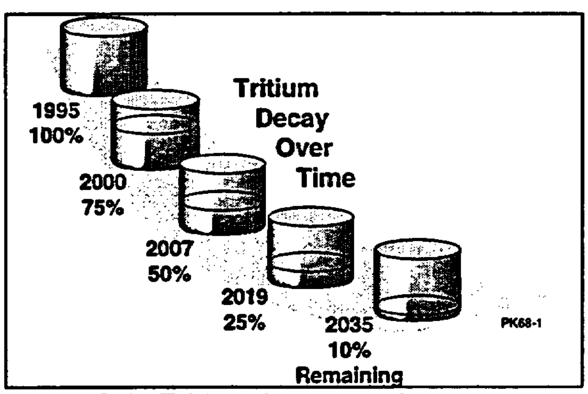

Figure S-1. Tritium decay over time.

For the past several years, DOE has been evaluating ways to produce tritium. Following the requirements of the National Environmental Policy Act (NEPA), the Department took its first step toward a solution with the *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling* (Tritium Supply PEIS), which evaluated both the need for a new tritium source and the alternatives to provide that source. On December 12, 1995, DOE published a Record of Decision (ROD; 60 FR 63878) following the programmatic environmental impact statement (PEIS), in which it announced that it would pursue a dual-track approach with the two most promising alternatives:

- To design, build, and test critical components of an accelerator system for tritium production.
- To initiate the purchase of an existing commercial reactor (operating or partially complete) for conversion to a defense facility, or the purchase of irradiation services with an option to purchase the reactor.

In the 1995 ROD, DOE committed that by late 1998, it would select one of these approaches as the primary source of tritium. In addition, the Department would, if feasible, continue to develop the other alternative as a backup tritium source. Further, the ROD announced DOE's decision to upgrade and consolidate the existing Savannah River Site (SRS) tritium recycling facilities. Finally, the ROD stated that a tritium extraction facility (TEF) would be constructed at the SRS.

DOE developed the following strategy for compliance with the NEPA process: (1) make decisions on the alternatives described and evaluated in the Tritium Supply PEIS, and (2) follow with site-specific assessments that implement those decisions. Thus, DOE is preparing three EISs tiered to the programmatic EIS: (1) an EIS on the use of specific commercial light water reactors (CLWRs) to produce tritium, (2) an EIS on the construction and operation of APT, and (3) this EIS on the construction and operation of TEF at SRS.

Since issuance of the Draft APT EIS in December 1997, several events have occurred and decisions have been made that influenced

the preparation of the Final EISs for APT, TEF, and CLWR. Most notably, two other EISs related to the tritium supply mission were issued. The Draft TEF EIS was issued in May 1998, and the Draft CLWR EIS was issued in August 1998. These three documents are closely interrelated. The proposed action described in the CLWR EIS is the "no-action" alternative for the APT EIS. Conversely, the APT is the "no-action" alternative for the CLWR.

In December 1998, Secretary of Energy Richardson announced his decision to select the use of commercial light water reactors as the primary tritium supply technology. Because of this decision, the Preferred Alternative of this EIS stays the same. The No-Action Alternative (combined TEF/APT) is kept in the EIS to fulfill the CEQ requirement to have a No-Action alternative.

> Comment M1-05 from the Economic Development Partnership contended that the EIS is deficient because it did not evaluate the impacts from the proposed Federal action to produce tritium for national defense purposes in commercial reactors. DOE believes that it will provide a complete evaluation in the programmatic and three site-specific EISs identified above. DOE has added the following text to the summary after the last paragraph on page S-1.

In response to public comments on the Draft Tritium Supply PEIS, DOE evaluated production of tritium for national defense in commercial reactors more thoroughly. DOE published a Notice in the *Federal Register* (60 FR 44327; August 25, 1995) to include this action as a reasonable alternative. Because of public comments on the Notice, public reviews of the Draft PEIS, and further consideration of nonproliferation issues, use of commercial reactors was evaluated as an additional reasonable alternative. The impacts of using CLWRs to produce tritium are described in the CLWR EIS and not in this TEF EIS. The purpose of this EIS is identified in the next section of this revised summary.

DOE also has prepared an EIS on accelerator production of tritium at SRS to assess the impacts of producing tritium in a DOE-owned accelerator.

On September 5, 1996, the Department published the "Notice of Intent to Prepare an Environmental Impact Statement for the Construction and Operation of a Tritium Extraction Facility at the Savannah River Site" (61 FR 46790). This proposed facility would be able to process tritium from CLWR targets or targets of similar design such as the alternate design targets from the accelerator or targets from the Fast Flux Test Facility. **From the Secretary's decision in December 1998,** the capability to extract tritium from CLWR targets will be required **when** commercial reactors are **used to produce** tritium. This EIS evaluates site options for a new tritium extraction facility at SRS, and assesses the impacts of facility construction and operation.

S.2 Purpose and Need for Action

> In the voice mail comment V1-01, the commenter questioned the need for DOE to produce more tritium and proposed other ways to satisfy the demand for tritium. In its response, the Department indicated that the need for defense nuclear materials is determined by the Department of Defense and the President and documented in the annual Nuclear Weapons Stockpile Plan. DOE, in turn, is charged with the responsibility to produce the tritium and to determine the schedule and means for such production. The Presidential Decision Directive accompanying the 1996 Nuclear Weapons Stockpile Plan established the need for new tritium by 2005. DOE evaluated reasonable alternatives for producing tritium in the Programmatic Environmental Impact Statement for Tritium Supply and Recycling. Therefore, tritium supply and production technologies are not within the scope of the TEF EIS, and DOE has modified the sections on Purpose and Need to clarify the decision process and the purpose for the proposed action evaluated in this EIS. The description of Purpose and Need for Action on page S-2 of the Draft EIS is replaced by the following text.

The purpose and need for the Department's action is described in the *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling* and in the *Record of Decision: Tritium Supply and Recycling Programmatic EIS* (60 FR 63878). The Tritium Supply

PEIS identified the 1994 Nuclear Weapons Stockpile Plan as the guidance document the Department must follow. **DOE evaluated reasonable technologies and schedules to meet the need for tritium in the PEIS; the Record of Decision identified the APT and the CLWR as the two most promising alternative sources of tritium. Therefore, the need for tritium and ways to satisfy that demand were established previously and are not within the scope of the TEF EIS.**

Since the issuance of the PEIS, the President has approved the 1996 Nuclear Weapons Stockpile Plan. With regard to the need for tritium, the difference between the 1994 and 1996 Nuclear Weapons Stockpile Plans was to change the projection of when a new tritium source would be needed from approximately 2010, as used in the PEIS, to 2005. However, the need for tritium for the nuclear weapons stockpile, as discussed in the PEIS, remains unchanged.

The purpose of the proposed action and alternatives evaluated in this EIS is to provide tritium extraction capability to support tritium production technology. DOE proposes to provide the capability to extract tritium from CLWR targets, which are tritium-producing burnable absorber rods (TPBARs), and from targets of similar design. A new tritium extraction capability must be in place beginning in 2005.

S.3 Decision to be Based on This EIS

The TEF EIS Record of Decision (ROD) will select the location at the SRS to construct, test, and operate a new TEF.

S.4 Proposed Action and Alternatives

DOE proposes to design, construct, test, and operate TEF at SRS. The Department will use this EIS and the NEPA process to inform the public and decision makers about the potential environmental impacts of the proposed action and alternatives (the estimated impacts of construction and operation are **compared in Tables S-1 and S-2 located on pages S-7 to S-12 and page S-15 of this Final EIS**).

S.4.1 Preferred Alternative

The proposed action is to design, construct, test and operate a new TEF at SRS. The purpose of TEF would be to extract tritium-containing gases from targets irradiated in a CLWR or from targets of similar design, and deliver the tritium-containing gases to Building 233-H for final purification. The preferred alternative would be to locate TEF in H Area, immediately adjacent to and west of Building 233-H. The reasons for co-locating TEF close to Building 233-H are: (1) to share common support facilities, services, and some personnel; (2) to facilitate the transfer of tritium between the two facilities; and (3) to use certain gas-handling processes located in H Area. TEF would consist of a concrete industrial facility constructed partly below grade. The facility would be divided into two major areas: (1) a remote handling area (RHA) and (2) a tritium processing building. The tritium processing building would be entirely aboveground; the floor of the RHA would be below grade. Construction of the proposed facility would require approximately 4 to 5 years. Major process and operation systems included within the proposed TEF would be: (1) the Receiving, Handling, and Storage System that would support all functions related to the receipt, handling, preparation, and storage of incoming radioactive sources and outgoing radioactive waste materials; (2) the Tritium Extraction System that would get tritium and other gases from irradiated targets, remove contaminants from the gas stream, and store the hydrogen isotope/helium mixture; (3) the Tritium/Product Processing Systems that would separate and purify process gases from the irradiated target materials; (4) the Tritium Analysis and Accountability Systems that would support monitoring and tritium accountability; (5) the Solid Waste Management System that would receive solid waste generated by TEF for management and storage prior to disposal in the E-Area vaults; and (6) the Heating, Ventilation, and Air Conditioning System that would provide and distribute conditioned supply air to the underground RHA and the aboveground tritium processing area and also discharge exhaust air to the environment via a 100-foot stack.

S.4.2 Upgrading the Existing Allied General Nuclear Services (AGNS) Facility Alternative

An alternative to constructing a new TEF within H Area would be to refurbish and use the existing Allied General Nuclear Services (AGNS) facility located in Barnwell County, adjacent to the eastern boundary of SRS. AGNS was completed in 1976, and portions of the facility were tested with natural uranium in anticipation of obtaining an operating license to process commercial spent nuclear fuel. However, due to a change in government policy on reprocessing commercial spent nuclear fuel, the facility never opened. It was cleaned up and placed in standby in 1977 and shut down in 1983. The AGNS facility was designed and built to Nuclear Regulatory Commission (NRC) standards. It would not meet all applicable DOE Orders without major modifications as discussed below. Utilization of AGNS would necessitate some new construction and modification. Extraction furnaces would have to be designed, built, and installed. A drying oven to remove pool water from CLWR target bundles or bundles from targets of similar design unloaded in the wet basin would be required (at AGNS, targets would be stored in existing fuel storage basins). A process gas stripper would have to be added to reduce stack tritium releases. Although rail lines to the existing facility have been removed, the tracks within the facility staging area and into the cask unloading bays are still in place. Roads on the AGNS property need moderate repair; and a short connecting road tying AGNS into the SRS road system would have to be constructed. Other requirements include refurbishing the heating, ventilation, air conditioning (HVAC) fans, motors, high-efficiency particulate air (HEPA) filters and dampers; and replacing the chiller water, fire protection, electrical, security, and personnel protection systems.

S.4.3 Refurbishment of the Existing Tritium Extraction, Concentration and Enrichment Facility (Building 232-H)

Another alternative considered early in the NEPA process but deemed unreasonable was to substantially modify and upgrade the existing Tritium Extraction, Concentration and Enrichment Facility (Building 232-H). This facility is approximately 40 years old; neither its design nor construction meet current industrial standards. The Building 232-H facility is used to extract tritium from legacy targets irradiated in heavy water reactors (HWRs). Once extraction of these legacy HWR targets is completed, the facility is scheduled to be deactivated after all other tritium processing operations are relocated to Building 233-H. The Building 232-H facility cannot safely and efficiently extract tritium from CLWR targets or targets of similar design without first undergoing significant process and safety upgrades. The renovation and utilization of the Building 232-H facility is not considered a reasonable alternative to the proposed action.

S.4.4 No Action

In compliance with the regulations of the Council on Environmental Quality (CEQ) for implementing NEPA (40 CFR Part 1500-1508), this EIS also assesses a no-action alternative. The interpretation of no action varies, depending upon the circumstances. Typically, no action means that the proposed activity would not be initiated. No action may also be defined in terms of no change in a current agency program. To provide tritium for the nation's nuclear weapons stockpile, DOE has selected the CLWR to be the primary new tritium source. The APT will continue to be developed as a backup tritium source.

Under the no-action alternative for the TEF EIS, DOE would not construct and operate a TEF either at the preferred location in H Area or at the alternate location at AGNS. Now that DOE has selected the CLWR as the primary option for tritium production, selection of no action for the TEF would result in the inability to extract tritium from the irradiated targets. Selection of CLWR as the primary source of tritium assumes that an accelerator (with extraction capabilities) would not be built as a backup source. In that case, DOE would not be able to fulfill the purpose and need for the proposed action. Such a decision would be inconsistent with the Record of Decision for the Tritium Supply Programmatic EIS. The environmental impacts projected for the TEF would not occur.

Even though the Secretary selected the APT as backup, the discussion below is retained in this Final EIS until a Record of Decision has been issued.

Describing the effect of selecting no action for the TEF in the event that DOE **had selected** the APT as the primary option for tritium production requires a more complex analysis. **If** APT **were ultimately** selected, DOE would need a tritium extraction capability in order for the CLWR option to be a viable backup tritium source (if that option is determined to be feasible). In addition, a tritium extraction capability would be needed **if** DOE **had decided** to use the APT alternate design targets, which are similar in design to CLWR targets. (The preferred APT **tritium production method is a flowing gas system which does** not require a TEF-type extraction capability.) This capability could be provided either by implementing the TEF as proposed in this EIS, or by incorporating tritium extraction capability in APT. The latter approach would **have required** installing tritium extraction furnaces and related equipment and processes within the APT facility.

If DOE **had selected** no action for the TEF and also **decided** not to incorporate tritium extraction capability in APT, the goals of preserving the CLWR option as a backup and of providing alternate design APT target extraction capability would not **have been** met. Likewise, the environmental impacts of achieving those goals would not **have occurred**. However, DOE could **have selected** no action for TEF and still preserve the CLWR option as a viable backup and **provided** for the alternate design APT targets by incorporating tritium extraction capability in APT. The impacts of that course of action are analyzed in this EIS under the no-action alternative. That analysis is based on **data developed for the Final APT EIS** and information developed since **the Draft TEF** EIS was issued.

S.5 Affected Environment

> Since the Draft TEF EIS was issued, DOE has continued to analyze the operation of the APT with and without extraction capability. This Final EIS incorporates the new analyses. The analyses are based on data developed to support the Final APT EIS. References to this data input rather than the Draft APT EIS are identified immediately below and throughout this Final EIS.

The preferred site for TEF is within H Area, a densely developed, industrialized area near the center of SRS, approximately 6.8 miles from the nearest (western) SRS boundary. There are four existing tritium-related facilities in the immediate vicinity of the proposed TEF site. Operations related to reclaiming previously used tritium reservoirs; receiving, packaging, and shipping reservoirs; recycling and enriching tritium gas; and laboratory and maintenance operations are performed in three of these facilities. The fourth facility, Building 233-H, is located mostly below ground and is dedicated primarily to emptying and refilling tritium reservoirs, mixing gases, and separating and purifying hydrogen isotopes.

Initially, two locations within H Area were identified as potential sites for the proposed TEF (immediately west and north of Building 233-H, respectively). DOE conducted a comprehensive site selection process to determine the best location for TEF. Selection criteria included resource requirements (i.e., land, utilities), security, proximity to Building 233-H, potential for impacting environmentally sensitive wetlands, and geotechnical factors. The location immediately adjacent to and west of Building 233-H was chosen as the preferred TEF site. This site is approximately 4 acres and presently is occupied by three warehouses and numerous office trailers. Advantages to locating TEF within H Area include minimal environmental impacts associated with construction and operation of the proposed TEF due to the developed nature of H Area; availability of site infrastructure (i.e., power, steam, potable water, sewerage); and close proximity to existing tritium-related facilities and processes to support TEF operations.

An alternative to the preferred alternative is to refurbish and use the decommissioned AGNS facility originally built to reprocess commercial spent nuclear fuel. AGNS is located on 1,632 acres adjacent to the eastern boundary of SRS. Of this total acreage, approximately 165 acres are devoted to the AGNS facilities. Existing facilities include a chemical separations building, laboratories, administrative buildings, a waste storage area, a cooling pond (Beacon Pond), road system, and related support infrastructure. The AGNS site is located approximately 9 miles east of the H-Area tritium complex. Aside from SRS, lands adjacent to the AGNS tract are primarily rural and used for agriculture or silviculture.

The no-action alternative could **have involved** incorporation of extraction capability at the preferred APT site which consists of about 250 acres of forested land north of the intersection of Roads F and E. The site, which is crossed by the Aiken-Barnwell County line, is bordered on the southwest by a 115-kilovolt transmission line, a buried super control and relay cable, and Monroe Owens Road. Three other secondary roads, including E-2, cross the site.

S.6 Comparison of Environmental Impacts Among Alternatives

In this section, on page S-5 the Draft EIS presents a comparison of the environmental impacts among the alternatives. In this Final EIS, Table S-1 on pages S-8 to S-13 compares the increment of the impacts of the proposed action and its alternatives to the current conditions at the SRS. Table S-2 on page S-15 compares the impacts of incorporating tritium extraction capabilities into APT to those associated with the construction and operation of APT without the tritium extraction capability. Since the Draft TEF EIS was issued, DOE has updated the information for operating APT in accordance with both the stand-alone APT and the APT with the extraction capability design variation. The following text and tables are revised based on the updated operational information.

This section compares the incremental environmental impacts among the proposed action, the AGNS alternative, and the no-action alternative, which for this EIS is to incorporate TEF into the accelerator for the production of tritium (APT) (Table S-1).

Table S-1 compares the increment of impacts of the proposed action and the alternative to construct and operate TEF at AGNS to the current SRS baseline. Where applicable, impacts from all natural, existing causes or regulatory standards are provided as a perspective on the severity of baseline conditions and incremental impacts of the alternatives. Table S-1 also presents the incremental impacts of incorporating TEF in APT (this EIS's no-action alternative).

In general DOE considers the expected impacts from the proposed action or its alternatives on the physical, biological, and human environment to be minor and consistent with what might be expected for an industrial facility. **Potential impacts to SRS waste treatment, storage, and disposal facilities from construction and operation of the TEF are expected to be small due to existing capacities and the low volumes of waste to be generated. In the comparison of impacts, DOE determined that changes from the baseline of less than 5 percent are within the margin of error and the conservatism inherent in the analyses. Therefore, DOE finds that in those instances there would be no measurable change from the baseline.**

Compared to the proposed action, **for the maximally exposed individual** the AGNS alternative **is projected to have a 0.13 millirem per year higher radiation** (due to its closer proximity to the boundary) but **nearly equal** collective population doses. The estimated radiation doses were used to predict whether any latent cancer fatalities would be associated with either normal operations or with potential accidents. Construction waste at AGNS would be less because putting TEF at AGNS would involve refurbishing existing facilities, rather than the total construction of TEF at H Area. Slightly higher sanitary waste would be generated at AGNS during operations due to a larger workforce.

Many of the incremental impacts of the no-action alternative would be less than those of the proposed action, because the combined tritium extraction and accelerator production of tritium processes would share land, components, and infrastructure that would be duplicated if each were developed as an independent facility. Table S-1 demonstrates reduced impacts from the no-action alternative to geology, surface water, groundwater, nonradiological air emissions, hazardous waste generation, aesthetics, socioeconomics, environmental justice, construction worker injuries, anticipated and unlikely accidents, and ecological resources.

S.6.1 Comparison of Proposed Action and the AGNS Alternative to the SRS Baseline

> In Comment M1-02, the commenter stated that there is little or no difference between the AGNS and H-Area alternatives, but that the EIS makes it look like a major difference. DOE did not intend to exaggerate the comparison of the H-Area (proposed action) and the AGNS alternatives. However, it did wish to capture the differences in environmental impacts for the decisionmaker(s) and the public. DOE has revised this section starting on page S-6 of the Draft EIS to clarify the differences between these two alternatives.

Table S-1 compares the incremental environmental impacts associated with the proposed action (construct and operate TEF in H Area) and the alternative to construct and operate TEF at AGNS against the SRS baseline. The environmental baseline describes the current site conditions which are detailed in Chapter 3. Values for CLWR targets and targets of similar design are both included when there is a difference greater than 5 percent. Where applicable, regulatory standards or current impacts from existing causes are provided as a perspective on the severity of baseline conditions and incremental impacts of the alternatives.

One difference between the proposed H Area and alternative AGNS locations is AGNS's close proximity to non-government land and therefore its greater potential for impacting offsite individuals due to releases near the site boundary. **Additional differences include stack height and radionuclides released to the environment. The quantities released at AGNS differ from those emitted at H Area because each rod would be cut three times to be placed in the AGNS furnace while full-height targets would be punctured at H Area. The shearing operation would result in higher emissions than the puncturing operation.**

While processing CLWR targets, the contributions of nonradiological air constituents at AGNS would be 0.13 percent of the applicable standard, **and still lower for the onsite H-Area alternative. Similarly,** the annual radiological dose for the offsite maximally exposed individual would be 0.13 millirem higher for AGNS than H Area, but both would be well below the regulatory annual limit of 10 millirem from airborne releases. Releases from processing targets of similar design would be lower than from processing CLWR targets for either alternative.

Because of the location of AGNS, some minority or low-income communities could be disproportionately affected by radiological and nonradiological air emissions, but again impacts are expected to be minor. At the AGNS site, construction noise and activity could have localized adverse effects on wildlife, but operations would not.

Advantages of AGNS include less land disturbed, less construction waste generation, and lower construction costs. Also, the lower population density in the communities near AGNS would result in a smaller collective dose from potential accidents.

> DOE has revised the Draft EIS to include advantages of the proposed H-Area site to provide a comparison to the advantages of AGNS discussed in the previous paragraph.

Advantages of the proposed H-Area site are primarily due to its close proximity to the location of the final tritium purification step in Building 233-H. This enables DOE to share common support facilities, services, and some personnel; to facilitate the transfer of tritium

Table S-1. Comparison of the alternatives for construction and operation of TEF.

Resource	Current SRS Baseline	Increment above baseline of proposed H Area site	Increment above baseline of alternative AGNS site	Increment above baseline of no-action alternative[a,b,c]
Schedule and Operating Parameters				
Construction	TEF is not built	5 years	5 years	No change in the period of construction for APT.
Annual electricity		20,600 Mw-hrs (CLWR targets) <19,570 Mw-hrs (targets of similar design)	Same as H Area	Less than 5 percent of baseline defined for no action. See footnote (b).
Annual sanitary wastewater (gallons)		770,000	1,200,000	No change from APT's baseline.
Annual radioactive process wastewater (gallons)		11,000	Same as H Area	11,000 (8 percent increase in APT's baseline).
Impacts to the Physical and Manmade Environment				
Geology	Existing sites are cleared and graded; grassed, paved or graveled; and used for industrial purposes	Minimal construction impacts through application of best management practices and compliance with Federal and state regulations.	Lower construction impacts than H Area because of less construction at AGNS.	No effects greater than 5 percent above APT's baseline. See footnote (b).
Groundwater		Minor dewatering during construction activities near or below the water table. Design would prevent process water migration into the groundwater during operations.	Facilities near the water table are in place and protected (fuel storage pools are doubled-walled stainless steel tanks with leak-detection systems).	No effects greater than 5 percent above APT's baseline.
		With an immediate response by SRS to contain and remediate spills, it is unlikely that a spill would impact groundwater.	Same as H Area	Same as APT's baseline. Immediate response by SRS would minimize the potential to impact groundwater.

Table S-1. (Continued).

Resource	Current SRS Baseline	Increment above baseline of proposed H Area site	Increment above baseline of alternative AGNS site	Increment above baseline of no-action alternative[a,b,c]
Surface Water	Construction in an industrial area with established stormwater control systems	Minimal construction impacts; construction would not disturb undeveloped areas.	Lower construction impacts than H Area because of less construction at AGNS.	No effects greater than 5 percent above APT's baseline.
	Permitted process wastewater discharges	Effluent treatment would remove radioactive cobalt from process water to safe levels before discharge to Upper Three Runs. Tritium concentration in the effluent would be less than the regulatory limit of 20,000 picoCuries per liter.	Same as H Area	Radioactive process wastewater from extraction facilities would be routed from the APT site, treated, and discharged to Upper Three Runs.
	Permitted sanitary wastewater discharges	Effluent would be treated before release to Fourmile Branch. All discharges would be within permit limits. Minimal impacts expected.	Effluent would be treated before release to Lower Three Runs. All discharges would be within permit limits. Minimal impacts expected.	No effects greater than 5 percent of APT's baseline.
Air Resources				
Nonradiological constituent concentrations at the SRS and AGNS site boundaries	Concentrations vary from approximately 0 to 60 percent of applicable standards and average 25 percent.[d]	Concentrations vary from approximately 0 to 0.19 percent of applicable standards and average 0.02 percent.[e] Ozone concentrations (measured as VOCs) would be 0.19 percent of the regulatory standard of 235 μg/m^3. All other contaminant levels would be less than 0.02 percent of their respective regulatory standards.	Concentrations vary from approximately 0 to 1.7 percent of applicable standards and average 0.2 percent.[e] Ozone concentrations (measured as VOCs) would be 1.7 percent of the regulatory standard of 235 μg/m^3. All other contaminant levels would be less than 0.20 percent of their respective regulatory standards.	Diesel generator backup power would be provided by the APT facility. Therefore, no increase in nonradiological air impacts.

Table S-1. (Continued).

Resource	Current SRS Baseline	Increment above baseline of proposed H Area site	Increment above baseline of alternative AGNS site	Increment above baseline of no-action alternative[a,b,c]
Annual radiological dose to the maximally exposed (offsite) individual (millirem). Dose limit = 10 millirem/yr.	0.05 millirem	0.02 millirem; the emission is 0.2 percent of the dose limit (CLWR targets) 0.014 millirem, 0.14 percent of the dose limit (targets of similar design)	0.15 millirem; the emission is 1.5 percent of the dose limit (CLWR targets) 0.030 millirem; 0.3 percent of the dose limit (targets of similar design)	0.006 millirem (CLWR targets)
Waste				
Total estimated construction debris (metric tons)	N/A	385	115	No effects greater than 5 percent above APT's baseline.
Total operations waste by type (cubic meters)				
High-level	150,750 (30 years)	0 (40 years)	Same as H Area	0 (40 years)
Low-level	343,710 (30 years)	9,320 (40 years; CLWR targets); 8,720 (40 years; targets of similar design)	Same as H Area	12,800 (40 years; CLWR targets)
Hazardous or mixed	90,450 (30 years	132 (40 years)	Same as H Area	80 (40 years; CLWR targets)
Transuranic	18,090 (30 years)	0 (40 years)	Same as H Area	0 (40 years)
Impacts to Human Environment				
Aesthetics[e]	Area is not visible to and noise is not heard by offsite public. Historic and archaeological resources are not present.	Temporary increase in noise during construction phase, but it would not be heard by the offsite public. No adverse aesthetic impacts during TEF operation. Historic and archaeological resources are not present.	Temporary increase in noise during construction phase. No adverse aesthetic impacts during TEF operation. Historic and archaeological resources are not present.	No effects greater than 5 percent above APT's baseline.

Table S-1. (Continued).

Resource	Current SRS Baseline	Increment above baseline of proposed H Area site	Increment above baseline of alternative AGNS site	Increment above baseline of no-action alternative[a,b,c]
Socioeconomics	SRS employment is assumed to decline to 10,000 employees by 2001[h], and regional growth trends are expected to continue.	Regional temporary increase of 740 jobs during peak year of construction, which is 0.29 percent of projected baseline regional employment of 258,000 jobs. The number of jobs at SRS would decline to 108 for TEF operation. The overall effects would be positive in terms of assisting to stabilize the regional employment base.	Regional temporary increase of 685 jobs during peak year of upgrades and refurbishment, which is 0.27 percent of the projected baseline regional employment of 258,000 jobs. The number of jobs at SRS would decline to 175 for TEF operation. The overall effects would be positive in terms of assisting to stabilize the regional employment base.	Approximately the same construction and operation work force as APT's baseline. No change would occur in socioeconomic impacts.
Environmental Justice	Minorities or low-income communities would not receive disproportionately high and adverse impacts.	Health effects would be minimal. Minority or low-income communities would not be disproportionately affected.	Health effects would be minimal. Because of their proximity to the AGNS site boundary, some minority or low-income communities could be disproportionately affected.	No measurable differences from APT's baseline.
Public Health				
Annual probability of fatal cancer to the maximally exposed (offsite) individual (annual fatal cancer risk from all natural causes is 3.4×10^{-3}).	9.5×10^{-8}	1.0×10^{-8} (CLWR targets) 6.8×10^{-9} (targets of similar design)	7.5×10^{-8} (CLWR targets) 1.5×10^{-8} (targets of similar design)	3×10^{-9} (CLWR targets)
Occupational Health				
Total estimated number of additional latent cancer fatalities (LCFs) to all involved workers from an annual dose.	0.066	1.6×10^{-3}	Same as H Area	No increase above APT's baseline.

Table S-1. (Continued).

Resource	Current SRS Baseline	Increment above baseline of proposed H Area site	Increment above baseline of alternative AGNS site	Increment above baseline of no-action alternative[a,b,c]
Number of construction worker injuries resulting in lost work time.	NA	11	10	No increase above APT's baseline
Accidents[f,g]				
Additional LCFs in offsite population	NA			
Annual frequency / Bounding accident				
$>10^{-2}$ / Hood or room fire		0.4	0.3	0
$\geq 10^{-4}$ to $\leq 10^{-2}$ / Area fire		0.4	0.4	0
$\geq 10^{-6}$ to $<10^{-4}$ / Design-basis seismic event with fire		0.7	0.7	0.3
Impacts to Ecological Resources				
Terrestrial Ecology	The affected environment is within developed areas consisting of paved lots, graveled surfaces, buildings and trailers, providing minimal terrestrial wildlife habitat.	No physical alterations to the landscape outside of H Area but limited potential to disturb any nearby resident wildlife as a result of construction and operations noise.	Because the AGNS facility has been inactive since 1983, it may contain more wildlife than the H Area site. Construction and operations noise and human activity would have localized adverse effects on wildlife.	No additional impacts above APT's baseline.
Aquatic Ecology	No aquatic habitat within H Area boundaries; aquatic habitat adjacent to H Area boundaries (Crouch Branch and Fourmile Branch).	Construction activities would occur under best management practices to limit sedimentation in detention basins and protect streams from non-point source pollution. Operations wastewater would be discharged through NPDES-permitted outfalls. DOE would continue to comply with the permit requirements and regulatory standards to ensure maintenance of water quality in receiving streams.	Same as H Area	No additional impacts above APT's baseline.

Table S-1. (Continued).

Resource	Current SRS Baseline	Increment above baseline of proposed H Area site	Increment above baseline of alternative AGNS site	Increment above baseline of no-action alternative[a,b,c]
Wetland Ecology	No wetland habitat within H Area boundaries; wetland habitat in the vicinity of H Area boundaries (Crouch Branch, Fourmile Branch, Upper Three Runs).	Wetlands in the Upper Three Runs watershed, including Crouch Branch, or the Fourmile Branch watershed would not be adversely affected by the construction and operation of the TEF.	Wetlands associated with Lower Three Runs would not be adversely affected by construction or operation.	No additional impacts above APT's baseline.
Threatened and Endangered Species	No threatened and endangered species within H Area boundaries.	No threatened or endangered species live or forage in H Area. There would be no adverse impact.	Same as H Area	No additional impacts above APT's baseline.

a. DOE determined that changes from the baseline of less than 5 percent are within the margin of error and the conservatism inherent in the analyses. DOE finds that in those instances there is no measurable change from baseline and has not evaluated the impacts further.

b. Baseline for no action includes an accelerator for production of tritium (APT) constructed on its preferred site and operated with its preferred helium-3 feedstock. The increment above baseline for no action incorporates extracting tritium from CLWR targets in the APT facility.

c. Source: England (1998a); Willison (1998).

d. Concentration increments that would be less than 0.1 percent of standard for both locations are not listed.

e. Includes land use, visual resources and noise, and historical and archeological resources.

f. Events with the most additional latent fatalities in offsite public are a full-facility fire and a design-basis earthquake with a secondary fire.

g. Accidents involving targets of similar design would have substantially lower impacts.

h. The employment of 10,000 is based on actual reductions in 1995, 1996, and 1997 and a continuation of that trend through 2000. The 1998 SRS workforce was 14,130 and is expected to remain stable through at least 1999. As such, the estimate serves as a conservative lower bound assumed to ensure that the workforces associated with the construction and operation of the TEF are not underestimated relative to the SRS workforce.

between the two facilities; and to use certain gas-handling processes located in H Area. Consequently the life-cycle cost of operating the TEF at this location is substantially less than AGNS.

S.6.2 Comparison of the TEF No-Action Alternative to the Base Case Proposed Action for the Accelerator for Production of Tritium (APT Without Extraction Capability)

Even though the Secretary selected the APT as backup, the discussion below is retained in this Final EIS until a Record of Decision has been issued.

For purposes of this document the no-action alternative involved providing tritium extraction capacity within APT as described in the No Action section above. Therefore, the impacts of incorporating TEF with APT were compared against the base case impacts of constructing and operating only APT based on data input prepared for the Final APT EIS. Differences between constructing APT with and without TEF capabilities are identified in Table S-2 (at the end of this section). Alternative targets were not evaluated for the no-action alternative; only CLWR targets were evaluated in the no-action alternative.

Under the no-action alternative for the TEF EIS, DOE would not have constructed and operated a TEF in H Area or the alternate location at AGNS, APT would be built and no action would be selected for the TEF EIS. DOE would have incorporated extraction capability within the APT facility. These impacts are compared to those associated with construction and operation of the APT without the tritium extraction capability.

The main additions required to combine TEF and APT would have been the addition of the Remote Handling Area, target preparation area, storage area, and the TEF furnaces to APT. These furnaces would have heated CLWR targets to drive tritium from them. In addition, the TEF furnaces could have been used to extract the tritium from targets of similar design. The furnaces would have been accommodated by the construction of a 48-foot addition along the length of one building in the APT facility. This addition would have added a total of 28,800 square feet on five levels, for an increase of approximately 10 percent in one APT building. Some system expansions and relocations within the building would have been necessary as a result of the combination of functions. However, these modifications would have been relatively minor in comparison with the entire APT project.

TEF at APT was assumed to store up to a maximum design capacity of 4,200 CLWR targets. These targets would have been kept in dry storage in one of the APT facility buildings. For accident analysis purposes, it was assumed that each CLWR rod contains a maximum of 1.5 grams of tritium. It was also conservatively assumed that all of the tritium in the extraction furnace and 1 percent of the tritium in the stored CLWR targets would be oxidized and released in the event of either a design-basis or beyond-design-basis seismic event.

The facility would have been designed so that both the tritium-extraction furnaces and the accelerator could have operated simultaneously. Operators in the APT facility would have been cross-trained in both TEF and APT functions. As a result, no additional personnel would have been expected for the combined facility.

<u>Impacts of Construction of the Combined TEF/APT</u>

The additional construction required for the combined facility would not have required any changes either to the construction start date or the period of construction. The additional construction necessary to build the combined extraction facility would have added less than 5 percent to the construction effort of building APT in both materials and workforce.

Construction of the combined facility would have involved expansion of one building and some additional equipment. The additional land required for the building footprint was adjacent to a planned building and already included in the

Table S-2. Comparison of operation of APT with and without extraction capability.

Resource	APT without extraction capability (base case)	No action (APT with extraction capability)
Annual Air Releases (curies)		
Tritium oxide[a]	30,000	35,000
Carbon-11	250	250
Expelled pellet material[b]	NA	4.2×10^{-5}
Argon-41	2,000	2,000
Cobalt-60	NA	4.2×10^{-4}
Beryllium-7	0.02	0.02
Iodine-125	2.7×10^{-3}	2.7×10^{-3}
Public and Worker Health		
Maximally exposed (offsite) individual (MEI) dose (mrem/yr)	0.052	0.058
Annual probability of fatal cancer to MEI from normal operations	2.6×10^{-8}	2.9×10^{-8}
Total dose to population (person-rem/yr)	2.0	2.2
Annual population latent cancer fatalities (LCFs) from air and aqueous releases[c]	1.0×10^{-3}	1.1×10^{-3}
Uninvolved worker dose (rem/yr)	1.7×10^{-3}	2.0×10^{-3}
Involved worker dose (rem/yr)	1.0	1.0
Collective involved worker dose (person-rem/yr)	88	92
Annual collective involved worker LCFs	0.04	0.04
Accidents		
Maximally exposed (offsite) individual (rem)		
Design-basis seismic event	2.9	3.3
Beyond design-basis seismic event	3.0	5.8
Total dose to population (person-rem)		
Design-basis seismic event	5,100	5,857
Beyond design-basis seismic event	5,500	10,577
Total LCFs to population		
Design-basis seismic event	2.6	2.9
Beyond design-basis seismic event	2.7	5.3
Uninvolved worker dose (rem)		
Design-basis seismic event	150	152
Beyond design-basis seismic event	168	180

a. The dose effects of elemental tritium are negligible compared to tritium oxide and are not included in this analysis.

b. Expelled pellet material resulting from puncturing CLWR targets. Source term radionuclides (with percent annual Curie content) include Se-75 (33%), Cr-51 (23%), Co-58 (13%), Fe-55 (12%), Ca-45 (10%), Ar-37 (3%), Mn-54 (2%), Ni-63 (1%), C-14 (1%), Ar-39 (1%), and trace isotopes (<1%) (Milgiore, 1998).

c. Aqueous releases from APT are 3,000 Ci/yr of tritium, 1×10^{-4} Ci/yr of cobalt-60, 2×10^{-3} Ci/yr of chromium, and 1×10^{-3} Ci/yr of sodium-22. The tritium extraction process has aqueous releases that are less than reportable levels.

APT footprint. As a result, no effects greater than five percent above APT's baseline would have been expected to the physical environment (landforms soils, geology, hydrology, surface water, air emissions, infrastructure, waste management, cultural resources, visual resources, or noise).

Construction of the combination facility would have involved no new hazards to workers beyond those already considered for the construction of the entire APT. As a result of design efficiencies, the combination facility would have been constructed with approximately the same workforce and no change expected in the number of additional traffic accident fatalities or occupational injuries during construction. In addition, no change would have occurred in socioeconomic impacts compared to the entire APT project.

As the combination facility would have been a small addition to the entire APT project, no impacts beyond those already considered would have taken place in the biological environment (terrestrial ecology, aquatic ecology, wetland ecology, threatened and endangered species).

Impacts of Operation of the Combined TEF/APT

Operation of the combined facility would not have required large changes in the operational characteristics of APT. No additional land use would have been required and additional water use would have been less than 5 percent of that already identified for separate APT and tritium extraction facilities. No effects on the landforms, soils, visual resources or noise from the facility beyond those already envisioned for APT would have occurred. Emissions of nonradiological gases to the environment would have been equivalent to the emissions already analyzed for APT as a whole.

This document identifies the impacts of the bounding case of storing CLWR targets per year in TEF, processing CLWR targets in TEF, and operating APT with the preferred helium-3 feedstock alternative. Operation of the combined facility would have increased emissions of radioactive gases and particulates compared to the APT baseline. The combined facility could have been expected to have annual air releases no greater than 35,000 curies of tritium oxide, 250 curies of carbon-11, 2,000 curies of argon-41, 0.02 curies of beryllium, 0.0077 curies of iodine-125, 4.2×10^{-5} curies attributable to pellet material emissions, and 4.2×10^{-4} curies of cobalt-60. Of these annual totals, extraction capability would have accounted for 5,000 curies of tritium and all the releases from pellet material emissions and cobalt-60. These releases would have bound all operational combinations of TEF and APT production, but in no case would the operation of the combined facilities have produced more than 3 kilograms of tritium per year.

Waste streams from the combined facility would have been very similar to those from the APT baseline with the exception of job control waste from TEF. The combined facility would have produced an additional 320 cubic meters annually of low-level solid radioactive waste and an additional 2 cubic meters annually of hazardous waste.

Cross-training of the workforce would have resulted in no additional workers required for the combined facility. Therefore, the estimates for occupational injuries, traffic accident fatalities, and impacts on the regional economy would be unchanged from the APT baseline. While emissions would have increased over the APT baseline, the relative effects of each element on the surrounding population would have been unchanged and the environmental justice conclusion of the Draft APT EIS would remain valid.

The diesel generator and storage tank necessary for backup power for TEF at H Area would not have been needed for the combined facility. The TEF furnaces did not require backup power and other backup power needs would have been provided by the APT facility generators. Therefore, there was no difference between the nonradiological air impacts for the combined facility and the APT baseline alternative.

Public health impacts would have been higher for the combined facility than those for the baseline APT alternative due to the higher radiological source term associated with extracting tritium from CLWR targets. Extraction capability would have increased the doses to the maximally exposed offsite individual and population to 0.058 millirem per year and 2.2 person-rem per year, respectively. The estimated number of annual latent cancer fatalities to the general population from the combined facility is 0.0011 compared to 0.0010 for the baseline APT.

Because worker radiological dose is an administratively controlled limit, the maximum worker dose allowed at the combined TEF/APT facility would have been unchanged from the APT baseline facility. As shown in Table S-2, the collective radiation exposure for workers at the combined facility would not be increased substantially from the baseline APT. The uninvolved worker dose (640 meters from the facility) would have been higher for the combined facility due to cobalt-60 emissions from extracting CLWR targets and a doubling of tritium emissions as a result of the additional TEF operations. The uninvolved worker dose would have increased from 1.7×10^{-3} millirem per year for baseline APT to 2.0×10^{-3} millirem per year for the combined facility.

Consequences of potential accidents at facilities that produce or process radioactive materials were driven by the amount of source material available for release to the environment. The combination facility differed from the baseline APT in that there was an increase in the amount of tritium stored in the form of CLWR targets. This additional fixed source term resulted in greater accident consequences for the combined facility over the APT baseline. The limiting accident scenarios for the APT facility were a large fire in the combined facility and design-basis and beyond-design-basis seismic events.

S.7 Cumulative Impacts

The counties surrounding SRS have numerous existing and planned industrial facilities with permitted air emissions and discharges to surface waters. Because of the distances between the SRS and the private industrial facilities, there is little opportunity for interactions of plant emissions, and no major cumulative impact on air or water quality. Construction and operation of planned off site facilities could affect the regional socioeconomic cumulative impacts. DOE also has evaluated the impact from its own proposed future actions by examining impacts to resources and the human environment as described in NEPA documents related to SRS. Additional NEPA documents related to SRS that were considered in the cumulative impacts include:

•*Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling.*

•*Final Environmental Impact Statement Accelerator Production of Tritium at Savannah River Site.*

•*Final Environmental Impact Statement Commercial Light Water Reactor.*

•*Draft Savannah River Site Spent Nuclear Fuel Management Draft Environmental Impact Statement.*

•*Final Environmental Impact Statement Interim Management of Nuclear Materials.*

•*Final Environmental Impact Statement Interim Management of Nuclear Materials.*

•*Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement.*

•*Defense Waste Processing Facility Supplemental Environmental Impact Statement.*

•*Draft Surplus Plutonium Disposition Environmental Impact Statement.*

•*Environmental Assessment for the Tritium Facility Modernization and Consolidation Project at the Savannah River Site.*

•*Final Environmental Impact Statement on Management of Certain Plutonium Residues and Scrub Alloy Stored at the Rocky Flats Environmental Technology Site.*

Cumulative impacts analysis also includes the impacts from actions proposed in this EIS. Risks to members of the public and site workers from radiological and nonradiological releases are based on the proposed action to extract tritium from commercial light water reactor (CLWR) targets. Impacts associated with extracting tritium from targets of similar design are not discussed here because in all cases they are less than the impacts of CLWR targets.

Air Resources.

The SRS maximum values are the maximum modeled concentrations that could occur at ground level at the Site boundary. The data demonstrate that total estimated concentrations of nonradiological air pollutants from the SRS, including the contributions from TEF, would be below the regulatory standards at the Site boundary. The cumulative concentrations range from less than one percent to 59 percent of the applicable standards. The higher percentages (54-59 percent) are for the shorter interval sulfur dioxide concentrations and the particulate concentrations and are still well within regulatory standards. The cumulative dose to the maximally exposed member of the public would be 1.1×10^{-3} rem (1.1 millirem) per year, equivalent to 11 percent of the regulatory standard of 10 millirem per year. The approach of summing the doses to a maximally exposed individual for the seven actions that contribute to the radiological dose, non-Federal contributions, and baseline SRS operations is an extremely conservative one because it assumes that the maximally exposed individual would occupy simultaneously the four locations that would receive the maximum doses from activities described in each EIS at the same time, a physical impossibility.

Water Resources.

Studies of water quality and biota downstream of existing outfalls suggest that discharges from these facilities have not degraded the water quality of Upper Three Runs or Fourmile Branch. Even with the addition of TEF wastewaters, ETF and the Central Sanitary Wastewater Treatment Facility would continue to meet the requirements of the SRS permit. Liquid effluents from the Site could contain small qualities of radionuclides that would be released to SRS streams that are tributaries of the Savannah River. The exposure pathways considered in this analysis included drinking water, fish ingestion, shoreline exposure, swimming, and boating. The preferred TEF configuration would result in minimal radiological dose to the maximally exposed individual at the SRS boundary from liquid releases. The dose from TEF liquid emissions would be minimal because effluent from TEF would be treated at ETF. ETF processes would remove non-tritium radiological components of the waste stream. The tritium in the TEF liquid effluent sent to ETF is expected to be well below the U.S. Environmental Protection Agency's (EPA's) drinking water limit of less than 20,000 picoCuries per liter.

Public and Worker Health.

The radiation dose to the maximally exposed offsite individual from air and liquid pathways is estimated to be 1.4×10^{-3} rem (1.4 mrem) per year, which is well below the applicable DOE regulatory limits (10 mrem per year from the air pathway, 4 mrem per year from the liquid pathway, and 100 mrem per year for all pathways). The total population dose for current and projected activities of 50 person-rem translates into 0.025 additional latent cancer fatality for each year of exposure for the population living within a 50-mile radius of the SRS. For comparison, 145,700 deaths from cancer due to all causes would be likely in the same population over their lifetimes. The annual radiation dose to the involved worker population would be 1,138 person-rem. The largest contributor to the dose is Alternative 3B in the Surplus Plutonium Disposition EIS. Specifically, the dose is associated with the operation of a plutonium disassembly and conversion facility that could be sited at SRS. It also should be noted that dose to the individual worker will be kept below the regulatory limit of 5,000 mrem per year. In addition, as low as reasonably achievable (ALARA) practices help maintain worker doses below DOE's administrative control level of 2,000 mrem per year. SRS-specific administrative control levels are as low as 700 mrem per year.

Waste generation.

The estimated quantity in this forecast of waste from operations during the next 30 years is 603,000 cubic meters. In addition, environmental restoration and decontamination and decommissioning activities identified in the 30-year forecast would produce an additional 712,000 cubic meters. Other proposed activities that were not included in the 30-year expected waste forecast (exclusive of decontamination and decommissioning) would add 211,705 cubic meters. Therefore, the total amount of waste from SRS activities exclusive of TEF is estimated to be 1,526,705 cubic meters. It is anticipated that SRS will have the capacity to handle the total amount of projected waste. Low-level waste would be generated from TEF operations activities. Mixed and hazardous wastes would be generated from TEF maintenance activities. High-level and transuranic waste would not be generated at TEF. The total waste volume associated with TEF activities (excluding decontamination and decommissioning) would be 9,430 cubic meters. The TEF post-treatment waste volume would require less than one percent of the low-activity waste and intermediate-level tritium waste vault disposal capacities per year. TEF hazardous and mixed waste also would require less than one percent of their respective storage capacities at SRS.

Utilities and Energy.

The cumulative consumption values for existing and planned activities (based on annual consumption estimates) would be a significant increase in electricity usage at SRS. Because the source of this electricity would be dispersed across the electric grid that serves SRS, DOE cannot estimate site-specific impacts from increased electricity requirements. The estimated annual electricity consumption by TEF (20,600 megawatt-hours) would be small compared to existing site electricity usage.

S.8 Public Comments and DOE Responses

During public review of the Draft EIS, submissions were received from 12 individuals and organizations. Of those, 9 were from individuals, 2 were from Federal agencies, and 1 was from a citizens group. Major comments and DOE responses are summarized below and are organized according to key issue areas.

Costs

Comment: The EIS should include costs for the various alternatives.

Response: DOE is not required by the National Environmental Policy Act (NEPA) to include project-related cost in an EIS. DOE has fully characterized and documented the socioeconomic impacts (e.g., the number of jobs created and the resultant effect of income generated on the local economy) of implementing each of the alternatives in the evaluation of socioeconomic impacts in Chapter 4 of the DEIS. DOE did not perform a cost-benefit analysis for construction and operation of TEF at H Area or AGNS.

Alternatives

Comment: There are little or no differences between AGNS and the H-Area alternatives, but the EIS makes these differences look like major differences.

Response: DOE did not intend to make qualitative judgements about differences in impacts between the two sites, but presented the data necessary for the reader to make those judgements. DOE did wish to capture the differences in environmental impacts for the decision maker(s) and the public. DOE has revised Section 2.4.1 starting on page 2-8 of the draft EIS to clarify the differences in these two alternatives. The revision is in Section 2 of the Final EIS.

Nonproliferation

Comment: The EIS action would change U.S. Policy mixing commercial and military uses.

Response: The purpose of the proposed action and alternatives evaluated in this EIS is to provide tritium extraction capability to support a new tritium source for continuing the nuclear weapons stockpile of the U.S. The production of tritium in commercial reactor facilities, the conformity of such production with national policy on nonproliferation, or the impact of such a policy on the United States position internationally in regard to nonproliferation, are not within the scope of this EIS. However, the Statement of Administration Policy, dated May 20, 1998, from the Executive Office of the President, Office of Management and Budget, reads "Tritium production in commercial reactors is not inconsistent with U.S. nonproliferation policy. There have been several instances of cooperation between U.S. military and civilian nuclear programs, including dual use of uranium enrichment facilities and commercial sale of electricity originating from a weapons material production reactor."" This conclusion was confirmed in the Interagency Review of July 1998 Report to Congress by DOE which further reinforced the position that the dual track strategy for tritium production should be maintained.

Impacts

Comment 1: Involved workers as well as uninvolved workers should be included in the EIS.

Response: DOE evaluated the impacts of normal operations on involved workers in the Draft EIS. See Section 4.1.2.5 (page 4-16), Table 4-13 (page 4-18), Section 4.2.2.5 (page 4-44), and Table 4-27 (page 4-46) of the Draft EIS. A quantitative analysis of the impact of accident conditions on involved workers was not performed because the large number of assumptions required in the consequence modeling would make the prediction unreliable. To protect involved workers, a qualitative evaluation of accident-relate hazards is performed and reported in the hazards section of the Safety Analysis Report. This analysis is used to identify required administrative controls/safety features.

Comment 2: Cobalt does not appear to be addressed.

Response: As indicated in Sections 4.1.1.2 (page 4-3), 4.1.1.4 (page 4-8), and 4.2.1.4 (page 4-37) of the DEIS, cobalt-60 is used to represent worst-case liquid discharges and atmospheric emissions from CLWR target residues. Coablt-60 imparts the highest atmospheric dose per curie amount of all the radionuclides in the target residues. As shown in Table 4-5 of the DEIS, DOE estimates that about 4.2 x 10^{-4} curies of cobalt-60 would be released annually. This release is included in the source term used to calculate radiological doses to the public and workers that would result from TEF operation.

Purpose and Need Section

Comment 1: This Section should state why existing DOE reactors were not used.

Response: DOE conducted an exhaustive review of technologies for supplying tritium, including using the five reactors on SRS, and documented it in the *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling*. The study revealed that only one of the reactors at SRS (K Reactor) was capable of returning to operation. DOE determined that operation of a first-generation reactor designed in the 1940s is not a reasonable alternative for a new, long-term, assured tritium supply. The purpose and need for this EIS is for the capability to extract tritium after tritium has been produced.

Comment 2: This Section should state why the existing tritium facility was not recommended for use.

Response: Unlike using the production reactors, refurbishing the existing tritium extraction facility is an alternative means to respond to the purpose and need for the actions evaluated in this EIS. Although this alternative was determined to be unreasonable, DOE believes that it is correct to present it in the Proposed Action and Alternatives section of the Summary rather than earlier in the Summary.

Dose and Risks

Comment 1: Report risks in percentage increase.

Response: DOE has revised Table 4-6 on page 4-9 of the Draft EIS in response to the suggestion. The revision is in Section 2 of the Final EIS.

Comment 2: "Determining" emissions are actually estimates.

Response: The commenter is correct. The sentence on page 4-8 of the Draft EIS (and in Section 2 of the Final EIS) was revised.

Comment 3: Requests were made for several terms to be defined and references added.

Response: These changes were made and are given in Section 2 of the Final EIS.

Comment 4: More information is needed on measures to mitigate occupational injuries or traffic fatalities.

Response: Positive measures are taken to minimize an increase in occupational injuries during any construction activities at the Savannah River Site. These include the adherence to agreements, safety plans, and safety procedures by all contractors, subcontractors, and Site forces. In addition to meeting OSHA requirements, Site workforces must adhere to Site safety procedures documented in Site Safety Manuals.

The potential risk for increase of traffic fatalities during construction is minimized through traffic law enforcement by the Site security force. Although an increase in actual numbers of accidents or fatalities could occur as a result of additional construction activities and the additional workers required, DOE does not expect the accident or fatality rate to increase. Therefore, DOE has not modified the Draft EIS.

Other (Miscellaneous)

Comment 1: TEF should be legally designated a DOE defense nuclear facility.

Response: The Defense Nuclear Facilities Safety Board (DNFSB) has the authority, under legislation establishing the DNFSB and its mission, to provide independent safety oversight to DOE in regard to the operation of defense nuclear facilities. The DNFSB from time to time provides recommendations to the Department. Ambiguities may exist in the Board's authority to provide oversight to TEF and other DOE tritium programs because tritium is not a special nuclear material as defined by the Atomic Energy Act of 1954. DOE cooperates fully with the Board on matters concerning existing and proposed DOE tritium facilities. As indicated in the draft EIS, because of its radiological characteristics, DOE has chosen to apply to tritium operations a number of regulations and standards that also apply to special nuclear material operations. DOE believes this is a conservative approach to safety management for tritium facilities. DOE has a rigorous regulatory system in place for tritium facilities. Because of this, it is not likely that changes in the definition of DOE nuclear facilities or the designation of tritium as a special nuclear material would change the safety posture of these facilities or of the TEF. Therefore, DOE has not modified the Draft EIS in this regard.

Comment 2: The EIS should state that no commercial sales of tritium will be allowed.

Response: The purpose of the proposed action and alternatives evaluated in the TEF EIS is to provide the capability to extract tritium from tritium producing burnable absorber rods irradiated in a commercial nuclear reactor, or targets of similar design, for the sole purpose of supplying tritium to the Department of Defense to support the nuclear weapons stockpile of the United States. Commercial sale of tritium extracted in the TEF is not contemplated at this time.

Comment 3: Add more information about emergency response plans.

Response: Emergency response-related factors were considered first during the formal site selection process conducted for TEF. As part of the SRS emergency preparedness process and prior to becoming operational, the TEF would be incorporated into the Site and H Area Emergency Plans. These plans would consider the potential impacts of TEF accidents on personnel in nearby facilities, and the potential impacts of existing operations on personnel assigned to the TEF. DOE prepares and implements Site- and facility-specific plans for responses to potential emergencies such as chemical spills and accidents. DOE has integrated these SRS plans with state and local offsite plans to enable coordination of a total response to SRS incidents.

Comment 4: The TEF needs separate independent inspections.

Response: One or more regulatory bodies, including EPA and the South Carolina Department of Health and Environmental Control oversee all Site activities. Other agencies, including the Defense Nuclear Facilities Safety Board, oversee particular facets of SRS operations. For example, the DOE industrial hygiene program complies with the Occupational Safety and Health Administration's regulatory requirements for tracking the incidence and type of injuries and illnesses and the resulting days lost from work. These agencies would exercise the same responsibilities for TEF operations.

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SECTION 1. PUBLIC COMMENTS AND DOE RESPONSES

This section provides DOE's responses to comments received during the public comment period. Comments received during the public meeting in North Augusta, South Carolina are summarized. Letters and the transcriptions of telephone comments received over DOE's message line also are reproduced in this section. The transcripts from the meeting can be found in Appendix C. Appendix C also contains written comments submitted at the public meeting, letters that acknowledge receipt of the Draft EIS but do not provide comments requiring DOE responses, did, and a letter and form from the South Carolina Office of State Budget.

DOE published the *Draft Environmental Impact Statement for the Construction and Operation of a Tritium Extraction Facility at the Savannah River Site* in May 1998. On June 9, 1998, DOE held public meetings on the Draft Environmental Impact Statement (DEIS) in North Augusta, South Carolina. The public comment period ended on June 22, 1998.

Court reporters documented comments and statements made during two public meeting sessions. In those two sessions, eight individuals provided comments or made public statements. DOE also received four letters with comments (including one by electronic mail) on the Draft EIS. Two individuals left comments by telephone on DOE's message line.

This section presents the comments received and the DOE responses to those comments. If a comment prompted a modification to the EIS, DOE has noted the change and directed the reader to that change.

Comments are identified by one of the following letter codes:

- M1 – M2 (comments submitted in either session 1 or 2 of the public meeting)
- L1 – L4 (comments received by letter or email)
- V1 – V2 (comments submitted by telephone to DOE's message line)

DOE numbered specific comments in each letter or telephone message sequentially (01, 02, etc.) to provide unique identifiers. Table 1-1 lists the individuals and government agencies that submitted comments and their unique identifiers.

The Department extends its gratitude to all the individuals and agencies who have shown the interest and taken the time to provide comments.

Table 1-1. Public comments on the Draft TEF EIS.

Comment source number[a]	Commenter	Page number
Commenters at the public meetings[b]		
M1-01, M1-02	Mr. Bob Newman	1-1, 1-2
M1-03	Dr. Mary Kelly	1-2
M1-04 to M1-07	Mr. Fred Humes	1-3
M1-08 to M1-09	Mr. Steve Parker	1-3
M1-10 to M1-11	Mr. Bob Newman	1-3, 1-4
M1-12	Mr. Ernie Chaput	1-3
M1-13	Mr. Steve Parker	1-4
M1-14	Ms. Paulette Thicke	1-4
M1-15 to M1-16	Mr. R. Stuhler	1-5
M2-01 to M2-02	Dr. Bob Smith	1-5, 1-6
Comments received by letter		
L1	Dr. David Moses	1-7 to 1-15
L2	Dr. David Moses	1-16 to 1-17
L3	U.S. Department of Health and Human Services	1-20 to 1-23
L4	U.S. Environmental Protection Agency	1-27
Comments received verbally at the DOE message line		
V-1	Mr. Marvin Lewis	1-28
V-2	Mr. Curt Graves	1-29

a. Unique source codes were given to each of the public meeting sessions (M-1 and M-2 respectively). The individuals comments are coded M1-01, etc.
b. Complete transcript of the meeting is in Appendix C.

Public Meetings

The public meetings consisted primarily of informal discussions and questions and answers related to the Tritium Extraction Facility (TEF). In this section, each public meeting speaker's statement is paraphrased because some statements span several pages of the transcript (see Appendix C). A number of comments and concerns were raised and discussed with Department officials during the meetings.

M1-01: One commenter stated that the EIS should include the costs for the facility with the impact on the community. DOE needs to provide the cost for the alternatives. This information should also include the basis for determining the costs.

Response: DOE is not required by National Environmental Policy Act (NEPA) to include cost in an EIS. Section 102(2)(B) of NEPA states "All agencies of the Federal government shall ... ensure that presently unquantified environmental amenities and values may be given appropriate consideration in decision-making along with economic and technical considerations." Cost was an important consideration when the Secretary selected the CLWR as the primary new tritium source. The EIS is intended to describe the environmental impacts of construction and operation of the facility. DOE has fully characterized and documented the socioeconomic impacts (e.g., the number of jobs created and the resultant effect of income generated on the local economy) of implementing each of the alternatives in the evaluation of socioeconomic impacts in Chapter 4 of the DEIS. DOE did not perform a cost-benefit analysis for construction and operation of TEF at H Area or AGNS; however, DOE used two sources of cost data for the socioeconomic analysis, which are available in the DOE public reading room (Brizes 1997; DOE 1997b).

M1-02: One commenter stated that there are little or no differences between AGNS and the H-Area alternatives, but the EIS makes these differences look like major differences.

Response: DOE did not intend to make qualitative judgments about differences in impacts between the two sites, but presented the data necessary for the reader to make those judgments. DOE did wish to capture the differences in environmental impacts for the decision maker(s) and the public. DOE has revised Section 2.4.1 starting on page 2-8 of the draft EIS to clarify the differences in these two alternatives. The revision is on page 2-9 of this Final EIS. Specifics of the environmental impacts of constructing and operating TEF in H Area and at the AGNS site are found in Chapter 4 and, in summary form, in Table 2-2 (page 2-9) of the DEIS and page 2-3 of this Final EIS. DOE considers the expected impacts from the preferred alternative or the AGNS alternative on the human environment to be minor and similar. Several differences between AGNS and H Area account for differences in environmental impacts between the two sites: one is a function of AGNS's closer proximity to the general public - operations at the AGNS site have a greater potential for affecting the offsite population near the Site boundary. For example, the impacts to the maximally exposed offsite individual associated with radiological and nonradiological air emissions are slightly greater for AGNS than for the H-Area alternative, but the differences are small and the emissions well below regulatory limits in both cases. Similarly, there is little to differentiate the two sites in terms of impacts on the natural environment because both sites have already been impacted by industrial development.

M1-03: One commenter stated that AGNS did not have an EIS prepared so it is difficult to consider the environmental impacts.

Response: AGNS prepared an Environmental Report on the Barnwell Nuclear Fuel Plant in 1971; the report is cited in the DEIS and available in DOE's public reading room in Aiken, South Carolina. In the DEIS, DOE described the environmental conditions at the AGNS site and the impacts of constructing and operating tritium extraction capability at the site, and compared those impacts with other alternatives.

The next seven comments deal with concerns about the U.S. nonproliferation policy. The DOE response follows the seventh comment.

M1-04: One commenter had reservations about producing tritium in a commercial reactor in that this may undermine U.S. nonproliferation policy.

M1-05, M1-09, and M1-12: Three comments stated that the DEIS is insufficient in that it does not address all environmental impacts. Producing tritium in commercial facilities is a change in national policy. Other nations may use this change as an excuse to use their commercial reactors for weapons production. This means that there will be additional environmental impacts throughout the world as other countries use their commercial reactors to produce tritium. These impacts should be addressed in this EIS.

M1-06: One commenter stated that the Commercial Light Water Reactor (CLWR) EIS does not address the nonproliferation policy.

M1-07: One commenter asked if the U. S. would endorse North Korea if they produced tritium.

M1-08: One commenter stated that we should use DOE [as opposed to commercial] facilities to avoid terrorists.

Response to comments M1-04, -05, -06, -07, -08, -09, and -12: The purpose of the proposed action and alternatives evaluated in this EIS is to provide tritium extraction capability to support a new tritium source for continuing the nuclear weapons stockpile of the U.S. The production of tritium in commercial reactor facilities, the conformity of such production with national policy on nonproliferation, or the impact of such a policy on the United States position internationally in regard to nonproliferation, are not within the scope of this EIS. However, the Statement of Administration Policy, dated May 20, 1998, from the Executive Office of the President, Office of Management and Budget, reads "Tritium production in commercial reactors is not inconsistent with U.S. nonproliferation policy. There have been several instances of cooperation between U.S. military and civilian nuclear programs, including dual use of uranium enrichment facilities and commercial sale of electricity originating from a weapons material production reactor." This conclusion was confirmed in the Interagency Review of July 1998 Report to Congress by DOE which further reinforced the position that the dual track strategy for tritium production should be maintained. Concerning the CLWR EIS, DOE has expanded the discussion on page S-2 of the TEF EIS to clarify the roles of the three project-specific EISs: one analyzing the production of tritium in a DOE-owned accelerator; one analyzing the production of tritium in a commercial light water reactor; and this EIS analyzing the extraction of tritium from irradiated targets regardless of their source. Concerning countries such as North Korea, the U.S. is a member of the Nuclear Nonproliferation Treaty, and as such supports reducing the nuclear threat by reducing the number of nuclear weapons and discourages the spread of the nuclear weapons. Concerning terrorists, the Nuclear Regulatory Commission (NRC) has stringent security requirements that apply to commercial facilities.

M1-10: One commenter stated that a recent emergency drill did not have all the people show up for their positions. Others did show up who filled those positions; however, each job function has specific responsibilities with its own expertise.

Response: The commenter is apparently referring to recent press reports regarding unsatisfactory response to pager communications initiating an emergency SRS drill. Test drills are conducted periodically and at no time during any of these drills has an SRS Emergency Operations Center position gone unfilled by a qualified individual. Each position in the Emergency Operations Center is staffed three deep with qualified individuals. Although these individuals rotate through their positions on a monthly basis, each carries a pager and is required to respond to emergency drills whether or not they are on shift. On April 27, 1998, a chemical spill at an SRS facility required activation of the Emergency Operations Center at 2:00 am. All Emergency Operations Center positions were filled by the designated, qualified individuals within one hour of the pager notification.

M1-11: One commenter stated that the EIS should evaluate impacts on involved as well as uninvolved workers and that the 640-meter distance from the stack used to evaluate uninvolved workers was a long distance; uninvolved workers 600 meters away from the stack are always included in EISs. He then asked about the involved workers and stated that these workers should be included in all EISs.

Response: DOE evaluated the impacts of normal operations on involved workers in the Draft EIS. See Section 4.1.2.5 (page 4-16), Table 4-13 (page 4-18), Section 4.2.2.5 (page 4-44), and Table 4-27 (page 4-46) of the Draft EIS. A quantitative analysis of the impact of accident conditions on involved workers was not performed because the large number of assumptions required in the consequence modeling would make the prediction unreliable. To protect involved workers, a qualitative evaluation of accident-related hazards is performed and reported in the hazards section of the Safety Analysis Report; this analysis is used to identify required administrative controls/safety features.

With respect to modeling uninvolved workers at 640 meters, limitations in industry-accepted modeling tools prevent the reliable modeling of airborne dispersion of radioactive or chemical materials at distances closer than 100 meters from an elevated or ground release. This is due primarily to limitations in the models themselves and to the difficulty of modeling air flow in and around complex structures. The use of 640 meters in the TEF EIS is appropriate because DOE calculated that maximum ground surface concentrations from TEF's elevated stack would occur at that approximate distance. Also, the use of 640 meters ensures consistency between this and previously prepared Savannah River EISs.

M1-13: One commenter stated that DOE should address where the reactor rods are coming from before it addresses the extraction of tritium from these rods.

Response: In order to provide tritium to the nuclear weapons stockpile by 2005, activities required for providing the nation's tritium supply must be conducted concurrently.

M1-14: One commenter stated that du Pont said that SRS was a clean site; however, Westinghouse is cleaning up SRS now. The commenter then asked if the current cleanup will be impacted by this TEF facility; if cleanup will be needed for this facility; and about the types of wastes and releases from this site.

Response: Locations on SRS needing cleanup were recognized when du Pont was operating the Site in 1987 in the *Final Environmental Impact Statement for Waste Management Activities for Groundwater Protection*. This EIS described the needed cleanup activities at known hazardous, radioactive, and mixed waste sites and the need for new waste disposal facilities. DOE has an ongoing Environmental Restoration program to clean up sites contaminated by past activities at the SRS. The SRS is listed on the National Priorities List and as such is subject to the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as enforced by the U.S. Environmental Protection Agency and the South Carolina Department of Health and Environmental Control. As indicated in Chapter 7 of the Draft EIS, TEF operations would be required to comply with these regulations in the event of spills of hazardous materials. Funding of SRS cleanup activities would not be directly affected by construction and operation of the TEF because Congress funds DOE's environmental cleanup activities separately from defense facilities.

DOE estimates (Section 2.5 on page 2-18 of the Draft EIS) that the operating life of the TEF would be 40 years. DOE would address the environmental impacts of decontaminating and decommissioning TEF when the facility is approaching the end of its operating life, using technologies available at that time. Given the potential for advancements in waste minimization and waste management technologies over the next 40 years, DOE has not attempted in this EIS to estimate the types and quantities of waste that would be generated by decontamination and decommissioning of the TEF at the end of its operational life.

DOE has estimated the types and quantities of waste that would be generated by construction and operation of TEF and described the impacts of managing those wastes in Chapter 4 of the Draft EIS.

On page 2-15 in Section 2.4.1 of the DEIS, DOE discusses unknown contaminated materials. The DEIS states that if any were discovered, DOE would remove and dispose of such material in accordance with all applicable laws and regulations.

M1-15: One commenter asked if the Site Emergency Plan and H Area Plan had been considered for impact by adding additional facilities.

Response: Emergency response-related factors were considered first during the formal site selection process conducted for TEF. As part of the SRS emergency preparedness process and prior to becoming operational, the TEF would be incorporated into the Site and H Area Emergency Plans. These plans would consider the potential impacts of TEF accidents on personnel in nearby facilities, and the potential impacts of existing operations on personnel assigned to the TEF. DOE prepares and implements Site- and facility-specific plans for responses to potential emergencies such as chemical spills and accidents. The Emergency Operations Center and a spill response team ensure appropriate response. Emergency response personnel are trained extensively, and each position has a primary and two alternates on call. The response plans include specific responses to specific incidents for specific facilities (e.g., a TEF), processes, or events. DOE has either used plans in actual emergencies or exercised them in simulated operating conditions. DOE has integrated these SRS plans with state and local offsite plans to enable coordination of a total response to SRS incidents.

M1-16: One commenter stated that the cobalt does not appear to be addressed for exposure and release.

Response: As indicated in Sections 4.1.1.2 (page 4-3), 4.1.1.4 (page 4-8), and 4.2.1.4 (page 4-37) of the DEIS, cobalt-60 is used to represent worst-case liquid discharges and atmospheric emissions from CLWR target residues. Cobalt-60 imparts the highest atmospheric dose per curie amount of all the radionuclides in the target residues. As shown in Table 4-5 of the Draft EIS, DOE estimates that about 4.2×10^{-4} curies of cobalt-60 would be released annually. This release is included in the source term used to calculate radiological doses to the public and workers that would result from TEF operation.

M2-01: One commenter asked about the targets if the TEF becomes part of the APT.

Response: If CLWR extraction capability is added to the APT, the CLWR targets processed at APT would be identical to those that would be processed in the TEF in H Area or AGNS. Also, an alternative APT target would require extraction in TEF.

M2-02: One commenter asked if the environmental impacts are more severe if APT and TEF are combined.

Response: Overall, the TEF/APT combination has higher release rates than APT alone. A comparison of the impacts of the APT facility with and without CLWR extraction capability is provided in Table 2-3, page 2-16 of the Draft EIS and page 2-11 of this Final EIS.

Letters

The comment letters DOE received on the Draft TEF EIS and DOE's responses are provided in the following section. Comments in each letter are identified, and the corresponding responses follow the letter.

130 Clemson Drive
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Electronic Mail: mosesa@aol.com
June 2, 1998

Andrew R. Grainger
NEPA Compliance Officer
SR Operations Office
Building 773-42A, Room 212
Aiken, SC 29808

Dear Mr. Grainger:

Ref: My letter to you with comments and recommendations on the draft EIS for the APT at SRS, February 2, 1998.

The following comments and recommendations are submitted on the Draft EIS for the Tritium Extraction Facility (TEF) at SRS:

1. Designation of TEF as a Department of Energy defense nuclear facility:

Comment: As described in the enabling legislation for the Defense Nuclear Facility Safety Board (DNFSB), as codified in Title 42 of the *United States Code* (USC) and specifically at 42 USC 2286a, the functions of the DNFSB are restricted to and focused on assuring the safety at each existing or new "Department of Energy defense nuclear facility."

As described in activity reports issued by the DNFSB, where such reports can be found and retrieved on the Internet either on the DNFSB homepage (http://www.dnfsb.gov/trip.html) or in the archives of the DOE Departmental Representative to the DNFSB (http://dr.tis.doe.gov/archive/default.htm), the DNFSB has taken an active role in reviewing the safety of operations at existing DOE tritium facilities at both Mound and Savannah River. As also reported both by the Accelerator Production of Tritium (APT) Project in its monthly and weekly reports on the project homepage (http://apt.lanl.gov/) and by the DNFSB SRS Representatives 1998 Weekly Activities Reports (http://www.dnfsb.gov/weekly/sr/sr1998.htm), the DNFSB staff is also taking an active role in reviewing the conceptual design of the proposed APT. These activities by the DNFSB are noted to be prudent and appropriate in assuring the independent oversight of the health and safety both of workers involved in nuclear materials activities at DOE tritium facilities and of the public who may be living in areas near DOE tritium facilities. DNFSB's active oversight of these DOE nuclear activities is to be praised and must continue as the public expects and apparently as Congress intended.

Unfortunately, such actions by the DNFSB appear to have no legal basis since the definition for a "Department of Energy defense nuclear facility" as given in 42 USC 2286g restricts the term to apply to a production facility or utilization facility as defined in 42 USC 2014 or to a DOE-owned nuclear waste storage facility that is not otherwise regulated. Since the definitions for a production facility and a utilization facility at 42 USC 2014(v) and (cc) are restricted to facilities that use, produce, or process "special nuclear material" (SNM) and since tritium is not designated to be

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SNM, legally the DNFSB has no current authority from Congress for reviewing the APT or the TEF. For purposes of planning work force restructuring and tracking worker exposures at Mound and SRS tritium facilities, certain DOE tritium facilities at these two sites had to be specially and individually designated as "Department of Energy defense nuclear facilities" in the Defense Authorization Act of 1993 as codified at 42 USC 7274j, but this restrictive definition does not apply to DNFSB safety oversight functions at these tritium facilities.

It is noted that, in reference to its own regulatory functions for emergency planning and response under the *Atomic Energy Act of 1954*, as amended, as given in Sect. 7.2.2 (p. 7-8) of the draft TEF EIS, DOE alludes to the issue of tritium not being a SNM; however, DOE's presentation of its statutory authority is a bit confusing as given in the draft EIS and lacks a specific reference to a document in which "DOE has determined...that DOE regulations apply to tritium-related activities." It is assumed that the unspecified reference is not an interpretation of "Section 57(b) of the Act," that is, 42 USC 2077(b), as cited by DOE in the discussion in the draft EIS, but rather the unprovided reference is to the DOE General Counsel's interpretation of 42 USC 2201(I)(3) as given at Sect. B.1, *Federal Register, 61*, pp. 4209-4910, February 5, 1996, where it is stated that "the requirements in [10 *CFR*] Parts 830 and 835 cover all activities under DOE's auspices with the potential to cause radiological harm." 42 USC 2201(i)(3) has nothing to do with SNM but does provide DOE with broad regulatory authority, which DOE uses to claim exemption from regulation by outside regulators such as the Occupational Safety and Health Administration (OSHA), to "prescribe such regulations or orders as it may deem necessary...to govern any activity authorized pursuant to this chapter, including standards and restrictions governing the design, location, and operation of facilities used in the conduct of such activity, in order to protect health and to minimize danger to life or property." Unfortunately Congress was not equally generous in equivalently granting similar authority to the DNFSB, which unlike DOE remains legally constrained by tritium not being determined to be an SNM or by the definition at 42 USC 2286g not being expanded to cover tritium facilities.

Thus, this situation raises serious questions as to the efficacy of the DNFSB's oversight at DOE tritium facilities, since DOE or its contractors can apparently halt or suborn any investigation or review of a tritium facility with legal impunity, and of DOE's ability to impose civil penalties for violations of DOE safety requirements that may be uncovered by DNFSB's "illegal" investigations or reviews. How can a contractor or contractor employee be held liable for violations discovered in a tainted investigation? Petty criminals are protected against illegal searches and seizures by law enforcement officers that are prohibited from introducing illegally-obtained evidence in courts of law. Can a DOE civil penalty withstand a challenge in Federal court if the law is violated or exceeded in uncovering an alleged offense?

This situation begs to be corrected either by DOE and DNFSB jointly seeking Congressional action to rectify the legal shortfall before it gets tested in an embarrassing or dangerous precedent or by DOE taking appropriate actions already authorized by law. The two alternatives that could be used to rectify this situation are (1) to have Congress revise the definition of "Department of Energy defense nuclear facility" at 42 USC 2286g in the DNFSB enabling legislation to include all DOE tritium facilities that are used for defense purposes or (2) to make the determination that tritium is SNM under the existing authority at 42 USC 2071. A broader version of the first option would be to expand the definition of "Department of Energy defense nuclear facility" at 42 USC 2286g to include all defense nuclear facilities that are regulated by DOE pursuant to 42 USC 2201(i)(3) or other pertinent law. The second option requires both Presidential assent and an opportunity for the Congressional Energy Committees to express dissent. Otherwise if the DOE and DNFSB General

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Counsels have a consensus reason to believe that there is already a legal basis for DNFSB oversight of DOE tritium facilities, such a finding should be published jointly in the *Federal Register* so that the public and the DOE contractors can readily understand why further action is not necessary when reading the current law as written implies otherwise.

Recommendation: The Final EIS for the TEF and, for that matter, the Final EIS for the APT at SRS should include a detailed description of the actions that DOE proposes to take to assure that the TEF and the APT are each legally designated to be a "Department of Energy defense nuclear facility." Failure to mitigate this situation and to explain to the public how the situation will be mitigated would be irresponsible. DOE should not proceed with the preliminary design of the TEF or APT until this situation is rectified so that the public can be assured that timely design reviews under 42 USC 2286a for considering safety issues are being performed properly and without question of the legality of the independent safety oversight. DOE should also provide precise descriptive discussions of and clear references to documented determinations such as the one alluded to in Sect. 7.2.2 (p. 7-8) of the draft TEF EIS. L1-01

2. Need for DNFSB review of the EIS sections on TEF accident analysis and waste management and of the accident analysis documented in Appendix B of the TEF EIS:

In the licensing of commercial production or utilization facilities under the *Atomic Energy Act of 1954*, as amended, the U.S. Nuclear Regulatory Commission (NRC) does not begin the EIS process until the applicant submits the license application, which contains both the preliminary safety analysis report (PSAR) and the environmental report, for NRC staff review. Thus, for licensed commercial nuclear facilities, the preliminary or final EIS is issued contemporaneously with NRC issuing the preliminary or final safety evaluation of the respective PSAR or final safety analysis report (FSAR). Therefore, consistent with the level of license being issued for a commercial nuclear facility, that is, either a construction permit or an operating license, an equivalently mature safety analysis report and its independent safety evaluation exist to support and supplement the EIS. However, as can be noted in the DOE EIS process for the TEF and the APT, the DOE EIS precedes the completion of the PSAR and the performance of any independent review or evaluation of the existing safety analysis documentation.

So while the NRC EIS is two step and is ultimately based on simultaneous NRC reviews of a mature safety analysis and a mature design basis, the DOE EIS process for its new nuclear facilities may be associated with little more than a cursory and internal safety assessment of an immature pre-conceptual or point design subject to no independent review and evaluation. DOE has made no attempt to correlate its EIS responsibilities under the *National Environmental Policy Act* as regulated upon DOE itself at 10 CFR Part 1021 either with its own nuclear safety oversight functions under 48 USC 2201(i)(3) and 2282a as regulated on its contractors at 10 CFR Parts 820 and 830 or with the DNFSB's independent oversight functions chartered by Congress at 42 USC 2286a. Included in DNFSB's legal mandate, subject of course to the restrictive definition at 42 USC 4486g, are the functions to "review the design of a new Department of Energy defense nuclear facility before construction of such facility begins and [to] recommend to the Secretary, within a reasonable time, such modifications of the design as the Board considers necessary to ensure adequate protection of public health and safety" and "in making its recommendations...[to] consider the technical and economic feasibility of implementing the recommended measures." As most experts in design and construction recognize, the early identification of problems leads to the most technically satisfactory and cost effective solutions. The EIS should be an integral part of a

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timely and economic assurance of "adequate protection of public health and safety," which is a key function of the DNFSB review process.

DOE's internal review process for recent EISs raises serious questions in this commenter's mind as to the adequacy of such reviews. DOE's current approach to issuing an EIS allows unbridled promotion and marketing by its own staff and contractors without a prescribed outside objective review by technical and safety experts.

When this commenter previously reviewed and commented on the Programmatic EIS for Tritium Supply and Recycle, numerous examples were noted where the internal review process apparently failed to address obvious health and safety regulatory issues especially for the APT option, and, as noted in the above-cited reference set of comments on the draft EIS for the APT at SRS, many of these issues were still not resolved as of a few months ago. In the past, this commenter has made inquires informally to DOE's cognizant nuclear safety enforcement and investigative staff with regard to their roles in reviewing EISs. These inquiries revealed that staff management in DOE's Office of Environment, Safety and Health (DOE/EH) routinely signed off on an EIS without a detailed review by the DOE/EH enforcement and investigative staff because such reviews were reportedly found to delay the process by raising technical or safety questions and thus prevented the obtaining of financial incentive bonuses by DOE managers for their timely processing of EIS paperwork. It is also apparent that DOE's Office of Environmental Management (DOE/EM) has had little or no impact on the Programmatic EIS for Tritium Supply and Recycle since APT's hottest radioactive wastes were characterized in that document as "routine low-level or mixed radioactive wastes" when under DOE/EM's guidance documents these wastes should have been characterized as "special case wastes" or "inherently hazardous special wastes." Similarly, the classification of these wastes as Greater-than-Class-C in the draft EIS for the APT at SRS, while more appropriate, is still inconsistent with both Federal law and the DOE/EM guidance documents for such wastes. One questions why DOE/EM bothers publishing guidance documents and policy statements on waste classifications since DOE staff and contractors apparently ignore them as evidenced by the recent record of EISs; this should be a matter of some interest to DNFSB, which is charged with oversight of DOE's implementation of standards. Similarly, the DOE Office of General Counsel apparently does not review the EISs since obvious statutory and regulatory issues such as those raised previously for the APT were not addressed. Perhaps, this is evidence of a lack of cognizant staff review or possibly of the provision of inadequate time for a detailed review by cognizant and knowledgeable staff since it is understood from at least one senior DOE manager in the DOE Office of Fissile Material Disposition that his office was given less than a day to review and sign off on the three volumes of the Programmatic EIS for Tritium Supply and Recycle. It appears that the velocity of DOE's internal review process for an EIS is more important than the validation of its veracity. If my understanding and description of this situation is indeed still a correct characterization, the need for an independent review of the waste management and safety assessments is true for the TEF draft EIS as well as also for other recent EISs, but my current focus is on the draft EIS for the TEF.

The situation described above can be rectified by requesting a DNFSB review of the TEF draft EIS waste management and accident analysis documentation and then publishing the results of the DNFSB review within the Final EIS. Even if that result is nothing more than a list of unanswered questions, it is important that the public know what the questions by the independent safety reviewer are and how DOE intends to address the questions. Such actions will go a long way toward making the DOE EIS process for a new nuclear facility more consistent with that used by the NRC for licensed nuclear facilities and will prevent DOE EISs from resembling marketing brochures for DOE staff or contractor proponents. This independent review can only better serve

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the interests of the American public and taxpayers.

Recommendation: DOE should request a DNFSB review of the TEF draft EIS waste management and accident analysis documentation, publish the results of the DNFSB review within the Final EIS, and describe how DOE intends to resolve any questions raised by the DNFSB review. L1-02

3. NRC licensing of commercial sales of tritium recovered in TEF or DOE prohibiting all commercial sales for tritium produced in the APT:

Comment: Under 42 USC 2141(a), NRC is authorized to license DOE's domestic commercial sales of tritium as a byproduct material as defined at 42 USC 2014(e)(1) and subject to the licensing provisions of 42 USC 2111 and 2114 as regulated at 10 CFR Part 20 and Parts 30-39 and for purposes of commercial exports at 10 CFR 110.9(c). Unfortunately, under the definition given at 42 USC 2014(e)(1), tritium is an NRC-regulated "byproduct material" only if it is produced in a reactor. This comment does not apply to the TEF for the recovery of tritium from CLWR irradiations.

Thus, if DOE's new source of tritium is the APT, then quantities of tritium recovered in the TEF, unlike the tritium recovered in older DOE tritium facilities from inventories produced in the now shutdown production reactors, are no longer subject to NRC regulation if sold for commercial purposes by DOE. In this case APT-produced tritium falls into the category of accelerator-produced radioactive material (ARM) that NRC claims to have no authority to license and regulate based upon the findings last reported by the NRC in the Policy Issue documented in SECY-92-325, James M. Taylor, Executive Director for Operations, to the Commissioners, "Characterization of discrete NARM and evaluation of the need to seek legislation extending NRC authority to discrete NARM," September 22, 1992 (NRC Public Document Room Accession No. 9204290244A). This policy issue document was issued by the NRC staff at the request of the Commission because a report on the subject requested by Commission Chairman Lando Zech from the Committee on Interagency Radiation Research and Policy Coordination (CIRRPC) was never issued. CIRRPC ceased to exist in 1992, and its replacement, the Interagency Steering Committee on Radiation Standards (ISCORS), which was formed about two years ago, is reportedly not considering ARM regulation on an active basis. Per SECY-92-325, NRC regulation of ARM is not authorized by the *Atomic Energy Act of 1954*, as amended, and therefore ARM falls under the regulatory authority of the States granted under the *U.S. Constitution* and under the regulatory authority of the Environmental Protection Agency (EPA) under the *Toxic Substances Control Act* (TSCA).

It should be noted that SECY-92-325 and several preceding NRC documents cited therein on the subject of regulating both ARM and naturally-occurring radioactive material (NORM) are a little less than clear on the statutory provisions with regard to the licensing and regulation of ARM. Although not directly addressed in SECY-92-325, there is an apparent legal basis for regulating ARM that can be found within the *Atomic Energy Act of 1954*, as amended, but there is no readily clear basis for issuing a license for the ownership, possession, use, production, transfer, or disposal of ARM. NRC would need licensing authority in order to exercise its authorities for requiring financial protection under 42 USC 2210 and for issuing civil penalties under 42 USC 2282. The bases for regulating ARM under the *Atomic Energy Act of 1954*, as amended, stem from 42 USC 2011, 2013(c), 2014(c), and 2201(p) where these statutory provisions provide that (1) NRC can issue any regulation needed to carry out the purposes of the Act, (2) the purposes of the Act are stated to be "to effectuate the policies set forth above [in 42 USC 2011] by providing for...a program for Government control of the possession, use, and production of atomic energy," and (3)

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atomic energy is defined to mean "all forms of energy released in the course of nuclear fission or nuclear transformation." Since ARM is created by machine-induced nuclear transformations and since ARM releases other energetic radiations by the process of nuclear transformation involved in radioactive decay, it is technically self-evident that the authority to regulate ARM exists within the *Atomic Energy Act of 1954*, as amended. However, as indicated above, there is no statutory authority given to license any activity associated with the production or use of ARM, as long as the ARM is not also SNM. Since NRC was granted only the "licensing and related regulatory functions of the Atomic Energy Commission" in the *Energy Reorganization Act of 1974* as codified at 42 USC 5841(f) and since NRC is also limited by the "consistent with existing law" provisions of 42 USC 2021b(9)(B) and 10101(12)(B) and (16)(B) with regard to classification authority for nuclear wastes, NRC does not regulate ARM as a radioactive product in use or as a radioactive material being disposed because NRC has no authority under current law to license the production, possession, and use of ARM.

In addition, if a domestic third party were to purchase from DOE tritium that had been produced in the APT and recovered for use in the TEF, since under current law that tritium is not byproduct material, there are no NRC nor Department of Commerce export licensing regulations to preclude its sale to a foreign government seeking tritium for use in a nuclear weapons program. As indicated at 15 CFR Part 774, for Commerce Commodity Control List Item 1B231, "Tritium facilities, plants and equipment," under related controls: "This entry does not control tritium, tritium compounds, and mixtures containing tritium, or products or devices thereof. See 10 CFR Part 110 for tritium subject to the export licensing authority of the Nuclear Regulatory Commission." Thus, the Department of Commerce regulations defer to the NRC regulations to control the export of tritium, but NRC controls tritium only if it is classified as byproduct material as defined in the law. It is noted however that the *Nonproliferation Treaty Act of 1978* modified 42 USC 2139 to add the following words:

> "After consulting with the Secretaries of State, Energy, and Commerce and the Director, the Commission is authorized and directed to determine which component parts as defined in section 2014(v)(2) or 2014(cc)(2) of this title and *which other* items or *substances are especially relevant from the standpoint of export control because of their significance for nuclear explosive purposes.* Except as provided in section 2155(b)(2) of this title, no such component, *substance*, or item which is so determined by the Commission shall be exported unless the Commission issues a general or specific license for its export after finding, based on a reasonable judgment of the assurances provided and other information available to the Federal Government, including the Commission, that the following criteria or their equivalent are met:...(2) no such component, *substance*, or item will be used for any nuclear explosive device or for research on or development of any nuclear explosive device..."

Although this addition to the law appears to imply that NRC has the requisite authority to regulate the export of commercially-sold APT-produced tritium, which could be used in a nuclear explosive device, the current NRC export regulations at 10 CFR Part 110 continue to limit its licensing and regulatory authority only to materials and substances that are defined to be subject to licensing in the *Atomic Energy Act of 1954*, as amended, and to those reactor materials covered in the export control guidelines issued by the Nuclear Suppliers Group (NSG). The NSG export control guidelines that are published by the International Atomic Energy Agency address heavy-water, deuterium and reactor-grade graphite but do not address tritium. Since tritium is also not listed as a dual use item by NSG guidelines, the Department of Commerce has no basis for its regulation as such on the Commodity Control List.

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The only regulatory safety net in this unfortunate situation is the exception cited in 10 CFR 110.1(b)(2) for "persons who export...U.S. Munitions List nuclear items." Under Department of State regulations issued under the *Arms Export Control Act*, as authorized under the *International Security and Development Cooperation Act of 1980*, 22 CFR 121.1, Article XVI(a) should be sufficiently broad enough to cover APT-produced, TEF-extracted tritium although 22 CFR 123.20(a) implies that the controls do not apply to items that should be regulated by either DOE or NRC. If this is the only regulatory safety net, then DOE is obligated to tighten the mesh of the net somewhat compared to what it appears to be now.

Therefore, for purposes of DOE domestic commercial sales of any tritium produced in the APT and recovered in the TEF, DOE should not permit such sales unless and until a clear and adequate regulatory regime is in place to control the material being sold with regard to both radiation safety and export prevention. DOE has several options that may be considered to mitigate this problem; these options include:

- Declaring in the *Federal Register* as DOE official policy that no tritium produced in APT and recovered in the TEF will be sold commercially.
- Obtaining an Executive Branch determination under 42 USC 2071 that tritium is SNM subject to NRC regulation.
- Obtaining, with NRC concurrence and assistance, Congressional action to amend the *Atomic Energy Act of 1954*, as amended, either to declare ARM to be byproduct material subject to NRC regulation or to declare that the production, possession and use of ARM is subject to licensing by the NRC.
- Securing EPA regulation of ARM under TSCA as considered in SECY-92-325 and either securing NRC regulation of tritium as a substance usable in a nuclear weapon under 42 USC 2139(b), securing Department of Commerce regulation of tritium as a dual use item (the latter may require action by the NSG), or issuing an official public policy statement that all tritium produced in APT and recovered in the TEF is covered solely for export control purposes by Department of State regulations under 22 CFR 121.1, Article XVI(a).

If DOE were to consider the alternative of mixing APT-produced tritium with existing inventories of previously-produced reactor-generated tritium as a means to effect the mixture's legal status as byproduct material, DOE needs to consider how records would have to be generated and maintained to prove its or the NRC's case in court for alleged violations of the *Atomic Energy Act of 1954*, as amended, in handling materials sold commercially. This alternative is judged to be an unnecessary risk and cost simply to avoid dealing with a legitimate problem in an open and professional manner that warrants public trust.

<u>Recommendation</u>: With regard to the potential of DOE domestic commercial sales of any tritium produced in the APT and recovered in the TEF, DOE should indicate in the final TEF EIS that DOE will not permit commercial sales of APT-produced, TEF-recovered tritium unless and until an adequate regulatory regime is in place to control the material being sold with regard to both radiation safety and export prevention. DOE should describe in detail the possible options, the adequacy of those options, and its specific plans to prevent such sales or to put in place the necessary regulatory controls. Failure to indicate in the TEF EIS how DOE intends to resolve this problem is unacceptable. The public needs to be assured that DOE is planning to act in a responsible manner to mitigate a serious legal question that could adversely effect both public health on a small scale and national defense on a much more serious scale. *L1-03*

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4. Inapplicability of 10 CFR Part 962 to the regulation of TEF radioactive wastes when contaminated with tritium produced in APT:

For the same reasons as described above for NRC's claimed inability to regulate tritium sold commercially if produced in the APT, DOE's regulations for byproduct materials at 10 CFR Part 962, which are "for use only in determining the Department of Energy's obligations under the Resource Conservation and Recovery Act (42 U.S.C. 6901 et seq.) with regard to radioactive waste substances owned or produced by the Department of Energy pursuant to the exercise of its responsibilities under the Atomic Energy Act of 1954," are invalid for APT radioactive wastes and for TEF radioactive wastes when processing APT-produced tritium.

This inapplicability could be interpreted to imply that all APT and associated TEF radioactive wastes fall under the full regulatory authority of the States and the EPA and are therefore fully subject to any DOE-state compliance agreements with regard to compliance with the *Resource Conservation and Recovery Act* (RCRA) and the *Federal Facilities Compliance Act* (FFCA). Given this interpretation, it appears that for such radioactive wastes DOE would not legally be able separate out the tritium content from other hazardous constituents as its sole regulatory responsibility for treatment and disposal.

As discussed previously, DOE would still be able to regulate occupational radiation exposures during handling of such wastes consistent with the DOE's General Counsel's interpretation of 42 USC 2201(i)(3) as given at Sect. B.1, *Federal Register, 61*, pp. 4209-4910, February 5, 1996, where it is stated that "the requirements in [10 *CFR*] Parts 830 and 835 cover all activities under DOE's auspices with the potential to cause radiological harm."

However, for military applications of atomic energy, 42 USC 2121(a)(3) authorizes DOE to "provide for safe storage, processing, transportation, and disposal of hazardous waste (including radioactive waste) resulting from nuclear materials production, weapons production and surveillance programs." Further, 42 USC 2011, 2013(c), 2014(c), and 2201(p), which were previously argued to provide a basis for NRC to regulate ARM, provide DOE with broad authority not currently reflected in 10 CFR Part 962.

Unless DOE has no objections to the regulation of the treatment and disposal of TEF and APT radioactive wastes by the State of South Carolina under RCRA and FFCA and by the EPA under RCRA/TSCA, the most direct means to avoid any future dispute over regulatory authorities in this situation, if viewed as a potential problem by DOE, would be either to obtain an Executive Branch determination under 42 USC 2071 that tritium is SNM subject to DOE and NRC regulation or to promulgate DOE rulemaking to amend 10 CFR Part 962 to extend DOE's regulatory authority over ARM including tritium produced in the APT and subsequently recovered in the TEF. The latter option would also clarify the issue of DOE regulation of ARM for the public in the upcoming EIS for the Spallation Neutron Source at Oak Ridge and provide a basis to preempt any intervenors from interceding through the states and EPA in the regulation of ARM wastes at DOE's other major accelerator facilities such as Argonne, Brookhaven, Fermi, and Los Alamos.

<u>Recommendation</u>: For the case in which TEF processes APT-produced tritium, DOE should explain in the Final EIS for TEF exactly how it intends to deal with TEF radioactive wastes in light of the current inapplicability of 10 CFR Part 962 in clearly defining the line between DOE authority L1-04

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and EPA/state authority under RCRA/FFCA. DOE should promulgate rulemaking to amend 10 CFR Part 962 or to add other rules to clarify its authority over ARM. This intent should be made clear in the Final EIS discussions of RCRA, FFCA and TSCA as currently given in Chapter 7 of the draft EIS. L1-04

Respectfully submitted,

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Nuclear Engineer

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June 3, 1998

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Aiken, SC 29808

Dear Mr. Grainger:

Ref: My letter to you with comments and recommendations on the draft EIS for the Tritium Extraction Facility (TEF) at SRS, June 2, 1998, specifically Comment 3, "NRC licensing of commercial sales of tritium recovered in TEF or DOE prohibiting all commercial sales for tritium produced in the APT.".

I sincerely apologize but I made an incorrect statement in Comment 3 of the reference letter dated June 2, 1998. A colleague of mine with whom I shared a copy of the letter has quickly pointed out that I had spoken in error when I made the statements that "Since tritium is also not listed as a dual use item by NSG guidelines, the Department of Commerce has no basis for its regulation as such on the Commodity Control List," and "securing Department of Commerce regulation of tritium as a dual use item (the latter may require action by the NSG)." In fact as you can verify yourself on the Internet at http://www.iaea.or.at/worldatom/infcircs/inf254r2p2m1.html, the NSG dual use guidelines at INFCIRC/254/Rev.2/Part 2/Mod.1, 19 March 1996, Sect. 8.3 state the following as being on the dual use list:

> "Tritium, tritium compounds, or mixtures containing tritium in which the ratio of tritium to hydrogen by atoms exceeds 1 part in 1000 and products or devices containing any of the foregoing; except: A product or device containing not more than 1.48×10^3 GBq (40 Ci) of tritium in any form."

However, the recommendation for Comment 3 does not change since as can be inferred and understood by examining the NRC regulations at 10 CFR 110.1(a), 110.2 in the definition for "byproduct material," 110.9, 110.23(a)(1), and Appendix L to Part 110, the applicability of NRC regulations for the export of tritium is clearly conditioned upon the assumption that the regulated tritium is byproduct material, which "means radioactive material (except special nuclear material) produced by exposure to the radiation incident to the process of producing or using special nuclear material." Thus the assertion in Comment 3 that APT-produced tritium that is recovered in the TEF is currently not explicitly covered in the export regulations of the NRC remains valid. However, the assertion that the Department of Commerce, which currently defers regulation of tritium exports to the NRC, would not have a basis for regulating the export of APT-produced, TEF-recovered tritium as a dual use item is not correct. DOE must still work with the other cognizant and responsible government regulatory agencies to assure that a consistent and clear set of regulations is in place to regulate the export of any commercial sales of APT-produced tritium.

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Letter L2 (page 1 of 2)

Respectfully and apologetically submitted,

David L. Moses, Ph.D., P.E.
Nuclear Engineer

2

Letter L2 (page 2 of 2)

Response to Comment L1-01 (Dr. David Moses)

The Defense Nuclear Facilities Safety Board (DNFSB) has the authority, under legislation establishing the DNFSB and its mission, to provide independent safety oversight to DOE in regard to the operation of defense nuclear facilities. The DNFSB from time to time provides recommendations to the Department. As the commenter points out, ambiguities may exist in the Board's authority to provide oversight to TEF and other DOE tritium programs because tritium is not a special nuclear material as defined by the Atomic Energy Act of 1954. As the commenter also points out, DOE cooperates fully with the Board on matters concerning existing and proposed DOE tritium facilities.

As indicated in the draft EIS, because of its radiological characteristics DOE has chosen to apply to tritium operations a number of regulations and standards which also apply to special nuclear material operations. DOE believes this is a conservative approach to safety management for tritium facilities. The regulations (including 10 CFR Parts 830 and 835) and DOE Orders are discussed and listed in Section 7.4 of the Draft EIS. DOE has evaluated the NRC Isotope Facility requirements; those facility NRC requirements that are more conservative and not covered in DOE Orders will be included in the final design of the TEF. DOE has a rigorous regulatory system in place for tritium facilities. Because of this, it is not likely that changes in the definition of DOE nuclear facilities or the designation of tritium as a special nuclear material would change the safety posture of these facilities or of the TEF. Therefore, DOE has not modified the Draft EIS in this regard.

Response to Comment L1-02 (Dr. David Moses)

The Defense Nuclear Facilities Safety Board (DNFSB) is an independent agency that freely conducts oversight activities of DOE facilities. DOE's Tritium Program has cooperated fully with Board and Board staff requests for information on the TEF. Board and Board staff have been provided briefings on TEF issues, at their request. As the commenter suggests, DOE submitted a copy of the TEF Draft EIS to the Board for review and comment. No comments were received from the DNFSB or DNFSB staff. DOE prepared the TEF EIS early in the facility decision process as mandated by NEPA; implicit in this objective of obtaining early public input is the fact that detailed design information is not available to support the EIS. Assuming that the Department decides to proceed with development of the TEF, detailed design and safety reviews (including independent review and oversight by DNFSB) will be conducted according to DOE policy and established safety practices at appropriate stages of design.

Response to Comment L1-03 (Dr. David Moses)

The purpose of the proposed action and alternatives evaluated in the TEF EIS is to provide the capability to extract tritium from tritium producing burnable absorber rods irradiated in a commercial nuclear reactor, or targets of similar design, for the sole purpose of supplying tritium to the Department of Defense to support the nuclear weapons stockpile of the United States. Commercial sale of tritium extracted in the TEF, regardless of the source (CLWR or APT), is not contemplated at this time. However, it should be noted that tritium produced in a CLWR does fall within the scope of existing regulations. The commenter points out that it is unclear where regulatory authority rests in regard to accelerator-produced tritium. DOE does not consider "targets of similar design" the preferred target alternative for the proposed accelerator. The preferred alternative, as described in the APT EIS, is to produce tritium in a helium target and extract the tritium at the accelerator facility; the TEF would not be required if the accelerator was chosen as the primary source of tritium and the helium target technology was implemented. Thus it is unlikely for a number of reasons that commercial sale of accelerator-produced tritium from the TEF will become an issue.

Response to Comment L1-04 (Dr. David Moses)

Waste generated from TEF construction and operation would be managed as described in Section 4.1.1.5 of the Draft EIS. As much waste as possible would be treated and disposed at SRS facilities. As described in Chapter 7 of the Draft EIS, these facilities are under the regulatory purview of the U.S. Environmental Protection Agency and the South Carolina Department of Health and Environmental Control. During TEF operation, facility wastes and wastes from CLWR or APT sources, would, therefore, fall under the same regulations as other SRS wastes and waste management facilities. This is the case today for wastes generated at SRS tritium facilities. DOE does not see the need to propose changes to any regulations because it is clear that TEF waste will be regulated in the same manner as current tritium waste at the SRS.

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June 22, 1998

Andrew R. Grainger, SR
NEPA Compliance Officer
Savannah River Site
Building 742-A, Room 183
Aiken, S.C. 29802

Dear Mr. Grainger:

We have completed our review of the Draft Environmental Impact Statement (DEIS) for the Construction and Operation of a Tritium Extraction Facility at the Savannah River Site. We are responding on behalf of the U.S. Public Health Service, Department of Health and Human Services. Technical assistance for this review was provided by the Radiation Studies Branch, Division of Environmental Hazards and Health Effects, National Center for Environmental Health, Centers for Disease Control and Prevention.

The comments offered by the Radiation Studies Branch (RSB)are enclosed for your consideration as you prepare the Final EIS. Their review focused on health issues associated with the proposed project. The potential public health impacts appear to have been addressed in the DEIS, however, the comments provided offer some general and specific comments that may add clarity to the Final document. If you have any questions regarding these comments, you may contact Dr. Patricia L. Lee of the RSB at (770) 488-7627, or me at (770) 488-7074.

Thank you for the opportunity to review and comment on this draft document. Please ensure that we are included on you mailing list to receive a copy of the Final EIS, and future EISs which may indicate potential public health impact and are developed under the National Environmental Policy Act (NEPA).

Sincerely,

Letter L3 (page 1 of 4)

TEF_EIS.WPD Page 2

Kenneth W. Holt, MSEH
Special Programs Group (F16)
National Center for Environmental
Health

Enclosure

Letter L3 (page 2 of 4)

June 22, 1998

Patricia L. Lee, Ph.D., Staff Fellow, National Center for Environmental Health, Division of Environmental Hazards and Health Effects, Radiation Studies Branch (F35)

Review of 'Construction & Operation of a Tritium Extraction Facility at the Savannah River Site'

Ken Holt, Environmental Health Scientist, Special Programs Office, National Center for Environmental Health

This review focuses on the public health consequences associated with the construction & operation of a Tritium Extraction Facility (TEF) at the Savannah River Site (SRS). The public health consequences have been addressed for all the proposed alternatives. Some general and more specific comments are provided below that may add some clarity.

General Comments:

- This EIS very clearly states the need for tritium production. However, little emphasis is put on the reasons for not using the existing technology. It would be helpful if this was a part of the "Purpose and Need for Action" so that the public and other interested parties are clear up front as to why DOE is not using one of the five reactors already there. L3-01 On Page S-3 there is a section on refurbishing the existing technology for the tritium extraction. This section is very clear on why the current technology for extraction of tritium won't work. This should be mentioned up front along with a similar statement of the inadequacy of the current reactors. L3-02

- DOE has assessed the dose and risk but there are a couple of things that may make the results more clear:

  1. The methods used to estimate doses are not clear. There is a section on page 4-8 where the programs used to estimate doses are named, however, a more detailed description of what these programs do, the pertinent parameters and/or a reference to where to obtain this information would increase the readers understanding of dose estimation. L3-03

  2. When referring to risk and dose, it would be clearer for the public if they were reported on a relative basis. It is L3-04

Letter L3 (page 3 of 4)

TEF_EIS.WPD Page 4

clear that the numbers are small and risk is low, however, the percent increase in risk could be a more meaningful value. L3-04

- DOE refers to "determining" emissions, dose, etc.(e.g., page 4-8). Aren't these actually estimates of expected releases? L3-05
- Acronyms are used in the text that are not defined in the text (e.g., MEI (page 4-9), CSWTF (page 4-11)) L3-06

Specific Comments

- On Page S-7, in the second paragraph, a 'design-basis' and 'beyond-design-basis' seismic event is mentioned. These terms are used throughout (including Table S-2) but are not defined. Also used on page 4-11 is "pre-conceptual and conceptual design" and not defined. L3-07
- On page 4-11, the second paragraph is a repeat of the prior paragraph. ("DOE incorporated waste...") L3-08
- In table 4-7 and in the text low level radioactive waste (LLWR) and low-activity waste (LAW) is used. It is not clear what the difference is. LAW is not defined in Table 4-8 like the others. L3-09
- On page 4-9 there is discussion in the first paragraph regarding validated census data. Is there a reference for this information? L3-10
- Also on page 4-9 is a statement that tritium is 98% of the dose at the SRS but there is no reference or calculation to represent the source of this number. Is there a reference? L3-11

Thank you for the opportunity to review this document. I hope that these comments and suggestions will be helpful to the preparers.

Patricia L. Lee, Ph.D.

Letter L3 (page 4 of 4)

Response to Comment L3-01 (U.S. Department of Health and Human Services)

DOE conducted an exhaustive review of technologies for supplying tritium, including using the five reactors on SRS, and documented it in the *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling.* The study revealed that only one of the reactors at SRS (K Reactor) was capable of returning to operation. DOE determined that operation of a first-generation reactor designed in the 1940s is not a reasonable alternative for a new, long-term, assured tritium supply. The purpose and need for this EIS is for the capability to extract tritium after tritium has been produced. DOE is evaluating new sources for tritium production in the Accelerator for Production of Tritium and Commercial Light Water Reactor(s) EISs.

Response to Comment L3-02 (U.S. Department of Health and Human Services)

Unlike using the production reactors discussed above, refurbishing the existing tritium extraction facility is an alternative means to respond to the purpose and need for the actions evaluated in this EIS. Although this alternative was determined to be unreasonable, DOE believes that it is correct to present it in the Proposed Action and Alternatives section of the Summary rather than earlier in the Summary, where background on the Programmatic EIS and its Record of Decision are presented.

Response to Comment L3-03 (U.S. Department of Health and Human Services)

DOE believes it has provided for the majority of readers the appropriate compromise between brevity and readability versus a more detailed discussion of the dose calculation algorithms.

However, for the commenter and other interested readers, DOE offers the following explanation from technical data input prepared for this EIS. Reference to the technical data input and references cited in the following paragraph are in the Reference list on page 2-29 in Section 2 of this Final EIS. The following paragraph is quoted from Simpkins (1998).

"Site-specific codes MAXIGASP and POPGASP are typically used to determine the dose to the maximally exposed individual and the 50-mile population dose, respectively, resulting from routine atmospheric releases. MAXIGASP and POPGASP both access XOQDOQ (Sagendorf et al., 1982), which is based on U.S. Nuclear Regulatory Commission Regulatory Guide 1.111. The XOQDOQ model calculates the relative concentration and relative deposition at specific downwind locations for both individual and population doses. Both codes utilize the GASPAR module, which is documented by the U.S. Nuclear Regulatory Commission (Eckerman et al. 1980). The GASPAR module calculates the atmospheric concentrations, deposition rates, concentration in foodstuffs, and radiation dose to individuals and populations resulting from chronic releases of radionuclides to the atmosphere. The basis for GASPAR (Hamby 1992) is U.S. Nuclear Regulatory Commission Regulatory Guide 1.109. Both GASPAR and XOQDOQ (Bauer 1991) have been verified for use."

Response to Comment L3-04 (U.S. Department of Health and Human Services)

DOE has revised Table 4-6 on page 4-9 of the Draft EIS in response to the suggestion. The revision is on page 2-15 of this Final EIS. The individual doses listed in this table range from 0.004 percent to 0.10 percent of the average 357 millirem per year exposure to individuals in the vicinity of SRS (Arnett and Mamatey 1997). The total dose to the population within a 50-mile radius (620,100 people; Arnett and Mamatey 1997) is 0.0003 percent of the average annual exposure.

Response to Comment L3-05 (U.S. Department of Health and Human Services)

The commenter is correct. The sentence on page 4-8 of the Draft EIS (page 2-14 of this Final EIS) is revised to read "After estimating routine emission rates, DOE used the computer codes MAXIGASP and POPGASP to predict potential radiological doses to the maximally exposed individual, the hypothetical uninvolved worker, and the population surrounding SRS."

Response to Comment L3-06 (U.S. Department of Health and Human Services)

DOE tries to reserve its use of acronyms for long strings of words that appear often in the text. For those words, the acronym is defined after its first use in each chapter. The words "maximally exposed individual" (MEI) and the Central Sanitary Waste Treatment Facility (CSWTF) are identified in the Draft and Final EIS list of *Acronyms and Abbreviations* in the front matter of the document.

Response to Comment L3-07 (U.S. Department of Health and Human Services)

As indicated on page GL-4 of the Draft EIS, a design-basis accident for nuclear facilities is a postulated abnormal event used to establish the performance requirements of structures, systems, and components to (1) maintain them in a safe shutdown condition indefinitely or (2) prevent or mitigate the consequences of an accident to the general public and operating staff (i.e., prevent exposure to radiation in excess of appropriate guideline values). Normally, a design-basis accident is the accident that causes the most severe consequences when engineered safety features function as intended. Typically, these events have an occurrence probability of greater than 10^{-6} per year.

A beyond-design-basis accident is more severe than the design-basis accident. It generally involves multiple failures of engineered safety systems and has an occurrence probability of less than 10^{-6} per year.

These definitions have been added to the *Glossary*, which is included in the back matter of this Final EIS.

Conceptual design is also defined in the Glossary (page GL-2 of both the Draft and Final EIS). Conceptual design involves the development of a facility that will meet project goals while ensuring cost effectiveness and attainable performance; development of project criteria and design parameters for all engineering disciplines; and identification of applicable requirements such as environmental studies, construction materials, space requirements, health and safety safeguards, and security requirements.

Pre-conceptual design has been added to the *Glossary*, page GL-10 of this Final EIS. The definition is as follows: Pre-conceptual design involves the development of the preliminary information necessary to define a project. This preliminary information consists of (1) Statement of Mission Need (why the project is needed), (2) preliminary functional and technical requirements (how the project will satisfy the need), and (3) the development of the preliminary budgetary information (very rough estimate of the total cost of the project). This preliminary information is then used to obtain DOE Program office approval to proceed into the further developmental stages of the project.

Response to Comment L3-08 (U.S. Department of Health and Human Services)

The duplicated paragraph on page 4-11 of the Draft EIS is eliminated as shown on page 2-15 of this Final EIS.

Response to Comment L3-09 (U.S. Department of Health and Human Services)

DOE disposes of its post-treatment low-level radioactive waste (LLRW) in vaults in E-Area on SRS that are designed for appropriate disposal of low-activity waste (LAW) or intermediate-activity waste. The fraction of LLRW that radiates less than 200 millirem per hour (at 5 centimeters) is classified as LAW and disposed in LAW vaults. The remainder radiates more than 200 millirem per hour (at 5 centimeters) and is classified as intermediate-activity waste and disposed in intermediate-level vaults. DOE has identified these two subsets of LLRW in Table 4-7 on page 4-10 of the Draft EIS. Table 4-7, as revised, also directs the reader to Table 4-9, which provides generating activities and examples of the basic waste types (e.g., LLRW). These revisions are on pages 2-16 and 2-18 of this Final EIS.

Response to Comment L3-10 (U.S. Department of Health and Human Services)

The population within 50 miles of the center of SRS referred to on page 4-9 of the Draft EIS is calculated from a database that identifies population densities in cells on a fine grid for an area covering most of South Carolina and eastern Georgia. There are over 800,000 total cells in the database. It uses data from the 1990 U.S. Census. The database and the calculation of the 50-mile radius population were developed and validated by the Oak Ridge National Laboratory (ORNL 1991). It is updated periodically when new validated population data are published. This reference has been added to the text on page 2-14 of this Final EIS. The reference is included in the reference list on page 2-31 of Section 2 of this Final EIS.

Response to Comment L3-11 (U.S. Department of Health and Human Services)

DOE has revised the Draft EIS (page 4-9) to provide the source for the percentage of dose that is due to tritium (Simpkins 1997b). The revision appears on page 2-14 in this Final EIS.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
100 ALABAMA STREET, S.W.
ATLANTA, GEORGIA 30303-3104

June 25, 1998

4EAD/rkm

Mr. Andrew R. Grainger
NEPA Compliance Officer
Savannah River Site
Building 742-A, Room 183
Aiken, South Carolina 29802

SUBJECT: Draft Environmental Impact Statement (DOE/EIS-0271D) for the *Construction and Operation of a Tritium Extraction Facility(TEF) at the Savannah River Site*

Dear Mr. Grainger:

We have reviewed the subject Draft Environmental Impact Statement (DEIS) in accordance with Section 102(2)(C) of the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. The proposed action is to design, construct, test and operate a new Tritium Extraction Facility (TEF) at Savannah River Site (SRS). The preferred alternative is to locate the TEF near the center of SRS at H Area. The purpose of the action is to provide the capability to extract tritium-containing gases. Overall, the DEIS is well written and illustrated. Our comments are listed below.

EPA has environmental concerns about the project; in particular, the final EIS should provide more information about emergency response plans for potential spills and accidents. L4-01

In addition, Section 4.1.2.5 of the DEIS, Occupational Health, states that DOE expects a minimal increase in occupational injuries and potential for traffic fatalities during construction of the TEF. The final EIS should give more information about measures to be taken to mitigate these potential risks. L4-02

Thank you for the opportunity to review this DEIS. Based on our review, we rate the DEIS "EC-2", that is, we have environmental concerns about the project, and more information is needed to fully assess the impacts. If you have questions, please contact Ramona McConney of my staff at 404/562-9615.

Sincerely,

Heinz J. Mueller, Chief
Office of Environmental Assessment

Letter L4 (page 1 of 1)

Response to Comment L4-01 (U. S. Environmental Protection Agency)

Response: Emergency response-related factors were considered first during the formal site selection process conducted for TEF. As part of the SRS emergency preparedness process and prior to becoming operational, the TEF would be incorporated into the Site and H Area Emergency Plans. These plans would consider the potential impacts of TEF accidents on personnel in nearby facilities, and the potential impacts of existing operations on personnel assigned to the TEF. DOE prepares and implements Site- and facility-specific plans for responses to potential emergencies such as chemical spills and accidents. The Emergency Operations Center and a spill response team ensure appropriate response. Emergency response personnel are trained extensively and each position has a primary and two alternates on call. The response plans include specific responses to specific incidents for specific facilities (e.g., a TEF), processes, or events. DOE has either used plans in actual emergencies or exercised them in simulated operating conditions. DOE has integrated these SRS plans with state and local offsite plans to enable coordination of a total response to SRS incidents.

Response to Comment L4-02 (U. S. Environmental Protection Agency)

Positive measures are taken to minimize an increase in occupational injuries during any construction activities at the Savannah River Site. These include the adherence to agreements, safety plans, and safety procedures by all contractors, subcontractors, and Site forces. All contractors must sign a Site Project Agreement that requires a properly trained workforce. Proper training of the workforce is guaranteed through hiring of only recognized labor trades. Subcontractors must also submit a health and safety plan that meets Occupational Safety & Health Administration (OSHA) requirements and is approved by the Savannah River Site Safety Department. In addition to meeting OSHA requirements, Site workforces must adhere to Site safety procedures documented in Site Safety Manuals.

The potential risk for increase of traffic fatalities during construction is minimized through traffic law enforcement by the Site security force, Wackenhut Security Inc. (WSI). WSI Site security forces are Marshals for the State of South Carolina with full jurisdiction to enforce traffic laws at the Savannah River Site.

In accordance with NEPA, mitigation measures are identified that should reduce significant impacts in construction and operation. Although an increase in actual numbers of accidents or fatalities could occur as a result of additional construction activities and the additional workers required, DOE does not expect the accident or fatality rate to increase. Therefore, DOE has not modified the Draft EIS.

Verbal Comments

Transcripts of the messages left on the DOE message line are presented next, followed by DOE responses.

Mr. Marvin Lewis (Comment V1-01)

This is a comment line; it is supposed to be open through June 23, 1998 according to the letter from Andrew R. Grainger to stakeholders April 30, 1998. If this is supposed to be a comment line, it is supposed to be open as a comment line.

I want to make some comments, actually additions to my previous comments. First and again and again I have to reiterate, there is plenty of commercial tritium available we can buy it on the open market if we really need it.

We don't really need it; we have got plenty of tritium from present weapons to recycle if we really need it.

I would like to point out what the media, several of the media, are saying about the India nuclear bomb tests or nuclear device tests or whatever you want to call it. Namely that there was no benefit to India from it. There was only negative to India from it and apparently the only real reason for India to go ahead with their nuclear testing was to buoy up the nuclear industry, nuclear bomb industry in the U.S. Namely with the Third World nations setting off bombs, everybody is going to run to the nuclear bomb makers to make more bombs.

I lost count already of how many things I have pointed out here, but I have to point out another thing. We sure don't need Project Stage Coach and the other sub-critical tests to find out anything. A lot of it can't be found out by computer simulation and a lot of it shouldn't be found out and needn't be found out, there is just no reason for it.

Finally, please don't sell nuclear bomb making stuff to Iran even if it is routed through Russia. Now this is the old gag: we did not sell, Russia sold it. Yeah, sure! Since when? We sell it, we know it. By the way I am pro-military but this hog wash that is coming down from DOE and DOD and whatever the Eisenhower's so well put in military industry complex is just bull. I am getting tired of it. I would like it stopped. Thank you.

Response to Comment V1-01 (Mr. Marvin Lewis)

The Purpose and Need Section in the Summary (page S-2) has been expanded to clarify why the U.S. needs tritium. Technologies to meet tritium production needs are not within the scope of this EIS. The 1995 *Final Programmatic Environmental Impact Statement Tritium Supply and Recycling* (PEIS) addressed the full range of reasonable alternatives for tritium production. Currently, no extractable tritium is being produced at commercial nuclear reactor sites, but the performance of tritium-producing burnable absorber rods is currently being demonstrated at a Tennessee Valley Authority reactor. As stated in the 1995 Tritium Supply PEIS, DOE considered the purchase of tritium from foreign nations. While there is no national policy against purchase from foreign sources, DOE determined that the uncertainties of purchasing tritium from a foreign country render such an action unreasonable for an assured long-term supply.

This TEF DEIS stated on page S-2 and in Section 1.3 that the need for tritium is based upon the Nuclear Weapons Stockpile Plan approved by the President, which calls for a new tritium source by 2005 if the CLWR option is selected. The amount of tritium that could be expected to be recovered from retired weapons would not sustain the long-term need under current stockpile requirements. A safe, reliable, domestic supply is required to maintain levels determined by national defense policies.

The purpose of the proposed action and alternatives evaluated in this EIS is to provide tritium extraction capability to support tritium production technology. Sub-critical testing is not within the scope of this EIS. Previous national decisions determined that subcritical experiments are essential to the United States' commitment to a world free of nuclear testing while maintaining a reliable nuclear deterrent. These experiments are an integral part of DOE's stockpile stewardship and management program.

Mr. Curt Graves (Comment V2-01)

I believe in the concept of the tritium facility, but would like to see a separate, independent (maybe non-governmental) group perform inspections on the facility to ensure it is in compliance with all environmental, health, and other regulations.

Response to Comment V2-01 (Mr. Curt Graves)

One or more regulatory bodies, including EPA and the South Carolina Department of Health and Environmental Control oversee all Site activities. Other agencies, including the Defense Nuclear Facilities Safety Board, oversee particular facets of SRS operations. For example, the DOE industrial hygiene program complies with the Occupational Safety and Health Administration's regulatory requirements for tracking the incidence and type of injuries and illnesses and the resulting days lost from work.

These agencies would exercise the same responsibilities for TEF operations.

DOE and the U.S. Nuclear Regulatory Commission (NRC) are currently exploring the possibility of NRC oversight of certain DOE facilities. A pilot program is being conducted during which the NRC is performing mock inspections of three DOE facilities, including the Receiving Basin for Offsite Fuels at SRS. DOE and NRC will further examine the process after this pilot project is completed.

SECTION 2. MODIFICATIONS TO THE DRAFT TEF EIS

This section presents the technical modifications to the Draft TEF EIS in the format described in the Foreword. The changes are made to (1) incorporate responses to comments received during the public comment period; (2) correct or clarify factual information; and (3) reflect TEF, CLWR, and APT design concepts developed since the Draft EIS was issued. The changes are presented in the same order (by chapter) the information was presented in the Draft EIS.

Chapter 1. Modifications – Background and Purpose and Need for Action

As explained in greater detail on page S-2 of this EIS, DOE has modified the sections on Purpose and Need to clarify the decision process and the purpose for the proposed action evaluated in this EIS. Please refer to page S-2 in this Final EIS for the revised description of Purpose and Need for Action. This modification also applies to Section 1.3 on page 1-3 of the Draft EIS.

In Section 1.5, Related Department of Energy Actions on page 1-4, the Draft EIS describes the Record of Decision for the Tritium Supply PEIS and the necessity to prepare related site-specific evaluations under NEPA. The following text is reproduced from the Draft EIS and introduces Figure 1-3 which has been updated.

As mentioned in Section 1.1, the Record of Decision supported by the Tritium Supply PEIS has resulted in a series of actions by DOE which require site-specific evaluations under NEPA. These actions are the purchase or use of a CLWR to make tritium, the construction of a new tritium extraction facility at SRS (this EIS), the upgrade and consolidation of SRS tritium facilities (DOE 1997a), and the APT (DOE 1998a). APT with its preferred feedstock of helium-3 would not require the tritium extraction processes in TEF; however, TEF could be built as a backup to process alternative APT targets or CLWR targets if necessary. Because of the relationships among these proposed actions related to tritium supply and recycling, DOE is closely coordinating the range of the proposed actions and the schedules for preparation of NEPA documents (Figure 1-3).

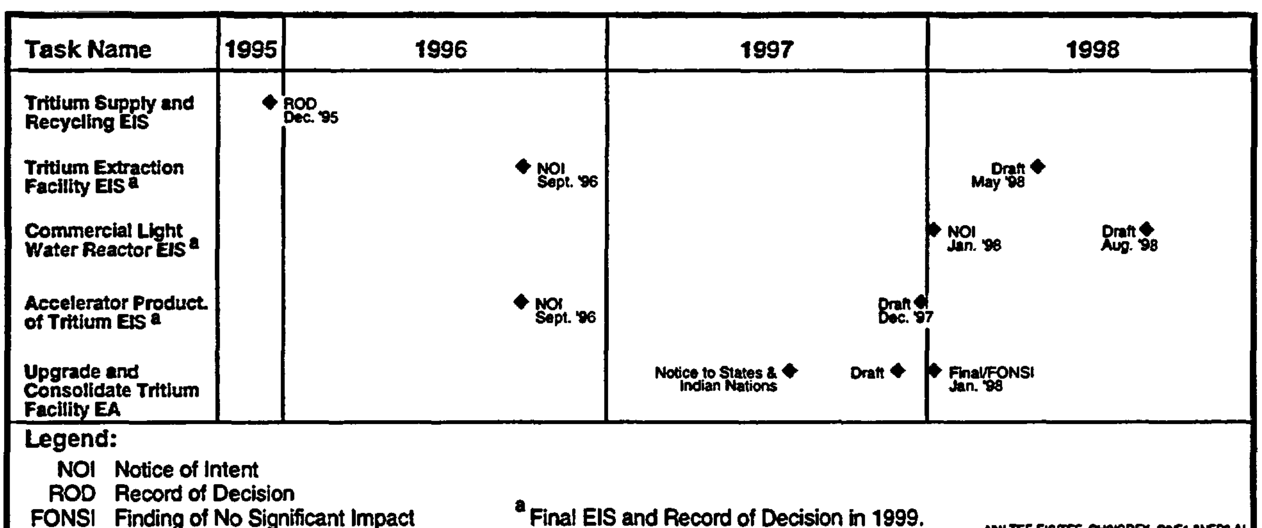

Figure 1-3. NEPA documentation for related DOE actions.

If the Secretary selects the CLWR option, DOE would transport the irradiated targets from the reactors to SRS for tritium extraction. Impacts of transporting irradiated targets from the commercial reactor to TEF will be discussed in the CLWR EIS. **The potential impacts of tritium-related transportation on or near the SRS are being addressed in the CLWR EIS.**

Chapter 2. Modifications – Proposed Action and Alternatives

In Section 2.4, Comparison of Environmental Impacts Among Alternatives Considered, on page 2-8 the Draft EIS presents a comparison of the environmental impacts among the alternatives. In this Final EIS, Table 2-2 on pages 2-3 to 2-8 compares the increment of the impacts of the proposed action and its alternatives to the current conditions at the SRS. Table 2-3 on page 2-11 compares the impacts of incorporating tritium extraction capabilities into APT to those associated with the construction and operation of APT without the tritium extraction capability. Since the Draft TEF EIS was issued, DOE has updated the information for operating APT in accordance with both the stand-alone APT and the APT with extraction capability design variation. The following text and tables are revised based on the updated operational information.

2.4 Comparison of Environmental Impacts Among Alternatives Considered

This section is based on the information in Chapter 3, Affected Environment, analyses in Chapter 4, Environmental Impacts, and **data prepared for the APT Final EIS (England 1998a; Willison 1998).** Its purpose is to present the impacts of the proposed action and the alternatives in comparative form to provide a clear basis for choice for the decisionmaker(s) and the public.

Table 2-2 **on pages 2-3 to 2-8** compares the increment of impacts of the proposed action and the alternative to construct and operate TEF at AGNS to the SRS baseline, which represents current conditions at the SRS as detailed in Chapter 3. Where applicable, impacts from all natural, existing causes or regulatory standards or current impacts from existing causes are provided as a perspective on the severity of baseline conditions and incremental impacts of the alternatives. Table 2-2 also presents the incremental impacts of incorporating TEF in APT (this EIS's no-action alternative).

In general DOE considers the expected impacts from the proposed action or its alternatives on the physical, biological, and human environment to be minor and consistent with what might be expected for an industrial facility. Impacts of the proposed action, the AGNS alternative and the no-action alternative are detailed in Table 2-2 and subsections 2.4.1 and 2.4.2. **In the comparison of impacts, DOE determined that changes from the baseline of less than 5 percent are within the margin of error and the conservatism inherent in the analyses. Therefore, DOE finds that in those instances there would be no measurable change from the baseline and has not evaluated the impacts further.**

Compared to the proposed action, the AGNS alternative **is projected to have a 0.13 millirem higher** radiation dose at the site boundary (due to **its** closer proximity to the boundary) but **nearly equal collective** population doses. The estimated radiation doses were used to predict whether any latent cancer fatalities would be associated with either normal operations or potential accidents. Construction waste at AGNS would be less because putting TEF at AGNS would involve refurbishing existing facilities, rather than the total construction of TEF at H Area. Slightly higher sanitary waste would be generated at AGNS during operations due to a larger workforce.

Many of the incremental impacts of the no-action alternative are less than those of the proposed action, because the combined tritium extraction and accelerator production of tritium processes would **have shared** land, components, and infrastructure that would be duplicated if each were developed as an independent facility. Table 2-2 demonstrates reduced impacts from the no-action alternative to geology, surface water, groundwater, nonradiological air emissions, hazardous waste generation, aesthetics socio-economics, environmental justice, construction worker injuries, anticipated and unlikely accidents, and ecological resources.

Table 2-2. Comparison of the alternatives for construction and operation of TEF.

Resource	Current SRS Baseline	Increment above baseline of proposed H Area site	Increment above baseline of alternative AGNS site	Increment above baseline of no-action alternative[a,b,c]
Schedule and Operating Parameters				
Construction	TEF is not built	5 years	5 years	No change in the period of construction for APT.
Annual electricity		20,600 Mw-hrs (CLWR targets) <19,570 Mw-hrs (targets of similar design)	Same as H Area	Less than 5 percent of baseline defined for no action. See footnote (b).
Annual sanitary wastewater (gallons)		770,000	1,200,000	No change from APT's baseline.
Annual radioactive process wastewater (gallons)		11,000	Same as H Area	11,000 (8 percent increase in APT's baseline).
Impacts to the Physical and Manmade Environment				
Geology	Existing sites are cleared and graded; grassed, paved or graveled; and used for industrial purposes	Minimal construction impacts through application of best management practices and compliance with Federal and state regulations.	Lower construction impacts than H Area because of less construction at AGNS.	No effects greater than 5 percent above APT's baseline. See footnote (b).
Groundwater		Minor dewatering during construction activities near or below the water table. Design would prevent process water migration into the groundwater during operations.	Facilities near the water table are in place and protected (fuel storage pools are doubled-walled stainless steel tanks with leak-detection systems).	No effects greater than 5 percent above APT's baseline.
		With an immediate response by SRS to contain and remediate spills, it is unlikely that a spill would impact groundwater.	Same as H Area	Same as APT's baseline. Immediate response by SRS would minimize the potential to impact groundwater.

Table 2-2. (Continued).

Resource	Current SRS Baseline	Increment above baseline of proposed H Area site	Increment above baseline of alternative AGNS site	Increment above baseline of no-action alternative[a,b,c]
Surface Water	Construction in an industrial area with established stormwater control systems	Minimal construction impacts; construction would not disturb undeveloped areas.	Lower construction impacts than H Area because of less construction at AGNS.	No effects greater than 5 percent above APT's baseline.
	Permitted process wastewater discharges	Effluent treatment would remove radioactive cobalt from process water to safe levels before discharge to Upper Three Runs. Tritium concentration in the effluent would be less than the regulatory limit of 20,000 picoCuries per liter.	Same as H Area	Radioactive process wastewater from extraction facilities would be routed from the APT site, treated, and discharged to Upper Three Runs.
	Permitted sanitary wastewater discharges	Effluent would be treated before release to Fourmile Branch. All discharges would be within permit limits. Minimal impacts expected.	Effluent would be treated before release to Lower Three Runs. All discharges would be within permit limits. Minimal impacts expected.	No effects greater than 5 percent of APT's baseline.
Air Resources				
Nonradiological constituent concentrations at the SRS and AGNS site boundaries	Concentrations vary from approximately 0 to 60 percent of applicable standards and average 25 percent.[d]	Concentrations vary from approximately 0 to 0.19 percent of applicable standards and average 0.02 percent.[e] Ozone concentrations (measured as VOCs) would be 0.19 percent of the regulatory standard of 235 $\mu g/m^3$. All other contaminant levels would be less than 0.02 percent of their respective regulatory standards.	Concentrations vary from approximately 0 to 1.7 percent of applicable standards and average 0.2 percent.[e] Ozone concentrations (measured as VOCs) would be 1.7 percent of the regulatory standard of 235 $\mu g/m^3$. All other contaminant levels would be less than 0.20 percent of their respective regulatory standards.	Diesel generator backup power would be provided by the APT facility. Therefore, no increase in nonradiological air impacts.

Table 2-2. (Continued).

Resource	Current SRS Baseline	Increment above baseline of proposed H Area site	Increment above baseline of alternative AGNS site	Increment above baseline of no-action alternative[a,b,c]
Annual radiological dose to the maximally exposed (offsite) individual (millirem). Dose limit = 10 millirem/yr.	0.05 millirem	0.02 millirem; the emission is 0.2 percent of the dose limit (CLWR targets) 0.014 millirem, 0.14 percent of the dose limit (targets of similar design)	0.15 millirem; the emission is 1.5 percent of the dose limit (CLWR targets) 0.030 millirem; 0.3 percent of the dose limit (targets of similar design)	0.006 millirem (CLWR targets)
Waste				
Total estimated construction debris (metric tons)	N/A	385	115	No effects greater than 5 percent above APT's baseline.
Total operations waste by type (cubic meters)				
High-level	150,750 (30 years)	0 (40 years)	Same as H Area	0 (40 years)
Low-level	343,710 (30 years)	9,320 (40 years; CLWR targets); 8,720 (40 years; targets of similar design)	Same as H Area	12,800 (40 years; CLWR targets)
Hazardous or mixed	90,450 (30 years	132 (40 years)	Same as H Area	80 (40 years; CLWR targets)
Transuranic	18,090 (30 years)	0 (40 years)	Same as H Area	0 (40 years)
Impacts to Human Environment				
Aesthetics[e]	Area is not visible to and noise is not heard by offsite public. Historic and archaeological resources are not present.	Temporary increase in noise during construction phase, but it would not be heard by the offsite public. No adverse aesthetic impacts during TEF operation. Historic and archaeological resources are not present.	Temporary increase in noise during construction phase. No adverse aesthetic impacts during TEF operation. Historic and archaeological resources are not present.	No effects greater than 5 percent above APT's baseline.

Table 2-2. (Continued).

Resource	Current SRS Baseline	Increment above baseline of proposed H Area site	Increment above baseline of alternative AGNS site	Increment above baseline of no-action alternative[a,b,c]
Socioeconomics	SRS employment is assumed to decline to 10,000 employees by 2001[h], and regional growth trends are expected to continue.	Regional temporary increase of 740 jobs during peak year of construction, which is 0.29 percent of projected baseline regional employment of 258,000 jobs. The number of jobs at SRS would decline to 108 for TEF operation. The overall effects would be positive in terms of assisting to stabilize the regional employment base.	Regional temporary increase of 685 jobs during peak year of upgrades and refurbishment, which is 0.27 percent of the projected baseline regional employment of 258,000 jobs. The number of jobs at SRS would decline to 175 for TEF operation. The overall effects would be positive in terms of assisting to stabilize the regional employment base.	Approximately the same construction and operation work force as APT's baseline. No change would occur in socioeconomic impacts.
Environmental Justice	Minorities or low-income communities would not receive disproportionately high and adverse impacts.	Health effects would be minimal. Minority or low-income communities would not be disproportionately affected.	Health effects would be minimal. Because of their proximity to the AGNS site boundary, some minority or low-income communities could be disproportionately affected.	No measurable differences from APT's baseline.
Public Health				
Annual probability of fatal cancer to the maximally exposed (offsite) individual (annual fatal cancer risk from all natural causes is 3.4×10^{-3}).	9.5×10^{-8}	1.0×10^{-8} (CLWR targets) 6.8×10^{-9} (targets of similar design)	7.5×10^{-8} (CLWR targets) 1.5×10^{-8} (targets of similar design)	3×10^{-9} (CLWR targets)
Occupational Health				
Total estimated number of additional latent cancer fatalities (LCFs) to all involved workers from an annual dose.	0.066	1.6×10^{-3}	Same as H Area	No increase above APT's baseline.

Table 2-2. (Continued).

Resource		Current SRS Baseline	Increment above baseline of proposed H Area site	Increment above baseline of alternative AGNS site	Increment above baseline of no-action alternative[a,b,c]
Number of construction worker injuries resulting in lost work time.		NA	11	10	No increase above APT's baseline
Accidents[f,g]					
Additional LCFs in offsite population		NA			
Annual frequency	Bounding accident				
$>10^{-2}$	Hood or room fire		0.4	0.3	0
$\geq 10^{-4}$ to $\leq 10^{-2}$	Area fire		0.4	0.4	0
$\geq 10^{-6}$ to $<10^{-4}$	Design-basis seismic event with fire		0.7	0.7	0.3
Impacts to Ecological Resources					
Terrestrial Ecology		The affected environment is within developed areas consisting of paved lots, graveled surfaces, buildings and trailers, providing minimal terrestrial wildlife habitat.	No physical alterations to the landscape outside of H Area but limited potential to disturb any nearby resident wildlife as a result of construction and operations noise.	Because the AGNS facility has been inactive since 1983, it may contain more wildlife than the H Area site. Construction and operations noise and human activity would have localized adverse effects on wildlife.	No additional impacts above APT's baseline.
Aquatic Ecology		No aquatic habitat within H Area boundaries; aquatic habitat adjacent to H Area boundaries (Crouch Branch and Fourmile Branch).	Construction activities would occur under best management practices to limit sedimentation in detention basins and protect streams from non-point source pollution. Operations wastewater would be discharged through NPDES-permitted outfalls. DOE would continue to comply with the permit requirements and regulatory standards to ensure maintenance of water quality in receiving streams.	Same as H Area	No additional impacts above APT's baseline.

Table 2-2. (Continued).

Resource	Current SRS Baseline	Increment above baseline of proposed H Area site	Increment above baseline of alternative AGNS site	Increment above baseline of no-action alternative[a,b,c]
Wetland Ecology	No wetland habitat within H Area boundaries; wetland habitat in the vicinity of H Area boundaries (Crouch Branch, Fourmile Branch, Upper Three Runs).	Wetlands in the Upper Three Runs watershed, including Crouch Branch, or the Fourmile Branch watershed would not be adversely affected by the construction and operation of the TEF.	Wetlands associated with Lower Three Runs would not be adversely affected by construction or operation.	No additional impacts above APT's baseline.
Threatened and Endangered Species	No threatened and endangered species within H Area boundaries.	No threatened or endangered species live or forage in H Area. There would be no adverse impact.	Same as H Area	No additional impacts above APT's baseline.

a. DOE determined that changes from the baseline of less than 5 percent are within the margin of error and the conservatism inherent in the analyses. DOE finds that in those instances there is no measurable change from baseline and has not evaluated the impacts further.

b. Baseline for no action includes an accelerator for production of tritium (APT) constructed on its preferred site and operated with its preferred helium-3 feedstock. The increment above baseline for no action incorporates extracting tritium from CLWR targets in the APT facility.

c. Source: England (1998a); Willison (1998).

d. Concentration increments that would be less than 0.1 percent of standard for both locations are not listed.

e. Includes land use, visual resources and noise, and historical and archeological resources.

f. Events with the most additional latent fatalities in offsite public are a full-facility fire and a design-basis earthquake with a secondary fire.

g. Accidents involving targets of similar design would have substantially lower impacts.

h. The employment of 10,000 is based on actual reductions in 1995, 1996, and 1997 and a continuation of that trend through 2000. The 1998 SRS workforce was 14,130 and is expected to remain stable through at least 1999. As such, the estimate serves as a conservative lower bound assumed to ensure that the workforces associated with the construction and operation of the TEF are not underestimated relative to the SRS workforce.

2.4.1 COMPARISON OF THE PROPOSED ACTION AND THE AGNS ALTERNATIVE TO THE SRS BASELINE

> In Comment M1-02, the commenter stated that there is little or no difference between the AGNS and H-Area alternatives, but that the EIS makes it look like a major difference. DOE did not intend to exaggerate the comparison of the H-Area (proposed action) and the AGNS alternatives. However, it did wish to capture the differences in environmental impacts for the decisionmaker(s) and the public. DOE has revised Section 2.4.1 starting on page 2-8 of the Draft EIS to clarify the differences between these two alternatives.

The action alternatives include the preferred alternative to construct and operate TEF in H Area (Section 2.2.1) and the alternative to upgrade and refurbish existing facilities and operate TEF at AGNS (Section 2.2.2). Table 2-2 on pages 2-3 to 2-8 compares the basic characteristics of locating TEF in H Area to those of locating it at AGNS.

One difference between the proposed H Area and alternative AGNS locations is AGNS's close proximity to non-government land and therefore its greater potential for impacting offsite individuals near the site boundary in case of a normal operational or accidental release. **This difference is considered to be minimal. As shown in the following table, additional differences include stack height and radionuclides released to the environment.**

Annual radionuclide emissions (curies) from CLWR targets and stack height at TEF at H Area and TEF at AGNS.[a]

	Annual emissions rate (curies)	
Radionuclide	H Area	AGNS
Tritium[b]	10,000	14,500
Expelled pellet material[c]	4.2×10^{-5}	0.0012
Cobalt-60[d]	4.2×10^{-4}	4.2×10^{-4}
Zirconium-95[e]	NA	1.1
Stack Height	100 feet	328 feet

a. Smith (1997a, 1998a) and England (1998a).
b. Assumed to be tritium oxide.
c. See Table 2-3.
d. Smith (1998b).
e. Zirconium-95 would be released only during the shearing of targets necessary at AGNS.

The quantities released at AGNS differ from those emitted at H Area because each rod would be cut three times to be placed in the AGNS furnace while full-height targets would be punctured at H Area. The shearing operation would result in higher emissions than the puncturing operation.

Should DOE discover threatened, endangered, or other sensitive resources on either potentially affected area, avoidance or other appropriate mitigation measures would be taken. Neither of the alternative sites for TEF is known to contain hazardous, toxic, or radioactive materials. Nonetheless, the potential exists that excavation-related activities could result in the discovery of previously unknown and undocumented hazardous, toxic, or radioactive materials. In the event that hazardous, toxic, or radioactive material was discovered, DOE would remove and dispose of such material in accordance with all applicable laws and regulations.

DOE has not identified any significant historic or archaeological resources at either alternative site that construction or operation of TEF could affect. However, if DOE discovered such sites during construction, it would comply with the stipulations of the Programmatic Memorandum of Agreement between DOE, the South Carolina State Historic Preservation Officer (SHPO), and the Advisory Council on Historic Preservation.

While processing CLWR targets, the contributions of nonradiological air constituents **at** AGNS would be 0.13 percent of the applicable standard, **and even lower for the onsite H-Area** alternative. **Similarly**, the annual radiological dose for the offsite maximally exposed individual would be 0.13 millirem higher for AGNS than H Area, but both would be well below the regulatory **annual** limit of 10 millirem from airborne releases. **Additionally, releases from processing targets of similar design would be lower than from processing CLWR targets for either alternative.**

Because of the location of AGNS, some minority or low-income communities could be disproportionately affected by radiological and nonradiological air emissions, but again impacts are expected to be minor. At the AGNS site, construction noise and activity could have localized adverse effects on wildlife, but operations would not.

Advantages of AGNS include less land disturbed, less construction waste generation, and lower construction costs. Also, the lower population density in the communities near AGNS would result in a smaller collective dose from potential accidents.

DOE has revised the Draft EIS to include advantages of the proposed H-Area site to provide a comparison to the advantages of AGNS discussed in the previous paragraph.

Advantages of the proposed H-Area site are primarily due to its close proximity to the location of the final tritium purification step in Building 233-H. This enables DOE to share common support facilities, services, and some personnel; to facilitate the transfer of tritium between the two facilities; and to use certain gas-handling processes located in H Area. Consequently the life-cycle cost of operating the TEF at this location is substantially less than AGNS.

2.4.2 COMPARISON OF THE TEF NO-ACTION ALTERNATIVE TO THE BASE CASE PROPOSED ACTION FOR THE ACCELERATOR FOR PRODUCTION OF TRITIUM (APT WITHOUT EXTRACTION CAPABILITY)

Even though the Secretary selected the APT as backup, the discussion below is retained in this Final EIS until a Record of Decision has been issued.

The impacts of incorporating tritium extraction capabilities into APT are compared to those associated with construction and operation of the APT without the tritium extraction capability. Differences between operating APT with and without TEF capabilities are identified in Table 2-3. Only CLWR targets were evaluated for the no-action alternative.

The main additions required to combine TEF and APT would have been the addition of the Remote Handling Area, target preparation area, storage area, and the TEF furnaces to APT. These furnaces would have heated CLWR targets to drive tritium from them. In addition, the TEF furnaces could have been used to extract the tritium from targets of similar design. The furnaces would be accommodated by the construction of a 48-foot addition along the length of one building in the APT facility. This addition would have added a total of 28,800 square feet on five levels, for an increase of approximately 10 percent in one APT building. Some system expansions and relocations within the building would have been necessary as a result of the combination of functions. However, these modifications would have been relatively minor in comparison with the entire APT project.

TEF at APT was designed to store up to 4,200 CLWR targets. These targets would have been kept in dry storage in one of the APT facility buildings. For accident analysis purposes, it was assumed that each CLWR rod contains a maximum of 1.5 grams of tritium. It was also conservatively assumed that all of the tritium in the extraction furnace and 1 percent of the tritium in the stored CLWR targets would have been oxidized and released in the event of either a design-basis or beyond-design-basis seismic event. The facility would have been designed so that both the tritium-extraction furnaces and the accelerator could have operated simultaneously. Operators in the APT facility would have been cross-trained in both TEF and APT functions. As a result, no additional personnel would have been expected for the combined facility.

2.4.2.1 <u>Impacts of Construction of the Combined TEF/APT</u>

The additional construction required for the combined facility would not have required changes either to the construction start date or the period of construction. The additional construction necessary to build the combined

Table 2-3. Comparison of operation of APT with and without extraction capability.[a]

Resource	APT without extraction capability (base case)	No action (APT with extraction capability)
Annual Air Releases (curies)		
Tritium oxide[b]	30,000	35,000
Carbon-11	250	250
Expelled pellet material[c]	NA	4.2×10^{-5}
Argon-41	2,000	2,000
Cobalt-60	NA	4.2×10^{-4}
Beryllium-7	0.02	0.02
Iodine-125	2.7×10^{-3}	2.7×10^{-3}
Public and Worker Health		
Maximally exposed (offsite) individual (MEI) dose (mrem/yr)	0.052	0.058
Annual probability of fatal cancer to MEI from normal operations	2.6×10^{-8}	2.9×10^{-8}
Total dose to population (person-rem/yr)	2.0	2.2
Annual population latent cancer fatalities (LCFs) from air and aqueous releases[d]	1.0×10^{-3}	1.1×10^{-3}
Uninvolved worker dose (rem/yr)	1.7×10^{-3}	2.0×10^{-3}
Involved worker dose (rem/yr)	1.0	1.0
Collective involved worker dose (person-rem/yr)	88	92
Annual collective involved worker LCFs	0.04	0.04
Accidents		
Maximally exposed (offsite) individual (rem)		
Design-basis seismic event	2.9	3.3
Beyond design-basis seismic event	3.0	5.8
Total dose to population (person-rem)		
Design-basis seismic event	5,100	5,857
Beyond design-basis seismic event	5,500	10,577
Total LCFs to population		
Design-basis seismic event	2.6	2.9
Beyond design-basis seismic event	2.7	5.3
Uninvolved worker dose (rem)		
Design-basis seismic event	150	152
Beyond design-basis seismic event	168	180

a. Source: England (1998a); Willison (1998).
b. The dose effects of elemental tritium are negligible compared to tritium oxide and are not included in this analysis.
c. Expelled pellet material resulting from puncturing CLWR targets. Source term radionuclides (with percent annual Curie content) include Se-75 (33%), Cr-51 (23%), Co-58 (13%), Fe-55 (12%), Ca-45 (10%), Ar-37 (3%), Mn-54 (2%), Ni-63 (1%), C-14 (1%), Ar-39 (1%), and trace isotopes (<1%) (Migliore, 1998).
d. Aqueous releases from APT are 3,000 Ci/yr of tritium, 1×10^{-4} Ci/yr of cobalt-60, 2×10^{-3} Ci/yr of chromium, and 1×10^{-3} Ci/yr of sodium-22. The tritium extraction process has aqueous releases that are less than reportable levels.

extraction facility would have added less than 5 percent to the construction effort of building APT in both materials and workforce.

Construction of the combined facility would have involved expansion of one building and some additional equipment. The additional land required for the building footprint was adjacent to a planned building and already included in the APT footprint. As a result, no effects greater than 5 percent above APT's baseline would have been expected to the physical environment (landforms, soils, geology, hydrology, surface water, air emissions, infrastructure, waste management, historic, archaeological and visual resources, or noise).

Construction of the combination facility would have involved no new hazards to workers beyond those already considered for the construction of the entire APT. As a result of design efficiencies, the APT with the combination facility would **have been** constructed with approximately the same workforce and no change expected in the number of additional traffic accident fatalities or occupational injuries during construction. In addition, no change would **have occurred** in socioeconomic impacts compared to the entire APT project.

The combination facility would **have been** a small addition to the entire APT project; therefore, no impacts beyond those already considered would **have taken** place in the biological environment (terrestrial ecology, aquatic ecology, wetland ecology, threatened and endangered species).

2.4.2.2 Impacts of Operation of the Combined TEF/APT

Operation of the combined facility would not **have required** large changes in the operational characteristics of APT. No additional land use would **have been** required and no water beyond that already identified for separate APT and tritium extraction facilities would **have been** required. No effects on the landforms, soils, visual resources or noise from the facility beyond those already envisioned for APT would **have occurred.** Emissions of non-radiological gases to the environment would **have been** equivalent to the emissions already analyzed for APT as a whole.

This document identifies the impacts of the bounding case of storing CLWR targets, processing CLWR targets in TEF, and operating APT with the preferred helium-3 feedstock alternative. Operation of the combined facility would **have increased** emissions of radioactive gases and particulates compared to the APT baseline. The combined facility could **have been** expected to have annual air releases no greater than **35,000** curies of tritium **oxide; 250 curies of carbon-11; 2,000 curies of argon-41; 0.02 curies of beryllium-7; 0.0027 curies of iodine-125;** 4.2×10^{-5} curies of **expelled pellet material**; and 4.2×10^{-4} curies of cobalt-60. These releases would **have bound** all operational combinations of TEF and APT production, but in no case would the operation of the combined facilities **have produced** more than 3 kilograms of tritium per year.

Waste streams from the combined facility would **have been** very similar to those from the APT baseline with the exception of job control waste and radioactive process wastewater from TEF. The combined facility would **have produced** an additional 320 cubic meters annually of low-level solid radioactive waste and an additional 2 cubic meters annually of hazardous waste. Radioactive wastewater would **have increased** 8 percent over the APT baseline.

Cross-training of the workforce would **have resulted** in no additional workers required for the combined facility. Therefore, the estimates for occupational injuries, traffic accident fatalities, and impacts on the regional economy would be unchanged from the APT baseline. While emissions would **have increased** over the APT baseline, the relative effects on each member of the surrounding population would **have been** unchanged and the environmental justice conclusion of the Draft APT EIS would remain valid.

The diesel generator and storage tank necessary for backup power for TEF at H Area would not **have been** needed for the combined facility. The TEF furnaces **did** not require backup power, and other backup power needs would **have been** provided by the APT facility generators. Therefore, there was no difference between the nonradiological air impacts for the combined facility and the APT baseline alternative.

Public health impacts would **have been** higher for the combined facility than those for the baseline APT alternative due to the higher radiological source terms associated with **extracting** tritium **from CLWR targets.** The doses to the maximally exposed offsite individual and population for the APT/TEF combination would be **0.058** mrem/year and **2.2** person-rem/year, respectively. The estimated number of **annual** latent cancer fatalities to the general population from the combined facility is **0.0011** compared to **0.0010** for the baseline APT.

Because worker radiological dose is an administratively controlled limit, the maximum worker dose allowed at the combined TEF/APT facility would have been unchanged from the APT baseline facility. The estimated number of latent cancer fatalities based on the collective worker dose would remain at 0.03. APT alone would have a bigger workforce and a higher individual dose than TEF alone, so the addition of the TEF dose to the APT dose would not have increased the number of potential latent cancer fatalities. The uninvolved worker dose (640 meters from the facility) would have been higher for the combined facility due to cobalt-60 emissions from extracting CLWR targets and also from increased tritium emissions as a result of the additional TEF operations. The uninvolved worker dose would have increased from 1.7×10^{-3} mrem/year for baseline APT to 2.0×10^{-3} mrem/year for the combined facility.

Consequences of potential accidents at facilities that produce or process radioactive materials were driven by the amount of source material available for release to the environment. The combination facility differed from the baseline APT in that there was an increase in the amount of tritium stored in the form of CLWR targets. This additional fixed source term resulted in greater accident consequences for the combined facility over the APT baseline. The limiting accident scenarios for the TEF/APT combination facility were a large fire in the combined facility and design-basis and beyond-design-basis seismic events.

Chapter 4. Modifications – Environmental Impacts

Comment letter L3, submitted on behalf of the U.S. Public Health Service, Department of Health and Human Services, had several comments that prompted changes to the section on the impacts of operation on radiological air quality which begins on page 4-8 of the Draft EIS. The following section, *Operation* is provided to place these changes in context.

Operation (under Radiological Air Quality of Section 4.1.1.4, Air Resources) – Although many different radionuclides would be emitted as a result of normal operations for processing CLWR targets, only a few would account for essentially all of the potential dose. Annual emissions (curies) for the radionuclides that are considered the major contributors to dose from CLWR targets are presented in Table 4-5 (Smith 1997a, 1998). Tritium and expelled pellet material emissions result from the puncturing and processing of CLWR targets. A number of radionuclides found in the CLWR target surface crud also are released in the course of normal operations.

Table 4-5. Annual radionuclide emissions (curies) from normal processing of CLWR targets or targets of similar design at TEF in H Area.[a]

	Annual emissions rate	
Radionuclide	CLWR targets	Targets of similar design
Tritium[b]	10,000	8,500
Expelled pellet material[c]	4.2×10^{-5}	$<4.0\times10^{-5}$[d]
Cobalt-60[e]	4.2×10^{-4}[f]	NA[g]

a. Smith (1997a) and England (1998b).
b. Assumed to be tritium oxide.
c. See Table 2-3.
d. For calculation purposes $<4.0\times10^{-5}$ Ci is conservatively assumed to be 4.0×10^{-5}.
e. Smith (1998).
f. Includes major dose-contributing radionuclides in CLWR target crud: Co-60, Co-58, Cr-51, Fe-59, and Mn-54 (Cunningham 1996).
g. NA = not applicable. Cobalt-60 is not a component of a target of similar design assumed to be made of lithium aluminum material.

The radionuclides in the CLWR target residue recognized as potential major contributors to radiological dose include cobalt-60, cobalt-58, chromium-51, iron-59, and manganese-54 (Cunningham 1996). However, except for cobalt-60, these other radionuclides have relatively short half-lives and thus would be present in only small amounts by the time the CLWR targets were processed. Additionally, of all the radionuclides in the surface material, cobalt-60 imparts a higher dose per curie amount. Therefore, in order to represent the worst case in terms of radiological effects, the total amount of curies released from the surface crud was assumed to be all in the form of cobalt-60, thereby making the calculated dose conservative. For purposes of estimating impacts, TEF is assumed to operate 24 hours a day, 365 days a year. All radionuclide emissions resulting from TEF processes would pass through the Glovebox and Purge Stripper System and the Module Stripper System, where tritium, oxygen, helium, moisture, and some hydrocarbons would be stripped or purged through a single 100-foot stack (DOE 1997b).

Radiological emissions (Ci/yr) associated with the processing of targets of similar design at TEF in H Area are presented in Table 4-5. As with the CLWR targets, the radionuclides listed for the target of similar design represent the major dose contributors. Tritium and expelled pellet material emissions for these targets would be less than those for the CLWR targets. For purposes of this analysis, a target of similar design is assumed to be made of lithium-aluminum material which is ductile, unlike the ceramic getter and pellets in the CLWR targets. The tritium in these targets would remain bound in the lithium until the targets were melted in the furnace (Smith 1998). For the case of the targets of similar design, TEF is assumed to operate 24 hours a day, 365 days a year and pass through the same stripper systems and 100-foot stack, as with the processing of CLWR targets. See Section 2.2.1.1 for uranium bed information.

> Comment L3-03 asked for more detail on the function of the computer programs discussed in the following paragraph, the pertinent parameters, or a reference to this information to increase the readers understanding of dose estimation. DOE believes that the text as written contains the appropriate level of detail for most readers. DOE provided the requested information in the response to the comment and refers interested readers to that comment and response. Comment L3-05 suggested changing "determining" to "estimating" in the following modified text to clarify that emission rates are not precise at this stage in the design of TEF.

> Comment L3-10 requested a reference for the validated data set discussed on page 4-9 of the Draft EIS in the paragraph below. DOE has inserted the appropriate reference.

After **estimating** routine emission rates, DOE used the computer codes MAXIGASP and POPGASP to **predict potential** radiological doses to the maximally exposed individual, the hypothetical uninvolved worker, and the population surrounding SRS. Both codes utilize the GASPAR (Eckerman et al. 1980) and XOQDOQ (Sagendorf et al. 1982) modules which have been adapted and verified for use at SRS (Hamby 1992 and Bauer 1991, respectively)

MAXIGASP and POPGASP are both site-specific computer programs that have SRS-specific meteorological parameters (e.g., wind speeds and directions) and population distribution parameters (e.g., number of people in sectors around the Site). Meteorological data gathered at SRS from 1987 through 1991 (the most recent validated data set available) were used for the radiological dispersion modeling. The 1990 census population database **(ORNL 1991)** was used to represent the population living within a 50-mile radius of the center of SRS. **For further information see the Comment L3-03 and the DOE response in Section 1 of this Final EIS.**

> Comment L3-04 recommended that the dose numbers discussed below and listed in Table 4-6 on page 4-9 of the Draft EIS be presented on a relative basis so the reader could judge the severity of these doses in proportion to doses commonly received by individuals in the vicinity of SRS. DOE revised Table 4-6 in response to this suggestion. Also, in response to Comment L3-11, DOE has provided the reference to the statement that tritium accounts for 98 percent of the dose to the SRS worker.

Table 4-6 presents the calculated maximum radiological doses associated with routine operations of TEF. Based on the dispersion model, the maximally exposed individual was identified as being located in the northern sector at the SRS boundary, 7.4 miles from the H Area TEF location. According to these results for the CLWR targets, the maximum committed effective dose equivalent for the maximally exposed individual would be 0.02 millirem for each year of operation, well below the annual dose limit of 10 millirem from SRS atmospheric releases (40 CFR 61.92). The estimated dose to the offsite population residing within a 50-mile radius is calculated as 0.77 person-rem per year (Simpkins 1997a). For both the maximally exposed individual and the offsite population, tritium is estimated to be the highest contributor to dose, accounting for 99 percent of both the maximally exposed individual and population doses (Simpkins 1997b).

Table 4-6. Annual doses from normal radiological air emissions from H Area TEF.[a]

Receptor	Maximum dose: CLWR targets	Maximum dose: Targets of similar design
MEI dose (millirem)[b]	0.02	0.014
Percent of total radiation exposure[c]	**0.006**	**0.004**
Total dose to population (person-rem)	0.77	0.66
Percent of total radiation exposure[d]	**0.0003**	**0.0003**
Uninvolved worker dose (millirem)	0.35	0.29
Percent of total radiation exposure	**0.10**	**0.08**

a. Simpkins (1997a).
b. MEI = maximally exposed individual.
c. **Relative to effective dose equivalent for non-occupational sources in the vicinity of SRS (357 millirem).**
d. **Relative to average annual dose to the offsite population of 620,100 within a 50-miles radius of SRS (0.357 rem x 620,100 persons = 221,376 person rem).**

Table 4-6 also reports a dose to the hypothetical onsite worker from annual radiological emissions. The onsite worker is located at a distance of 640 meters from the release point in the direction, as determined through modeling, of the highest dose; for TEF, this location is toward the southwest. The estimated maximum committed effective dose equivalent is 0.35 millirem for each year of operation (Simpkins 1997a). Tritium is the highest contributor to the worker dose, accounting for 98 percent of the total dose (Simpkins 1997b).

Radiological doses due to the processing of the targets of similar design are determined in the same manner as doses from the CLWR targets, and are presented in Table 4-6. All the receptor doses for the targets of similar design are approximately the same as for the CLWR targets. The MEI, population, and worker doses would be 0.014 millirem, 0.66 person-rem, and 0.29 millirem, respectively, with tritium responsible for essentially all the dose.

4.1.1.5 Waste Management

This section describes the impacts of TEF construction and operations (described in Appendix A) waste management activities on the environment (described in Chapter 3) at SRS. DOE has determined that construction and operation of TEF would result in generation of several types of nonradioactive and radioactive waste.

The waste would be managed at SRS, onsite vendor-operated, or offsite treatment, storage, and disposal facilities. This analysis assumes that as much waste as possible would be treated and disposed at SRS facilities. Potential impacts to the waste management facilities are expected to be small due to existing SRS waste treatment, storage, and disposal capacities for the projected types of waste and the relatively low volumes of waste generated (Table 4-7).

DOE clarified Table 4-7 from page 4-10 of the Draft EIS as requested in Comment L3-09.

DOE incorporated waste minimization and pollution prevention factors into the TEF preconceptual and conceptual designs. Production processes were configured to minimize waste generation. This was accomplished through segregation of activities that generate radioactive and hazardous wastes, treatment to separate radioactive and nonradioactive components to reduce the volume of mixed waste, and substitution of nonhazardous materials for materials that contribute to hazardous or mixed wastes.

Table 4-7. Impacts on SRS treatment, storage, and disposal facilities from operation of proposed action for CLWR targets or targets of similar design.[a,b]

Waste facility[b]	Annual waste quantity[c]	Waste type[a,d]	Operating capacity	Impact of proposed action
		Pretreated waste volumes		
CIF	230 m^3 (CLWR targets) 20 m^3 (targets of similar design)	Incinerable LLRW	17,830 m^3/yr[b,e,f]	1.3 percent of capacity 0.11 percent of capacity (targets of similar design)
	2.5 m^3 0.09 m^3	Incinerable MW Incinerable HW		
Compactor	75 m^3	LLRW	3,983 m^3/yr[b]	1.9 percent of capacity
		Waste-generation and post-treatment volumes		
E-Area LAW vault	195 m^3[g]	LLRW	30,500 m^3/vault[b]	0.006 vault/yr
E-Area ILTV	35 m^3 (CLWR targets) 20 m^3 (targets of similar design)	LLRW with tritium	5,300 m^3/vault[b]	0.006 vault/yr 0.004 vault/yr
Storage building	0.6 m^3 2.5 m^3[h]	HW MW	2,618 m^3 619 m^3/building(total)[b]	<1 percent of capacity <1 percent of capacity
Three Rivers Landfill	231.5 m^3	Sanitary waste	3,592.5 m^3/day[i]	0.06 days/yr
CSWTF	770,000 gallons	Sanitary wastewater	1 million gallons/day[a]	0.8 days/yr
Effluent Treatment Facility	11,000 gallons[c]	Process wastewater	187,000 gallons per day[a]	0.06 days/yr
Burma Road Landfill	33 m^3[j]	Industrial waste	100,000 m^3/yr[b]	0.03 percent of annual capacity

a. WSRC (1997).
b. DOE (1995a).
c. These quantities cannot be compared with volumes in Appendix A which are only wastes generated. The volumes in this table include waste-generation volumes and the post-treatment volumes sent to storage and disposal facilities.
d. **Waste types are described in Table 4-9.**
e. All waste considered as solid feed.
f. 50 percent attainment capacity.
g. Includes post-compacted LLRW with tritium (4:1 ratio).
h. Excludes pumps oils and alcohols.
i. DOE (1995b).
j. BSRI (1997).

CIF = Consolidated Incineration Facility.
CSWTF = Central Sanitary Wastewater Treatment Facility.
HW = hazardous waste.
ILTV = intermediate-level tritium vault **disposes of low-level radioactive waste containing tritium and radiating greater than 200 millirem per hour.**
LLRW = low-level radioactive waste.
LAW = low-activity waste. **Low-level radioactive waste radiating less than 200 millirem per hour.**
MW = mixed waste.
N/A = not applicable. A new wastewater treatment facility would be constructed.

Construction – The construction of TEF would generate nonhazardous, nonradioactive wastes, including construction debris (mixed rubble, metals, plastics), and sanitary wastewater. Table 4-8 lists estimated maximum quantities of waste for construction of TEF in H Area.

DOE could use the existing Burma Road Landfill on SRS for rubble and other nonrecyclable construction debris or transport them to an offsite commercial landfill. DOE estimates a total of approximately 165 metric tons of construction debris would be generated during TEF construction.

Table 4-8. Construction waste generated from the proposed action for CLWR targets and targets of similar design.[a]

Waste type	Waste quantity for proposed action
Construction debris	165 cubic meters
Sanitary wastewater	3.1 million gallons
Low-level radioactive waste	0

a. Smith (1997b).

During construction, sanitary wastewater would be managed by an offsite vendor using portable restroom facilities until DOE could build permanent restroom facilities at TEF. Because the vendor would be responsible for disposing of this sanitary wastewater offsite, it would not affect SRS wastewater treatment facilities. After connection of the TEF facilities to the CSWTF, the maximum annual volume attributable to TEF construction would represent approximately **750,000 gallons (0.2 percent)** of the **CSWTF's** annual operating capacity of about 365 million gallons.

Operation – TEF operations would generate a number of nonradioactive and radioactive waste streams. In addition, some of the TEF radioactive waste would be mixed (Resource Conservation and Recovery Act [RCRA] hazardous and radioactive) waste. Because processes at TEF do not involve fission and DOE would not use materials with high atomic numbers in the extraction process, the facility would not generate high-level radioactive or transuranic wastes.

TEF operations' wastes would be generated by the extraction of tritium from irradiated targets, decontamination processes, and operation of supporting facilities. They would also be generated incidentally as a result of failed equipment, routine maintenance, and off-normal events. Table 4-9 lists the waste types generated by activity and examples of items included in each waste type.

The waste estimates in Table 4-7 are based on pre-conceptual and conceptual design information, conceptualized modes of operation, assumed levels of production, engineering judgment, waste forecasts, and waste management plans.

TEF would be able to pretreat, treat, accumulate, handle, package, and store the wastes it generated prior to shipment to a waste treatment, storage, or disposal facility. DOE would manage TEF wastes for treatment and disposal according to waste type, using SRS, onsite vendor-operated, and offsite waste treatment, storage, and disposal facilities. Table 4-7 lists the waste types and quantities destined for treatment, storage, and disposal facilities and the subsequent impact to the facility from operation of TEF in H Area.

4.3 IMPACTS OF THE NO-ACTION ALTERNATIVE

DOE has modified Section 4.3 beginning on page 4-56 of the Draft EIS. The No-Action Alternative is described in the Summary on page S-4 of this Final EIS. Text included in Section 4.3 that is in addition to the text in Section 2.4 (page 2-8 of the Draft EIS) is modified as follows. Table 4-31, which is called out in the text below, is identical to Table 2-3 and is modified as indicated in Table 2-3 on page 2-11 of this EIS.

This EIS analyzes the incremental impacts of the no-action alternative above the APT baseline. **The data prepared to support the Final APT EIS (England 1998a; Willison 1998)** contains an analysis of impacts to the physical and

Table 4-9. TEF operational waste types, generating activities, and examples.[a]

Waste type	Generating activity	Examples of waste stream items
Sanitary solid waste	Offices, change rooms	Paper
Industrial waste	Production, maintenance, housekeeping	Failed nonrecyclable equipment, expired nonhazardous chemicals
Low-level radioactive waste	Production, maintenance, decontamination, housekeeping	Personnel protective equipment, failed equipment, spent TPBARs and extraction baskets, TPBAR baseplates, furnace components, process equipment, U/Mg beds, hydride/catalyst/ zeolite beds, HEPA filters, tritiated oil, glovebox bubbler fluid
Mixed low-level radioactive waste	Production, maintenance, decontamination, housekeeping	Process equipment, oil/solvent rags, decontamination, cleaning, degreasing, spill clean-up and maintenance paper, products, lubricating oil and solvents, analytical laboratory/radiological control chemicals, spent fuel cells
Hazardous waste	Routine analytical, process operation, maintenance, cleaning, degreasing, and decontamination	Lubricating oil and solvents, analytical laboratory/radiological control chemicals
Mixed low-level liquid radioactive waste	Cooling water systems, radiological control analytical activities, pollution control equipment, decontamination, fluids collected in the floor drains in potentially contaminated areas	TPBAR cask/trailer decontamination, tritiated water and aqueous solutions, tritium-contaminated process cooling water, analytical laboratory/ radiological control chemicals
Sanitary wastewater	Restrooms	Wastewater
Nonradioactive process wastewater	Process cooling water	Cooling water with traces of salts, corrosion inhibitor, slimicide, dispersant; rainwater, groundwater, wastewaters

TPBAR = tritium-producing burnable absorber rod.
a. WSRC (1997).

manmade environment, the human environment, and to archaeological, historic, and ecological resources. The TEF no-action analysis is based on the Final APT EIS and information developed since the draft TEF EIS was issued. Table 4-31 compares the basic impacts of operating APT with and without TEF. Section 2.4 (page 2-2 of this EIS) discusses more fully the impacts presented in Table 4-31.

Chapter 5. Modifications – Cumulative Impacts

Chapter 5, Cumulative Impacts, has been modified to reflect changes from the Draft EIS and includes three potential new missions as identified in the text that follows. The revised analysis includes the effects of these three potential missions on air and water resources, public health, waste management, and utilities.

The counties surrounding SRS have numerous existing (e.g., an electric generating station, textile mills, paper product mills, and manufacturing facilities) and planned (e.g., Bridgestone Tire, and Hankook Polyester) industrial facilities with permitted air emissions and discharges to surface waters. Because of the distances between the SRS and the private industrial facilities, there is little opportunity for interactions of plant emissions, and no major cumulative impact on air or water quality. Construction and operation of Bridgestone Tire and Hankook Polyester facilities could affect the regional socioeconomic cumulative impacts.

DOE also has evaluated the impact from its own proposed future actions by examining impacts to resources and the human environment as described in NEPA documents related to SRS. Additional NEPA documents related to SRS that were considered in this cumulative impacts section include:

- *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling* (DOE 1995a). In addition to construction and operation of TEF, the Record of Decision (ROD) states that the preferred alternatives for tritium production are either to pursue the purchase of an existing commercial reactor, irradiation services from a commercial reactor, or to build an accelerator system. The SRS was selected as the location for an accelerator, should one be built. In addition, the existing tritium recycling facilities would be upgraded to support either option.

  Three project-level NEPA documents discussed below cover the cumulative impacts of the activities associated with the tritium supply and recycling program: an accelerator (DOE, 1999a; England 1998a; Willison 1998), commercial light water reactor (DOE 1997b), and upgrade of existing tritium recycling facilities (DOE 1997a).

- *Final Environmental Impact Statement Accelerator Production of Tritium at Savannah River Site* **(DOE, 1999a; England 1998a; Willison 1998;).** DOE has proposed to de**sign, build, and test critical components of an accelerator system for tritium production (APT). The preferred** accelerator design would use helium-3 target blanket material and an alternate accelerator design **would** use lithium-6 target blanket material. If an accelerator is built, it would be located at SRS. The cumulative impact analysis includes projected impacts from the helium-3 target blanket material accelerator. **The cumulative impact analysis includes data from the final EIS.**

- ***Final Environmental Impact Statement Commercial Light Water Reactor* (DOE 1999b). DOE has proposed to initiate the purchase of an existing commercial reactor (operating or partially complete) for conversion to a defense facility, or the purchase of irradiation services with an option to purchase the reactor. Either the CLWR or the APT would be selected as the primary tritium source. The project impact zone for this EIS that overlaps the TEF project impact zone is the transportation corridor within a 50-mile radius of the SRS, to the point of transfer to the TEF of irradiated targets and to the SRS Solid Waste Disposal Facility of associated low-level waste.**

  The CLWR EIS presents quantitative data for human health impacts to include impacts to the transportation crews and members of the public from moving the targets along the entire transportation corridor of approximately 500 miles from the proposed Tennessee Valley Authority nuclear plant to SRS. The human health effects within the TEF project impact zone (within the 50-mile radius of SRS) would be approximately 10 percent of the total transportation route impacts. The annual radiological dose to the public from transportation (entire route) of irradiated targets to TEF is estimated in the CLWR EIS to be 0.014 person-rem. The dose to the population within the 50-mile radius of SRS would be approximately 0.0014 person-rem. This dose represents less than 0.005 percent of the cumulative dose to the 50-mile population from airborne releases from TEF. Because of the minimal impacts of CLWR-associated transportation activities, data from that EIS is generally not included in the cumulative impact analysis in this EIS; however, low-level waste quantities associated with CLWR shipments to SRS have been included in the Waste Management section of this chapter.

- *Savannah River Site Spent Nuclear Fuel Management Environmental Impact Statement* (DOE 1998c). The DOE proposed action is to provide additional capability at SRS to receive and prepare spent nuclear fuel for ultimate disposal at a Federal geologic repository. Specific actions to accomplish this could include construction and operation of a transfer and storage facility; construction and operation of a treatment facility; and additional dry storage capacity.

- *Final Environmental Impact Statement Interim Management of Nuclear Materials* (DOE 1995c). DOE has begun implementing the preferred scenarios for most of the nuclear materials discussed in the Interim Management of Nuclear Materials EIS with the exception of selecting the "comparative management scenario" alternatives for the following materials: H-Canyon plutonium-239 solutions (process to oxide), Mark-16 and -22 fuels (blending down to low-enriched uranium), and other aluminum-clad fuel targets (process and store for vitrification at DWPF). Data in this chapter reflect projected impacts from the preferred and comparative management scenarios.

- *Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement* (DOE 1996a). The cumulative impacts analysis discussed in this chapter incorporates from that EIS the blending of highly enriched-uranium to 4 percent low-enriched uranium as uranyl nitrate hexahydrate.

- *Defense Waste Processing Facility Supplemental Environmental Impact Statement* (DOE 1994). The selected alternative in the Record of Decision (ROD) is the completion and operation of the Defense Waste Processing Facility to immobilize high-level radioactive waste at the SRS. The facility is currently in operation. However, SRS baseline data is not representative of full operational impacts. Therefore, the DWPF data is listed separately.

- *Draft Surplus Plutonium Disposition Environmental Impact Statement* (DOE 1998b). This EIS analyzes the activities necessary to implement DOE's disposition strategy for surplus plutonium. SRS is being considered in this EIS as one of four candidate sites for construction of three types of facilities for plutonium disposition. The cumulative impacts analysis in this EIS includes data from the draft plutonium disposition EIS, which was issued after the Draft TEF EIS was distributed.

- *Environmental Assessment for the Tritium Facility Modernization and Consolidation Project at the Savannah River Site* (DOE 1997a). This environmental assessment (EA) addresses the impacts of consolidating the tritium activities currently performed in Building 232-H into the newer Building 233-H and Building 234-H. Tritium extraction functions would be transferred to TEF. The overall impact would be to reduce the tritium facility complex net tritium emissions by up to 50 percent. Another positive effect of this planned action would be to reduce the amount of low-level job control waste. Effects on other resources would be negligible. Therefore, impacts from the EA have not been included in this cumulative impacts analysis.

- *Final Environmental Impact Statement on Management of Certain Plutonium Residues and Scrub Alloy Stored at the Rocky Flats Environmental Technology Site* (DOE 1998a). DOE proposes to process certain plutonium-bearing materials being stored at the Rocky Flats Environmental Technology Site. These materials are plutonium residues and scrub alloy remaining from nuclear weapons manufacturing operations formerly conducted by DOE at Rocky Flats. Under one of the alternatives, Processing with Plutonium Separation Alternative, DOE would remove most of the plutonium from the plutonium-bearing materials in preparation for disposal at SRS, Rocky Flats, or the Los Alamos National Laboratory. Environmental impacts from this EIS are included in this section.

The cumulative impacts analysis also includes the impacts from actions proposed in this EIS. Risks to members of the public and site workers from radiological and nonradiological releases are based on the proposed action to extract tritium from commercial light water reactor (CLWR) targets. Impacts associated with extracting tritium from targets of similar design are not discussed here because in all cases they are less than the impacts of CLWR targets.

In addition, the cumulative impacts analysis accounts for other SRS operations. Most of the SRS data (radiological and nonradiological emissions) are based on 1996 values (Arnett and Mamatey 1997), which are the most recent data available.

Temporal boundaries were defined by examining the period of influence from both the proposed action and the other actions to be included in the cumulative impact analysis.

TEF site preparation and construction are planned to begin in the first quarter of fiscal year 1999 and be completed in 2003. Startup would depend on the preferred tritium supply source. A commercial light water reactor source could begin delivering tritium to the stockpile in 2005. Operation of the tritium supply source, TEF, and tritium recycling facilities are expected to continue for 40 years. Impacts over the 40 years of operation are expected to be essentially constant. Temporal limits for new actions **are discussed below.**

Actions for interim management of nuclear materials, highly enriched uranium, **and certain plutonium residues and scrub alloy from** Rocky Flats occur over a shorter time period **than tritium extraction facilities while spent nuclear fuel activities initially occur concurrently with the other activities and are scheduled to be completed in 2035.** For example, interim management (processing) of nuclear materials is scheduled to be complete in 2006; **Rocky Flats plutonium residues and scrub alloy processing at SRS would be completed by 2004**; and receipt and preparation of spent nuclear fuel for ultimate offsite disposal is scheduled to be completed in 2035.

In addition, activities associated with storage and disposition of weapons-usable fissile materials involves expansion of the Actinide Packaging and Storage Facility (APSF) proposed in the Interim Management of Nuclear Materials EIS. The APSF is scheduled for completion in 2006. Expansion and operation activities would occur concurrently with TEF construction and operation. Activities associated with plutonium disposition involve possible construction of as many as three facilities (completed in the 2003-2006 timeframe) that would operate for approximately 10 years, or longer if new missions are considered at a later date.

Therefore, the period of interest **for cumulative impacts** is during concurrent construction of the Accelerator Production of Tritium (APT) and TEF and their operation while actions for nuclear materials, spent nuclear fuel, highly enriched uranium, and **plutonium residues/scrub alloy** are ongoing.

5.1 Air Resources

Table 5-1 compares the cumulative concentrations of nonradiological air pollutants from SRS to Federal or state regulatory standards. The SRS maximum values are the maximum modeled concentrations that could occur at ground level at the Site boundary. The data demonstrate that total estimated concentrations of nonradiological air pollutants from the SRS, including the contributions from TEF, would be below the regulatory standards at the Site boundary. The cumulative concentrations range from less than 1 percent to 59 percent of the applicable standards. The higher percentages (54-59 percent) are for the shorter interval sulfur dioxide concentrations and the particulate concentrations and are still well within regulatory standards.

DOE also evaluated the cumulative airborne radioactive releases for dose to a maximally exposed individual at the SRS boundary. DOE included the dose attributable to Plant Vogtle (NRC 1996) in this cumulative total. The radiological emissions from Chem-Nuclear Services and Starmet CMI, Inc. are very low (SCDHEC 1995) and are not included. Table 5-2 presents the results of the cumulative radiological analysis, using 1996 data for the SRS baseline (1992 for Plant Vogtle). The cumulative dose to the maximally exposed member of the public would be **1.1×10^{-3} rem (1.1** millirem) per year, equivalent to **11** percent of the regulatory standard of 10 millirem per year (40 CFR Part 61). The approach of summing the doses to a maximally exposed individual for

Table 5-1. Estimated maximum cumulative ground-level concentrations of nonradiological pollutants (micrograms per cubic meter) at SRS boundary.[a,b]

Pollutant	Averaging time	SCDHEC ambient standard (μg/m³)	TEF	SRS baseline (μg/m³)	Other foreseeable planned SRS activities[c] (μg/m³)	Cumulative concentration[d,e] (μg/m³)	Percent of standard
Carbon monoxide	1 hour	40,000	3.6	5,014.6	79.4	5,097.6	13
	8 hours	10,000	0.45	631.8	19.3	632.2	6
Oxides of Nitrogen	Annual	100	5.5×10^{-3}	8.8	4.9	13.7	14
Sulfur dioxide	3 hours	1,300	0.088	690.2	6.02	696.3	54
	24 hours	365	1.0×10^{-3}	215.4	1.55	216.9	59
	Annual	80	9.0×10^{-5}	16.3	0.12	16.4	21
Ozone[f]	1 hour	235	0.45	NA[f]	0.8	1.3	<1
Lead	Max. quarter	1.5	$<1.0\times10^{-6}$	<0.01	NA	<0.01	<1
Particulate matter (≤10 microns aerodynamic diameter)[g]	24 hours	150	0.01	80.6	0.16	80.7	54
	Annual	50	9.0×10^{-5}	4.8	0.03	4.8	10
Total suspended particulates (μg/m³)	Annual	75	1.6×10^{-4}	43.3	0.07	43.3	58

a. DOE (1995a,c,d; 1997c; 1998b,c,1999b); England (1998a); Willison (1998).
b. Hydrochloric acid, formaldehyde, hexane, and nickel are not listed in Table 5-1 because operation of TEF or other foreseeable, planned SRS activities would not result in any change to the SRS baseline concentrations of these toxic pollutants.
c. Includes Accelerator Production of Tritium, Highly Enriched Uranium, Interim Management of Nuclear Materials, Spent Nuclear Fuel, Surplus Plutonium Disposition, and Management of Certain Plutonium Residue and Scrub Alloy concentrations.
d. SCDHEC (1976).
e. Includes TEF concentrations.
f. Not available.
g. New NAAQS for ozone (1 hr replaced by 8 hr standard = 0.08 ppm) and particulate matter ≤ 2.5 microns (24 hr standard = 65 μg/m³) and annual standard of 15 μg/m³ will become enforceable during the stated temporal range of the cumulative impacts analyses.

the seven actions that contribute to the radiological dose, non-Federal contributions, and baseline SRS operations is an extremely conservative one because it assumes that the maximally exposed individual would occupy simultaneously the four locations that would receive the maximum doses from activities described in each EIS at the same time, a physical impossibility.

Adding the population doses from TEF, non-Federal activities, and current and projected activities at SRS could yield a total annual cumulative dose of 48 person-rem from airborne sources. The total annual cumulative dose translates into 0.023 latent cancer fatality for each year of exposure by the population living within a 50-mile radius of SRS. For comparison, 145,700 deaths from cancer due to all causes would be likely in the same population over their lifetimes.

5.2 Water Resources

At present, a number of SRS facilities discharge treated wastewater to Upper Three Runs and its tributaries and Fourmile Branch via National Pollutant Discharge Elimination System (NPDES)-permitted outfalls. These include the F and H Area Effluent Treatment Facility (ETF) and the M-Area Liquid Effluent Treatment Facility. TEF operations would generate process and sanitary wastewater streams that would be treated at ETF and the SRS Central Sanitary Wastewater Treatment Facility, respectively.

Table 5-2. Estimated average annual cumulative radiological doses and resulting health effects to offsite population in the 50-mile radius from airborne releases.

	Offsite Population			
	Maximally exposed individual (MEI)		50-mile population	
Activity	Dose (rem)	Probability of fatal cancer[a]	Collective dose (person-rem)	Latent cancer fatalities[b]
SRS baseline[c]	5.0×10^{-5}	2.5×10^{-8}	2.8	1.4×10^{-3}
Tritium Extraction Facility	2.0×10^{-5}	1.0×10^{-8}	0.77	3.9×10^{-4}
Accelerator Production of Tritium[d]	3.7×10^{-5}	1.9×10^{-8}	1.6	8.0×10^{-4}
Surplus HEU disposition[e]	2.5×10^{-5}	1.3×10^{-8}	0.16	8.0×10^{-5}
Interim Mgmt of Nuclear Materials[f]	9.7×10^{-4}	4.9×10^{-7}	40	0.02
Management of Spent Nuclear Fuel[g]	1.5×10^{-5}	7.5×10^{-9}	0.56	2.8×10^{-4}
Management of Plutonium Residues/ Scrub Alloy[h]	5.7×10^{-7}	2.9×10^{-10}	6.2×10^{-3}	3.1×10^{-6}
Surplus Plutonium Disposition[i]	4.0×10^{-6}	2.0×10^{-9}	1.6	8.0×10^{-4}
Defense Waste Processing Facility[j]	1.0×10^{-6}	5.0×10^{-10}	7.1×10^{-2}	3.6×10^{-5}
Plant Vogtle[k]	5.4×10^{-7}	2.7×10^{-10}	0.042	2.1×10^{-5}
Total	1.1×10^{-3}	5.5×10^{-7}	48	0.023

a. NCRP (1993); expressed as the "probability" of a latent cancer fatality when applying the NCRP dose-to-risk conversion factor to an individual rather than a population.
b. Excess fatal cancers per year.
c. Arnett and Mamatey (1997) for MEI and population.
d. England (1998a); Willison (1998).
e. DOE (1996); HEU = highly enriched uranium.
f. DOE (1995c).
g. DOE (1998c).
h. DOE (1998a)
i. DOE (1998b).
j. DOE (1994).
k. NRC (1996).

Treated wastewater from ETF is discharged to Upper Three Runs and from the Central Sanitary Wastewater Treatment Facility to Fourmile Branch. Studies of water quality and biota downstream of these outfalls suggest that discharges from these facilities have not degraded the water quality of Upper Three Runs or Fourmile Branch (Halverson et al. 1997). Even with the addition of TEF wastewaters, ETF and the Central Sanitary Wastewater Treatment Facility would continue to meet the requirements of the SRS NPDES permit.

Depending on the volumes of radioactive, hazardous, and mixed wastes generated during environmental restoration and decontamination and decommissioning of surplus facilities, a number of waste management facilities could be built that discharge into Upper Three Runs. If APT is built, it would discharge into Upper Three Runs. New facilities or additions or modifications to existing SRS facilities would be required to comply with the NPDES permit limits that ensure protection of water quality.

Table 5-3 summarizes the estimated cumulative radiological doses to human receptors from exposure to waterborne sources downstream from SRS. Liquid effluents from the Site could contain small quantities of radionuclides that would be released to SRS streams that are tributaries of the Savannah River. The exposure pathways considered in this analysis included drinking water, fish ingestion, shoreline exposure, swimming, and boating. As discussed in Section 4.1.1.2, the preferred TEF configuration would result in minimal radiological dose to the maximally exposed individual at the SRS boundary from liquid releases. The dose from TEF liquid emissions would be minimal because

Table 5-3. Estimated average annual cumulative radiological doses and resulting health effects to offsite population from aqueous releases.

	Offsite Population			
	Maximally exposed individual (MEI)		50-mile population	
Activity	Dose (rem)	Probability of fatal cancer[a]	Collective dose (person-rem)	Latent cancer fatalities[b]
SRS baseline[c]	1.4×10^{-4}	7.0×10^{-8}	2.2	1.1×10^{-3}
Tritium Extraction Facility	(d)	(d)	(d)	(d)
Accelerator Production of Tritium[e]	**1.5×10^{-5}**	**8.2×10^{-9}**	**0.42**	**2.1×10^{-4}**
Surplus HEU Disposition[f]	None	None	None	None
Interim Mgmt of Nuclear Materials[g]	**2.4×10^{-5}**	**1.2×10^{-8}**	**0.09**	**4.5×10^{-5}**
Management of Spent Nuclear Fuel[h]	5.7×10^{-5}	2.9×10^{-8}	0.19	9.5×10^{-5}
Management Plutonium Residues/Scrub Alloy[i]	**(d)**		**(d)**	**(d)**
Surplus Plutonium Disposition[j]	**(d)**	**(d)**	**(d)**	**(d)**
Defense Waste Processing Facility[k]	**None**	**None**	**None**	**None**
Plant Vogtle[l]	5.4×10^{-5}	2.7×10^{-8}	2.5×10^{-3}	1.3×10^{-6}
Total	**2.9×10^{-4}**	**1.5×10^{-7}**	**2.9**	**1.4×10^{-3}**

a. NCRP (1993); expressed as the "probability" of a latent cancer fatality when applying the NCRP dose-to-risk conversion factor to an individual rather than a population.
b. Excess fatal cancers per year.
c. Arnett and Mamatey (1997) for MEI and population.
d. Less than minimum reportable levels.
e. **England (1998a); Willison (1998); DOE (1999a).**
f. DOE (1996); HEU = highly enriched uranium.
g. DOE (1995c).
h. DOE (1998c).
i. DOE (1998a).
j. DOE (1998b).
k. DOE (1994).
l. NRC (1996).

effluent from TEF would be treated at ETF. ETF processes would remove non-tritium radiological components of the waste stream. The tritium in the TEF liquid effluent sent to ETF is expected to be well below the U.S. Environmental Protection Agency's (EPA's) drinking water limit of less than 20,000 picoCuries per liter.

The estimated cumulative dose from all SRS activities to the maximally exposed member of the public from liquid releases would be **2.9×10^{-4}** rem (**0.29** millirem) per year, well below the regulatory standard of 4 millirem per year (40 CFR Part 141). Adding the population doses associated with current and projected SRS activities to the SRS baseline would increase the cumulative annual dose to **2.9** person-rem from liquid sources. This translates into **1.4×10^{-3}** latent cancer fatality for each year of exposure of the population living downstream of the SRS. For comparison, 15,300 deaths from cancer due to all causes would be likely in the population of 65,000 downstream residents over their lifetimes.

5.3 Public and Worker Health

Text was added to Section 5.3 on page 5-6 of the Draft EIS, Public and Worker Health, to expand the discussion on the public and worker health impacts presented in Table 5-4 on page 5-7 of the Draft EIS.

Table 5-4 summarizes the annual cumulative radiological doses and resulting health effects to the offsite population and site workers from routine SRS operations, based on 1996 data and proposed DOE actions. Impacts resulting from proposed DOE actions are described in the environmental documents listed earlier. In additionto estimated radiological doses to the

Table 5-4. Estimated average annual cumulative radiological doses and resulting health effects to offsite population and facility workers.[a]

Activity	Maximally exposed individual: Dose from airborne releases (rem)	Dose from liquid releases (rem)	Total dose (rem)	Probability of fatal cancer[b]	Offsite population: Collective dose from airborne releases (person-rem)	Collective dose from liquid releases (person-rem)	Total collective dose	Latent cancer fatalities[c]	Involved workers: Collective dose (person-rem)	Latent cancer fatalities[c]
SRS baseline[d]	5.0×10^{-5}	1.4×10^{-4}	1.9×10^{-4}	9.5×10^{-8}	2.8	2.2	5.0	2.5×10^{-3}	164	0.066
Tritium Extraction Facility	2.0×10^{-5}	(e)	2.0×10^{-5}	1.0×10^{-8}	0.77	(e)	0.77	3.9×10^{-4}	4.0	1.6×10^{-3}
Accelerator Production of Tritium[f]	3.7×10^{-5}	1.5×10^{-5}	5.3×10^{-5}	2.6×10^{-8}	1.6	0.42	2.0	1.0×10^{-3}	88	0.035
Surplus HEU disposition[g]	2.5×10^{-6}	(e)	2.5×10^{-6}	1.3×10^{-8}	0.16	(e)	0.16	8.0×10^{-5}	11	4.4×10^{-3}
Interim Mgmt of Nuclear Materials[h]	9.7×10^{-4}	2.4×10^{-5}	9.9×10^{-4}	5.0×10^{-7}	40	0.09	40	0.02	127	0.051
Management of Spent Nuclear Fuel[i]	1.5×10^{-5}	5.7×10^{-5}	7.2×10^{-5}	3.6×10^{-8}	0.56	0.19	0.75	3.8×10^{-4}	55	0.022
Management Plutonium Residues/ Scrub Alloy[j]	5.7×10^{-7}	(e)	5.7×10^{-7}	2.9×10^{-10}	6.2×10^{-3}	(e)	6.2×10^{-3}	3.1×10^{-6}	8.0	3.2×10^{-3}
Surplus Plutonium Disposition[k]	4.0×10^{-6}	(e)	4.0×10^{-6}	2.0×10^{-9}	1.6	(e)	1.6	8.0×10^{-4}	561	0.22
Defense Waste Processing Facility[l]	1.0×10^{-6}	0	1.0×10^{-6}	5.0×10^{-10}	7.1×10^{-2}	0	7.1×10^{-2}	3.6×10^{-5}	120	0.048
Plant Vogtle[m]	5.4×10^{-7}	5.4×10^{-5}	5.5×10^{-5}	2.7×10^{-8}	0.042	2.5×10^{-3}	0.045	2.2×10^{-5}	NA	NA
Total[n]	1.1×10^{-3}	2.9×10^{-4}	1.4×10^{-3}	7.0×10^{-7}	48	2.9	50	0.025	1,138	0.45

a. Collective dose to the 50-mile population for atmospheric releases and to the downstream users of the Savannah River for aqueous releases.
b. NCRP (1993); expressed as the "probability" of a latent cancer fatality when applying the NCRP dose-to-risk conversion factor to an individual rather than a population.
c. Incidence of excess fatal cancers.
d. Arnett and Mamatey (1997) for 1996 data for MEI and population. Worker dose is based on 1997 data (WSRC 1998).
e. Less than minimum reportable levels.
f. **England (1998a); Willison (1998); DOE, (1999a).**
g. DOE (1996); HEU = highly enriched uranium.
h. DOE (1995b).
i. **DOE (1998c).**
j. **DOE (1998a).**
k. DOE (1998b).
l. **DOE (1994).**
m. NRC (1996).
n. **Totals are rounded to 2 significant figures.**

NA = not available.

hypothetical maximally exposed individual and the offsite population, Table 5-4 lists potential latent cancer fatalities for the public and workers due to exposure to radiation.

The radiation dose to the maximally exposed offsite individual from air and liquid pathways is estimated to be 1.4×10^{-3} rem (1.4 mrem) per year, which is well below the applicable DOE regulatory limits (10 mrem per year from the air pathway, 4 mrem per year from the liquid pathway, and 100 mrem per year for all pathways). The total population dose for current and projected activities of 50 person-rem translates into 0.025 additional latent cancer fatality for each year of exposure for the population living within a 50-mile radius of the SRS. As stated in Section 5.1, for comparison, 145,700 deaths from cancer due to all causes would be likely in the same population over their lifetimes.

The annual radiation dose to the involved worker population would be 1,138 person-rem. The largest contributor to the dose is Alternative 3B in the Surplus Plutonium Disposition EIS. Specifically, the dose is associated with the operation of a plutonium disassembly and conversion facility that could be sited at SRS. It also should be noted that dose to the individual worker will be kept below the regulatory limit of 5,000 mrem per year (10 CFR 835). In addition, as low as reasonably achievable (ALARA) practices help maintain worker doses below DOE's administrative control level of 2,000 mrem per year and facility. SRS-specific administrative control levels are as low as 700 mrem per year.

5.4 Waste Generation

Table 5-5 lists cumulative volumes of high-level, low-level, transuranic, hazardous, and mixed wastes that the SRS would generate, based on the 30-year expected waste forecast (WSRC 1994) which includes tritium recycling waste. The waste forecasts for TEF and other proposed activities are included in the estimates. The 30-year expected waste forecast is based on operations and the following assumptions: secondary waste from DWPF, In-Tank Precipitation, and Extended Sludge Processing operations as described in the DWPF EIS; high-level waste volumes based on the selected option for the F-Canyon Plutonium Solutions EIS and the Interim Management of Nuclear Materials at SRS EIS; some investigation-derived wastes handled as hazardous waste per Resource Conservation and Recovery Act (RCRA) regulations; purge water from well sampling handled as hazardous waste; and continued receipt of small amounts of low-level waste from other DOE facilities and nuclear naval operations. Amounts of waste generated from decontamination and decommissioning and planned environmental restoration projects are also included in the waste forecast. The estimated quantity in this forecast of waste from operations during the next 30 years is 603,000 cubic meters. In addition, environmental restoration and decontamination and decommissioning activities identified in the 30-year forecast would produce an additional 712,000 cubic meters (WSRC 1994; Hess 1995). **Other proposed activities that were not included in the 30-year expected waste forecast** (exclusive of decontamination and decommissioning) would add **211,705** cubic meters. Therefore, the total amount of waste from SRS activities exclusive of TEF is estimated to be **1,526,705** cubic meters. **It is anticipated that SRS will have the capacity to handle the total amount of projected waste.**

As stated in Section 4.1.1.5, low-level waste would be generated from TEF operations activities. Mixed and hazardous wastes would be generated from TEF maintenance activities. High-level and transuranic waste would not be generated at TEF. The total waste volume associated with TEF activities (excluding decontamination and decommissioning) would be **9,430** cubic meters. **The TEF post-treatment waste volume would require less than 1 percent of the low-activity waste and intermediate-level tritium waste vault disposal capacities per year. TEF hazardous and mixed waste also would require less than 1 percent of their respective storage capacities at SRS.**

The Three Rivers Solid Waste Authority Regional Landfill at SRS is being built for the

Table 5-5. Estimated life-of-project waste disposal volumes from SRS projected activities (cubic meters).

Waste Type	SRS projected activities[a,b]	ER/D&D[c]	TEF	Other proposed activities[c]	Total
High-level	150,750	0	0	**11,032**	**161,782**
Low-level	343,710	132,000	**9,300**	**186,653**	**671,663**
Hazardous/mixed	90,450	575,180	**130**	**5,030**	**670,790**
Transuranic	18,090	4,820	**0**	**8,990**	**31,900**
Total	603,000	712,000	**9,430**	**211,705**	**1,536,135**

a. **Sources: WSRC (1994); Hess (1995).**
b. Based on a total 30-year expected waste generation forecast, **but does not include Environmental Restoration and Decontamination and Decommissioning activities.**
c. **Life cycle waste associated with reasonably foreseeable future activities such as APT, spent nuclear fuel management, highly-enriched uranium blend-down activities, Rocky Flats plutonium residues, surplus plutonium disposition, and CLWR-associated waste.**

disposal of nonhazardous and nonradioactive solid wastes from the SRS and eight South Carolina counties. This municipal solid waste landfill is intended to provide modern (Subtitle D) facilities for landfilling solid wastes while reducing the environmental consequences associated with construction and operation of multiple county-level facilities (DOE 1995b). It was designed to accommodate combined SRS and county solid waste disposal needs for at least 20 years, with a projected maximum operational life of 45 to 60 years (DOE 1995b). The landfill is designed to handle an average of 1,000 tons per day and a maximum of 2,000 tons per day of municipal solid wastes. The SRS and eight cooperating counties had a combined generation rate of 900 tons per day in 1995. The Three Rivers Solid Waste Authority Regional Landfill **began accepting waste on July 1, 1998.**

TEF would not generate large volumes of radioactive, hazardous, or solid wastes and would have little impact on existing or planned capacities of SRS waste storage and management facilities.

5.5 Utilities and Energy

Table 5-6 lists the cumulative consumption of electricity from SRS activities. The values are based on annual consumption estimates. This would be a significant increase in electricity usage at SRS. Because the source of this electricity would be dispersed across the electric grid that serves SRS, DOE cannot estimate site- specific impacts from increased electricity requirements. The estimated annual electricity consumption by TEF (20,600 megawatt-hours) would be small compared to existing site electricity usage.

Table 5-6. Estimated average annual cumulative electrical consumption.

Activity	Electricity consumption (megawatt-hours)
1993 SRS usage[a]	660,000
Tritium Extraction Facility[b]	20,600
Accelerator Production of Tritium[c]	3,100,000
Defense Waste Processing Facility[d]	32,000
Surplus HEU disposition[e]	5,000
Interim Management of Nuclear Materials[f]	140,000
Management of Spent Nuclear Fuel[g]	**23,600**
Management Plutonium Residues/Scrub Alloy[h]	**9,800**
Surplus Plutonium Disposition[i]	**38,000**
Total estimated annual consumption	**4,029,000**

a. DOE (1995e).
b. Vozniak (1997).
c. **England (1998a); Willison (1998).**
d. DOE (1994).
e. DOE (1996); HEU = highly enriched uranium.
f. DOE (1995c).
g. **DOE (1998c).**
h. **DOE (1998a)**
i. **DOE (1998b).**

5.6 Socioeconomics

DOE did not revise the section on socioeconomics (Section 5.6, page 5-9 in the Draft EIS). Although processing of plutonium residues from Rocky Flats Environmental Technology Site (DOE 1997c) and construction and operation of one to three facilities for surplus plutonium disposition (Pit Conversion Facility, Immobilization Facility, and a Mixed-Oxide Facility) at SRS (DOE 1998d) may result in a slight increase in regional employment, these actions should not have a major impact on regional economy. The additional jobs associated with plutonium management and disposition would likely offset potential reductions in the SRS workforce. Data for these actions have not been analyzed because differences identified would be less than the precision of the measurement and would not change the conclusions drawn on the cumulative socioeconomic effects.

Appendix B. Modifications – Accident Analysis

Two references in Appendix B were replaced with current revisions. One reference was deleted because at the time of its publication (1993), it was considered unclassified controlled nuclear information.

Patel (1996) was changed to Patel (1997). The new reference is:

Patel, S. M., 1997, *Hazardous Evaluation Tables for the Commercial Light Water Reaction-Tritium Extraction Facility (U)*, S-CLC-00525, Revision B, Westinghouse Savannah River Company, Aiken, South Carolina, December.

Mangiante (1997) was changed to Mangiante (1998). The new reference is:

Mangiante, W. R., 1998, *Hazard Assessment Document Commercial Light Water Reactor-Tritium Extraction Facility*, Revision 2, Westinghouse Savannah River Company, Aiken, South Carolina, October.

East (1997) has been deleted.

References

Arnett, M. W. and A. R. Mamatey, 1997, *Savannah River Site Environmental Data for 1996*, WSRC-TR-96-077, Savannah River Site, Aiken, South Carolina.

Bauer, L. R., 1991, *Modeling Chronic Atmospheric Releases at the SRS: Evaluation and Verification of XOQDOQ*, WSRC-RP-91-320, Savannah River Laboratory, Aiken, South Carolina.

BSRI (Bechtel Savannah River, Inc.), 1997, Project S-6091, *Commercial Light Water Reactor Tritium Extraction Facility (CLWR-TEF)*, CLWR-TEF Study No. 68, Liquid Effluent Summary, M-ADS-H-00018, Rev. 0.

Cunningham, M. E., 1996, "Tritium Target Qualification Project, Pacific Northwest National Laboratory, Richland, Washington, CLWR-Initial Information on Expected Levels of External Crud and Contamination on TPBARs; Attachment from K. G. Turnage, Southern Nuclear Company, Augusta, Georgia," letter to W. F. Brizes, Westinghouse Savannah River Company, Aiken, South Carolina, September 4.

DOE (U.S. Department of Energy), 1994, *Final Supplemental Environmental Impact Statement for the Defense Waste Processing Facility*, Savannah River Operations Office, Aiken, South Carolina.

DOE (U.S. Department of Energy), 1995a, *Savannah River Site Waste Management Final Environmental Impact Statement*, DOE/EIS-0217, Savannah River Operations Office, Aiken, South Carolina.

DOE (U.S. Department of Energy), 1995b, *Environmental Assessment for the Construction and Operation of the Three Rivers Solid Waste Authority Regional Waste Management Center at the Savannah River Site*, DOE/EA-1079, Savannah River Operations Office, Aiken, South Carolina.

DOE (U.S. Department of Energy), 1995c, *Final Environmental Impact Statement Interim Management of Nuclear Materials*, DOE/EIS-0220, Savannah River Operations Office, Aiken, South Carolina.

DOE (U.S. Department of Energy), 1995d, *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling*, DOE/EIS-0161, Office of Reconfiguration, Washington, D.C.

DOE (U.S. Department of Energy), 1995e, *Data Report on Tritium Extraction Facility for Commercial Light Water Reactor*, Office of Reconfiguration, Washington, D.C.

DOE (U.S. Department of Energy), 1996, *Disposition of Surplus Highly Enriched Uranium Final Environmental Impact*, DOE/EIS-0161, Office of Fissile Materials Disposition, Washington, D.C.

DOE (U.S. Department of Energy), 1997a, *Environmental Assessment for the Tritium Facility Modernization and Consolidation Project at the Savannah River Site*, DOE/EA-1222, Savannah River Operations Office, Aiken, South Carolina.

DOE (U.S. Department of Energy), 1997b, *Conceptual Design Report for Commercial Light Water Reactor (CLWR) Tritium Extraction Facility (TEF) Project S-6091 (U) Volume 1*, 98-D-125, Commercial Light Water Reactor Project Office, Aiken, South Carolina, July 8.

DOE (U.S. Department of Energy), 1998a, *Final Environmental Impact Statement on Management of Certain Plutonium Residues and Scrub Alloy Stored at the Rocky Flats Environmental Technology Site*, DOE/EIS-0277F, Assistant Secretary for Environmental Management, Washington, D.C.

DOE (U.S. Department of Energy), 1998b, *Draft Surplus Plutonium Disposition Environmental Impact Statement*, DOE/EIS-0283D, Office of Fissile Materials Disposition, Washington, D.C.

DOE (U.S. Department of Energy), 1998c, *Draft Environmental Impact Statement for Savannah River Site Spent Nuclear Fuel Management*, Savannah River Operations Office, Aiken, South Carolina, July.

DOE (U.S. Department of Energy), 1999a, *Final Environmental Impact Statement, Accelerator Production of Tritium at the Savannah River Site*, DOE/EIS-270, Savannah River Operations Office, Aiken, South Carolina.

DOE (U.S. Department of Energy), 1999b, *Final Environmental Impact Statement for the Production of Tritium in a Commercial Light Water Reactor*, DOE/EIS-0288F, Assistant Secretary for Defense Programs, Washington, D.C.

Eckerman, K. F., F. J. Congel, A. K. Roecklein, and W. J. Pasciak, 1980, *Users Guide to Gaspar Code*, NUREG-0597, U.S. Nuclear Regulatory Commission, Washington, D.C.

England, J., 1998a, "Augmentation of Previous Radiological Air and Water Emissions Estimates from Routine Operations," SPM-APT-98-0051, interoffice memorandum, Westinghouse Savannah River Company, Aiken, South Carolina, April 20.

England, J., 1998b, "Re: Al-Li Target Info. – APT/TEF EISs – Minutes/Actions," interoffice memorandum to Robert Smith, Westinghouse Savannah River Company, Aiken, South Carolina, February 17.

Halverson, N. V., L. D. Wike, K. K. Patterson, J. A. Bowers, A. L. Bryan, K. F. Chen, C. L. Cummins, B. R. del Carmen, K. L. Dixon, D. L. Dunn, G. P. Friday, J. E. Irwin, R. K. Kolka, H. E. Mackey, Jr., J. J. Mayer, E. A. Nelson, M. H. Paller, V. A. Rogers, W. L. Specht, H. M. Westbury, and E. W. Wilde, 1997, *Savannah River Site Ecology Environmental Information Document*, WSRC-TR-97-0223, Westinghouse Savannah River Company, Savannah River Site, Aiken, South Carolina.

Hamby, D. M.,1992, *Verification of GASPAR Dose Assessment Module Used in MAXIGASP and POPGASP*, WSRC-RP-92-418, Savannah River Laboratory, Aiken, South Carolina.

Hess, M. L., 1995, Westinghouse Savannah River Company, Aiken, South Carolina, "WSRC Data Transmittal - Summary of Changes Between Draft and Final WMEIS Forecasts and Alternatives," ESH-NEP-95-0084, interoffice memorandum to H. L. Pope, U.S. Department of Energy, Savannah River Operations Office, Aiken, South Carolina, May 15.

Migliore, R. J., 1998, "Activated Particulate Release from a Punctured TPBAR," PNNL memo: TTQP-1-2036, Pacific Northwest National Lab, Richland, WA, 1998.

NRC (U.S. Nuclear Regulatory Commission), 1996, *Dose Commitments Due to Radioactive Releases from Nuclear Power Plant Sites in 1992*, NUREG/CR 2850, Vol. 14, Washington, D.C.

ORNL (Oak Ridge National Laboratory), 1991, Demographic database on 1980 census, Oak Ridge, Tennessee.

Sagendorf, J. F., J. T. Croll, and W. F. Sandusky, 1976, *XOQDOQ: Computer Program for the Meteorological Evaluation of Routine Effluent Releases at Nuclear Power Stations*, NUREG/CR-2919, U.S. Regulatory Commission, Washington, D.C.

SCDHEC (South Carolina Department of Health and Environmental Control), 1976, South Carolina Code of Laws, SCDHEC Regulations 61-62, "Air Pollution Control Regulations and Standards," Columbia, South Carolina.

SCDHEC (South Carolina Department of Health and Environmental Control), 1995, *South Carolina Nuclear Facility Monitoring - Annual Report 1995*, Columbia, South Carolina.

Simpkins, A. A., 1997a, "Atmospheric Dose Modeling for Tritium Extraction Facility EIS," SRT-EST-97-0469, interoffice memorandum to C. B. Shedrow, Westinghouse Savannah River Company, Aiken, South Carolina, December 10.

Simpkins, A. A., 1997b, "TEF EIS Routine Release Environmental Dosimetry Calculations," SRT-EST-97-466, interoffice memorandum to C. B. Shedrow, Westinghouse Savannah River Company, Aiken, South Carolina.

Simpkins, A. A., 1998, "APT EIS Routine Release Environmental Dosimetry Calculations – Stack Height = 80m," interoffice memorandum to C. B. Shedrow, Westinghouse Savannah River Company, Aiken, South Carolina, April 22.

Simpkins, A.A., 1999, "APT EIS Routine Release Environmental Dosimetry Calculations – Addional Radionuclides," SRT-EST-99-107, interoffice memorandum to C. B. Shedrow, Westinghouse Savannah River Company, Aiken, South Carolina, January 13.

Smith, R., 1997a, "Re: TEF Stack Emissions – Draft Estimates/Confirmed Valid," U.S. Energy, Aiken, South Carolina, memorandum to C. B. Shedrow, Westinghouse Savannah River Company, Aiken, South Carolina, December 10.

Smith R., 1997b, "TEF Construction Waste Estimate for EIS," Westinghouse Savannah River Company, Aiken, South Carolina, December 4.

Smith R., 1998a, "AGNS Emissions for CLWR Targets," Westinghouse Savannah River Company, Aiken, South Carolina, February 20.

Smith, R. 1998b, "Co-60 Emissions Reductions and Revisions of CLWR-TEF DEIS," Westinghouse Savannah River Company, Aiken, South Carolina, April 2.

Vozniak, G., 1997, Bechtel Savannah River, Inc., Aiken, South Carolina, "Project S-6091 Commercial Light Water Reactor Tritium Extraction Facility (CLWR-TEF). EIS Data Call Input, Transmittal of Utility Data (U)," memorandum to C. B. Shedrow, Westinghouse Savannah River Company, Aiken, South Carolina, December 10.

Willison, J. S., 1998, Design Parameters and Expected Impacts from Construction and Operation of Tritium Extraction Functions Combined with the Accelerator Production of Tritium Project, TtNUS-APT-98-001, Tetra Tech NUS, Inc., Aiken, South Carolina, April.

WSRC (Westinghouse Savannah River Company), 1994, *Thirty-Year Solid Waste Generation Forecast for Facilities at SRS*, Revision 3, WSRC-RP-94-532, Savannah River Site, Aiken, South Carolina.

WSRC (Westinghouse Savannah River Company), 1997, *Process Waste Assessment*, WSRC-TR-96-0294, Rev. 1, Savannah River Site, Aiken, South Carolina.

WSRC (Westinghouse Savannah River Company), 1998, *Savannah River Site Radiological Performance, 4th Quarter 1997*, ESH-SHP-98-0007, Savannah River Site, Aiken, South Carolina.

INDEX

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Brenda Hays	J.D., 1986	Contributing author to Chapter 7; DOE reviewer of Draft EIS	6 years preparing NEPA documents; 11 years experience as attorney
Michael O. Hickman	B.S., Engineering Science, 1978	DOE reviewer of Draft EIS; contributing author to Chapters 1, 2, and 6, and Appendix A	2 years preparing NEPA documents; 17 years in nuclear engineering and project management
Richard L. Huskin	A.S., Nuclear Science, 1969	Primary DOE reviewer for health physics sections of Chapter 3 and Appendix B	2 years preparing NEPA documents; 28 years in applied health physics and radiation protection

Name	Degree	Expertise	Experience
Ronald Jernigan	B.S., Geography, 1973	Reviewer of Chapters 3 and 6	14 years reviewing NEPA documents; 25 years in real estate management
John Knox	M.S., Botany, 1974 B.S., Biology, 1972	Document Manager; prepared Summary and Chapter 1; principal DOE reviewer of Draft EIS; contributing author to Chapter 3	4 years preparing or reviewing NEPA documents; 24 years in environmental analysis and environmental management
David Roberts	B.S., Nuclear Engineering, 1979	Contributing author to Chapters 3 and 7	5 years preparing NEPA documents; 20 years in regulatory compliance
Dennis P. Ryan	M.B.A., Business Administration, 1980 M.S., Planning, 1976 B.S., Economics, 1974	Contributing author to Chapters 3 and 7	2 years experience in land use planning at TVA (Environmental Division); 10 years experience in preparing NEPA documents; 28 years in environmental services
Thomas Temples	M.S., Geology, 1978 B.S., Geology, 1976	Contributing author to Chapter 3	4 years preparing NEPA documents; 18 years as a geophysicist
Richard Viviano	M.S., Management, 1985 B.S., Mechanical Engineering, 1975	DOE reviewer of Draft EIS; contributing author to Chapters 1 and 2 and Appendix A	7 years preparing NEPA documents; 26 years of navy and commercial light water reactor engineering, design, construction, operation and research and development
Tetra Tech NUS, Inc.			
John B. Bland	M.A., Economics, 1982 B.S., Mathematics, 1970	Prepared socioeconomics and environmental justice sections of Chapter 4	4 years preparing NEPA documents; 20 years in environmental and emergency management, military, and commercial security

Name	Degree	Expertise	Experience
Bruce H. Bradford, P.E.	Ph.D., Civil Engineering, 1974 M.S., Civil Engineering, 1966 B.S., Civil Engineering, 1965	Project Manager for TtNUS; contributing author to Chapters 1, 2, 3, 6, and 7	14 years preparing NEPA documents; 30 years in civil engineering specializing in hydrology, hydraulics, and water resources
Steven J. Connor	M.S., Physics, 1974 B.S., Physics, 1973	Reviewer of noise, transportation, and environmental radiation sections of Chapter 4	7 years preparing NEPA documents; 22 years in scientific, educational, and engineering disciplines
William J. Craig	M.S., Planning, 1977 B.S., Forestry, 1972	Reviewer of and contributing author to socioeconomics sections of Chapter 4	10 years preparing NEPA documents; 20 years utility fuel planning and powerplant siting
Kent Cubbage	M.S., Ecotoxicology, 1993 B.S., Biology, 1991	Prepared ecological resources sections of Chapter 4	3 years preparing NEPA documents; 5 years as a ecotoxicologist
Alan A. Eckmyre, CHMM	B.E., Nuclear Engineering, 1981 B.S., Business Administration, 1979	Prepared waste management sections of Chapter 4	5 years preparing NEPA documents; 18 years in nuclear-environmental engineering
Scott Flickinger	M.E.M., Natural Resource Economics and Policy, 1988 B.A., Political Science and Biology, 1985	Reviewer of geology and groundwater sections of Chapter 4	4 years preparing NEPA documents; 10 years in site characterization and permitting
Gary L. Gunter, PG	B.S., Geology, 1984	Prepared geology and hydrogeology sections of Chapter 4	1 year preparing NEPA documents; 10 years as geologist/hydrogeologist
Kathryn B. Hauer, CHMM	M.A., English, 1985 B.A., English, 1983	Document manager; contributing author to Summary, Chapter 4 introduction, and front and back sections of EIS	6 years preparing NEPA documents; 11 years technical editing and writing experience

Name	Degree	Expertise	Experience
Brian A. Hill, CHMM	B.S., Environmental Health, 1988	Prepared occupational and public health and environmental justice sections in Chapter 4 and cumulative impacts in Chapter 5	2 years preparing NEPA documents; 11 years in health physics, industrial hygiene, emergency preparedness, and environmental science
Jeff Keenum	B.S., Geology, 1986	Prepared groundwater sections of Chapter 4	2 years preparing NEPA documents; 11 years preparing groundwater related reports; Registered Professional Geologist
Douglas Kennemore	M.S., Biology, 1995 B.S., Biology, 1991	Prepared visual resources, historic and archaeological resources, noise, and land use sections in Chapter 4	1 year preparing NEPA documents; 6 years in botany and plant community investigations
Lisa Matis	M.S., Mechanical Engineering, 1989 B.S., Chemical Engineering, 1984	Reviewer of waste management sections of Chapter 4	6 years preparing NEPA documents; 14 years in chemical-environmental engineering
Philip R. Moore	M.S., Wildlife & Fisheries Biology, 1983 B.A., English, 1975	Contributing author to and reviewer of aquatic ecology sections of Chapter 4	8 years preparing NEPA documents; 17 years as fishery biologist and aquatic ecologist
Aparajita S. Morrison, CHMM	B.S., Health Physics, 1985	Prepared occupational and public health and environmental justice sections of Chapter 4, and cumulative impacts in Chapter 5	2 years preparing NEPA documents; 11 years in environmental and occupational protection
James L. Oliver	B.S., Biology (Fisheries), 1971	Reviewer of sections on aquatic ecology, surface water, and wetlands in Chapter 4; author of No-Action Alternative section of Chapter 4	13 years preparing NEPA documents; 26 years in environmental research and impact assessment

Name	Degree	Expertise	Experience
Karen K. Patterson	M.A., Biology, 1977 B.A., Biology, 1973	Editor	5 years preparing NEPA documents; 25 years in ecology and environmental sciences
Eugene M. Rollins, CHP, CHMM	M.S.P.H., Health Physics, 1976 B.S., Nuclear Engineering, 1973	Reviewer of sections on occupational and public health, and accident analysis	3 years preparing NEPA documents; 19 years in radiological health protection
Diane S. Sinkowski, CHMM	M.E., Environmental Engineering, 1994 B.S., Nuclear Engineering Sciences, 1990	Prepared air quality sections of Chapter 4	3 years preparing NEPA documents; 6 years in air permitting, fate and transport modeling, human health impacts, environmental compliance, and health physics
James S. Willison, PE, CHP	M.S., Nuclear Engineering, 1982 B.S., Nuclear Engineering, 1980	Prepared accident analysis sections of Chapter 4	1 year preparing NEPA documents; 13 years of accident analyses at nuclear facilities; health physics and radiological engineering
Paul F. Wise, CEA, CHMM	M.S., Biology, 1984 B.S., Biology, 1982	Prepared surface water sections of Chapter 4	2 years preparing NEPA documents; 14 years in environmental, water quality, waste management, and environmental audits
Philip L. Young, CHP	M.S., Health Physics, 1989 B.S., Radiation Health, 1988	Reviewed public and worker health and safety, air resources, environmental justice, and cumulative impacts sections	6 years preparing NEPA documents; 10 years experience in environmental health physics and environmental impact assessment

OCI REPRESENTATION STATEMENT

Contract No. DE-AM04-97AL77613

Task Order No. DE-AT04-97SR22040

Construction and Operation of a Tritium Extraction Facility
at the Savannah River Site
Environmental Impact Statement

I hereby certify (or as a representative of my organization, I hereby certify) that, to the best of my knowledge and belief, no facts exist relevant to any past, present, or currently planned interest or activities (financial, contractual, personal, organizational or otherwise) which relate to the proposed work and bear on whether I have (or the organization has) a possible conflict of interest with respect to (1) being able to render impartial, technically sound, and objective assistance or advice, or (2) being given an unfair */ competitive advantage.

Signature: [signature] Date: 2/25/98

Name: Dean R. Sackett, Jr. Organization: Halliburton NUS Corporation

Title: Vice-President and General Manager

*/ An unfair competitive advantage does not include the normal flow of benefits from the performance of this contract.

GLOSSARY

A-weighted decibel (dBA)

A unit of weighted sound pressure level, measured by the use of a metering characteristic and the "A" weighting, which favors the human ear, specified by American National Standard Institute S1.4-1971(R176). (See *decibel*).

accelerator

A device that accelerates charged particles (e.g., *electrons* or *protons*) to high velocities so they have high kinetic energy (i.e., the energy associated with motion); it focuses the charged particles into a beam and directs them against a *target*.

adsorption

The adhesion (attachment) of a substance to the surface of a solid or solid particles.

air stripper

A device that blows air through effluent, sewage, groundwater, etc., and has an aerator that removes unwanted materials such as gases, volatile organic compounds, or synthetic detergents.

aquifer

A geologic formation that contains enough saturated porous material to permit movement of groundwater and to yield groundwater to wells and springs.

As Low As Reasonably Achievable (ALARA)

An approach to radiation protection that controls or manages exposures (both individual and collective to workers and general public) as low as social, technical, economic, practical and public policy considerations permit. ALARA is not a dose limit, but a process which has the objective of dose levels as far below applicable limits of 10 CFR 835 as is reasonably achievable. Particular attention is to be paid to this definition in design of facilities.

attainment area

An area that complies with *National Ambient Air Quality Standards* (NAAQS) for criteria pollutants; a *nonattainment area* does not meet these standards.

bedrock

The solid rock underlying surface materials (as soil).

benthic

Associated with the bottom of a body of water (ocean, lake, river, stream), as in "benthic organism."

Best Management Practices (BMP)

A practice or combination of practices that is determined by a state (or other planning agency) to be the most effective, practicable means of preventing pollution generated by nonpoint sources or reducing it to a level compatible with air or water quality goals.

beyond-design-basis accident

A beyond-design-basis accident is more severe than the design-basis accident. It generally involves multiple failures of engineered safety systems and has an occurrence probability of less than 10^{-6} per year.

bounding accident

An accident whose calculated consequences encompass all other possible accidents for that facility. For example, a bounding accident for the release of hazardous material from a storage tank would postulate the release of the entire tank contents. The consequences from this accident would be greater than the consequences of all other tank release scenarios.

bounding analysis

See bounding accident.

Carolina bay

Oval-shaped, intermittently flooded, marshy depression that occurs abundantly on the Coastal Plain of the Carolinas.

cesium

Naturally-occurring element with 55 protons in its nucleus. A radioactive isotope of cesium, cesium-137, is a common fission product.

cladding

The material that covers fuel and target assemblies in nuclear reactors.

colocated worker

A worker on the SRS who is not involved with the operation of the facility being evaluated or under the control of the Emergency Plan of that facility.

commercial light-water reactor

A reactor that uses regular water as the neutron moderator. Commercial reactors are owned and operated by utilities to produce electricity for consumers.

committed dose equivalent

The calculated *dose equivalent* received by a tissue or an organ during the 50-year period after a *radionuclide* is introduced into the body.

committed effective dose equivalent

The sum of the *committed dose equivalents* to various tissues/organs in the body multiplied by their appropriate tissue weighting factor. Equivalent in effect to a uniform external dose of the same value.

community (environmental justice)

A group of people or a site in a specified area exposed to industrial risks that could threaten health, ecology, or land values, or exposed to unwanted noise, smell, industrial traffic, particulate matter, or other unaesthetic impacts.

conceptual design

Name for the process to develop a facility that will meet project goals while ensuring feasible and attainable performance levels; develop project criteria and design parameters for all engineering disciplines; and identify applicable codes and standards, quality assurance requirements, environmental studies, construction materials, space allowances, energy conservation features, health and safety safeguards, security requirements, and other features or requirements of the project.

confining unit
A body of impermeable or distinctly less permeable material stratigraphically adjacent to one or more *aquifers*.

confluence
The point where two streams meet.

consequence
The result or effect (especially projected exposure to radiological or chemical hazards) of a release of hazardous materials to the environment.

crack
To break a compound into simpler molecules.

crud
For the purposes of this EIS, crud (short for Chalk River Unidentified Deposits) refers to oxidation residue attached to targets.

cryogenic distillation
Cryogenic distillation is used to separate different hydrogen isotopes.

cumulative impacts
Impacts on the environment including additive ecological, health, or socioeconomic effects that result from the addition of the impact of the proposed action to impacts from other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes the other actions (40 CFR 1508.7).

decay (radioactive)
The spontaneous transformation of one nuclide into a different nuclide or into a different energy state of the same nuclide. The process results in the emission of nuclear *radiation*.

decibel
A unit for measuring the relative loudness of sounds. In general, a sound doubles in loudness for every increase of 10 decibels.

decision maker
Group or individual responsible for making a decision on constructing and operating a tritium extraction facility at the Savannah River Site. Decision makers include DOE officials as specified in DOE Order 451.1A; elected officials; Federal, state, and local agency representatives; and the public.

Defense Waste Processing Facility
Savannah River Site facility that processes high-level radioactive waste into a glass form for transport to a permanent disposal site.

deflagration
Rapid burning with great heat and intense light.

deinventory
Packaging unused nuclear materials and placing them in storage on the SRS or at their source.

demographic

Related to the statistical study of human populations, including size, density, distribution, and vital statistics such as age, gender, and ethnicity.

design-basis accident

For nuclear facilities, a postulated abnormal event used to establish the performance requirements of structures, systems, and components to (1) maintain them in a safe shutdown condition indefinitely or (2) prevent or mitigate the consequences of an accident to the general public and operating staff (i.e., prevent exposure to radiation in excess of appropriate guideline values). Normally, a design-basis accident is the accident that causes the most severe consequences when engineered safety features function as intended. **Typically these events have an occurrence probability of greater than 10^{-6} per year.**

design-basis events

The set of events that serve as part of the basis for the establishment of design requirements for systems, structures, and components within a facility.

dose

The energy imparted to matter by *ionizing radiation*. The unit of absorbed dose is the *rad*, which is equal to 0.01 joule per kilogram of irradiated material in any medium.

dose equivalent

A term used to express the amount of effective radiation when modifying factors have been considered. It is the product of absorbed dose (rads) multiplied by a quality factor and other modifying factors. It is measured in rem (Roentgen equivalent man).

dry storage area

An area in the remote handling area of the tritium extraction facility that will store incoming storage/shipping containers. Shielding of stainless steel and concrete will protect personnel.

E-Area Waste Storage Facility

Facilities on the Savannah River Site (SRS) that store wastes generated by SRS activities.

ecosystem

The community of living things and the physical environment in which they live.

effluent

A liquid or airborne material released to the environment; in common usage, a liquid release.

effluent monitoring

The collection and analysis of samples to measure liquid and gaseous effluents to characterize and quantify contaminants, to assess *radiation exposure* to members of the public, and to demonstrate compliance with applicable standards effluent monitoring; occurs at the point of discharge, such as an air stack or drainage pipe.

EIS (environmental impact statement)

A legal document required by the National Environmental Policy Act (NEPA) of 1969, as amended, for Federal actions involving significant or potentially significant environmental impacts. A tool for decisionmaking, it describes the positive and negative impacts of the proposed action and the alternative actions.

electron

An elementary particle with a mass of 9.107×10^{-28} gram (or 1/1837 of a *proton*) and a negative charge. Electrons surround the positively charged nucleus and determine the chemical properties of the atom.

emission standards

Legally enforceable limits on the quantities and kinds of air contaminants that may be emitted to the atmosphere.

environment

The sum of all external conditions and influences affecting the life, development, and ultimately the survival of an organism.

environmental justice

The fair treatment of people of all races, cultures, incomes, and educational levels with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment implies that no population of people should be forced to shoulder a disproportionate share of the negative environmental impacts of pollution or environmental hazards due to a lack of political or economic strength.

environmental surveillance

The collection and analysis of samples of air, water, soil, foodstuffs, biota, and other media and the measurement of external *radiation* to demonstrate compliance with applicable standards, assess radiation exposures to members of the public, and assess effects, if any, on the local environment.

exposure (to radiation)

The incidence of *radiation* on living or inanimate material by accident or intent. Background exposure is the exposure to natural background ionizing radiation. Occupational exposure is the exposure to ionizing radiation that occurs during a person's working hours. Population exposure is the exposure to a number of persons who inhabit an area.

exposure pathway

The way a chemical or physical agent gets from its source to an organism. The pathway describes the way an individual or population is exposed to the chemical or physical agent. Each exposure pathway must have a source, a release from the source, an exposure point, and a method of exposure (ingestion, breathing, etc.). If the exposure point differs from the source, a transport/exposure medium (e.g., air) and an exposure route is included in the pathway.

extraction basket

Hardware that hold a bundle of reactor targets (tritium sources) during the high temperature extraction process which releases tritium and other process gases.

fault (geological)

A fracture in the earth's crust accompanied by a displacement of one side in relation to the other.

floodplain

The relatively flat valley floors adjacent to and formed by rivers subject to flooding. When the river floods, the floodplain is inundated.

getters
The material in a target rod that collects the tritium produced when the rod is in a reactor.

glovebox
Large sealed enclosure that contains equipment used to process hazardous materials. A glovebox is normally constructed of stainless steel with large acrylic/lead glass windows. Workers are physically separated from the hazardous material, but can manipulate the equipment with heavy-duty, lead-impregnated rubber gloves, whose cuffs are sealed in portholes in the glovebox windows.

gross regional product
The total value of the goods and services produced in a defined region.

half-life (radiological)
The time it takes for the radioactivity of a *radioactive isotope* to decay by half. Half-lives vary from millionths of a second to billions of years.

hazard analysis
A comprehensive assessment of facility hazards and/or accidents that could produce undesirable consequences for the onsite population, the public, and/or the environment. Included in the analysis are hazard identification, screening for common hazards, postulation of release events, screening for hazardous release events, defense-in-depth evaluation, and risk grouping of events.

hazardous waste
Waste (solid, semisolid, or liquid) with the characteristics of ignitability, corrosivity, toxicity, or reactivity, as defined by the *Resource Conservation and Recovery Act* and identified or listed in 40 CFR 261 or the Toxic Substances Control Act.

heavy water
Water in which the hydrogen of the water molecule consists entirely of the heavy hydrogen isotope having a mass number of 2; also called deuterium oxide (D_2O).

heavy water reactor
A nuclear reactor in which *heavy water* serves as a neutron moderator and sometimes as a coolant.

HEPA filters
High Efficiency Particulate Air filters filter air and gases to remove particulate matter that is smaller than a micron.

high-level waste
The highly *radioactive* wastes that result from the chemical processing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid waste derived from the liquid. High-level waste contains a combination of transuranic waste and fission products in concentrations requiring permanent isolation.

HVAC fans
Heating, ventilation, and air conditioning fans.

hydrogen isotope separation
System used to separate different hydrogen isotopes using the TCAP process (see below).

incineration
The efficient burning of combustible solid and liquid wastes to destroy organic constituents and reduce the volume of the waste. The greater the burning efficiency, the cleaner the air emission. Incineration of *radioactive* materials does not destroy the *radionuclides* but does significantly reduce the volume of the waste.

inerted
For the purposes of this EIS, a term to describe the process of replacing the air in a confined space with nitrogen gas.

inert module
A container, filled with non-reactive gas, where targets are prepared remotely for tritium extraction.

inert separation
For the purposes of this EIS, a system used to separate nitrogen or inert gases from hydrogen isotopes.

inert transporter
For the purposes of this EIS, a transporting device filled with nitrogen gas to prevent a chemical reaction. Targets are moved among inert modules and to the furnace in the inert transporter.

infrastructure
The system of public works of a county, state, or region; also, the resources (buildings or equipment) required for an activity.

irradiated
A term to describe target rods that have been exposed to *radiation* in a reactor such as commercial light water reactor.

irradiation
Exposure to *radiation*.

isotope
An isotope of a chemical element has the same atomic number (i.e., number of protons) but has a different atomic mass (i.e., number of neutrons plus protons) than other isotopes of the same element. That is, although the number of protons always remains fixed for an element, the number of neutrons may vary, giving rise to different isotopes of that element. Isotopes of an element display identical chemical properties. Isotopes may be radioactive.

jurisdictional wetlands
Wetlands that are protected by the Clean Water Act. The U.S. Army Corps of Engineer requires a permit to fill or dredge jurisdictional wetlands.

latent cancer fatalities
Deaths resulting from cancer that became active sometime after the exposure to the carcinogen that induced the cancer.

laydown
Area of construction site used to sort and store construction materials.

LiAl
The chemical symbols for lithium and aluminum and which describes one type of target that could be irradiated in an accelerator to produce tritium.

light water
Term used to distinguish ordinary water from heavy water. (A light water reactor uses ordinary water as the neutron moderator.) Heavy water, on the other hand, is D_2O, deuterium oxide. Deuterium is an isotope of hydrogen with an atomic mass of 2 or twice that of hydrogen.

light-water reactor
A nuclear *reactor* that uses ordinary water to moderate (reduce the energy of) the *neutrons* created in the core by fission reactions.

low-income community
A community in which 25 percent or more of the population lives in poverty.

low-level waste
Radioactive waste not classified as *high-level waste*, transuranic waste, *spent nuclear fuel*, or byproduct material.

maximally exposed individual
A hypothetical member of the public at the SRS boundary who receives the maximum possible *dose equivalent* from a given exposure scenario.

metal hydride bed
A vessel filled with a metal which will form a hydride when exposed to hydrogen isotopes. These beds are typically used for storage of hydrogen isotopes.

millirem
One thousandth of a *rem*. (See *rem*.)

minority communities
A community whose minority population is equal to or greater than the average minority population of a defined area or jurisdiction. A minority is classified by the U.S. Bureau of the Census as Black, Hispanic, Asian and Pacific Islander, American Indian, Eskimo, Aleut, or other nonwhite persons.

mixed waste
Waste material that contains both *hazardous waste* and *radioactive*, special nuclear, or byproduct material (subject to the Atomic Energy Act of 1954).

National Ambient Air Quality Standards
Air quality standards established by the Clean Air Act, as amended in 1990. The primary National Ambient Air Quality Standards are intended to provide the public with an adequate margin of safety, and the secondary National Ambient Air Quality Standards are intended to protect the public from known or anticipated adverse impacts of a pollutant.

National Pollutant Discharge Elimination System
Federal system that permits liquid effluents regulated through the Clean Water Act, as amended.

National Register of Historic Places
A list maintained by the Secretary of the Interior of districts, sites, buildings, structures, and objects of prehistoric or historic local, state, or national significance.

neutron
An uncharged nuclear particle that has a mass approximately the same as that of a *proton*; it is present in all atomic nuclei except that of hydrogen-1. A free neutron is unstable and decays with a half-life of about 13 minutes into an electron and a proton.

nitrogen inerted
Describes when the internal atmosphere of a system, structure or device completely consists of nitrogen.

nitrogen inerted modules
Describes when a module's internal atmosphere consists completely of nitrogen.

nonattainment area
See *attainment area.*

nuclide
An atomic nucleus specified by atomic weight, atomic number, and energy state; a *radionuclide* is a radioactive nuclide.

overpacking
The act of placing packaged radioactive waste into a second container for transport and/or disposal. At TEF, extracted targets and the extraction basket would be placed into a steel tube (the overpack) designed to go into an SRS waste storage facility.

oxides of nitrogen (NO_x)
Primarily nitrogen oxide (NO) and nitrogen dioxide (NO_2), these compounds are produced in the combustion of fossil fuels, and contribute to air pollution.

ozone
A compound of oxygen in which three oxygen atoms are chemically attached to each other. Ozone is an air pollutant.

pellets
One configuration of the reactive material in a target rod.

person-rem
The measure of radiation dose commitment to a specific population; the sum of the individual doses received by a population.

pH
A measure of the hydrogen ion concentration in an aqueous (made from, with, or by water) solution. Pure water has a pH of 7, acidic solutions have a pH less than 7, and basic solutions have a pH greater than 7.

pre-conceptual design
Pre-conceptual design involves the development of the preliminary information necessary to define a project. This preliminary information consists of (1) Statement of Mission Need (why the project is needed), (2) preliminary functional and technical requirements (how the project will satisfy the need), and (3) the development of the preliminary budgetary information (very rough estimate of the total cost of the project). This preliminary information is then used to obtain DOE Program office approval to proceed into the further developmental stages of the project.

process hood
An enclosure which contains equipment for processing tritium. A process hood is maintained at a slight negative pressure with a high velocity air in-flow.

process stripper
Equipment used to reduce the concentration of unwanted materials in air or some other gaseous atmosphere.

proton
A nuclear particle with a positive charge equal in magnitude to the negative charge of the *electron*; it is a constituent of all atomic nuclei, and the atomic number of an element indicates the number of protons in the nucleus of each atom of that element.

quantitative analysis
Analysis that uses precise values.

radiation
The emitted particles and photons from the nuclei of *radioactive* atoms; a short term for *ionizing radiation* or nuclear radiation, which is different from nonionizing radiation such as microwaves, ultraviolet rays, etc.

radioactivity
The spontaneous decay of unstable atomic nuclei accompanied by the emission of *radiation*.

radiological
Related to *ionizing radiation*.

radionuclide
See *nuclide*.

reactor
A device in which a chain reaction of fissionable material is initiated and controlled; a nuclear reactor.

receptor
The individual being affected by radiation or a chemical hazard.

Record of Decision (ROD)
A document that provides a concise public record of an agency decision on a proposed action described in an EIS. An ROD identifies the alternatives, the environmentally preferable alternative(s), factors the agency balanced in making the decision, and whether the agency has adopted all practicable means to avoid or minimize environmental harm and if not, why not.

release fraction
The calculated percent of total material in a facility that could be released in a particular accident.

rem (Roentgen equivalent man)
The unit of dose equivalent for human exposure to radiation. It is equal to the product of the absorbed dose in rads and a quality factor.

remote handling cell
A room designed so that the process carried out in the room is done remotely by operators manipulating robotic equipment.

Resource Conservation and Recovery Act
The Act that provides, among other things, a system for managing hazardous waste from its generation until its ultimate disposal.

Richter Scale
A scale for measuring earthquakes with graded steps from 1 to 10. Each step is about 60 times greater than the preceding step, adjusted for different regions of the earth.

risk
In a radioactive accident analysis, the probability-weighted consequence of an accident, defined as the accident frequency per year multiplied by the dose. Risk also is used commonly in other applications to describe the probability of an event occurring times the consequences of the event.

sanitary waste
Solid waste that is neither hazardous as defined by the *Resource Conservation and Recovery Act* nor *radioactive*; sanitary waste streams include paper, glass, discarded office material, and construction debris.

seismicity
Capacity for earth-movement events, usually earthquakes.

shielded transport casks
A heavily shielded container designed to hold one or more tritium targets during transport.

shipping bay
An opening or recess in a building where materials are loaded or unloaded for shipping.

spent target rods
Target rods that have had their tritium extracted.

stripper system
A decontamination system that removes tritium and water vapors from the nitrogen atmosphere circulating through *inerted* process gloveboxes.

sulfur dioxide
A heavy, pungent, toxic gas, used as a preservative or refrigerant, that is an air pollutant.

Target/target of similar design
A tube, rod, or other form containing material that, on being irradiated in a *nuclear reactor* or an *accelerator*, would produce a desired end product.

Thermal Cycling Absorption Process (TCAP)
A system that separates different hydrogen isotopes in a hydrogen gas stream.

tier
To link to another in a hierarchical chain. An upper-tier document might be programmatic to the entire DOE complex of sites; a lower-tier document might be specific to one site or process.

tritium
A *radioactive isotope* of hydrogen and an essential component of every warhead in the current and projected U.S. nuclear weapons stockpile. Tritium enables warheads to perform as designed.

Tritium Extraction Facility
A proposed facility at SRS that would extract tritium from *target* material irradiated in either an *accelerator* or a commercial light-water *reactor.*

Tritium-producing burnable absorber rods (TPBARs)
A highly radioactive target rod which contains recoverable tritium after irradiation in a reactor.

Tritium Separation Facility
A proposed facility at SRS that would separate hydrogen isotopes (protium, deuterium, and tritium) from helium using metal hydride beds that would absorb hydrogen and allow helium to pass through, and that would separate tritium from the other hydrogen isotopes using cryogenic distillation.

uninvolved worker
For this EIS, an SRS worker who is assumed to be 640 meters from a point of release.

water quality standards
Provisions of Federal or state law that consist of a designated use or uses for the waters of the United States and water quality standards for such waters based on their uses. Water quality standards are used to protect the public health or welfare, and enhance the quality of water.

way stations
Modules located inside the remote handling area of TEF. Their purpose is to capture gases that may be emitted from partially extracted target rods.

wetlands

Land exhibiting the following: hydric soil conditions, saturated or inundated soil during some portion of the year, and plant species tolerant of such conditions; also, areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

zeolite bed

A vessel that recovers tritiated and non-tritiated waters from process gas streams and converts them to gas of various hydrogen isotopes for later recovery of tritium. The waters are driven off the zeolite beds by heating for recovery of tritium.

DISTRIBUTION LIST

DOE is providing copies of the final EIS to Federal, state, and local elected and appointed officials and agencies of government; Native American groups; Federal, state, and local environmental and public interest groups; and other organizations and individuals listed below. Copies will be provided to other interested parties upon request.

CONTENT

A. UNITED STATES CONGRESS

A.1 SENATORS FROM AFFECTED AND ADJOINING STATES

The Honorable Max Cleland
United States Senate

The Honorable Paul Coverdell
United States Senate

The Honorable Ernest F. Hollings
United States Senate

The Honorable Strom Thurmond
United States Senate

A.2 UNITED STATES SENATE COMMITTEES

The Honorable Mary L. Landrieu
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The Honorable John Warner
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The Honorable Lindsey Graham
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Natural Resource Trustee
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APPENDIX C

TRANSCRIPTS, LETTERS, AND FORMS

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DEPARTMENT OF ENERGY

DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)

PUBLIC BRIEFING FOR THE

CONSTRUCTION & OPERATION

OF A

TRITIUM EXTRACTION FACILITY (TEF)

Held at the North Augusta Community Center
Brookside Drive, North Augusta, South Carolina
On June 9th, 1998, Commencing at 1:00 p.m.

- - - - -

ACCURATE REPORTING
Post Office Box 2567
Augusta, Georgia 30903-2567
(706) 869-9262

MR. LAWSON: We now have an opportunity for you to discuss with the Department any concerns you have, ask questions, or perhaps just make some comments. I remind you that we do have -- there's hand-held mikes. If you would raise your hand, I'll recognize you and we'll bring you a mike.

And I'd like to ask Gail, if she would, just jot down briefly some of the issues or concerns that are raised by people.

Anyone have a comment or a concern?

Yes, sir, right here.

MR. NEWMAN: Excuse me if I don't stand up.

MR. LAWSON: That's fine. Would you just give us your name again for the record, please?

MR. NEWMAN: Newman.

MR. LAWSON: Thanks.

MR. NEWMAN: I've only got one leg, that's why I want to sit.

MR. LAWSON: That's fine.

MR. NEWMAN: I get regularly to these things. It's your world, make the best of it. The money that DOE spends is also my money. And this is just a little preface to what I'm going to say later.

But the other day I got this in the mail; fifty-five cents, three pieces of paper from Westinghouse, from CAB.

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ACCURATE REPORTING

A couple of days later from CAB I get this with four pieces of paper for thirty-two cents. Who's watching for my money? That's a little bit more now.

I got this in the mail. Very voluminous, lots of detail; Construction and Operation of the Tritium Extraction Facility at the Savannah River Site. As I -- I asked for a copy of the NEPA Regulations before I came here, and there was a miscommunication. I didn't get the NEPA Regulations, I got the DOE interpretation of the NEPA Regulations.

It's my recollection -- and I've been in this business for something like thirty, forty years. My recollection, that NEPA says, among other things to be considered in an EIS, is economics and social effects. DOE has very cleverly combined economics and social effects to socioeconomic effects. There is not a thing in this book that addresses the economics of your decision, the proposed decision, for consideration.

MR. LAWSON: Okay. Could I ask, just to clarify your question, are you talking about the economic effect in the community or the cost of the facilities when you say economics?

MR. NEWMAN: I'm talking any economic effects you can think of. I'm talking the cost of the facility, I'm talking -- oh, this addresses the impact on the community,

MI-01

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ACCURATE REPORTING

it sure does. But it does not look at what it is going to cost you and me and all the rest of us in here to go one way or the other.

If one of them is three times as much expensive as the other one, do we ignore that fact? This says we do. This says we don't address that.

MI-01

MR. LAWSON: We can --

MR. NEWMAN: It does not address it.

MR. LAWSON: You can get an answer to that question if you'd like to before you go on?

MR. NEWMAN: Oh, sure. I'd love to have the answer to that question.

MR. HICKMAN: The alternative to that was selected, which is the west of 233-H, was the least expensive alternative --

MR. NEWMAN: How -- do you show that in your EIS?

MR. HICKMAN: No, we do not, because it's an environmental impact and not an economic impact.

MR. NEWMAN: Does not the NEPA say that the Environmental Impact Statement addresses economics?

MR. HICKMAN: I defer to my NEPA expert.

MR. NEWMAN: Somebody tell me that in the preparation of an EIS, you do not address economics? Tell me.

MR. KNOX: The socioeconomic portion was --

MR. NEWMAN: Speak up.

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ACCURATE REPORTING

Transcript from Public Hearing Session 1 (Page 2 of 21)

MR. KNOX: The socioeconomic portion --

MR. LAWSON: John, could you also give your name, please.

MR. KNOX: John Knox, DOE. The socioeconomic portion of that was designed to approach that aspect, the combination of socioeconomics --

MR. NEWMAN: You haven't answered my question. Does not the NEPA say you must address economics in your EIS?

MR. KNOX: I can't remember the specific citation.

MR. NEWMAN: Well, I want a very detailed and documented response to that. Because I was with AGNS, and I am not taking the position of AGNS today. I have -- the only thing I get from AGNS now is my pension, and I'm not an agent for AGNS or anything like that. But it aggravates me when you guys go ahead -- and I've raised this question before. An EIS is supposed to address the economics of your decision. Is it going to cost the taxpayer three times as much or a third as much? M1-01

UNIDENTIFIED SPEAKER: I think --

MR. NEWMAN: And I think that's kind of important. And it's not touched on in here.

MR. LAWSON: Obviously economics will have to be considered. Is there somebody here who can answer the question of where does economics be considered?

MR. NEWMAN: It belongs in the EIS.

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ACCURATE REPORTING

MR. LAWSON: Right over here. Name please, Max.

MR. CLAUSSEN: My name is Max Claussen. I'm the Deputy Project Manager of the Commercial Light Water Reactor in Headquarters at the Department of Energy.

The decision process which includes the evaluation of the Environmental Impact Statement and a number of other very important parameters are placed before the Secretary of Energy for a decision. Included in that process will be a complete evaluation of both the capital cost and the long-term life cycle cost of conducting this project or any other alternative that is considered to replace it.

Now, that documentation will then be captured in the Record of Decision, which is separate and not part of, based on the Environmental Impact Statement.

MR. LAWSON: Mr. Claussen --

MR. NEWMAN: Somebody send me a copy of the first part of NEPA that says what should be included in an Environmental Impact Statement, and I'll back down. Because I think it says economics, and it says social effects, not socioeconomics. I think it says economics. It calls for the EIS; preliminary, final, record of decision, you name it. Economics. What -- where would this country get if we didn't look at money?

Because the DOE says, okay, we'll -- we know it's going to cost three times as much, but we won't tell you

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ACCURATE REPORTING

about that until we give it to the Secretary for his Record of Decision.

MR. LAWSON: Let me -- further clarification, yeah.

MR. VIVIANO: Richard Viviano from the Department of Energy. On Page 5-9 where they do talk about the socioeconomic --

MR. NEWMAN: I'm not talking socioeconomic. I'm talking economic.

MR. LAWSON: Let --

MR. VIVIANO: But they do break it down into social and economics in this section.

MR. NEWMAN: Okay. Where is it --

MR. VIVIANO: Page 5-9.

MR. NEWMAN: 5-9?

MR. VIVIANO: That's right. They talk about population over the next forty years. They talk about personal income over the next forty years as a result of this facility.

MR. NEWMAN: Do we talk about the cost of the facility?

MR. VIVIANO: No, I don't see that.

MR. NEWMAN: I don't think you do. I mean that is -- that is real economics. If it's going to cost two million or two billion or three billion, whatever, and they only cost three times as much, that has to go into your

decision-making process. That has to go into the public discussion process.

MR. LAWSON: Your point is well-taken. And the question I would ask Mr. Claussen is, is there anytime short of a Record of Decision where information about the cost is available to the public?

MR. NEWMAN: Cost of the facility, not cost of jobs.

MR. LAWSON: I understand, cost of the facility.

MR. CLAUSSEN: The costs for these projects are being reviewed --

MR. NEWMAN: Put it closer to your mouth, please.

MR. CLAUSSEN: I said the costs for these project are in fact being reviewed and they're part of the --

MR. NEWMAN: They are --

MR. CLAUSSEN: Pardon me, sir.

MR. LAWSON: Let him -- let him finish. Let him finish.

MR. NEWMAN: They were not put out for public comment.

MR. LAWSON: Just let him finish.

MR. CLAUSSEN: The costs of this project are being developed as we work on the project. They are estimates that we are continuing to validate and improve. Some of the costs of the option have not been negotiated with the people who are going to participate in the option;

therefore, we don't have final data. We have projections and budgets we've placed before Congress and they're reviewed in the public there.

MR. NEWMAN: I -- my bottom line is, and it will be the last time I say it, the federal law says that EIS will consider the economics of the project. The economics of a project include the costs of the project, the way I grew up. They were not there. I submit that this -- and that's only the first part. This is meaningless to the public. They're not being told what they're buying there.

The second thing is, it strikes me as a now-retired consultant, retired because DOE didn't like the things I told them, that this is a consultant's survival document. With differences in the impact between the Savannah River Site and the Barnwell site, as minuscule as they are, the consultants have made a doggone fortune in nitpicking, looking at minute, and making a big deal about it. This thing should be about a fifth of what it is, to be a thesis decision-making document.

M1-02

MR. LAWSON: So your viewpoint is that there is very little difference between those two sites?

MR. NEWMAN: Very little difference, but an awful lot of money in this thing.

MR. LAWSON: Okay. Before I have you go on, we have another person and I'd like to go around and have other

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ACCURATE REPORTING

people have a chance to make a first comment before we go to a second and third.

DR. KELLY: Well, I think you need to understand, and I hope that the Department of Energy people do -- I think you need to understand, and I think the Department of Energy does understand that, that in South Carolina, the AGNS facility has been a very controversial issue. And one of the factors involved is that it was built just before NEPA came on line. It never had a true Environmental Impact Statement done for it. So if it's -- I don't think it's going to be painless for you to make the AGNS choice.

M1-03

MR. NEWMAN: I hope --

MR. LAWSON: Now, wait a minute. Just one at a time. Yeah. Sir, you're going to have plenty of chance to talk, but let's do it one at a time. And I'd like to call on other people who would like to speak.

MR. NEWMAN: I thought she was finished.

MR. HUMES: My name is Fred Humes, and I'm Director of the Economic Development Partnership, and we represent both Aiken and Edgefield Counties. The site is of course one of the largest employers, not only in this region and in the state, and certainly we support that. But I think before providing or making a few comments, I'd like to just give you a little background to put it in context.

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And I certainly won't read all three pages, but I will provide it to you.

First and foremost, this community is proud of the unique role that we have played in being the nation's only supplier of tritium. And we kind of feel like that it was our site that helped win the Cold War and we're proud of that.

And secondly, the Department of Energy has a friend here at Savannah River Site. A lot of the community support for SRS activities is as real as it is legendary. And I don't think there's any denial of that. That support is based on appreciation that the intellectual and physical talents of SRS are technically confident and committed to safe conduct of all of the site activities and tritium enjoys a warm place in our hearts.

And while I fully support the national need for tritium, in fact, our organization has spent considerable time and dollars in support of the accelerator option, I do have serious reservation about the concept of producing tritium for military purposes in a Commercial Light Water Reactor. And I think that many people have repeatedly expressed that -- that concern and I think it's disturbing to a large number of our people. And I believe that it will undermine our nation's international nonproliferation and activities. M1-04

The recent action by the House National Security Committee and the FY99 Authorization Legislation to preclude production of tritium in US commercial and nuclear power reactors was based, I think, on many of these same concerns. But, if before Congress adopts the House language, then the tritium extraction facility in its present form will not be required, at least on my understanding.

And I basically contend then, though, if you went ahead with this project and with this EIS, that the draft Environmental Impact Statement is deficient in certain areas and probably does not meet the requirements of NEPA for evaluating all environmental impacts associated or resulting from the federal action. And specifically, I don't think it was -- it addresses the environmental impact that's going to result in a change in this nation's policy towards the production of tritium or strategic material in a Commercial Light Water Reactor. M1-05

I think what we're going to find is that other nations are going to pick up on that. That will certainly have an impact on their programs and eventually is going to have environmental impact of some nature on the United States. And I really think that needs to be addressed in this EIS.

The United States nuclear weapons research production and testing programs was subject to revision of NEPA. Extensive environmental documentation was required and this action will cause a similar increase in nuclear weapons development and testing activity and I think similar environmental impacts that should be looked at. And I think failure to not analyze these impacts will violate the spirit, if not the intent, of NEPA.

I once again reiterate that I am very supportive of the tritium program. I do not believe that a Commercial Light Water Reactor and consequently this TEF is the right way to go, and I would like to enter these comments into the record.

MR. LAWSON: Great. Thank you very much.

And he reminds me, if others of you have written comments, they're always welcome. And of course that's the surest way to make sure that your comments are taken verbatim.

Mike, do you have any comments to make in response to that or any clarification that you need to --

MR. HICKMAN: Just to reiterate, the purpose of this EIS is for this extraction facility. There is also an EIS being evaluated for the Commercial Light Water Program, which is the irradiation service and the transportation of those irradiated rods to Savannah River. But our EIS is just focused on the facility here at Savannah River.

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MR. HUMES: So you don't need this if you don't have the CLWR; is that correct?

MR. HICKMAN: That's correct.

MR. CHAPUT: I just have a comment. My understanding is that -- my name is Ernie Chaput, Economic Development Partnership.

My understanding is that the CLWR programmatic EIS also does not address -- is deficient in that it does not address the nonproliferation aspects associated with making tritium in the commercial reactor. And that's -- you know, it needs to be there. M1-06

MR. LAWSON: Does anyone have a comment on that --

MR. HICKMAN: Well, it hasn't been issued yet, but Max can address that.

MR. CLAUSSEN: The President of the United States has addressed that by issuing a statement of administration policy that says that, in fact, there is no proliferation concern of using Commercial Light Water Reactors to manufacture tritium in this country. This country has a long history of making nuclear weapons material in all kinds of facilities.

The Atomic Energy Act, as originally construed and as amended in 1974, preserved the capability for the United States as the original nuclear weapons state to use all of its resources, whatever they may be, to do whatever it

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needs for its national defense requirements. We continue to persist with that. There is no record whatsoever that we've been able to find, not a policy, a law, a treaty, a regulation, that says that this is not an acceptable course of action in the United States.

MR. LAWSON: I -- just to clarify, the point that was made here is that -- I think one of the points was that if you didn't follow that, that the environmental impacts following that should be included --

MR. CLAUSSEN: Well, if it were a change in policy, I would agree with that. But this is a longstanding, non-changed policy in the United States.

MR. LAWSON: Well, your point is -- is (inaudible).
Do you want to follow up?

MR. HUMES: Are we also saying that this country endorses North Korea producing tritium -- M1-07

MR. CLAUSSEN: North Korea is not a nuclear weapons state. The United States is in fact the original nuclear weapons state. And, in fact, all of our -- I guess the way I would like to characterize this is, nobody has ever found anything that was illegal, fattening, and immoral about doing tritium in the United States in any reactor or any facility that we've got.

MR. HUMES: We have not done it, though.

MR. CLAUSSEN: Oh, yes, we have. Over the first

fourteen years the United States commercial nuclear power plants, over seventeen thousand metric tons of commercial nuclear fuel were purchased for use in the stockpile from commercial nuclear power plants.

MR. LAWSON: Okay. There's a question over here, Mr. Walker.

MR. PARKER: Yes. My name is Lane Parker, and a couple of comments here.

Recently in one of our Citizens Advisory Board meetings, I can't recall the gentleman's name that came before us and -- talking about national security. And one of the concerns, and evidently DOE has had a change of heart like they always do, that they were trying to bring everything in and get it fenced in closer where they didn't have to build more fences.

And my concern here is, and I don't go along with this producing this thing outside of a regular DOE facility, but what we're doing, we're laying the groundwork here for terrorists or whatever, whatever comes down the road. And I think we need to give that serious consideration before we go ahead and do this because, all we're doing is leaving the door open for all this. M1-08

And I think that the other countries will pick up on it, too. Even though we might have done it in the past, I think we've been setting a good example recently. And I think M1-09 we should continue on doing that.

MR. LAWSON: I called you Mr. Walker instead of Parker. My apologies. Anyone else?

Incidently I would ask you, although I'm not going to try to limit your comments here, I would ask you to focus in on specific comments on this draft EIS because this is the day that you have the opportunity to do that.

Yes, sir? You have something?

MR. NEWMAN: One or two other things. I've heard a lot of whether we should do -- produce tritium in commercial reactors or not, and I didn't think that was the subject of this meeting. And I would like to get involved in that, but if it's not the subject, I don't want to --

MR. LAWSON: That's why I just made a comment that I just did.

MR. NEWMAN: Good. Good. One thing that has disturbed me with the Savannah River Site recently is when they had the emergency drill during the holidays, a third of the people supposed to show up did not show up. And so they shrugged their shoulders and said, well, a lot of people who are not scheduled to show up did show up, so they had ninety-two percent of the people they needed.

M1-10

I have been involved in drawing up emergency response plans. I do have specific expertise for each of those

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jobs. So a lot of people that weren't scheduled to show up showed up. Were they the ones who filled in for those specific jobs? That wasn't addressed.

The CAB apparently and the news media accepted this. Oh, no, we don't have to worry, they had plenty of warm bodies there. Warm bodies do not count in an emergency response. It's expertise, specified expertise that is required.

M1-10

MR. LAWSON: Now, is your comment in relationship to the --

MR. NEWMAN: No, it's not -- it's not -- but it's the kind of stuff that we're getting from the Savannah River Site. They just -- it's a snow job and I'm getting tired of it, essentially.

One other thing, I have complained about this before, and this has to do with this EIS, where they differentiate between involved and uninvolved workers. They don't really define -- well, they said uninvolved workers are six hundred meters away from the stack.

MR. LAWSON: Six hundred meters?

M1-11

MR. NEWMAN: Six -- that's a long ways. That's -- six hundred and eighty, I think it is actually. That's a long ways away. But they don't say where involved workers are.

To me, any worker in that plant who could be exposed

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to excess radiation should be documented in here.

MR. LAWSON: Okay.

MR. NEWMAN: But they keep playing this game. And I've talked about this for two or three years. And I keep being told, well, we'll take care of that. But I still get involved and uninvolved workers.

MR. LAWSON: Okay.

MR. NEWMAN: And I know when I was out in Hanford, I was talking to one of the engineers up there on this subject and he said, well, we don't worry; we know we're expendable. That is a, excuse the expression, a hell of an attitude for a worker to have to take. Hey, I'm expendable because I'm an exposed worker. So -- I'll try to stop it right there.

MR. LAWSON: Okay. [Inaudible] --

MR. NEWMAN: [Inaudible] is inconsistent. Basically I think this is trash, period.

MR. LAWSON: Mike, do you want to --

MR. HICKMAN: Well, I appreciate your comments but let me assure you that the Department of Energy, and Westinghouse Savannah River and the other contractors at the site, don't think anyone out there is expendable.

MR. NEWMAN: Well, why are you talking about exposed and unexposed?

MR. HICKMAN: Well, the nature of working at a

nuclear facility, there are going to be individuals that will go through routine exposure due to the nature of the work involved there. And there are workers that don't get around the radiation, so they are uninvolved in the nuclear processes that are going on at the site.

MR. LAWSON: Comment back here.

MR. SHEDROW: Let me at least partially --

MR. LAWSON: Can you give your name, please?

MR. SHEDROW: My name is Barry Shedrow, I'm with the Westinghouse NEPA Group. And let me at least try to partially answer the question that was raised.

MR. NEWMAN: I can't hear you.

MR. SHEDROW: My name is Barry Shedrow. Can you hear that? Okay. I'm with the Westinghouse NEPA Group. And this is not my area of expertise and I'll just -- I had someone try to explain this to me not too long ago. The uninvolved worker, someone who is six hundred and forty meters away, okay, and the question --

MR. NEWMAN: How far?

MR. SHEDROW: Six hundred and forty meters.

MR. NEWMAN: Six hundred -- okay.

MR. SHEDROW: Okay. And a partial answer to what your question is, they use certain models in order to determine the impact of some accident or something occurring within the facility of six hundred and forty meters away. If you try to model the impact on someone who is closer, such as someone who is working in the facility, you have to make so many gross assumptions in trying to get the model to work, the answer you get is nonsensical, it doesn't make that much sense. Okay?

Now, you also have to take what I'm telling you at surface value, because I can't argue the point with you. That's the way it was explained to me, and it sounds reasonable, at least it does to me.

MR. LAWSON: Okay. Thank you, sir. I appreciate that.

Any other comments or anyone we haven't heard from yet?

AUDIENCE MEMBER: I just have a question.

MR. LAWSON: Sure.

AUDIENCE MEMBER: Can I get the gentleman's name down there on the end who was making the comment concerning the President's position on nonproliferation?

MR. LAWSON: Mr. Claussen. Mr. Claussen.

AUDIENCE MEMBER: Lawson?

MR. LAWSON: Claussen.

AUDIENCE MEMBER: Thank you.

MR. LAWSON: Big difference. Lawson is here, Claussen is there.

Anyone else have another comment?

Right over here.

MR. CHAPUT: Yeah, let me -- I'm not sure that my question was specifically answered. The thrust of my comment was that we, as a country, regardless of what the law says, but from a moral standpoint, this country has taken a position where we're trying to encourage other nations who are not currently nuclear powers from engaging in weapons research development, nuclear weapons research development and production.

And one of the things that we're suggesting or jawboning them to do is to not make materials that are capable of specifically for nuclear weapons in commercial reactors. And, the international community is buying reactors from North Korea to get them out of reactors which are capable of making nuclear materials. And it's not a lot different from the recent Iraqi situation where the weapons of mass destruction were biological as opposed to nuclear. But the international community has tried to act to prevent a -- a country from obtaining those types of capabilities.

This country has been accused of duplicity by some foreign countries by saying on one hand, don't use your commercial nuclear facilities in the weapons program, at the same time we've been, you know -- our proposal to do the same thing ourselves.

M1-12

The making of tritium in commercial reactors will undermine our foreign policy objectives in nonproliferation; that's the thrust. And to the extent that it undermines the foreign policy initiative, which causes environmental impacts because other nations are now engaged in nuclear weapons research and development including testing in India and Pakistan, that causes environmental impact as a result of our inability or our lack -- our reduced ability to cause other nations to refrain in those activities.

M1-12

That reduced ability to cause those nations to refrain causes environmental impact, and that's what we're saying ought to be included in this environmental impact statement. Not -- you know, not to say what we've done in the past is right or wrong or indifferent. But wherever we are today in looking forward, we are trying to dissuade other countries from nuclear weapons research and development, using their commercial facilities. And we're pulling the rug out from under our foreign policy initiative. That has an environmental impact. That's the environmental impact that we think needs to be included in this particular analysis.

MR. HICKMAN: Once again let me reiterate, Ernie, that this EIS is for this facility at Savannah River. There is -- there is a CLWR EIS and there will be a public

meeting and that will be held in this area in --

MS. JERNIGAN: Right now the schedule is for September.

MR. HICKMAN: -- in September. And that will be an opportunity to address those proliferation issues in that EIS, but not this one.

MR. CHAPUT: Well, I disagree. If this facility is not constructed, then those proliferation issues won't come up in the first place.

MR. HICKMAN: That's not -- that's not necessarily true because we can use -- we can irradiate a rod in a noncommercial light water reactor and extract them here at Savannah River. We also have the option of purchasing a reactor for DOE's use.

MR. CHAPUT: Yes. But that's a DOE reactor, not a commercial reactor.

MR. HICKMAN: That's an option that we have available to us.

MR. CHAPUT: And that does not cause a nonproliferation concern [inaudible].

MR. LAWSON: The important thing here is not to -- is not to argue this facility or not this facility, although I know that's important to many people, but it's focusing in on the adequacy of the environmental impact analysis that's been conducted.

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And this gentleman has another question. Linda, if you will [inaudible].

MR. NEWMAN: Okay. A couple of things. If I read correctly, if India or Pakistan or anybody else decided to make tritium with an accelerator -- he'd have no problem. He shouldn't do it in a light water reactor, because if we do it in a light water reactor, it would encourage them to do it.

Second, I have headed up two projects, excuse me, I've headed up two projects. One was back in the '60s developing gas centrifuge technology for uranium producing. And AEC cut us off because they were afraid if other countries knew we were -- I've got to watch my language, because I think it's still classified. If they knew that we were encouraged, they might start it up themselves. They shut down our project after we'd spent about a million dollars on it, which sent [inaudible] to other countries like Germany, Holland, England, hey, those guys over there must have had something or they wouldn't have been cut off. And so they got into it and they developed it.

The second was there was a plant down -- or near here in Barnwell on which we had spent over two hundred million dollars. Jimmy Carter said, if you go ahead it's going to encourage others to reprocess commercial nuclear fuel, so

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we're going to shut you down. He shut us down. That plant is still sitting there.

Germany is still processing. Russia is processing. France is processing. England is processing. Japan is processing. China is processing. This idea that if we want to put the blinders on ourselves, it's going to make other people put their blinders on is absurd. We've got to find a better way of doing it. I'm all for stopping for the nuclear race, but I'm not after to let everybody do what they want to do.

But our being holier than thou and saying, okay, we're going to produce tritium at Savannah River in an accelerator is not the subject of this meeting, but then we are going to build a facility to separate tritium somewhere which is the subject of this meeting, is that discouraging other countries from doing the same thing?

MR. LAWSON: Let me just ask a clarification, Mike. There's obviously a link that's being drawn here between this extraction facility and a clean light water reactor. Will a decision on this facility, up or down, be made before a decision has been made on the clean -- on the nuclear water -- the Commercial Light Water Reactor?

MR. HICKMAN: No.

MR. LAWSON: So that decision was made first before --

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MR. HICKMAN: Production source will be determined first and then we'll get a nod to go ahead if it's a -- if it's a Commercial Light Water Reactor.

MR. LAWSON: Okay, great. Mr. Parker has another question over here, please.

MR. PARKER: I'm looking at one of your slides here and one of the first things here it says, tritium-producing burnable absorber rod manufacturers. And you go all the way -- I guess, I might be a little -- I just barely got to walking around sense -- but I'm looking at this thing, the end thing here is the tritium stacking facility.

Well, it looks like we've got the cart before the horse, if we're going to determine where we're going to make the burnable rods at. And I'm thinking, it sort of come to me, that it looks like TVA and DOE has got these unfinished reactors sitting around. And I think that's just an excuse to go ahead and get them up and running in a roundabout way, because DOE is awful famous for drawing these fine lines there that we just barely can see.

M1-13

MR. HICKMAN: Well, to put that drawing in perspective, the requirement that we had for the project was to be ready and available to put tritium into the stockpile by the year of 2005. In order to do that with this overall program, which is what you see depicted on

that picture, the entire CLWR program, a lot of activities had to go in parallel.

So the project has started. Not physical construction, but the design development of the project has begun. Like I said, we're at thirty percent design on the facility. In the meantime, the other avenues, as Max indicated, the rod producer is -- those things are being negotiated. The irradiation service is being negotiated. All these activities are coming in parallel leading to a '98 decision by the Secretary.

MR. PARKER: Are you telling me right now that you don't have a manufacturer in line? The only thing you're looking about is the effect of the facility, and you don't have a clue of who the manufacturer is?

MR. HICKMAN: I wouldn't say we don't have a clue. But we do not have a [inaudible] manufacturer determined yet.

MR. LAWSON: Is there anyone else who hasn't spoken yet who has a concern that they'd like to raise?

Yes, in the back row here.

MS. THICKE: Yes, my name is Paulette Thicke. And I'm not an engineer, I'm an English major so this may be a very elementary question. In the past, DuPont said that they were doing such wonderful things in keeping Savannah River Site very clean. So when they sold off to

Westinghouse, then Westinghouse decided that there was a terrible mess out there, and DuPont must somehow not have been paying any attention or didn't tell the honest truth to the locals. There have been other remarks in the paper and such about cleanup at Savannah River Site.

My question is, with an additional effort, how will that impact on the ability to clean up the past as well as what is it going to do to the future? I'm not a native South Carolinian, but I think it is a beautiful state. And I would just hate to see it just give up and fall in the water or glow in the dark or whatever is eventually going to happen if we don't control all these very -- I don't know what the word is, these -- all these different things that can impact so highly, not only on the land and the air, but on the people and the animals.

M1-14

MR. LAWSON: Okay. That's a good two-part question. The first really is, will this effort in any way stall or inhibit the general cleanup that's going on or will be going on at Savannah River.

And the second I suppose is, anything that's being proposed here, would that contribute to more waste that would have to be cleaned up in the future.

MR. HICKMAN: The answer to your first question is, no. This -- the construction of this facility will in no way impact the cleanup efforts that are going on because

the Department of Energy that oversees this facility is the national security's organization, and the department that oversees the cleanup is an environmental management organization. They are two separate, funded entities within DOE. So, no, construction of this facility will not impact the cleanup effort that's going on.

As far as contribution of this facility to releases and the environmental impact, currently the plans for the tritium facility, the national defense, the national security effort is to shrink our footprint at Savannah River. And in so doing, by constructing this extraction facility we can close and shut down an existing extraction facility, that is second generation tritium extraction facility, doesn't have all the environment -- all the engineering attributes that our facility will have in it, which is modeled after the recycle/reloading facility that was constructed and came on line in '95.

The releases of tritium as a result of this facility going on line will be less than what currently is being released due to the fact of those engineering safeguards that we are building into this facility. So there will be an environmental impact in the fact that you've got another facility. But the overall impact of tritium release will be less than what's currently being released.

MS. THICKE: The current one will go away?

MR. HICKMAN: The current extraction facility will eventually be shut down when we have a new extraction facility on line, yes.

MS. THICKE: Okay.

MR. LAWSON: Foes the new extraction facility, is that necessary for the old one to be shut down?

MR. HICKMAN: No.

MR. LAWSON: So the old one will be shut down whether you have the new one or not?

MR. HICKMAN: Eventually, yes.

MR. LAWSON: Okay.

MR. LAWSON: Anyone else who hasn't yet had a chance to ask a question? Anybody else want to comment? Sure, there is no hurry here.

Okay. If there are none, I want to thank you for your time. Before you run off -- yes, sir?

MR. NEWMAN: One more. Can somebody send me the first page or two of the NEPA law?

MR. LAWSON: Yes. I think we made a note to do that. Hopefully, yes. We have person who has committed to do that. Make sure you -- he has your address.

I just want to thank you all for your time. Before you run off, just a couple of things. First of all, if you have some other informal questions or want to follow up in more detail on any questions, these people will stay

-- will be around here for awhile. Please feel free to stay and talk with them.

Also that blue evaluation sheet that I [inaudible], you can hand that in. It could be mailed later but it will cost you thirty-two cents or fifty-five cents or a dollar one, depending on how many pieces of paper you send at the same time. But anyway, if you want to hand those in, that would be great, too.

Thank you all for coming and for your thoughtful questions. Remember that comments one way or another can still be sent in for another couple of weeks until the 22nd. I thank you and thank others who have tried to answer the questions here. We appreciate it and remind you that there's a meeting again at 6:00 tonight. You're certainly welcome to come back and enjoy that crew and ask any questions that you'd like at that time.

Any other comments?

Great. Thanks a lot.

[Meeting concluded at 2:13 p.m.]

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STATE OF GEORGIA)

COUNTY OF RICHMOND)

I hereby certify that the foregoing transcript consisting of (32) thirty-two pages is a true and correct transcript of the meeting held before me; that said meeting was reported by the method of Stenomask with Backup.

I further certify that I am not kin or counsel to the parties in the case, am not in the regular employ of counsel or said parties, nor am I otherwise interested in the result of said case.

This the 29th day of June, 1998.

CATHY T. JONES, CCR, CVR
CERTIFIED COURT REPORTER
GEORGIA CERTIFICATE # B-1925

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DEPARTMENT OF ENERGY

DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)

PUBLIC BRIEFING FOR THE

CONSTRUCTION & OPERATION

OF A

TRITIUM EXTRACTION FACILITY (TEF)

Held at the North Augusta Community Center

Brookside Drive, North Augusta, South Carolina

On June 9, 1998, Commencing at 6:00 p.m.

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Post Office Box 2567
Augusta, Georgia 30903-2567
(706) 869-9262

MR. LAWSON: We'll now take any comments or questions that you have, as Mike indicated. We have some hand-held mikes out there that if you would like to speak, just raise your hand, we'll bring the mike over so we can get a good recording. And if you would, just give us your name and affiliation, if you'd like, at the same time.

Are there any questions or comments that anyone would like to make? Or if anyone would like to make a comment?

MR. CHAPUT: I have a quick question.

MR. LAWSON: Name?

MR. CHAPUT: Yeah. Ernie Chaput, Economic Development Partnership. It was reported Secretary Pena might make the APT CLWR decision before he leaves at the end of June. What's the status on that?

MR. LAWSON: Mike, do you have any --

MR. HICKMAN: As far as I know, it's still just reported that he could make that decision before he leaves office.

MR. LAWSON: Any other comments? Questions? Certainly you have a question. We have the design team here so they can understand all of this. Members who are not directly involved, any questions?

Sir?

MR. SMITH: Yeah, I'll ask a question that may be of some interest here. I'm Bob Smith, I am with the TEF

Project.

Mike, could you provide some clarification on what are some of the potential targets that would go into TEF if the no-action alternative were chosen and TEF became part of the APT facility? M2-01

MR. HICKMAN: Assuming that the TEF were to go in to APT, the assumption would be that commercial light water irradiation would not be the preferred alternative. Therefore, if we use that facility for extraction purposes, those target rods would have to be -- would have to come from somewhere else. There's an alternative -- alternate target, technology within APT that could be used in the extraction facility.

There has been mention of other facilities that could perform an irradiation service on rods like the FFTF out of Hanford. So there are other places that tritium sources could come from other than commercial light water irradiator sources.

MR. LAWSON: Max?

MR. CLAUSSEN: I'm Max Claussen from the Department of Energy.

The other source is that if in fact there were a problem in the development design and deployment of the accelerator, having a light water reactor as a backup would afford us an opportunity to extract the Commercial

Light Water Reactor irradiated targets in a facility which would be the TEF -- APT target handling building so that they could move forward with their design and construction and deployment in a way that would allow them to put the technology in place and preserve the ability to use the Commercial Light Water Reactor as a backup.

They have done a study. They have looked at the potential for using the APT target building for that capability and there are some potential savings if it were combined in that facility if, in fact, the facility is the primary technology. So we probably -- the plan is just to go ahead and be able to do the same sort of extraction we do with modifications in the ultimate stream in order to move the tritium as the accelerator folks would do to the tritium recycling facility.

MR. LAWSON: Okay, thank you. Any other comments or questions?

Yes, Bob, go ahead.

MR. SMITH: Bob Smith again with the project.

Are the environmental impacts more severe is you combine those facilities, the TEF and the APT together as opposed to having one of those two facilities up and running? M2-02

MR. HICKMAN: John?

MR. KNOX: John Knox, DOE. I think there's a slight

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increase in the impact with the combination.

MR. LAWSON: In what regard? What kind of impacts?

MR. KNOX: I would have to do a little digging in the EIS, because I don't remember the specifics.

MR. LAWSON: Okay.

MR. HICKMAN: That is pretty well outlined in our EIS or that combination. And the differences between the baseline for APT and plus TEF, the TEF are included.

MR. LAWSON: Anyone else?

Okay. If there are no other comments or questions, you're certainly welcome to stay around. If you haven't already seen the display, is this program set up over here?

MR. HICKMAN: Yes, sir.

MR. LAWSON: It's a display of the inward workings of the -- inner workings of the -- of the extraction facility available on the monitor over there. There's a display, assuming either the gentleman or ladies that are here who work on the project would be willing to answer any questions that you may have.

Also for those of you, whether you work at the Site or not, if you have comments that you would like to submit, I remind you that have a variety of ways to do it and just have it in by June 22nd, if you would.

I thank you very much for taking your time to come.

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MS. JERNIGAN: The evaluation form?

MR. LAWSON: Pardon? You are real serious about that. I haven't filled mine out yet.

So please take an extra minute to fill those in and deposit them as you leave. Any other questions or comments?

Okay. Thanks for your time. We appreciate it very much. And please stick around if you'd like.

[Meeting concluded at 6:40 p.m.]

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CERTIFICATE OF COURT REPORTER

STATE OF GEORGIA)
COUNTY OF RICHMOND)

I hereby certify that the foregoing transcript consisting of (6) six pages is a true and correct transcript of the meeting held before me; that said meeting was reported by the method of Stenomask with Backup.

I further certify that I am not kin or counsel to the parties in the case, am not in the regular employ of counsel or said parties, nor am I otherwise interested in the result of said case.

This the 29th day of June, 1998.

Cathy T. Jones

CATHY T. JONES, CCR, CVR
CERTIFIED COURT REPORTER
GEORGIA CERTIFICATE # B-1925

-7-

ACCURATE REPORTING

Statement on Draft Environmental Impact Statement
Construction and Operation of a Tritium Extraction Facility
by
Economic Development Partnership
June 9, 1998

Good Afternoon. My name is Fred Humes and I am the Director of the Economic Development Partnership of Aiken and Edgefield Counties, South Carolina. The Partnership is a non-profit organization sponsored by the two counties for the purpose of attracting capital investment and fostering job creation in our two county region. A portion of the Savannah River Site is located in Aiken County. The Site is the single largest employer in the two county region, and a vital part of our economic base. I am pleased to have this opportunity to comment on the Draft Environmental Impact Statement for the Construction and Operation of a Tritium Extraction Facility at the Savannah River Site.

Before providing specific comments, I would like to make a few background statements which will, hopefully, put my comments in the proper context.

> First and foremost, this community is proud of the unique role that Savannah River has enjoyed as the nation's only supplier of tritium for our nuclear weapons stockpile and the pivotal role that OUR site played in the winning of the cold war. This area - indeed the entire state of South Carolina - has a long and rich heritage in supporting programs integral to our nation's defense.
>
> Secondly, the Department of Energy has a friend in South Carolina. The level of community support for SRS activities is as real as it is legendary - support based on an appreciation that the intellectual and physical talents at the SRS are technically competent and committed to the safe conduct of all site activities. Tritium activities enjoy a particularly warm spot in this relationship.

While I fully support the National need to construct and operate a new infrastructure for the production of Tritium, I have serious reservations about the concept of producing tritium for military purposes in commercial nuclear reactors. We have repeatedly expressed the view that such a course of action

Written comments submitted at Public Hearing, Session 1 (page 1 of 3)[a]

a. **Response appears under M1-12 on page 1-3.**

is DISTURBING to a large number of our citizens, and will totally undermine our nation's international non-proliferation initiatives.

The recent action by the House National Security Committee in the FY 1999 Authorization legislation to preclude the production of tritium in US commercial nuclear power reactors was based on many of these same concerns. If the full Congress adopts the House language, then the Tritium Extraction Facility may not be needed.

If instead, Congressional action supports continuation of the current "dual track" program for tritium production, which includes construction of the TEF, then I offer the following comments on your draft Environmental Impact Statement.

Foreign governments will continue to accuse the United States of duplicity so long as we ask them to restrain from using their civilian nuclear programs as a springboard for producing nuclear weapons while, at the same time, we are taking actions to co-mingle our civilian and military nuclear programs. The community of nations has taken military actions, pledged many billions of dollars and placed intense pressure on nuclear weapons- capable states to dissuade them from developing nuclear weapons. Against all reason, the United States is now proposing to retreat from this moral high ground with the ill-conceived program to produce tritium for nuclear weapons in commercial nuclear power reactors. We believe that if this program is embraced, domestic and international opinion will eventually doom this program to failure - the right result but only after losing valuable time and thereby potentially jeopardizing the tritium supplies which are vitally needed for our nations defense.

I contend that your draft Environmental Impact Statement is deficient, and does not meet the requirements of the National Environmental Policy Act for evaluating all environmental impacts resulting from the proposed Federal action. Specifically, the draft EIS does not address the environmental impacts which will result from a change in United States policy in the production of tritium in commercial reactors. The greater likelihood is that additional foreign powers will more aggressively pursue nuclear weapons programs to produce, test and possibly even use nuclear weapons. These activities will affect the environment in the United States as well as the global environment. Because other nations' policies will result from the programmatic action to

Written comments submitted at Public Hearing, Session 1 (page 2 of 3)

construct a Tritium Extraction Facility to recover tritium produced in commercial nuclear power reactors for use in military weapons, the resultant impacts and analysis are required to be included in this EIS. The United States nuclear weapons research, production and testing program was subject to the provisions of NEPA, and extensive environmental documentation was required. This action will similarly cause increased nuclear weapons development and testing activity, with similar environmental impacts. Failure to analyze these impacts will violate the spirit if not the letter of NEPA.

Thank you very much for the opportunity to comment on this draft EIS.

Written comments submitted at Public Hearing, Session 1 (page 3 of 3)

If you have other questions or know of additional stakeholders who should be consulted, please list them, and we will mail a response to any questions you may have to you as soon as possible.

Name Richard J. Stahler
Address 415 Scotts Way Augusta GA 30909
Phone 706-737-2655

Questions/Comments:

Has the site Emergency Plan and H-Area Plan been considered for impact by adding additional facilities? M1-15
The Cobalt does not appear to be addressed for Exposure and release. M1-16

Written comments submitted at Public Hearing, Session 1 (page 1 of 1)

United States Department of the Interior

OFFICE OF THE SECRETARY
OFFICE OF ENVIRONMENTAL POLICY AND COMPLIANCE
Richard B. Russell Federal Building
75 Spring Street, S.W.
Atlanta, Georgia 30303

June 11, 1998

ER-98/282

Andrew R. Grainger,
NEPA Compliance Officer
Savannah River Site
U. S. Department of Energy
Building 742-A -
Room 183
Aiken, SC 29802

Dear Mr. Grainger:

This responds to your letter dated April 30, 1998. The Department of the Interior has reviewed the Draft Environmental Impact Statement for the Construction and Operation of a Tritium Extraction Facility at the Savannah River Site in Aiken, SC. We have no comments to offer.

Sincerely,

James H. Lee
James H. Lee
Regional Environmental Officer

CC: OEPC, WASO

Letter L5 (page 1 of 1)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702-2432

June 16, 1998

Mr. Andrew R. Grainger
Senior NEPA Compliance Officer
Savannah River Site
Building 742-A, Rm. 183
Aiken, SC 29802

Dear Mr. Grainger:

The National Marine Fisheries Service (NMFS) has reviewed the Draft Environmental Impact Statement (DEIS), regarding the proposed Tritium Extraction Facility at the Department of Energy's Savannah River Site, near Aiken, South Carolina. The DEIS (DOE/EIS-0271) was transmitted by letter dated April 30, 1998.

We find the document to be well written and adequate with regard to the assessment of impacts on living marine and anadromous fishery resources under the purview of NMFS.

These comments do not satisfy your consultation responsibilities under Section 7 of the Endangered Species Act of 1973, as amended. If any activity(ies) "may affect" listed species and habitats under NMFS purview, consultation should be initiated with our Protected Resources Division at the letterhead address. Please direct other questions or comments related to marine and anadromous fishery resources to the attention of Mr. Prescott Brownell at our Charleston Area Office. He may be reached at 219 Fort Johnson Road, Charleston, South Carolina 29412-9110, or at (843) 762-8591.

Sincerely,

David H. Rackley
for Andreas Mager, Jr.
Assistant Regional Administrator
Habitat Conservation Division

Letter L6 (page 1 of 1)

STATE OF SOUTH CAROLINA
State Budget and Control Board
OFFICE OF STATE BUDGET

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LUTHER F. CARTER
EXECUTIVE DIRECTOR

July 15, 1998

Mr. Andrew R. Grainger
NEPA Compliance Office
Dept. of Energy - Savannah River Operation Office
Post Office Box A
Aiken, South Carolina 29802

Project Name: Construction and Operation of a Tritium Extraction Facility at the Savannah River Site Draft Environmental Impact Statement (DOE-EIS-0271)

Project Number: EIS-980404-005

Dear Mr. Grainger,

The Office of State Budget, has conducted an intergovernmental review on the above referenced activity as provided by Presidential Executive Order 12372. All comments received as a result of the review are enclosed for your use.

The State Application Identifier number indicated above should be used in any future correspondence with this office. If you have any questions call me at (803) 734-0485.

Sincerely,

Rodney P. Grizzle
Grants Services Coordinator

Enclosures

Fax: (803) 734-0645

Letter from South Carolina Office of State Budget State Application Identifier (Page 1 of 1)

Office of State Budget

South Carolina Project Notification and Review

1122 Lady Street, 12th floor
Columbia, SC 29201

State Application Identifier EIS-980404-005
Suspense Date 6/9/98

Beth McClure
S.C. Department of Parks, Recreation and Tourism

The Office of State Budget is authorized to operate the South Carolina Project Notification and Review System (SCPNRS). Through the system the appropriate state and local officials are given the opportunity to review, comment, and be involved in efforts to obtain and use federal assistance, and to assess the relationship of proposals to their plans and programs.

Please review the attached information, mindful of the impact it may have on your agency's goals and objectives. Document the results of your review in the space provided. Return your response to us by the suspense date indicated above. Your comments will be reviewed and utilized in making the official state recommendation concerning the project. The recommendation will be forwarded to the cognizant federal agency.

Should you have no comment, please return the form signed and dated.

If you have any questions, call me at (803) 734-0485. Rodney Grizzle

RECEIVED
OFFICE OF STATE BUDGET

- [ ] Project is consistent with our goals and objectives.
- [ ] Request a conference to discuss comments.
- [ ] Please discontinue sending projects with this CFDA# to our office for review.
- [x] Comments on proposed Application are as follows:

No comments.

Signature: Tony L. Bell Date: 5/21/98
Tony L. Bebber
Title: Planning Manager Phone: 803/734-0189

South Carolina Office of State Budget Project Notification and Review Form (Page 1 of 1)