

**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001**

August 28, 2001

**Communication Plan for NRC's Role in  
DOE's Program to Produce Tritium**

**1.0 Goals**

This plan helps ensure that NRC informs internal and external stakeholders about DOE's program to produce tritium (Tritium Production Program or TPP). The Program uses two commercial nuclear power plants to supply irradiation services to DOE. The primary goal of this communication plan is to ensure that internal and external stakeholders understand NRC's licensing role and its responsibility to ensure that Tennessee Valley Authority (TVA) maintains reactor safety while providing irradiation services.

Secondary goals of this plan are to assist DOE in their efforts to increase public confidence regarding the following:

- the need for DOE program and the use of a commercial nuclear power reactor as an irradiation facility to produce tritium
- handling and transportation of irradiated tritium-producing burnable absorber rods (TPBARs) from the reactor sites to DOE's tritium extraction facility (currently under construction) at the Savannah River plant in SC

This communication plan is based upon NRC performing plant licensing reviews associated with the use and irradiation of TPBARs at the Watts Bar and Sequoyah plants. We will use various communication tools (see Section 4.0 Communication Tools and Techniques) to internally and externally reach the primary and secondary goals of this plan. The Lead Project Manager's monthly status report is the main tool that will support the internal and external communications techniques. This report (see Attachment 1 - Status Report Format) highlights the status of the NRC's role in DOE's TPP. The report is intended to advise internal stakeholders about the status of the following:

- project status
- licensing review activities
- outcomes of internal and external meetings
- upcoming management review activities
- revisions to the Frequently Asked Questions or the Tritium Production Fact Sheet located on an external web site
- management issues needing NRR Leadership Team/Executive Team attention

The Lead Project Manager's monthly report will also form the basis for the information placed on the NRC external web site (see Attachment 2 - Proposed Contents of NRC External Web Site).

## **2.0 History/Background**

Tritium, an essential material in US nuclear weapons, is an isotope of hydrogen that decays at a rate of about 5 percent per year (half of it decays in about 12 years). Thus, tritium must be replenished in nuclear weapons routinely. The US has not produced tritium since 1988, when DOE shut down their last production facility at the Savannah River site in SC. The US is currently recycling tritium from dismantled US nuclear weapons to meet its immediate tritium needs. Resuming tritium production is essential to maintain the US nuclear weapons stockpile according to DOE.

On December 22, 1998, the Secretary of Energy announced that he had chosen the light water reactor technology as the primary means for producing tritium. On May 6, 1999, he selected TVA's Watts Bar and Sequoyah nuclear power plants in Tennessee as the facilities that will irradiate the TPBARs for DOE.

NRC must grant license amendments to TVA before TVA can use the Watts Bar and Sequoyah plants to irradiate TPBARs in large numbers. TVA requested a Watts Bar license amendment on August 20, 2001, expects to request a Sequoyah amendment in September 2001, and will seek NRC approval within 1 year of each request.

TVA will irradiate the TPBARs for one operating cycle. They will be removed during the next refueling outage and shipped to a tritium extraction facility at the Savannah River site in the winter of 2005. TVA will then remove and reload new TPBARs into the reactor core during subsequent refueling outages for the life of the plants.

The licensing reviews might involve TPBAR transportation issues. DOE has not yet decided if it will use DOE-qualified shipping casks and canisters or will use casks that NRC will have to qualify. TVA prefers to use NRC-qualified casks. NRC does not have any responsibilities related to the fabrication of TPBARs or the construction and operation of DOE's tritium extraction facility.

### **Previous Public Meetings**

NRC held two meetings to give the public opportunities to comment on the technical issues of the confirmatory test, and to inform the public of NRC activities early in the evaluation process. An initial meeting was held at NRC Headquarters in Rockville, Maryland, in February 1997. Another public meeting was held near TVA's Watts Bar nuclear power plant in Tennessee in August 1997, prior to loading 32 TPBARs into the reactor core to demonstrate the design of the TPBARs.

## **3.0 Audiences**

This communication plan is structured to give the staff the flexibility it needs to address three different situational communication scenarios that could occur during the NRC's review of TVA's license amendment requests. The situational communication scenarios that could occur are as follows:

1. Routine licensing review with some external stakeholder involvement or feedback.
2. Routine licensing review with external feedback related to affiliated TPP and transportation issues.
3. Licensing review with moderate to extensive external stakeholder feedback (including a possible hearing) related to affiliated TPP and transportation issues.

This plan identifies the communication tools and techniques that could be used, as appropriate, to implement the goals of this plan. The table below shows possible stakeholders.

### Possible Stakeholders

Internal Stakeholders	External Stakeholders	
HQ managers and staff within NRR	Media (respond to media inquiries)	
HQ managers and staff outside NRR	Individuals and Public Interest Groups	
EDO	Local, State, and Federal Government Agencies including DOE	
NRR Executive Team	TVA	
Commission staff	US Congress	
Regional managers and staff	Industry-related groups (e.g., NEI, INPO, EPRI)	
NMSS		
OPA		OSP
OGC		OCA

## 4.0 Communication Tools and Techniques

Communication tools include the following:

- Director Highlights
- *Tritium Production* Fact Sheet (see Attachment 3)
- Frequently Asked Questions (FAQs)
- Monthly Status Report for NRC's role in DOE's TPP
- external web site for NRC's role in DOE's TPP
- coordination/interface meetings, as necessary, with DOE and NMSS on affiliated TPP issues and responses to the public
- Commission/ACRS information papers
- DOE/NRC "town hall" information meetings
- press releases
- other (e.g., hearing)

Communication techniques include the following:

A. For Internal Stakeholders

- Produce a Monthly Status Report for NRC's role in DOE's TPP.
- Issue Director Highlights.
- Hold monthly internal project review meetings, including NMSS & RES (see Attachment 4 for meeting format).
- Communicate with NRR Leadership Team, Executive Team, and other NRC managers and program offices, as necessary.
- Have a DOE/TVA 1-hour big-picture presentation to NRC management and staff involved in DOE's TPP.
- Other (TBD).

B. For External Stakeholders

- Produce and maintain an external web site for NRC's role in DOE's TPP.
- Put licensing correspondence, including requests for additional information, in ADAMS.
- Hold meetings
  - public licensing review meetings
  - as-needed DOE/NRC town hall-type public education meetings
  - external stakeholder meetings (e.g., licensee).
- Issue press releases.
- Other (e.g., hearing).

In general, information contained in the Monthly Status Report will form the basis for the information posted on the external web site. The *Tritium Production in Commercial Nuclear Reactors* fact sheet currently exists on NRC's external web site under Nuclear Power Plant Fact Sheets. We will relocate this fact sheet to the new external web site for NRC's role in DOE's TPP.

## 5.0 Key Messages

The following are the overall key messages:

A. Overview of DOE's TPP

- Why the nation needs tritium.
- Why use a commercial power reactor as part of the process.

B. NRC licensing reviews

- Assure public health and safety by performing technical reviews of the 17 Plant-Specific Interface Issues shown in Section 5.1 of NRC's Safety Evaluation Report (SER) issued as NUREG-1672 related to DOE's topical report on the tritium production core.

### C. Transportation of Irradiated TPBARs

- Operational, transportation, and safety issues, as required.

Attachment 5 contains an initial list of FAQs. We will put this list on the external web site and update the list with questions received from stakeholders.

## 6.0 Cost and Schedule

During the course of the review, NRC staff might determine that additional inspection guidance is needed for the reactor oversight process and its baseline inspection program. The NRR Lead PM for NRC's Role in DOE's Program to Produce Tritium will note the need for additional resources to do this in the Monthly Status Report. He will also address this with the NRR Leadership Team and through the Planning, Budgeting and Performance Management process.

Estimated Cost: \$150K total (\$20K for external web site development; \$20K for web site maintenance; \$20K for newspaper ads; \$60K for public meetings; and \$30K for meeting support). The FY01-02 budget estimate does not consider this scenario.

Estimated Resources: Depending on the situations arising from this scenario, 0.5 to 1.5 additional FTE could be needed. The FY01-02 budget estimate does not consider this scenario.

Communication Schedule: (See Attachment 6).

TVA submitted an amendment request for Watts Bar on August 20, 2001, and expects to submit a request for Sequoyah in September 2001. TVA requests amendments within 1 year of each submittal. NMSS is responsible for determining schedules for any licensing reviews involving TPBAR transportation.

## 7.0 Evaluation

The communication plan will be complete when NRR issues the license amendments and completes any other TPP licensing reviews for Watts Bar and Sequoyah, or when DOE determines that it no longer wants to use a commercial power reactor as part of its TPP. The monthly status reports will measure program progress.

Communication feedback will be accomplished via the questions and comments received from the following:

- public interaction with NRC's external web site
- public meeting feedback (verbal as well as that documented on NRC Form 659)
- direct correspondence received from the public regarding NRC's TPP licensing review activities

## 8.0 Findings

The monthly status report will include the progress of the licensing review, internal and external interactions, and lessons learned from implementing this communication plan.

## 9.0 Points of Contact:

### A. Nuclear Regulatory Commission

Lead Project Manager:	Mark Padovan (301) 415-1423	E-mail: <a href="mailto:Imp@nrc.gov">Imp@nrc.gov</a> )
Project Section Chief:	Richard Correia (301) 415-1009	E-mail: <a href="mailto:rpc@nrc.gov">rpc@nrc.gov</a> )
Project Director:	Herbert Berkow (301) 415-1485	E-mail: <a href="mailto:hnb@nrc.gov">hnb@nrc.gov</a> )

### Technical Staff Reviewers:

#### **NRR**

Tony Attard	SRXB
Lambros Louis	SRXB
Ken Heck	IQPB
Steve Klementowicz	IOLB
Brian Thomas	SPLB
Chang Li	SPLB

#### **NMSS**

NMSS/SFPO — Mike Tokar (for irradiated TPBAR transportation issues).

#### **RES**

TBD (Mel Fields, NRR/DLPM's Senior Interface Coordinator is talking with RES about their involvement in DOE's Tritium Production Program).

### B. Department of Energy

Steve Sohinki	Director, Office of Tritium Production (202) 586-5845, E-mail: <a href="mailto:stephen.sohinki@nnsa.doe.gov">stephen.sohinki@nnsa.doe.gov</a>
Max Clausen	Director, Office of Commercial LWRs (202) 586-8217, E-mail: <a href="mailto:max.clausen@nnsa.doe.gov">max.clausen@nnsa.doe.gov</a>

### C. Tennessee Valley Authority

Jim Chardos	Tritium Program Manager (423) 365-8767, E-mail: <a href="mailto:jschardos@tva.gov">jschardos@tva.gov</a>
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**Status Report Format for NRC's Role in  
DOE's Program to Produce Tritium  
for (month) 2001**

L. Mark Padovan, Lead Project Manager  
NRR/DLPM  
O8G15 415-1423

I. Overview and Summary of Activities During the Month

II. NRC Technical Review Status

Responsible Branch:

SE Input Description:

SE Target Date:

Critical path issues (including licensee's responses to NRC Requests for Additional Information):

(Repeat the above for each branch providing SE input).

III. Meeting Minutes

IV. Summary of Significant Communications with External Stakeholders

V. Summary of Upcoming Major Activities and Milestones

VI. Revisions to Web Site FAQs or to Tritium Production Fact Sheet

VII. Management Issues

(This section will contain a brief executive summary of program status emphasizing the status of NRC's license amendment review. It will highlight any issue that could impact the review schedule or needs management attention).

## **Proposed Contents of NRC External Web Site for NRC's Role in DOE's Program to Produce Tritium**

DLPM will plan, create, and maintain an external web site that will include the following:

- a home page
- site index
- search capability
- TPP background and summary information
- description of NRC's and DOE's TPP responsibilities
- TPP documents (e.g., correspondence with the licensee)
- status of the licensing process
- descriptions of opportunities for public involvement
- means to provide comments and ask questions
- meeting agenda
- FAQs
- news related to NRC's TPP
- links to NRC press releases
- external links including a link to DOE's web site so stakeholders can direct questions to DOE that are DOE's responsibility
- TPP contact information

## **Tritium Production**

### Background

Tritium, an essential material in US nuclear weapons, is an isotope of hydrogen that decays at a rate of about 5 percent per year (half of it decays in about 12 years). Thus, tritium must be replenished in nuclear weapons routinely. The US has not produced tritium since 1988, when the Department of Energy (DOE) shut down their last production facility at the Savannah River site in SC. The US is currently recycling tritium from dismantled US nuclear weapons to meet its immediate tritium needs. Resuming tritium production is essential to maintain the US nuclear weapons stockpile according to DOE.

### DOE's Strategy for Producing Tritium

DOE is responsible for re-establishing the capability to produce tritium gas by the end of 2005, in accordance with a Presidential Directive. During 1995 to 1998, DOE considered two options for producing tritium. One involved using a linear accelerator, which does not require Nuclear Regulatory Commission (NRC) approval. The second option uses a commercial nuclear power plant to produce tritium, which requires NRC review and approval.

On May 22, 1996, the Secretary of Energy and the Chairman of NRC signed a joint Memorandum of Understanding that establishes the basis for NRC review and consultation regarding DOE's use of commercial reactors for producing tritium. The memorandum supplements a 1978 agreement between DOE and NRC and relates solely to producing tritium.

### Confirmatory Testing for Producing Tritium in Commercial Light Water Reactors

DOE developed a technology for producing tritium using lithium, rather than boron, in burnable absorber rods installed in commercial pressurized-water reactors. Neutron irradiation of the lithium burnable absorber in the reactor core converts the lithium to tritium. The rods will then be removed from the fuel assemblies and shipped to the Savannah River site where DOE will extract the tritium.

In the first phase of the tritium program, NRC evaluated DOE's proposal to irradiate a limited number of fuel assemblies containing tritium-producing burnable absorber rods (TPBARs) in a commercial nuclear reactor. NUREG-1607 documents the results of the review. DOE contracted with the Tennessee Valley Authority (TVA) to conduct a one-time confirmatory test at the Watts Bar nuclear power plant near Spring City, Tennessee. In April 1997, TVA applied for an amendment to the Watts Bar facility operating license to put 32 TPBARs in the reactor core during one fuel cycle. NRC issued a license amendment to TVA in September 1997 authorizing the test to irradiate the TPBARs.

TVA loaded the TPBARs into the core during Watts Bar's first refueling outage and irradiation began the next month. TVA removed the 32 irradiated TPBARs from the reactor during Watts Bar's spring 1999 outage. DOE shipped the rods offsite and subjected them to nondestructive examination and destructive post-irradiation examination to confirm TPBAR design methodology and performance.

## DOE Decision for Producing Tritium

On December 22, 1998, the Secretary of Energy announced that he had chosen the light water reactor technology as the primary means for producing tritium production and will retain the accelerator design as a backup. On May 6, 1999, he selected TVA's Watts Bar and Sequoyah nuclear power plants in Tennessee as the facilities that will irradiate the TPBARs for DOE.

## Irradiating TPBARs in TVA's Watts Bar and Sequoyah Units 1 and 2 Nuclear Plants

The second phase of the tritium production program focuses on irradiating production quantities of TPBARs. This phase involves NRC assisting DOE in assessing and resolving technical and licensing issues involved in using commercial reactors for tritium production. NRC has reviewed DOE's safety assessments submitted in a topical report. NRC's SER, issued as NUREG-1672 in May 1999, documents the review. The NUREG identifies plant-specific interface issues that TVA must address to get NRC approval to irradiate TPBARs in large numbers.

NRC must grant license amendments to TVA before TVA can use the Watts Bar and Sequoyah plants to irradiate TPBARs in large numbers. TVA requested a Watts Bar license amendment on August 20, 2001, and seeks NRC approval by August 2002, to install up to 2304 TPBARs into Watts Bar. TVA expects to request Sequoyah Units 1 and 2 license amendments in September 2001 and seek NRC approval by September 2002. Both actions will be subject to opportunities for hearings. Current DOE plans call for loading the TPBARs into Watts Bar and Sequoyah Units 1 and 2 during their fall 2003 outages. TVA will irradiate the TPBARs for one operating cycle. They will be removed during the next refueling outage and shipped to the tritium extraction facility at the Savannah River site in the winter of 2005.

## Public Meetings

NRC held public meetings on DOE's TPP as follows:

- An initial meeting was held at NRC Headquarters in Rockville, Maryland, in February 1997. Another public meeting was held near TVA's Watts Bar nuclear power plant in Tennessee in August 1997, prior to loading TPBARs into the reactor core. These meetings gave the public opportunities to comment on the technical issues of the confirmatory test, and to inform the public of NRC activities early in the evaluation process.
- Technical meetings between TVA and NRC that were open to the public were held on March 23 and August 24, 2000 to provide the status of resolution of technical issues and communicate proposed schedules for licensing activities.
- On August 20, 2001, NRC, DOE, and TVA held a public meeting at NRC headquarters to give an update of ongoing TPP activities and get stakeholder feedback.
- The NRC, along with DOE and TVA, will hold a public meeting in Evensville, TN on the evening of October 2, 2001, to discuss the TPP and the NRC's process for reviewing TVA's license amendment request.
- The NRC will hold an additional public meeting in the Watts Bar vicinity before issuing the Watts Bar license amendment.

## **Monthly Internal Project Review Meeting Format**

Meeting duration will not exceed 1 hour.

Typical agenda:

- purpose
- desired outcomes and success criteria
- review progress made since last meeting
- review issues
- management issues
- resolution of to-do items
- external web site feedback review and resolution
- other

## **Frequently Asked Questions About NRC's Role in DOE's Program to Produce Tritium**

### **What is tritium?**

Hydrogen has three isotopes; protium, deuterium and tritium. Protium and deuterium are stable and are not radioactive. Tritium is a radioactive form (or isotope) of the hydrogen atoms that has two neutrons, one proton, and one electron.

### **Why did DOE establish a Commercial Light Water Reactors Tritium Production Program?**

DOE is responsible for ensuring that the US has a supply of materials to maintain its nuclear weapons stockpile at levels directed by the President. Tritium is a gaseous isotope of hydrogen that helps to increase the yield of nuclear weapons. DOE established a Commercial Light Water Reactor (CLWR) Tritium Production Program for the following two reasons:

- The US no longer has government-owned, operating nuclear reactors needed to produce tritium.
- Tritium has a relatively short half-life and decays at a rate about 5.5 percent per year. This means that present supplies will be cut nearly into half before the year 2010.

Presidential Directive mandates that new tritium be available by approximately 2005. Therefore, it is essential for DOE to develop new sources of tritium.

### **What does the CLWR Tritium Production Program consist of?**

DOE will fabricate Tritium Producing Burnable Absorber Rods (TPBARs) and ship them to the Tennessee Valley Authority's (TVA's) Watts Bar and Sequoyah nuclear plants where TVA will irradiate them in their nuclear reactors. DOE will then ship the irradiated TPBARs to a newly constructed tritium extraction facility in Savannah River, SC, where DOE will extract and purify tritium from the TPBARs.

### **What are TPBARs?**

Rods that contain lithium-6 instead of the normally-used boron. The lithium changes to tritium when irradiated.

### **What is DOE's role in the CLWR Tritium Production Program?**

DOE is responsible for procurement, packaging and delivery of TPBARs to be irradiated at TVA nuclear power plants. DOE is responsible for making arrangements and achieve necessary appropriate regulatory approvals for possession of byproduct materials, packaging, transport of irradiated TPBARs to a facility for extraction and purification of tritium and disposal of waste.

**What Is NRC's role in this Program?**

NRC will review TVA's request to put TPBARs into the Watts Bar and Sequoyah nuclear plants. TVA needs NRC approval before inserting TPBARs into their reactors.

**Does tritium have other uses?**

Yes, tritium has both commercial and scientific uses. Tritium is used to make self-luminous exit signs, lock illuminations, and gunsights among other things.

**Can we handle tritium safely?**

Yes. Beta radiation from tritium cannot escape to the environment when it is kept in specially designed containers.

**Why are commercial power reactors being used in this process?**

Because the CLWR TPBAR's irradiation process provides a highly reliable, technical mature, readily available and operationally flexible cost effective alternative source for providing the tritium gas to the nuclear weapons stockpile a critical requirement for the national defense and security of the US.

**Could TPBARs adversely impact safe reactor operation?**

The NRC will review TVA's request to put TPBARs into the Watts Bar and Sequoyah nuclear plants and will approve TVA's request only if using TPBARs meets NRC regulatory requirements and is safe. The NRC's requirements for commercial light water reactors are contained in 10 CFR Part 50.

**How is NRC going to ensure that DOE safely transports the TPBARs to their Savannah River, SC, Tritium Extraction Facility?**

DOE will contract with a transportation company to ship the TPBARs in casks. DOE may choose to use self-certified packages (under Department of Transportation authority) without NRC review and approval. DOE may also decide to transport TPBARs using "Type B" packages certified by NRC to 10 CFR Part 71.

# Communication Schedule for NRC's Role in DOE's Program to Produce Tritium

## Implementing the Plan

### **Initial Phase**

1. Held an NRC/DOE/TVA big-picture public presentation to NRC management and staff involved in DOE's TPP on August 20, 2001.
2. Receive TVA's license amendment request.
3. Notify the applicable congressional committees (working with OCA):
  - Senate Armed Services Committees
  - normal NRC oversight committees
  - Congressional Research Service at the Library of Congress
  - others, as applicable
4. Issue press release.
5. Issue Federal Register Notice.
6. Hold a DOE/TVA/NRC big-picture presentation in the vicinity of Watts Bar early in the amendment review process - currently scheduled for October 2, 2001.<sup>1</sup>

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### **Routine Feedback**

- Hold monthly internal project review meetings.
  - Collect and address feedback received via web site and other controlled correspondence.
  - Revise and issue monthly status report.
  - Revise external web site as appropriate
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<sup>1</sup> Commissioner McGaffigan recommendation via Jeff Sharkey's E-mail of August 14, 2001.

**Augment Communications for Extensive Stakeholder Feedback** (including possible hearings).

- Hold stakeholder meetings, as appropriate:
  - public licensing review meeting before issuing the license amendment<sup>2</sup>
  - as-needed DOE/NRC town hall-type public education meetings
  - external stakeholder meetings (e.g., licensee)
- Issue press releases, as appropriate.
- If a hearing is requested, notify the Commission if the staff intends to make a final finding of “no significant hazards consideration.”<sup>3</sup>
- Other (TBD)

Contact: L. Mark Padovan, (301) 415-1423  
Accession No. ML012350170

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<sup>2</sup> Commission Staff Requirements Memorandum of December 10, 1996 says “hold .... public meetings before TPBARs are inserted in any particular NRC-licensed facility for the production phase of DOE’s CLWR program.” This is documented in NUREG-1672 “Safety Evaluation Report Related to the Department of Energy’s Topical Report on the Tritium Production Program,” Section B.2, page 1-4.

<sup>3</sup> Source — NUREG-1672, Section B.1, page 1-3.