

**DEPARTMENT OF ENERGY****Request for Expressions of Interest for Tritium Production**

**AGENCY:** Department of Energy (DOE).

**ACTION:** Request for expressions of interest.

**SUMMARY:** Tritium is an essential material in all nuclear weapons in the U.S. nuclear stockpile. Because the U.S. is not currently producing tritium, development of a new tritium supply will be essential for maintaining the U.S. nuclear deterrent. The Department of Energy's preferred strategy for acquiring new supplies of tritium is to pursue the two most promising production alternatives: (1) use of one or more existing Commercial Light Water Reactors (CLWRs); and (2) to design, build and test critical components of an Accelerator-Produced Tritium (APT) system to be used for tritium production. By this Notice, DOE is requesting expressions of interest concerning DOE's possible acquisition of one or more CLWRs, or acquisition of irradiation services from CLWRs, for the production of tritium. In addition, this request will solicit interest regarding the future potential use of mixed oxide fuel from surplus weapons plutonium either coincident with or separate from tritium production. The use of mixed oxide fuel is not part of DOE's preferred strategy for acquiring new supplies of tritium and no firm decisions have been made regarding the use of such fuel. Nevertheless, DOE is seeking to ascertain industry interest in the possible use of mixed oxide fuel for disposal of surplus weapons plutonium.

**DATES:** Initial expressions of interest should be submitted on or before January 29, 1996. Supplementary information regarding the expressions of interest should be submitted on or before February 26, 1996.

**ADDRESSES:** Requests for information, and submittal of initial and supplemental expressions of interest (original plus five (5) copies, citing this Notice), should be directed to: Stephen M. Sohinki, Director, Office of Reconfiguration, DP-25, United States Department of Energy, 1000 Independence Ave. SW., Washington D.C. 20585, Attention: Tritium EOI, Telephone: (202) 586-0838.

Answers to questions that, in DOE's judgment, are of general interest and applicability to all potential respondents will be made available for review in DOE's Public Reading Room at DOE Headquarters in Washington, D.C.

**I. Purpose****A. Dual Path Strategy for Tritium Supply**

Tritium, an essential material in U.S. nuclear weapons, decays at a rate of approximately five percent per year (12.3 year half life). The U.S. is not currently producing tritium. Resumption of tritium production will be essential for maintaining the U.S. nuclear weapons stockpile and the U.S. nuclear deterrent. Tritium could be required as early as 2005 should the START II treaty not be ratified and implemented according to its terms. If the START II treaty is ratified and implemented as written tritium would be required in 2011.

DOE distributed its Tritium Supply and Recycling Programmatic Environmental Impact Statement in October, 1995, in which it announced its preferred "dual path" strategy for acquiring a new supply of tritium. That strategy is to begin work on the two most promising production alternatives: (1) to procure an option or options to purchase or lease one or more existing CLWRs or procure CLWR irradiation services for tritium production; and (2) to design, build and test critical components of an APT system for tritium production. A decision to implement the DOE's preferred dual path strategy for tritium production, based upon the Programmatic Environmental Impact Statement and related cost, schedule and technical analyses, was announced in a Record of Decision issued on December 5, 1995.

The CLWR and APT options present very different approaches and pose fundamentally different technical and institutional issues that must be evaluated to provide a basis for selection. During the next three years, DOE will be undertaking the research and analyses necessary to provide the technical, economic and regulatory bases for the selection of the primary and backup technology approaches by 1998. If the CLWR option is not selected as the primary source of tritium, however, DOE intends to go forward with some form of the CLWR option as a backup for the APT, as a contingency for U.S. national defense requirements.

**B. Tritium Target Development**

To produce tritium in a reactor, tritium target rods must be inserted into the reactor to capture neutrons and generate tritium. A lithium-aluminate, getter-barrier target design for use in a CLWR is currently under development. Tritium is produced via neutron capture in the lithium and the tritium generated is captured in a Zircaloy getter. The

target rod outer cladding is stainless steel which has an aluminide inner coating to prevent tritium release. DOE's target development has focused on PWR technology, with target dimensions sized so that the target can be placed in either burnable poison or fuel rod locations. Following irradiation, target rods would be removed from the reactor as part of the refueling process and shipped to DOE's Savannah River Site where the tritium would be extracted. Depending on production requirements, between 2000 to 5000 target rods would be needed per fuel cycle. A single reactor or multiple reactors could be utilized. Target development work to date indicates that reactor fuel enrichment need not exceed five (5) percent.

DOE's target development work has progressed to the point that it is now appropriate to evaluate potential reactor candidates for the production mission.

**C. Acquisition of Option**

DOE is interested in acquiring one or more options to purchase or lease an existing commercial reactor or reactors, or to procure irradiation services from one or more such reactors. To accomplish this DOE will consider different types of options, as described in detail below. To facilitate assessing the feasibility of these options, DOE is requesting expressions of interest.

This Request for Expressions of Interest is not intended to be a solicitation for proposals, and it is not anticipated that an award will be made based on the expressions of interest received. Depending on the nature of the responses received and subsequent determinations by DOE, a formal solicitation for competitive proposals may be issued in the future, and awards may be made based upon an evaluation of proposals received pursuant to the evaluation criteria as stated in the solicitation. However, DOE may utilize the information received in response to this request to take any other action as authorized by law to fulfill the government's requirements for the production of tritium, and potential disposition of surplus weapons plutonium, including a noncompetitive process.

For the information of potential respondents, a preliminary procurement schedule is provided as an appendix to this Notice. The preliminary schedule provided in the appendix is tentative and depends upon a number of factors, including the nature of the responses to this Request, meetings which may be conducted with respondents, and the need for and schedule of necessary technical studies and analyses.

Respondents are encouraged to provide comments on the schedule so that DOE may be made aware of any concerns and attempt to alleviate them to the extent consistent with programmatic requirements.

#### *D. Potential Use of Mixed Oxide Fuel From Surplus Weapons Plutonium*

DOE is currently examining options for the disposal of surplus weapons plutonium and is preparing a Programmatic Environmental Impact Statement (PEIS) on storage and disposition of weapons-usable fissile materials, scheduled for completion in late 1996. However, to facilitate the Department's ongoing efforts to assess the feasibility of disposal of surplus weapons plutonium through the use of mixed oxide fuel in existing light water reactors, the Department is taking the opportunity of this request for expressions of interest to solicit information regarding the general level of industry interest in the potential future use of mixed oxide fuel from surplus weapons plutonium either coincident with (multipurpose) or separate from tritium production. *A reactor operator need not be interested in use of mixed oxide fuel, however, in order to respond to the request for expressions of interest for tritium production.*

#### II. Areas of DOE Interest

DOE is considering acquiring in 1997 or 1998 one or more options to:

- Purchase or lease an operating reactor or reactors, including options to purchase a complete facility, purchase a reactor without any power-generating systems, obtain a long-term lease of a facility or part of a facility or other similar arrangements, or purchase an uncompleted reactor or reactors; or
- Purchase target irradiation services, including all possibilities ranging from obtaining all tritium from a single reactor to using several reactors (the number of reactors to be utilized would depend, among other things, on the quantity of tritium required). An option to purchase irradiation services may also include an option to purchase the reactor or reactors being utilized to provide the services.

These options would be exercised after all necessary regulatory approvals have been obtained.

DOE may also desire an option to conduct irradiation and other testing of a Lead Test Assembly (LTA) target as a prelude to tritium production. Follow-on tritium production may be accomplished in the same reactor or reactors that were used for irradiation of the LTA, or in a different reactor or

reactors. Reactors to be considered may need to be available for testing of tritium targets not later than July, 1997, and for mission use in about 2003, and would need to have sufficient remaining useful life to meet mission needs. Candidate reactors should have licenses with expiration dates of 2020 or later.

DOE's target development work has focused on targets for use in pressurized water reactors (PWRs). Although tritium targets could be developed for use in boiling water reactors (BWRs), significant additional development work would likely be required at substantial additional cost. DOE does not plan to develop such targets, given existing budget constraints and the need to complete target development and qualification in the required time frame. However, DOE has not ruled out the use of BWRs and would be interested in expressions of interest with respect to both the use of BWR plants and to the development of BWR tritium targets.

In addition to the above, if the option of using existing light water reactors were to be selected for the disposition of surplus weapons plutonium when the DOE completes its Programmatic Environmental Impact Statement (PEIS) on storage and disposition of weapons-usable fissile materials in late 1996, DOE would intend to embark on a mixed oxide fuel (MOX) test and demonstration program including regulatory review and testing of lead test assemblies. Thus, DOE requests that respondents indicate their interest, if any, in participating in such a potential test program.

Respondents should provide information that is as accurate as possible, but information provided will not be considered as binding nor all inclusive.

Respondents are requested to provide expressions of interest in two parts over a 75 day response period:

- Initial expressions of interest due at the end of the first 45 day response period; and
- Supplementary information due 30 days after submission of initial expressions of interest.

Respondents are requested to provide the following information in their initial expressions of interest:

- The reactor(s) it may wish to sell, lease, or offer for irradiation services.
- The reactor(s) age, location, specifications, operating schedule (including the anticipated refueling/outage schedule) and capacity factor for each year of operation.

Respondents are requested to provide as much of the following supplementary information as is feasible 30 days after

the due date for initial expressions of interest:

- Proposed arrangements by which DOE would use the reactor or reactors to produce tritium, including a non-binding price estimate (or estimated range of prices), for each arrangement contemplated by respondent, assuming that DOE would begin tritium production in 2005. Discuss important variables that could affect the price or other terms of the arrangements.

- Equity- and debt-structure of owner(s)/co-owners, and approvals that would be needed and requirements (terms/conditions) that must be met before the respondent can enter into an agreement with DOE.

- Potential issues involving decontamination and decommissioning, or other technical or cost issues.

- Interest and issues concerning the potential use of mixed oxide fuel from surplus weapons plutonium.

- Nuclear Regulatory Commission (NRC) license requirements, Securities and Exchange Commission disclosure requirements and requirements of other federal, state or local regulatory authorities.

- The complete operating history of the reactor(s), and respondent's experience in operating the reactor(s).

- The NRC enforcement history with respect to the reactor(s).

- Major maintenance actions taken in the last 10 years and actions expected in the next 15 years for the reactor(s) and their actual or estimated costs, as appropriate.

- Any other issues specifically related to the particular reactor(s), fuel type or assumptions, facility or services identified in the response.

- Any additional information or other requirements necessary for developing a complete response to a future solicitation by DOE for the use of CLWRs to produce tritium, including the potential use of mixed oxide fuel from surplus weapons plutonium either coincident with or separate from the production of tritium.

#### III. Expressions of Interest Format

There is no minimum length for expressions of interest. Maximum aggregate length is fifty (50) pages for both initial and supplementary responses, including enclosures or attachments. It is left to the respondent to determine how best to use the fifty (50) page maximum. It would, however, facilitate review if initial and supplementary expressions of interest are divided into sections that correspond to the categories of information identified in Section II., above.

*Proprietary Information*

If the initial or supplementary expression of interest contains information that is privileged or confidential and which the respondent does not want disclosed to the public, the respondent should place the following notice on the expression of interest:

The information contained in pages \_\_\_\_\_ of this Expression of Interest has been submitted in confidence and contains trade secrets or commercial or financial information that is confidential or privileged, and such information should be used or disclosed by the Government or its contractors, only for purposes of consideration of this Expression of Interest. This restriction does not limit the Government's right to use or disclose other information obtained without proprietary restrictions from any source, including other information provided by the respondent.

*Submission*

Each submittal should consist of one original and five (5) photocopies. DOE

is under no obligation to pay for any costs associated with the preparation or submission of expressions of interest in response to this Notice. DOE reserves the right to respond, or not respond to all or any portion of any expression of interest submitted in response to this Notice. DOE intends to conduct a public meeting regarding this notice 30 days from the date of its publication. Following receipt of initial or supplementary responses, DOE may also conduct one or more scoping meetings with all respondents to disseminate additional information on this effort, and may also conduct meetings with individual respondents for clarification of their responses or to obtain additional information.

Issued in Washington, D.C. on December 5, 1995.  
Hazel R. O'Leary,  
*Secretary.*

APPENDIX—PRELIMINARY  
PROCUREMENT SCHEDULE

Activity	Completion date
Receipt of Initial Responses.	Jan. 19, 1996.
Receipt of Supplemental Information.	Feb. 20, 1996.
Complete Review of EOIs . Issue Request for Proposals.	Mar. 15, 1996. Jun. 1, 1996.
Proposals Due Date .....	Sep. 1, 1996.
Evaluate Proposal's and Select Competitive Range.	Dec. 1, 1996.
Conduct Discussions and Request and Receive Best and Final Offers.	Apr. 1, 1997.
Make Conditional Selection	Jun. 1, 1997.

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