



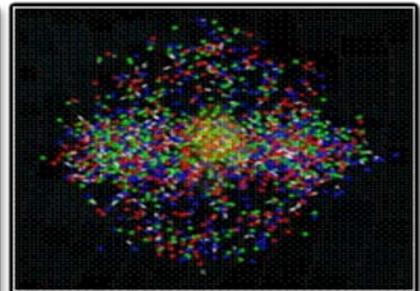
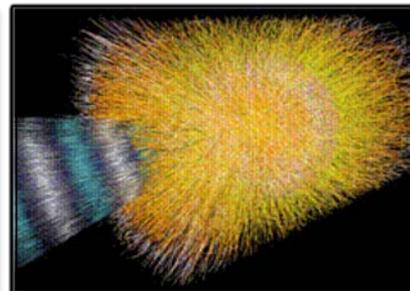
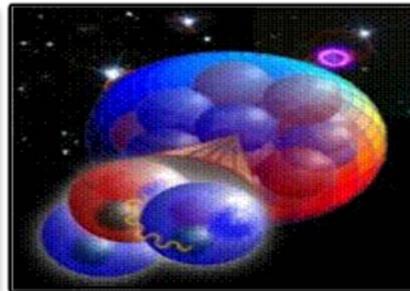
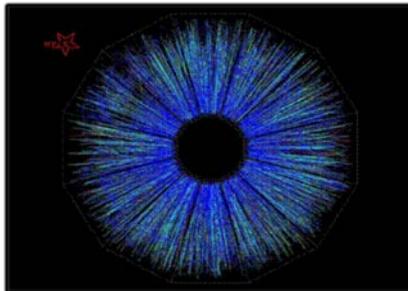
U.S. DEPARTMENT OF  
**ENERGY**

Office of  
Science

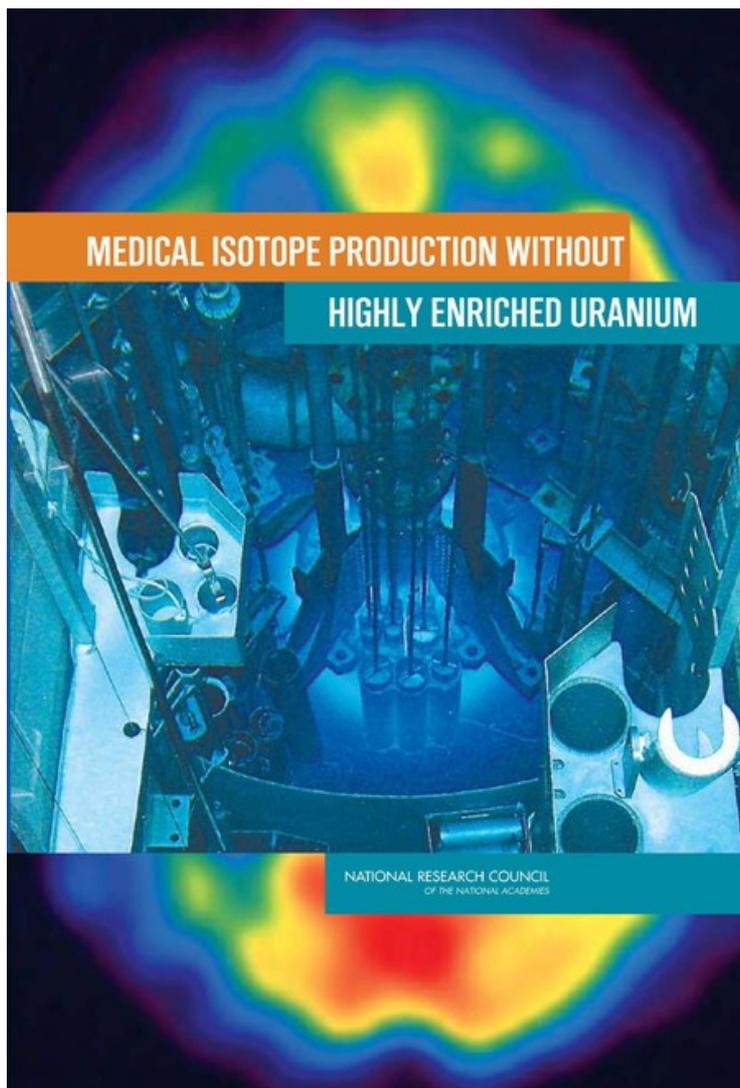
# Charge to NSAC Related to NNSA Development of Mo99 Domestic Supply

Nuclear Science Advisory Committee Meeting  
December 19, 2013

Dr. T. J. Hallman  
Associate Director for Nuclear Physics  
DOE Office of Science



# The Importance and the Challenge of Mo-99 Production



The decay product of Mo-99, technetium-99m<sup>1</sup> (Tc-99m), is used in a very high percentage (~ 70%) of all diagnostic medical isotope procedures in the United States.

A very high percentage of Mo-99 is currently being produced using highly enriched uranium (HEU) targets which is a major concern

NRC Report 2009



# The National Defense Authorization Act for FY2013

- **SEC. 3173. IMPROVING THE RELIABILITY OF DOMESTIC MEDICAL ISOTOPE SUPPLY.**
- (a) **MEDICAL ISOTOPE DEVELOPMENT PROJECTS.—**
- (1) **IN GENERAL.—**The Secretary shall carry out a technology-neutral program—
  - (A) to evaluate and support projects for the production in the United States, without the use of highly enriched uranium, of significant quantities of molybdenum-99 for medical uses;
  - (B) to be carried out in cooperation with non-Federal entities; and
  - (C) the costs of which shall be shared in accordance with section 988 of the Energy Policy Act of 2005 (42U.S.C. 16352).
- (2) **CRITERIA.—**Projects shall be evaluated against the following primary criteria:
  - (A) The length of time necessary for the proposed project to begin production of molybdenum-99 for medical uses within the United States.
  - (B) The capability of the proposed project to produce a significant percentage of United States demand for molybdenum-99 for medical uses.
  - (C) The capability of the proposed project to produce molybdenum-99 in a cost-effective manner.
  - (D) The cost of the proposed project.
- (3) **EXEMPTION.—**An existing reactor in the United States fueled with highly enriched uranium shall not be disqualified from the program if the Secretary determines that—
  - (A) there is no alternative nuclear reactor fuel, enriched in the isotope U-235 to less than 20 percent, that can be used in that reactor;
  - (B) the reactor operator has provided assurances that, whenever an alternative nuclear reactor fuel, enriched in the isotope U-235 to less than 20 percent, can be used in that reactor, it will use that alternative in lieu of highly enriched uranium; and
  - (C) the reactor operator has provided a current report on the status of its efforts to convert the reactor to an alternative nuclear reactor fuel enriched in the isotope U-235 to less than 20 percent, and an anticipated schedule for completion of conversion.



# Other News: The National Defense Authorization Act for FY2013 and NSAC

---

(H. R. 4310— 581)

(4) PUBLIC PARTICIPATION AND REVIEW.—The Secretary shall—

(A) develop a program plan and annually update the program plan through public workshops; and

(B) use the Nuclear Science Advisory Committee to conduct annual reviews of the progress made in achieving the program goals and make recommendations to improve program effectiveness.

New NSAC subcommittee is formed to perform assessment.



# Charge to NSAC Related to NNSA Development of Mo-99 Domestic Supply



U.S. Department of Energy  
and the  
National Science Foundation



December 5, 2013

Dr. Donald Geesaman  
Chair, DOE/NSF Nuclear Science Advisory Committee  
Argonne National Laboratory  
9800 South Cass Avenue  
Argonne, Illinois 60439

Dear Dr. Geesaman:

This letter is to request that, in accordance with direction given to the DOE in the National Defense Authorization Act (NDAA) for FY2013, the Nuclear Science Advisory Committee (NSAC) form a Subcommittee to assess the effectiveness of the National Nuclear Security Administration-Global Threat Reduction Initiative's (NNSA-GTRI) Domestic Molybdenum-99 (Mo-99) Program.



U.S. DEPARTMENT OF  
**ENERGY**

Office of  
Science

NSAC Meeting

December 19, 2013

# Charge to NSAC Related to NNSA Development of Mo-99 Domestic Supply

---

As you may know, the primary mission of the GTRI Convert Program is to reduce and eliminate the use of highly enriched uranium (HEU)-235 in civilian applications, including in the production of medical isotopes. Technetium-99m (Tc-99m) is the decay product of the radioisotope Mo-99 and is used in diagnosing heart disease, cancer treatment, and studying organ structure and function. Present day technology for producing Mo-99 relies heavily on recovering Mo-99 from HEU targets irradiated at research reactors and processed at isotope production facilities located outside the United States. For this reason, the NNSA GTRI Convert program works with international producers to convert isotope production from the use of HEU targets to low enriched uranium targets, without negatively impacting the Mo-99 supply. In recent years, planned and unplanned outages at facilities producing Mo-99 outside the United States have greatly increased the urgency of NNSA GTRI supported efforts to also accelerate the establishment of a domestic supply of Mo-99 produced without the use of HEU.

As a part of the GTRI stewardship of establishing a domestic supply of Mo-99, NNSA entered into cooperative agreements in FY2009 and FY2010 with four commercial entities, each pursuing unique, non-HEU-based technologies to develop the capacity to produce 3,000 six-day curies of Mo-99 per week.



# Charge to NSAC Related to NNSA Development of Mo-99 Domestic Supply

---

The American Medical Isotopes Production Act of 2012 (Act), formerly known as S.99 and H.R. 3276, was incorporated into the National Defense Authorization Act (NDAA) for FY2013. On January 2, 2013, President Obama signed the NDAA into law, enacting this legislation. A stipulation of the NNDA under section 3173 - *IMPROVING THE RELIABILITY OF DOMESTIC MEDICAL ISOTOPE SUPPLY* is that:

*“... the Secretary [of Energy] shall... use the Nuclear Science Advisory Committee to conduct annual reviews of the progress made in achieving the [NNSA GTRI] program goals and make recommendations to improve program effectiveness.”*

Accordingly, we request that NSAC form a Subcommittee to provide an initial assessment of the following charge elements:

- Are NNSA GTRI programmatic goals for establishing a domestic supply of Mo-99 well defined?
- Have the risks in implementing those goals been fully identified?
- What is the current status of implementing these goals?
- Is the strategy for implementing the NNSA goals complete and feasible, within an international context?
- What steps should be taken to improve NNSA program effectiveness in establishing a domestic supply of Mo-99?



# Charge to NSAC Related to NNSA Development of Mo-99 Domestic Supply

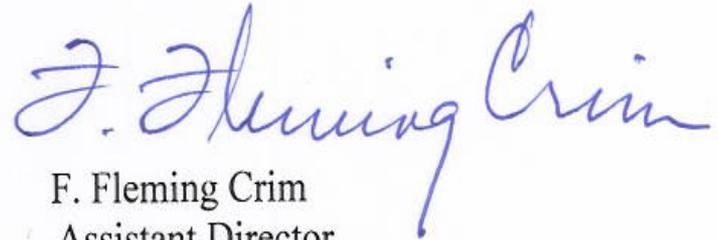
This Subcommittee will be constituted as a standing subcommittee of NSAC for three years. It is requested that an initial assessment be submitted to the Office of Science by April 30, 2014. Subsequent assessments are to be provided annually.

We are aware that this charge represents an additional burden on your time. However, the involvement of NSAC is essential to inform the Agency regarding the effectiveness of efforts to steward Mo-99, an isotope essential for the health and well being of the Nation.

Sincerely,



Patricia M. Dehmer  
Acting Director  
Office of Science



F. Fleming Crim  
Assistant Director  
Directorate for Mathematical  
and Physical Sciences

Work on this charge by an NSAC subpanel will commence January, 2014

