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Dr. Patricia M. Dehmer
Acting Director, Office of Science
U. S. Department of Energy
1000 Independence Avenue
Washington, D.C. 20583

Dr. F. Fleming Crim
Assistant Director
Directorate of Mathematical and Physical Sciences
National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

Dear Drs. Dehmer and Crim:

In a letter from your offices dated December 5, 2013, NSAC was asked to assess the effectiveness of the National Nuclear Security Administration-Global Threat Reduction Initiative's (NNSA-GTRI) Domestic Molybdenum-99 (Mo-99) Program.

NSAC formed a sub-committee chaired by Dr. Susan Seestrom of Los Alamos National Laboratory to prepare a response to the charge. This subcommittee presented its report to NSAC at a meeting on April 24-25, 2014. NSAC made some suggestions for clarifications and accepted the revised report by an 8 to 1 vote with 1 abstention. A copy of the report is enclosed with this letter.

Mo-99 is used to produce the Technetium-99 isomer (Tc-99m), which is the most widely used isotope in diagnostic nuclear imaging procedures. As such, its availability is of great concern to the medical community and the general public. Present technology relies heavily on recovering Mo-99 from the irradiation of highly enriched uranium (HEU) targets at facilities outside the United States. The NNSA GTRI program works with the international producers to convert isotope production from the use of HEU targets to low enriched uranium targets without negatively impacting the Mo-99 supply. The National Defense Authorization Act for FY2013 also directs the program to "... support projects for the production in the United States, without the use of highly enriched uranium, of significant quantities of molybdenum-99 for medical users."

As defined by the charge, the Subcommittee focused on the reviewing the goals and processes of the GTRI program for establishing domestic production of Mo-99 and their approach to managing risk. However since the anticipated need and viability of domestic production capability depends on the worldwide situation and competition, we also considered broader issues to place domestic production in proper context. The individual plans and progress of the four cooperative agreement partners were not examined in detail. The subcommittee does not see any fundamental technical barriers to the projects, but specific technical and engineering questions can have significant impact on the cost-effectiveness of production and the time scale for regulatory approval, and thus on the long term economic viability of domestic production efforts. The cooperative partners moving forward expressed their confidence in dealing with these issues.

The basic conclusion of the report is that establishing a reliable domestic supply of Mo-99 without the use of HEU is an extremely complex issue with many factors outside the direct control of the NNSA GTRI program. The program is to be lauded for their attempts to deal with this complexity and to work with and provide leadership to various federal and international entities to try to achieve a situation that results in a stable U.S. supply of Mo-99. As an element in achieving stable supply, the NNSA strategy to accelerate the development of domestic production of Mo-99 is feasible in that, if the risks are positively resolved, it can result in a stable supply of Mo-99 in the U.S. with at least one or more U.S. producers. At the present time, there remain significant risks to success as discussed in the report.

A report from this subcommittee is called for once a year. We will continue to welcome community input to this process.

Sincerely yours,

A handwritten signature in blue ink, appearing to read "Donald F. Geesaman", with a long horizontal flourish extending to the right.

Donald F. Geesaman
Chair, NSAC