

112TH CONGRESS  
1ST SESSION

# S. 99

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## AN ACT

To promote the production of molybdenum-99 in the United States for medical isotope production, and to condition and phase out the export of highly enriched uranium for the production of medical isotopes.

1 *Be it enacted by the Senate and House of Representa-*  
2 *tives of the United States of America in Congress assembled,*

1 **SECTION 1. SHORT TITLE.**

2 This Act may be cited as the “American Medical Iso-  
3 topes Production Act of 2011”.

4 **SEC. 2. DEFINITIONS.**

5 In this Act:

6 (1) DEPARTMENT.—The term “Department”  
7 means the Department of Energy.

8 (2) HIGHLY ENRICHED URANIUM.—The term  
9 “highly enriched uranium” means uranium enriched  
10 to 20 percent or greater in the isotope U-235.

11 (3) LOW ENRICHED URANIUM.—The term “low  
12 enriched uranium” means uranium enriched to less  
13 than 20 percent in the isotope U-235.

14 (4) SECRETARY.—The term “Secretary” means  
15 the Secretary of Energy.

16 **SEC. 3. IMPROVING THE RELIABILITY OF DOMESTIC MED-  
17 ICAL ISOTOPE SUPPLY.**

18 (a) MEDICAL ISOTOPE DEVELOPMENT PROJECTS.—

19 (1) IN GENERAL.—The Secretary shall carry  
20 out a technology-neutral program—

21 (A) to evaluate and support projects for  
22 the production in the United States, without  
23 the use of highly enriched uranium, of signifi-  
24 cant quantities of molybdenum-99 for medical  
25 uses;

1 (B) to be carried out in cooperation with  
2 non-Federal entities; and

3 (C) the costs of which shall be shared in  
4 accordance with section 988 of the Energy Pol-  
5 icy Act of 2005 (42 U.S.C. 16352).

6 (2) CRITERIA.—Projects shall be judged against  
7 the following primary criteria:

8 (A) The length of time necessary for the  
9 proposed project to begin production of molyb-  
10 denum-99 for medical uses within the United  
11 States.

12 (B) The capability of the proposed project  
13 to produce a significant percentage of United  
14 States demand for molybdenum-99 for medical  
15 uses.

16 (C) The cost of the proposed project.

17 (3) EXEMPTION.—An existing reactor in the  
18 United States fueled with highly enriched uranium  
19 shall not be disqualified from the program if the  
20 Secretary determines that—

21 (A) there is no alternative nuclear reactor  
22 fuel, enriched in the isotope U-235 to less than  
23 20 percent, that can be used in that reactor;

24 (B) the reactor operator has provided as-  
25 surances that, whenever an alternative nuclear

1 reactor fuel, enriched in the isotope U-235 to  
2 less than 20 percent, can be used in that reac-  
3 tor, it will use that alternative in lieu of highly  
4 enriched uranium; and

5 (C) the reactor operator has provided a  
6 current report on the status of its efforts to  
7 convert the reactor to an alternative nuclear re-  
8 actor fuel enriched in the isotope U-235 to less  
9 than 20 percent, and an anticipated schedule  
10 for completion of conversion.

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

13 (A) develop a program plan and annually  
14 update the program plan through public work-  
15 shops; and

16 (B) use the Nuclear Science Advisory  
17 Committee to conduct annual reviews of the  
18 progress made in achieving the program goals.

19 (b) DEVELOPMENT ASSISTANCE.—The Secretary  
20 shall carry out a program to provide assistance for—

21 (1) the development of fuels, targets, and proc-  
22 esses for domestic molybdenum-99 production that  
23 do not use highly enriched uranium; and

24 (2) commercial operations using the fuels, tar-  
25 gets, and processes described in paragraph (1).

1 (c) URANIUM LEASE AND TAKE-BACK.—

2 (1) IN GENERAL.—The Secretary shall establish  
3 a program to make low-enriched uranium available,  
4 through lease contracts, for irradiation for the pro-  
5 duction of molybdenum-99 for medical uses.

6 (2) TITLE.—The lease contracts shall provide  
7 for the producers of the molybdenum-99 to take title  
8 to and be responsible for the molybdenum-99 created  
9 by the irradiation, processing, or purification of ura-  
10 nium leased under this section.

11 (3) DUTIES.—

12 (A) SECRETARY.—The lease contracts  
13 shall require the Secretary—

14 (i) to retain responsibility for the final  
15 disposition of spent nuclear fuel created by  
16 the irradiation, processing, or purification  
17 of uranium leased under this section for  
18 the production of medical isotopes; and

19 (ii) to take title to and be responsible  
20 for the final disposition of radioactive  
21 waste created by the irradiation, proc-  
22 essing, or purification of uranium leased  
23 under this section for which the Secretary  
24 determines the producer does not have ac-  
25 cess to a disposal path.

1 (B) PRODUCER.—The producer of the  
2 spent nuclear fuel and radioactive waste shall  
3 accurately characterize, appropriately package,  
4 and transport the spent nuclear fuel and radio-  
5 active waste prior to acceptance by the Depart-  
6 ment.

7 (4) COMPENSATION.—

8 (A) IN GENERAL.—Subject to subpara-  
9 graph (B), the lease contracts shall provide for  
10 compensation in cash amounts equivalent to  
11 prevailing market rates for the sale of com-  
12 parable uranium products and for compensation  
13 in cash amounts equivalent to the net present  
14 value of the cost to the Federal Government  
15 for—

16 (i) the final disposition of spent nu-  
17 clear fuel and radioactive waste for which  
18 the Department is responsible under para-  
19 graph (3); and

20 (ii) other costs associated with car-  
21 rying out the uranium lease and take-back  
22 program authorized by this subsection.

23 (B) DISCOUNT RATE.—The discount rate  
24 used to determine the net present value of costs  
25 described in subparagraph (A)(ii) shall be not

1 greater than the average interest rate on mar-  
2 ketable Treasury securities.

3 (5) AUTHORIZED USE OF FUNDS.—The Sec-  
4 retary may obligate and expend funds received under  
5 leases entered into under this subsection, which shall  
6 remain available until expended, for the purpose of  
7 carrying out the activities authorized by this Act, in-  
8 cluding activities related to the final disposition of  
9 spent nuclear fuel and radioactive waste for which  
10 the Department is responsible under paragraph (3).

11 (6) EXCHANGE OF URANIUM FOR SERVICES.—  
12 The Secretary shall not barter or otherwise sell or  
13 transfer uranium in any form in exchange for—

14 (A) services related to the final disposition  
15 of the spent nuclear fuel and radioactive waste  
16 for which the Department is responsible under  
17 paragraph (3); or

18 (B) any other services associated with car-  
19 rying out the uranium lease and take-back pro-  
20 gram authorized by this subsection.

21 (d) COORDINATION OF ENVIRONMENTAL RE-  
22 VIEWS.—The Department and the Nuclear Regulatory  
23 Commission shall ensure to the maximum extent prac-  
24 ticable that environmental reviews for the production of

1 the medical isotopes shall complement and not duplicate  
2 each review.

3 (e) OPERATIONAL DATE.—The Secretary shall estab-  
4 lish a program as described in subsection (c)(3) not later  
5 than 3 years after the date of enactment of this Act.

6 (f) RADIOACTIVE WASTE.—Notwithstanding section  
7 2 of the Nuclear Waste Policy Act of 1982 (42 U.S.C.  
8 10101), radioactive material resulting from the production  
9 of medical isotopes that has been permanently removed  
10 from a reactor or subcritical assembly and for which there  
11 is no further use shall be considered low-level radioactive  
12 waste if the material is acceptable under Federal require-  
13 ments for disposal as low-level radioactive waste.

14 **SEC. 4. EXPORTS.**

15 Section 134 of the Atomic Energy Act of 1954 (42  
16 U.S.C. 2160d) is amended by striking subsection c. and  
17 inserting the following:

18 “c. Effective 7 years after the date of enactment of  
19 the American Medical Isotopes Production Act of 2011,  
20 the Commission may not issue a license for the export of  
21 highly enriched uranium from the United States for the  
22 purposes of medical isotope production.

23 “d. The period referred to in subsection b. may be  
24 extended for no more than 6 years if, no earlier than 6  
25 years after the date of enactment of the American Medical

1 Isotopes Production Act of 2011, the Secretary of Energy  
2 certifies to the Committee on Energy and Commerce of  
3 the House of Representatives and the Committee on En-  
4 ergy and Natural Resources of the Senate that—

5           “(1) there is insufficient global supply of molyb-  
6 denum-99 produced without the use of highly en-  
7 riched uranium available to satisfy the domestic  
8 United States market; and

9           “(2) the export of United States-origin highly  
10 enriched uranium for the purposes of medical iso-  
11 tope production is the most effective temporary  
12 means to increase the supply of molybdenum-99 to  
13 the domestic United States market.

14           “e. To ensure public review and comment, the devel-  
15 opment of the certification described in subsection c. shall  
16 be carried out through announcement in the Federal Reg-  
17 ister.

18           “f. At any time after the restriction of export licenses  
19 provided for in subsection b. becomes effective, if there  
20 is a critical shortage in the supply of molybdenum-99  
21 available to satisfy the domestic United States medical iso-  
22 tope needs, the restriction of export licenses may be sus-  
23 pended for a period of no more than 12 months, if—

24           “(1) the Secretary of Energy certifies to the  
25 Congress that the export of United States-origin

1 highly enriched uranium for the purposes of medical  
2 isotope production is the only effective temporary  
3 means to increase the supply of molybdenum-99 nec-  
4 essary to meet United States medical isotope needs  
5 during that period; and

6 “(2) the Congress enacts a Joint Resolution ap-  
7 proving the temporary suspension of the restriction  
8 of export licenses.

9 “g. As used in this section—

10 “(1) the term ‘alternative nuclear reactor fuel  
11 or target’ means a nuclear reactor fuel or target  
12 which is enriched to less than 20 percent in the iso-  
13 tope U-235;

14 “(2) the term ‘highly enriched uranium’ means  
15 uranium enriched to 20 percent or more in the iso-  
16 tope U-235;

17 “(3) a fuel or target ‘can be used’ in a nuclear  
18 research or test reactor if—

19 “(A) the fuel or target has been qualified  
20 by the Reduced Enrichment Research and Test  
21 Reactor Program of the Department of Energy;  
22 and

23 “(B) use of the fuel or target will permit  
24 the large majority of ongoing and planned ex-  
25 periments and medical isotope production to be

1           conducted in the reactor without a large per-  
2           centage increase in the total cost of operating  
3           the reactor; and

4           “(4) the term ‘medical isotope’ includes molyb-  
5           denum-99, iodine-131, xenon-133, and other radio-  
6           active materials used to produce a radiopharma-  
7           ceutical for diagnostic or therapeutic procedures or  
8           for research and development.”.

9   **SEC. 5. REPORT ON DISPOSITION OF EXPORTS.**

10          Not later than 1 year after the date of the enactment  
11          of this Act, the Chairman of the Nuclear Regulatory Com-  
12          mission, after consulting with other relevant agencies,  
13          shall submit to the Congress a report detailing the current  
14          disposition of previous United States exports of highly en-  
15          riched uranium used as fuel or targets in a nuclear re-  
16          search or test reactor, including—

17                 (1) their location;

18                 (2) whether they are irradiated;

19                 (3) whether they have been used for the pur-  
20          pose stated in their export license;

21                 (4) whether they have been used for an alter-  
22          native purpose and, if so, whether such alternative  
23          purpose has been explicitly approved by the Commis-  
24          sion;

1           (5) the year of export, and reimportation, if ap-  
2       plicable;

3           (6) their current physical and chemical forms;  
4       and

5           (7) whether they are being stored in a manner  
6       which adequately protects against theft and unau-  
7       thorized access.

8 **SEC. 6. DOMESTIC MEDICAL ISOTOPE PRODUCTION.**

9       (a) IN GENERAL.—Chapter 10 of the Atomic Energy  
10 Act of 1954 (42 U.S.C. 2131 et seq.) is amended by add-  
11 ing at the end the following:

12       “SEC. 112. DOMESTIC MEDICAL ISOTOPE PRODUC-  
13 TION.—

14       “a. The Commission may issue a license, or grant an  
15 amendment to an existing license, for the use in the  
16 United States of highly enriched uranium as a target for  
17 medical isotope production in a nuclear reactor, only if,  
18 in addition to any other requirement of this Act—

19           “(1) the Commission determines that—

20                   “(A) there is no alternative medical isotope  
21                   production target, enriched in the isotope U-  
22                   235 to less than 20 percent, that can be used  
23                   in that reactor; and

24                   “(B) the proposed recipient of the medical  
25                   isotope production target has provided assur-

1           ances that, whenever an alternative medical iso-  
2           tope production target can be used in that reac-  
3           tor, it will use that alternative in lieu of highly  
4           enriched uranium; and

5           “(2) the Secretary of Energy has certified that  
6           the United States Government is actively supporting  
7           the development of an alternative medical isotope  
8           production target that can be used in that reactor.

9           “b. As used in this section—

10           “(1) the term ‘alternative medical isotope pro-  
11           duction target’ means a nuclear reactor target which  
12           is enriched to less than 20 percent of the isotope U-  
13           235;

14           “(2) a target ‘can be used’ in a nuclear re-  
15           search or test reactor if—

16           “(A) the target has been qualified by the  
17           Reduced Enrichment Research and Test Reac-  
18           tor Program of the Department of Energy; and

19           “(B) use of the target will permit the large  
20           majority of ongoing and planned experiments  
21           and medical isotope production to be conducted  
22           in the reactor without a large percentage in-  
23           crease in the total cost of operating the reactor;

1           “(3) the term ‘highly enriched uranium’ means  
2 uranium enriched to 20 percent or more in the iso-  
3 tope U-235; and

4           “(4) the term ‘medical isotope’ includes molyb-  
5 denum-99, iodine-131, xenon-133, and other radio-  
6 active materials used to produce a radiopharma-  
7 ceutical for diagnostic or therapeutic procedures or  
8 for research and development.”.

9           (b) TABLE OF CONTENTS.—The table of contents for  
10 the Atomic Energy Act of 1954 is amended by inserting  
11 the following new item at the end of the items relating  
12 to chapter 10 of title I:

“Sec. 112. Domestic medical isotope production.”.

13 **SEC. 7. ANNUAL DEPARTMENT REPORTS.**

14           (a) IN GENERAL.—Not later than 1 year after the  
15 date of enactment of this Act, and annually thereafter for  
16 5 years, the Secretary shall report to Congress on Depart-  
17 ment actions to support the production in the United  
18 States, without the use of highly enriched uranium, of mo-  
19 lybdenum-99 for medical uses.

20           (b) CONTENTS.—The reports shall include the fol-  
21 lowing:

22           (1) For medical isotope development projects—  
23               (A) the names of any recipients of Depart-  
24               ment support under section 3;

1 (B) the amount of Department funding  
2 committed to each project;

3 (C) the milestones expected to be reached  
4 for each project during the year for which sup-  
5 port is provided;

6 (D) how each project is expected to sup-  
7 port the increased production of molybdenum-  
8 99 for medical uses;

9 (E) the findings of the evaluation of  
10 projects under section 3(a)(2); and

11 (F) the ultimate use of any Department  
12 funds used to support projects under section 3.

13 (2) A description of actions taken in the pre-  
14 vious year by the Secretary to ensure the safe dis-  
15 position of spent nuclear fuel and radioactive waste  
16 for which the Department is responsible under sec-  
17 tion 3(c).

18 **SEC. 8. NATIONAL ACADEMY OF SCIENCES REPORT.**

19 (a) IN GENERAL.—The Secretary shall enter into an  
20 arrangement with the National Academy of Sciences to  
21 conduct a study of the state of molybdenum-99 production  
22 and utilization, to be provided to Congress not later than  
23 5 years after the date of enactment of this Act.

24 (b) CONTENTS.—The report shall include the fol-  
25 lowing:

1 (1) For molybdenum-99 production—

2 (A) a list of all facilities in the world pro-  
3 ducing molybdenum-99 for medical uses, includ-  
4 ing an indication of whether these facilities use  
5 highly enriched uranium in any way;

6 (B) a review of international production of  
7 molybdenum-99 over the previous 5 years, in-  
8 cluding—

9 (i) whether any new production was  
10 brought online;

11 (ii) whether any facilities halted pro-  
12 duction unexpectedly; and

13 (iii) whether any facilities used for  
14 production were decommissioned or other-  
15 wise permanently removed from service;  
16 and

17 (C) an assessment of progress made in the  
18 previous 5 years toward establishing domestic  
19 production of molybdenum-99 for medical uses,  
20 including the extent to which other medical iso-  
21 topes that have been produced with molyb-  
22 denum-99, such as iodine-131 and xenon-133,  
23 are being used for medical purposes.

24 (2) An assessment of the progress made by the  
25 Department and others to eliminate all worldwide

1 use of highly enriched uranium in reactor fuel, reac-  
2 tor targets, and medical isotope production facilities.

3 **SEC. 9. REPEAL.**

4 The Nuclear Safety Research, Development, and  
5 Demonstration Act of 1980 (42 U.S.C. 9701 et seq.) is  
6 repealed.

7 **SEC. 10. BUDGETARY EFFECTS.**

8 The budgetary effects of this Act, for the purpose of  
9 complying with the Statutory Pay-As-You-Go-Act of 2010,  
10 shall be determined by reference to the latest statement  
11 titled “Budgetary Effects of PAYGO Legislation” for this  
12 Act, submitted for printing in the Congressional Record  
13 by the Chairman of the Senate Budget Committee, pro-  
14 vided that such statement has been submitted prior to the  
15 vote on passage.

Passed the Senate November 17, 2011.

Attest:

*Secretary.*

112<sup>TH</sup> CONGRESS  
1<sup>ST</sup> SESSION

**S. 99**

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**AN ACT**

To promote the production of molybdenum-99 in the United States for medical isotope production, and to condition and phase out the export of highly enriched uranium for the production of medical isotopes.