

112TH CONGRESS
1ST SESSION

S. 99

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.

IN THE SENATE OF THE UNITED STATES

JANUARY 25 (legislative day, JANUARY 5), 2011

Mr. BINGAMAN (for himself and Ms. MURKOWSKI) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

A BILL

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,*

3 **SECTION 1. SHORT TITLE.**

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

6 **SEC. 2. IMPROVING THE RELIABILITY OF DOMESTIC MED-**
7 **ICAL ISOTOPE SUPPLY.**

8 (a) **MEDICAL ISOTOPE DEVELOPMENT PROJECTS.—**

1 (1) IN GENERAL.—The Secretary of Energy
2 shall establish a technology-neutral program—

3 (A) to evaluate and support projects for
4 the production in the United States, without
5 the use of highly enriched uranium, of signifi-
6 cant quantities of molybdenum-99 for medical
7 uses;

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

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

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

15 (A) The length of time necessary for the
16 proposed project to begin production of molyb-
17 denum-99 for medical uses within the United
18 States.

19 (B) The capability of the proposed project
20 to produce a significant percentage of United
21 States demand for molybdenum-99 for medical
22 uses.

23 (C) The cost of the proposed project.

24 (3) EXEMPTION.—An existing reactor fueled
25 with highly enriched uranium shall not be disquali-

1 fied from the program if the Secretary of Energy de-
2 termines that—

3 (A) there is no alternative nuclear reactor
4 fuel, enriched in the isotope U-235 to less than
5 20 percent, that can be used in that reactor;

6 (B) the reactor operator has provided as-
7 surances that, whenever an alternative nuclear
8 reactor fuel, enriched in the isotope U-235 to
9 less than 20 percent, can be used in that reac-
10 tor, it will use that alternative in lieu of highly
11 enriched uranium; and

12 (C) the reactor operator has provided a
13 current report on the status of its efforts to
14 convert the reactor to an alternative nuclear re-
15 actor fuel enriched in the isotope U-235 to less
16 than 20 percent, and an anticipated schedule
17 for completion of conversion.

18 (4) PUBLIC PARTICIPATION AND REVIEW.—The
19 Secretary of Energy shall—

20 (A) develop a program plan and annually
21 update the program plan through public work-
22 shops; and

23 (B) use the Nuclear Science Advisory
24 Committee to conduct annual reviews of the
25 progress made in achieving the program goals.

1 (5) AUTHORIZATION OF APPROPRIATIONS.—

2 There are authorized to be appropriated to the Sec-
3 retary of Energy for carrying out the program under
4 paragraph (1) \$143,000,000 for the period encom-
5 passing fiscal years 2011 through 2014.

6 (b) DEVELOPMENT ASSISTANCE.—The Secretary of
7 Energy shall establish a program to provide assistance
8 for—

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

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

14 (c) URANIUM LEASE AND TAKE BACK.—The Sec-
15 retary of Energy shall establish a program to make low
16 enriched uranium available, through lease contracts, for
17 irradiation for the production of molybdenum-99 for med-
18 ical uses. The lease contracts shall provide for the Sec-
19 retary to retain responsibility for the final disposition of
20 radioactive waste created by the irradiation, processing,
21 or purification of leased uranium. The lease contracts
22 shall also provide for compensation in cash amounts equiv-
23 alent to prevailing market rates for the sale of comparable
24 uranium products and for compensation in cash amounts
25 equivalent to the net present value of the cost to the Fed-

1 eral Government for the final disposition of such radio-
2 active waste, provided that the discount rate used to deter-
3 mine the net present value of such costs shall be no great-
4 er than the average interest rate on marketable Treasury
5 securities. The Secretary shall not barter or otherwise sell
6 or transfer uranium in any form in exchange for services
7 related to final disposition of the radioactive waste from
8 such leased uranium.

9 **SEC. 3. EXPORTS.**

10 Section 134 of the Atomic Energy Act of 1954 (42
11 U.S.C. 2160d) is amended by striking subsections b. and
12 c. and inserting in lieu thereof the following:

13 “b. Effective 7 years after the date of enactment of
14 the American Medical Isotopes Production Act of 2011,
15 the Commission may not issue a license for the export of
16 highly enriched uranium from the United States for the
17 purposes of medical isotope production.

18 “c. The period referred to in subsection b. may be
19 extended for no more than 6 years if, no earlier than 6
20 years after the date of enactment of the American Medical
21 Isotopes Production Act of 2011, the Secretary of Energy
22 certifies to the Committee on Energy and Commerce of
23 the House of Representatives and the Committee on En-
24 ergy and Natural Resources of the Senate that—

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

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

10 “d. To ensure public review and comment, the devel-
11 opment of the certification described in subsection c. shall
12 be carried out through announcement in the Federal Reg-
13 ister.

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

20 “(1) the Secretary of Energy certifies to the
21 Congress that the export of United States-origin
22 highly enriched uranium for the purposes of medical
23 isotope production is the only effective temporary
24 means to increase the supply of molybdenum-99 nec-

1 essary to meet United States medical isotope needs
2 during that period; and

3 “(2) the Congress enacts a Joint Resolution ap-
4 proving the temporary suspension of the restriction
5 of export licenses.

6 “f. As used in this section—

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

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

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

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

20 “(B) use of the fuel or target will permit
21 the large majority of ongoing and planned ex-
22 periments and isotope production to be con-
23 ducted in the reactor without a large percentage
24 increase in the total cost of operating the reac-
25 tor; and

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

6 **SEC. 4. REPORT ON DISPOSITION OF EXPORTS.**

7 Not later than 1 year after the date of the enactment
8 of this Act, the Chairman of the Nuclear Regulatory Com-
9 mission, after consulting with other relevant agencies,
10 shall submit to the Congress a report detailing the current
11 disposition of previous United States exports of highly en-
12 riched uranium, including—

- 13 (1) their location;
- 14 (2) whether they are irradiated;
- 15 (3) whether they have been used for the pur-
16 pose stated in their export license;
- 17 (4) whether they have been used for an alter-
18 native purpose and, if so, whether such alternative
19 purpose has been explicitly approved by the Commis-
20 sion;
- 21 (5) the year of export, and reimportation, if ap-
22 plicable;
- 23 (6) their current physical and chemical forms;
- 24 and

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

4 **SEC. 5. DOMESTIC MEDICAL ISOTOPE PRODUCTION.**

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

8 “SEC. 112. DOMESTIC MEDICAL ISOTOPE PRODUC-
9 TION.— a. The Commission may issue a license, or grant
10 an amendment to an existing license, for the use in the
11 United States of highly enriched uranium as a target for
12 medical isotope production in a nuclear reactor, only if,
13 in addition to any other requirement of this Act—

14 “(1) the Commission determines that—

15 “(A) there is no alternative medical isotope
16 production target, enriched in the isotope U-
17 235 to less than 20 percent, that can be used
18 in that reactor; and

19 “(B) the proposed recipient of the medical
20 isotope production target has provided assur-
21 ances that, whenever an alternative medical iso-
22 tope production target can be used in that reac-
23 tor, it will use that alternative in lieu of highly
24 enriched uranium; and

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

5 “b. As used in this section—

6 “(1) the term ‘alternative medical isotope pro-
7 duction target’ means a nuclear reactor target which
8 is enriched to less than 20 percent of the isotope U-
9 235;

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

12 “(A) the target has been qualified by the
13 Reduced Enrichment Research and Test Reac-
14 tor Program of the Department of Energy; and

15 “(B) use of the target will permit the large
16 majority of ongoing and planned experiments
17 and isotope production to be conducted in the
18 reactor without a large percentage increase in
19 the total cost of operating the reactor;

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

23 “(4) the term ‘medical isotope’ includes molyb-
24 denum-99, iodine-131, xenon-133, and other radio-
25 active materials used to produce a radiopharma-

1 ceutical for diagnostic, therapeutic procedures or for
2 research and development.”.

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

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

7 **SEC. 6. ANNUAL DEPARTMENT OF ENERGY REPORTS.**

8 The Secretary of Energy shall report to Congress no
9 later than one year after the date of enactment of this
10 Act, and annually thereafter for 5 years, on Department
11 of Energy actions to support the production in the United
12 States, without the use of highly enriched uranium, of mo-
13 lybdenum-99 for medical uses. These reports shall include
14 the following:

15 (1) For medical isotope development projects—

16 (A) the names of any recipients of Depart-
17 ment of Energy support under section 2 of this
18 Act;

19 (B) the amount of Department of Energy
20 funding committed to each project;

21 (C) the milestones expected to be reached
22 for each project during the year for which sup-
23 port is provided;

1 (D) how each project is expected to sup-
2 port the increased production of molybdenum-
3 99 for medical uses;

4 (E) the findings of the evaluation of
5 projects under section 2(a)(2) of this Act; and

6 (F) the ultimate use of any Department of
7 Energy funds used to support projects under
8 section 2 of this Act.

9 (2) A description of actions taken in the pre-
10 vious year by the Secretary of Energy to ensure the
11 safe disposition of radioactive waste from used mo-
12 lybdenum-99 targets.

13 **SEC. 7. NATIONAL ACADEMY OF SCIENCES REPORT.**

14 The Secretary of Energy shall enter into an arrange-
15 ment with the National Academy of Sciences to conduct
16 a study of the state of molybdenum-99 production and uti-
17 lization, to be provided to the Congress not later than 5
18 years after the date of enactment of this Act. This report
19 shall include the following:

20 (1) For molybdenum-99 production—

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

1 (B) a review of international production of
2 molybdenum-99 over the previous 5 years, in-
3 cluding—

4 (i) whether any new production was
5 brought online;

6 (ii) whether any facilities halted pro-
7 duction unexpectedly; and

8 (iii) whether any facilities used for
9 production were decommissioned or other-
10 wise permanently removed from service;
11 and

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

19 (2) An assessment of the progress made by the
20 Department of Energy and others to eliminate all
21 worldwide use of highly enriched uranium in reactor
22 fuel, reactor targets, and medical isotope production
23 facilities.

24 **SEC. 8. DEFINITIONS.**

25 In this Act the following definitions apply:

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

4 (2) LOW ENRICHED URANIUM.—The term “low
5 enriched uranium” means uranium enriched to less
6 than 20 percent in the isotope U-235.

7 **SEC. 9. 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.

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