

118TH CONGRESS
2D SESSION

S. 4151

To amend the Atomic Energy Act of 1954 and the Nuclear Energy Innovation and Modernization Act to clarify existing requirements relating to fusion machines, and for other purposes.

IN THE SENATE OF THE UNITED STATES

APRIL 17, 2024

Mr. PADILLA (for himself, Mr. CORNYN, Mr. BOOKER, Mr. YOUNG, and Mrs. MURRAY) introduced the following bill; which was read twice and referred to the Committee on Environment and Public Works

A BILL

To amend the Atomic Energy Act of 1954 and the Nuclear Energy Innovation and Modernization Act to clarify existing requirements relating to fusion machines, and for other purposes.

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 “Fusion Energy Act
5 of 2024”.

1 **SEC. 2. CLARIFICATION ON FUSION REGULATION.**

2 (a) DEFINITIONS OF FUSION MACHINE AND BY-
3 PRODUCT MATERIAL.—Section 11 of the Atomic Energy
4 Act of 1954 (42 U.S.C. 2014) is amended—

5 (1) in subsection e. (3)(B)—

6 (A) in clause (i), by inserting “, including
7 by use of a fusion machine” after “particle ac-
8 celerator”; and

9 (B) in clause (ii), by inserting “if made ra-
10 dioactive by use of a particle accelerator that is
11 not a fusion machine,” before “is produced”;

12 (2) in each of subsections ee. through hh., by
13 inserting a subsection heading, the text of which
14 comprises the term defined in the subsection;

15 (3) by redesignating subsections ee., ff., gg.,
16 hh., and jj. as subsections jj., gg., hh., ii., and ff.,
17 respectively, and moving the subsections so as to ap-
18 pear in alphabetical order;

19 (4) in subsection dd., by striking “dd. The” and
20 inserting the following:

21 “ee. HIGH-LEVEL RADIOACTIVE WASTE; SPENT NU-
22 CLEAR FUEL.—The”; and

23 (5) by inserting after subsection ee. the fol-
24 lowing:

25 “dd. FUSION MACHINE.—The term ‘fusion machine’
26 means a machine that is capable of—

1 “(1) transforming atomic nuclei, through fusion
2 processes, into different elements, isotopes, or other
3 particles; and

4 “(2) directly capturing and using resultant
5 products, including particles, heat, or other electro-
6 magnetic radiation.”.

7 (b) TECHNOLOGY-INCLUSIVE REGULATORY FRAME-
8 WORK.—

9 (1) IN GENERAL.—Section 103(a) of the Nu-
10 clear Energy Innovation and Modernization Act (42
11 U.S.C. 2133 note; Public Law 115–439) is amend-
12 ed—

13 (A) in paragraph (4)—

14 (i) by striking “inclusive,” and insert-
15 ing “inclusive”;

16 (ii) by inserting “(other than new nu-
17 clear fusion reactor license applications)”
18 before the period at the end;

19 (iii) by striking “Not later” and in-
20 serting the following:

21 “(A) ADVANCED NUCLEAR REACTORS
22 OTHER THAN FUSION REACTORS.—Not later”;
23 and

24 (iv) by adding at the end the fol-
25 lowing:

1 “(B) FUSION MACHINES.—Not later than
2 December 31, 2027, the Commission shall com-
3 plete a rulemaking to establish a technology-in-
4 clusive regulatory framework for optional use
5 by fusion machine applicants for new fusion
6 machine license applications.”; and

7 (B) in paragraph (5)(B)(ii), by inserting
8 “and fusion machine license applications” after
9 “commercial advanced nuclear reactor license
10 applications”.

11 (2) DEFINITION.—Section 3 of the Nuclear En-
12 ergy Innovation and Modernization Act (42 U.S.C.
13 2215 note; Public Law 115–439) is amended—

14 (A) by redesignating paragraphs (8)
15 through (15) as paragraphs (9) through (16),
16 respectively; and

17 (B) by inserting after paragraph (7) the
18 following:

19 “(8) FUSION MACHINE.—The term ‘fusion ma-
20 chine’ has the meaning given the term in section 11
21 of the Atomic Energy Act of 1954 (42 U.S.C.
22 2014).”.

23 (c) REPORT.—

24 (1) DEFINITIONS.—In this subsection:

1 (A) AGREEMENT STATE.—The term
2 “Agreement State” has the meaning given the
3 term in section 3 of the Nuclear Energy Inno-
4 vation and Modernization Act (42 U.S.C. 2215
5 note; Public Law 115–439).

6 (B) COMMISSION.—The term “Commis-
7 sion” means the Nuclear Regulatory Commis-
8 sion.

9 (C) FUSION MACHINE.—The term “fusion
10 machine” has the meaning given the term in
11 section 11 of the Atomic Energy Act of 1954
12 (42 U.S.C. 2014).

13 (2) REQUIREMENT.—Not later than 1 year
14 after the date of enactment of this Act, the Commis-
15 sion shall submit to Congress a report on—

16 (A) the results of a study, conducted in
17 consultation with Agreement States and the pri-
18 vate fusion sector, on risk- and performance-
19 based, design-specific licensing frameworks for
20 mass-manufactured fusion machines, including
21 an evaluation of the design, manufacturing, and
22 operations certification process used by the
23 Federal Aviation Administration for aircraft as
24 a potential model for mass-manufactured fusion
25 machine regulations; and

1 (B) the estimated timeline for the Commis-
2 sion to issue consolidated guidance or regula-
3 tions for licensing mass-manufactured fusion
4 machines, taking into account—

5 (i) the results of that study; and

6 (ii) the anticipated need for such
7 guidance or regulations.

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