

**H.R. 5866, AS AMENDED BY THE SUBCOMMITTEE
ON ENERGY AND ENVIRONMENT ON JULY 28,
2010**

1 **SECTION 1. SHORT TITLE.**

2 This Act may be cited as the “Nuclear Energy Re-
3 search and Development Act of 2010”.

4 **SEC. 2. OBJECTIVES.**

5 Section 951(a) of the Energy Policy Act of 2005 (42
6 U.S.C. 16271(a)) is amended—

7 (1) by redesignating paragraphs (2) through
8 (8) as paragraphs (5) through (11), respectively;

9 (2) by inserting after paragraph (1) the fol-
10 lowing new paragraphs:

11 “(2) Reducing the costs of nuclear reactor sys-
12 tems.

13 “(3) Reducing used nuclear fuel and nuclear
14 waste products generated by civilian nuclear energy.

15 “(4) Supporting technological advances in areas
16 that industry by itself is not likely to undertake be-
17 cause of technical and financial uncertainty.”; and

18 (3) by inserting after paragraph (10), as so re-
19 designated, the following new paragraph:

1 “(11) Researching and developing technologies
2 and processes so as to improve and streamline the
3 process by which nuclear power systems meet Fed-
4 eral and State requirements and standards.”.

5 **SEC. 3. FUNDING.**

6 Section 951 of the Energy Policy Act of 2005 (42
7 U.S.C. 16271) is further amended—

8 (1) in subsection (b), by striking paragraphs
9 (1) through (3) and inserting the following:

10 “(1) \$419,000,000 for fiscal year 2011;

11 “(2) \$429,000,000 for fiscal year 2012; and

12 “(3) \$439,000,000 for fiscal year 2013.”; and

13 (2) in subsection (d)—

14 (A) by striking “under subsection (a)” and
15 inserting “under subsection (b)”;

16 (B) by amending paragraph (1) to read as
17 follows:

18 “(1) For activities under section 953—

19 “(A) \$201,000,000 for fiscal year 2011;

20 “(B) \$201,000,000 for fiscal year 2012;

21 and

22 “(C) \$201,000,000 for fiscal year 2013.”;

23 and

24 (C) by inserting after paragraph (3) the
25 following new paragraphs:

1 “(4) For activities under section 952, other
2 than those described in section 952(d)—

3 “(A) \$64,000,000 for fiscal year 2011;

4 “(B) \$64,000,000 for fiscal year 2012; and

5 “(C) \$64,000,000 for fiscal year 2013.

6 “(5) For activities under section 952(d)—

7 “(A) \$55,000,000 for fiscal year 2011;

8 “(B) \$65,000,000 for fiscal year 2012; and

9 “(C) \$75,000,000 for fiscal year 2013.

10 “(6) For activities under section 958—

11 “(A) \$99,000,000 for fiscal year 2011;

12 “(B) \$99,000,000 for fiscal year 2012; and

13 “(C) \$99,000,000 for fiscal year 2013.”.

14 **SEC. 4. NUCLEAR ENERGY RESEARCH AND DEVELOPMENT**
15 **PROGRAMS.**

16 Section 952 of the Energy Policy Act of 2005 (42
17 U.S.C. 16272) is amended by striking subsections (c)
18 through (e) and inserting the following:

19 “(c) REACTOR CONCEPTS.—

20 “(1) IN GENERAL.—The Secretary shall carry
21 out a program of research, development, demonstra-
22 tion, and commercial application to advance fission
23 power systems as well as technologies to sustain cur-
24 rently deployed systems.

1 “(2) DESIGNS AND TECHNOLOGIES.—In con-
2 ducting the program under this subsection, the Sec-
3 retary shall examine advanced reactor designs and
4 nuclear technologies, including those that—

5 “(A) are economically competitive with
6 other electric power generation plants;

7 “(B) have higher efficiency, lower cost, and
8 improved safety compared to reactors in oper-
9 ation as of the date of enactment of the Nu-
10 clear Energy Research and Development Act of
11 2010;

12 “(C) utilize passive safety features;

13 “(D) minimize proliferation risks;

14 “(E) substantially reduce production of
15 high-level waste per unit of output;

16 “(F) increase the life and sustainability of
17 reactor systems currently deployed;

18 “(G) use improved instrumentation;

19 “(H) are capable of producing large-scale
20 quantities of hydrogen or process heat; or

21 “(I) minimize water usage or use alter-
22 natives to water as a cooling mechanism.

23 “(3) INTERNATIONAL COOPERATION.—In car-
24 rying out the program under this subsection, the
25 Secretary shall seek opportunities to enhance the

1 progress of the program through international co-
2 operation through such organizations as the Genera-
3 tion IV International Forum, or any other inter-
4 national collaboration the Secretary considers appro-
5 priate.

6 “(4) EXCEPTIONS.—No funds authorized to be
7 appropriated to carry out the activities described in
8 this subsection shall be used to fund the activities
9 authorized under sections 641 through 645.”.

10 **SEC. 5. SMALL MODULAR REACTOR PROGRAM.**

11 Section 952 of the Energy Policy Act of 2005 (42
12 U.S.C. 16272) is further amended by adding at the end
13 the following new subsection:

14 “(d) SMALL MODULAR REACTOR PROGRAM.—

15 “(1) IN GENERAL.—

16 “(A) The Secretary shall carry out a small
17 modular reactor program to promote research,
18 development, demonstration, and commercial
19 application of small modular reactors, including
20 through cost-shared projects for commercial ap-
21 plication of reactor systems designs.

22 “(B) The Secretary shall consult with and
23 utilize the expertise of the Secretary of the
24 Navy in establishing and carrying out such pro-
25 gram.

1 “(C) Activities may also include develop-
2 ment of advanced computer modeling and sim-
3 ulation tools, by Federal and non-Federal enti-
4 ties, which demonstrate and validate new design
5 capabilities of innovative small modular reactor
6 designs.

7 “(2) DEFINITION.—For the purposes of this
8 subsection, the term ‘small modular reactor’ means
9 a nuclear reactor—

10 “(A) with a rated capacity of less than 300
11 electrical megawatts; and

12 “(B) that can be constructed and operated
13 in combination with similar reactors at a single
14 site.

15 “(3) LIMITATION.—Demonstration activities
16 carried out under this section shall be limited to in-
17 dividual technologies and systems, and shall not in-
18 clude demonstration of full reactor systems or full
19 plant operations.

20 “(4) ADMINISTRATION.—In conducting the
21 small modular reactor program, the Secretary may
22 enter into cooperative agreements to support small
23 modular reactor designs that enable—

1 “(A) lower capital costs or increased access
2 to private financing in comparison to current
3 large reactor designs;

4 “(B) reduced long-term radiotoxicity,
5 mass, or decay heat of the nuclear waste pro-
6 duced by generation;

7 “(C) increased operating safety of nuclear
8 facilities;

9 “(D) reduced dependence of reactor sys-
10 tems on water resources;

11 “(E) increased seismic resistance of nu-
12 clear generation;

13 “(F) reduced proliferation risks through
14 integrated safeguards and security proliferation
15 controls; and

16 “(G) increased efficiency in reactor manu-
17 facturing and construction.

18 “(5) APPLICATION.—To be eligible to enter into
19 a cooperative agreement with the Secretary under
20 this subsection, an applicant shall submit to the Sec-
21 retary a proposal for the small modular reactor
22 project to be undertaken. The proposal shall docu-
23 ment—

24 “(A) all partners and suppliers that will be
25 active in the small modular reactor project, in-

1 including a description of each partner or sup-
2 plier's anticipated domestic and international
3 activities;

4 “(B) measures to be undertaken to enable
5 cost-effective implementation of the small mod-
6 ular reactor project;

7 “(C) an accounting structure approved by
8 the Secretary; and

9 “(D) all known assets that shall be con-
10 tributed to satisfy the cost-sharing requirement
11 under paragraph (6).

12 “(6) COST SHARING.—Notwithstanding section
13 988, the Secretary shall require the parties to a co-
14 operative agreement under this subsection to be re-
15 sponsible for not less than 50 percent of the costs
16 of the small modular reactor project.

17 “(7) CALCULATION OF COST SHARING
18 AMOUNT.—A recipient of financial assistance under
19 this section may not satisfy the cost sharing require-
20 ment under paragraph (6) by using federally appro-
21 priated funds.

22 “(8) PROJECT SELECTION CRITERIA.—The Sec-
23 retary shall consider the following factors in entering
24 into a cooperative agreement under this subsection:

1 “(A) The domestic manufacturing capabili-
2 ties of the parties to the cooperative agreement
3 and their partners and suppliers.

4 “(B) The viability of the reactor design
5 and the business plan or plans of the parties to
6 the cooperative agreement.

7 “(C) The parties to the cooperative agree-
8 ment’s potential to continue the development of
9 small modular reactors without Federal sub-
10 sidies or loan guarantees.

11 “(D) The cost share to be provided.

12 “(E) The degree to which the goals de-
13 scribed in paragraph (4)(A) through (G) will be
14 advanced.”.

15 **SEC. 6. FUEL CYCLE RESEARCH AND DEVELOPMENT.**

16 (a) AMENDMENTS.—Section 953 of the Energy Pol-
17 icy Act of 2005 (42 U.S.C. 16273) is amended—

18 (1) in the section heading by striking “**AD-**
19 **VANCED FUEL CYCLE INITIATIVE**” and inserting
20 “**FUEL CYCLE RESEARCH AND DEVELOPMENT**”;

21 (2) by striking subsection (a);

22 (3) by redesignating subsections (b) through (d)
23 as subsections (e) through (g), respectively; and

1 (4) by inserting before subsection (e), as so re-
2 designated by paragraph (3) of this subsection, the
3 following new subsections:

4 “(a) IN GENERAL.—The Secretary shall conduct a
5 fuel cycle research and development program (referred to
6 in this section as the ‘program’) on fuel cycle options that
7 improve uranium resource utilization, maximize energy
8 generation, minimize nuclear waste creation, improve safe-
9 ty, mitigate risk of proliferation, and improve waste man-
10 agement in support of a national strategy for spent nu-
11 clear fuel and the reactor concepts research, development,
12 demonstration, and commercial application program under
13 section 952(c).

14 “(b) FUEL CYCLE OPTIONS.—Under this section the
15 Secretary may consider implementing the following initia-
16 tives:

17 “(1) OPEN CYCLE.—Developing fuels, including
18 the use of nonuranium materials, for use in reactors
19 that increase energy generation and minimize the
20 amount of nuclear waste produced in an open fuel
21 cycle.

22 “(2) MODIFIED OPEN CYCLE.—Developing fuel
23 forms, reactors, and limited separation and trans-
24 mutation methods that increase fuel utilization and
25 reduce nuclear waste in a modified open fuel cycle.

1 “(3) FULL RECYCLE.—Developing technologies
2 to repeatedly recycle nuclear waste products to mini-
3 mize radiotoxicity, mass, and decay heat to the
4 greatest extent possible.

5 “(4) ADVANCED STORAGE METHODS.—Devel-
6 oping advanced storage technologies for both onsite
7 and long-term storage that substantially prolong the
8 effective life of current storage devices or that sub-
9 stantially improve upon existing nuclear waste stor-
10 age technologies and methods, including repositories.

11 “(5) ALTERNATIVE AND DEEP BOREHOLE
12 STORAGE METHODS.—Developing alternative storage
13 methods for long-term storage, including deep
14 boreholes into stable crystalline rock formations and
15 salt dome storage.

16 “(6) OTHER TECHNOLOGIES.—Developing any
17 other technology or initiative that the Secretary de-
18 termines is likely to advance the objectives of the
19 program established under subsection (a).

20 “(c) ADDITIONAL ADVANCED RECYCLING AND
21 CROSSCUTTING ACTIVITIES.—In addition to and in sup-
22 port of the specific initiatives described in paragraphs (1)
23 through (6), the Secretary may support the following ac-
24 tivities:

1 “(1) Development and testing of integrated
2 process flow sheets nuclear fuel recycling processes.

3 “(2) Research to characterize the byproducts
4 and waste streams resulting from fuel recycling
5 processes.

6 “(3) Research and development on reactor con-
7 cepts or transmutation technologies that improve re-
8 source utilization or reduce the radiotoxicity of waste
9 streams.

10 “(4) Research and development on waste treat-
11 ment processes and separations technologies, ad-
12 vanced waste forms, and quantification of prolifera-
13 tion risks.

14 “(5) Identification and evaluation of test and
15 experimental facilities necessary to successfully im-
16 plement the advanced fuel cycle initiative.

17 “(6) Advancement of fuel cycle-related modeling
18 and simulation capabilities.

19 “(d) BLUE RIBBON COMMISSION REPORT.—In car-
20 rying out this section the Secretary shall give consider-
21 ation to the final report on a long-term nuclear waste solu-
22 tion produced by the Blue Ribbon Commission on Amer-
23 ica’s Nuclear Future. Not later than 180 days after the
24 release of the Blue Ribbon Commission on America’s Nu-
25 clear Future final report, the Secretary shall transmit to

1 Congress a report describing any plans the Department
2 may have to incorporate any relevant recommendations
3 from this report into the program.”.

4 (b) CONFORMING AMENDMENT.—The item relating
5 to section 953 in the table of contents of the Energy Policy
6 Act of 2005 is amended to read as follows:

“Sec. 953. Fuel cycle research and development.”.

7 **SEC. 7. NUCLEAR ENERGY ENABLING TECHNOLOGIES PRO-**
8 **GRAM.**

9 (a) AMENDMENT.—Subtitle E of title IX of the En-
10 ergy Policy Act of 2005 (42 U.S.C. 16271 et seq.) is
11 amended by adding at the following new section:

12 **“SEC. 958. NUCLEAR ENERGY ENABLING TECHNOLOGIES.**

13 “(a) IN GENERAL.—The Secretary shall conduct a
14 program to support the integration of activities under-
15 taken through the reactor concepts research, development,
16 demonstration, and commercial application program under
17 section 952(c) and the fuel cycle research and development
18 program under section 953, and support crosscutting nu-
19 clear energy concepts. Activities commenced under this
20 section shall be concentrated on broadly applicable re-
21 search and development focus areas.

22 “(b) ACTIVITIES.—Activities conducted under this
23 section may include research involving—

24 “(1) advanced reactor materials;

25 “(2) advanced radiation mitigation methods;

1 the potential of a severe accident arising from the use of
2 civilian nuclear energy technology, including reactor tech-
3 nology deployed or likely to be deployed as of the date
4 of enactment of this Act, and outlining the technologies
5 currently available to mitigate the consequences of such
6 an accident. The report shall include recommendations of
7 areas of technological development that should be pursued
8 to reduce the potential public harm arising from such an
9 incident.

10 **SEC. 9. NEXT GENERATION NUCLEAR PLANT.**

11 (a) **PROTOTYPE PLANT LOCATION.**—Section
12 642(b)(3) of the Energy Policy Act of 2005 (42 U.S.C.
13 16022(b)(3)) is amended to read as follows:

14 “(3) **PROTOTYPE PLANT LOCATION.**—The pro-
15 totype nuclear reactor and associated plant shall be
16 constructed at a location determined by the consor-
17 tium through an open and transparent competitive
18 selection process.”.

19 (b) **REPORT.**—

20 (1) **REQUIREMENT.**—Not later than 1 year
21 after the date of enactment of this Act, the Comp-
22 troller General shall transmit to the Congress a re-
23 port providing a status update of the Next Genera-
24 tion Nuclear Plant program that provides analysis
25 of—

1 (A) its progress;

2 (B) how Federal funds appropriated for
3 the project have been distributed and spent;
4 and

5 (C) the current and expected participation
6 by non-Federal entities.

7 (2) CONTENTS.—The report shall include—

8 (A) an analysis of the proposed facility's
9 technical capabilities and remaining techno-
10 logical development challenges, and a cost esti-
11 mate and construction schedule;

12 (B) an assessment of the advantages and
13 disadvantages of funding a pilot-scale research
14 reactor project in lieu of a full-scale commercial
15 power reactor;

16 (C) an assessment of alternative construc-
17 tion sites proposed by private industry;

18 (D) an assessment of the extent to which
19 the Department of Energy is working with in-
20 dustry and the Nuclear Regulatory Commission
21 to ensure that the Next Generation Nuclear
22 Plant program meets industry expectations for
23 long-term application of technologies and ad-
24 dresses potential licensing procedures for de-
25 ployment;

1 (E) an assessment of the known or antici-
2 pated challenges to securing private non-Fed-
3 eral cost share funds and any measures to over-
4 come these challenges, including any alternative
5 funding approaches such as front loading the
6 Federal share;

7 (F) an assessment of project risks, includ-
8 ing those related to—

9 (i) project scope, schedule, and re-
10 sources;

11 (ii) the formation of partnerships or
12 agreements between the Department and
13 the private sector necessary for the
14 project's success; and

15 (iii) the Department's capabilities to
16 identify and manage such risks; and

17 (G) an assessment of what is known about
18 the potential impact of natural gas and other
19 fossil fuel prices on private entity participation
20 in the project.

21 **SEC. 10. TECHNICAL STANDARDS COLLABORATION.**

22 (a) IN GENERAL.—The Director of the National In-
23 stitute of Standards and Technology shall establish a nu-
24 clear energy standards committee (in this section referred
25 to as the “technical standards committee”) to facilitate

1 and support, consistent with the National Technology
2 Transfer and Advancement Act of 1995, the development
3 or revision of technical standards for new and existing nu-
4 clear power plants and advanced nuclear technologies.

5 (b) MEMBERSHIP.—

6 (1) IN GENERAL.—The technical standards
7 committee shall include representatives from appro-
8 priate Federal agencies and the private sector, and
9 be open to materially affected organizations involved
10 in the development or application of nuclear energy-
11 related standards.

12 (2) CO-CHAIRS.—The technical standards com-
13 mittee shall be co-chaired by a representative from
14 the National Institute of Standards and Technology
15 and a representative from a private sector standards
16 organization.

17 (c) DUTIES.—The technical standards committee
18 shall, in cooperation with appropriate Federal agencies—

19 (1) perform a needs assessment to identify and
20 evaluate the technical standards that are needed to
21 support nuclear energy, including those needed to
22 support new and existing nuclear power plants and
23 advanced nuclear technologies;

24 (2) formulate, coordinate, and recommend pri-
25 orities for the development of new technical stand-

1 ards and the revision of existing technical standards
2 to address the needs identified under paragraph (1);

3 (3) facilitate and support collaboration and co-
4 operation among standards developers to address the
5 needs and priorities identified under paragraphs (1)
6 and (2);

7 (4) as appropriate, coordinate with other na-
8 tional, regional, or international efforts on nuclear
9 energy-related technical standards in order to avoid
10 conflict and duplication and to ensure global com-
11 patibility; and

12 (5) promote the establishment and maintenance
13 of a database of nuclear energy-related technical
14 standards.

15 (d) AUTHORIZATION OF APPROPRIATIONS.—There
16 are authorized to be appropriated \$1,000,000 for each of
17 fiscal years 2011 through 2013 to the Director of the Na-
18 tional Institute for Standards and Technology for activi-
19 ties under this section.

20 **SEC. 11. EVALUATION OF LONG-TERM OPERATING NEEDS.**

21 (a) IN GENERAL.—Secretary of Energy shall enter
22 into an arrangement with the National Academies to con-
23 duct an evaluation of the scientific and technological chal-
24 lenges to the long-term maintenance and safe operation

1 of currently deployed nuclear power reactors up to and
2 beyond the specified design-life of reactor systems.

3 (b) REPORT.—Not later than 1 year after the date
4 of enactment of this Act, the Secretary shall transmit to
5 the Congress, and make publically available, the results
6 of the evaluation undertaken by the Academies pursuant
7 to subsection (a).

