

S. 245

To authorize funding for University Nuclear Science and Engineering Programs at the Department of Energy for fiscal years 2002 through 2006.

IN THE SENATE OF THE UNITED STATES

FEBRUARY 1, 2001

Mr. Bingaman introduced the following bill (for himself, Mr. Domenici and Mr. Crapo); which was read twice and referred to the

_____.

A BILL

To authorize funding for University Nuclear Science and Engineering Programs at the Department of Energy for fiscal years 2002 through 2006.

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

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as “Department of Energy University
5 Nuclear Science and Engineering Act”.

6 **SEC. 2. FINDINGS.**

7 The Congress finds the following:

8 (1) U.S. university nuclear science and engineering programs are
9 in a state of serious decline. The supply of bachelor degree nuclear
10 science and engineering personnel in the United States is at a 35-year
11 low. The number of four year degree nuclear engineering programs has
12 declined 50 percent to approximately 25 programs nationwide. Over
13 two-thirds of the faculty in these programs are 45 years or older.

1 (2) Universities cannot afford to support their research and
2 training reactors. Since 1980, the number of small training reactors in the
3 United States have declined by over 50 percent to 28 reactors. Most of
4 these reactors were built in the late 1950s and 1960s with 30- to 40-year
5 operating licenses, and will require re-licensing in the next several years.

6 (3) The neglect in human investment and training infrastructure is
7 affecting 50 years of national R&D investment. The decline in a
8 competent nuclear workforce, and the lack of adequately trained nuclear
9 scientists and engineers, will affect the ability of the United States to
10 solve future waste storage issues, maintain basic nuclear health physics
11 programs, operate existing and design future fission reactors in the
12 United States, respond to future nuclear events worldwide, help stem the
13 proliferation of nuclear weapons, and design and operate naval nuclear
14 reactors.

15 (4) Further neglect in the nation's investment in human resources
16 for the nuclear sciences will lead to a downward spiral. As the number
17 of nuclear science departments shrink, faculties age, and training reactors
18 close, the appeal of nuclear science will be lost to future generations of
19 students.

20 (5) Current projections are that 76% of the nation's professional
21 nuclear workforce can retire in 5 years, a new supply of trained scientists
22 and engineers is needed.

23 (6) The Department of Energy's Office of Nuclear Energy,
24 Science and Technology is well suited to help maintain tomorrow's
25 human resource and training investment in the nuclear sciences.
26 Through its support of research and development pursuant to the
27 Department's statutory authorities, the Office of Nuclear Energy,
28 Science and Technology is the principal federal agent for civilian
29 research in the nuclear sciences for the United States. The Office
30 maintains the Nuclear Engineering and Education Research Program
31 which funds basic nuclear science and engineering. The Office funds the
32 Nuclear Energy and Research Initiative which funds applied
33 collaborative research among universities, industry and national
34 laboratories in the areas of proliferation resistant fuel cycles and future
35 fission power systems. The Office funds Universities to refuel training

1 reactors from highly enriched to low enriched proliferation tolerant fuels,
2 performs instrumentation upgrades and maintains a program of student
3 fellowships for nuclear science, engineering and health physics.

4 **SEC. 3. DEPARTMENT OF ENERGY PROGRAM.**

5 (a) ESTABLISHMENT.--The Secretary of Energy, through the
6 Office of Nuclear Energy, Science and Technology, shall support a
7 program to maintain the nation's human resource investment and
8 infrastructure in the nuclear sciences and engineering consistent with the
9 Department's statutory authorities related to civilian nuclear research
10 and development.

11 (b) DUTIES OF THE OFFICE OF NUCLEAR ENERGY,
12 SCIENCE AND TECHNOLOGY.--In carrying out the program under
13 this Act, the Director of the Office of Nuclear Science and Technology
14 shall--

15 (1) develop a robust graduate and undergraduate fellowship
16 program to attract new and talented students;

17 (2) assist universities in recruiting and retaining new faculty
18 in the nuclear sciences and engineering through a Junior Faculty
19 Research Initiation Grant Program;

20 (3) maintain a robust investment in the fundamental nuclear
21 sciences and engineering through the Nuclear Engineering
22 Education Research Program;

23 (4) encourage collaborative nuclear research between
24 industry, national laboratories and universities through the Nuclear
25 Energy Research Initiative; and

26 (5) support communication and outreach related to nuclear
27 science and engineering.

28 (c) MAINTAINING UNIVERSITY RESEARCH AND
29 TRAINING REACTORS AND ASSOCIATED INFRASTRUCTURE.--
30 Within the funds authorized to be appropriated pursuant to this Act, the
31 amounts specified under section 4(b) shall, subject to appropriations, be
32 available for the following research and training reactor infrastructure
33 maintenance and research:

1 (1) Refueling of research reactors with low enriched fuels,
2 upgrade of operational instrumentation, and sharing of reactors
3 among universities.

4 (2) In collaboration with the U.S. nuclear industry,
5 assistance, where necessary, in re-licensing and upgrading training
6 reactors as part of a student training program.

7 (3) A reactor research and training award program that
8 provides for reactor improvements as part of a focused effort that
9 emphasizes research, training, and education.

10 (d) UNIVERSITY - DOE LABORATORY INTERACTIONS--
11 The Secretary of Energy, through the Office of Nuclear Science and
12 Technology, shall develop--

13 (1) a sabbatical fellowship program for university professors
14 to spend extended periods of time at Department of Energy
15 laboratories in the areas of nuclear science and technology; and

16 (2) a visiting scientist program in which laboratory staff can
17 spend time in academic nuclear science and engineering
18 departments.

19 The Secretary may under section 3(b)(1) provide for fellowships for
20 students to spend time at Department of Energy laboratories in the area
21 of nuclear science under the mentorship of laboratory staff.

22 (e) OPERATIONS AND MAINTENANCE - for the research
23 programs described, portions thereof may be used to supplement
24 operation of the research reactor during investigator's proposed effort
25 provided the host institution provides cost sharing in the reactor's
26 operation.

27 (f) MERIT REVIEW REQUIRED.--All grants, contracts,
28 cooperative agreements, or other financial assistance awards under this
29 Act shall be made only after independent merit review.

30 **SEC. 4. AUTHORIZATION OF APPROPRIATIONS.**

31 (a) TOTAL AUTHORIZATION -- The following sums are
32 authorized to be appropriated to the Secretary of Energy, to remain
33 available until expended, for the purposes of carrying out this Act:

34 (1) \$30,200,000 for fiscal year 2002.

35 (2) \$41,000,000 for fiscal year 2003.

1 (3) \$47,90,000 for fiscal year 2004.

2 (4) \$55,600,000 for fiscal year 2005.

3 (5) \$64,100,000 for fiscal year 2006.

4 (b) GRADUATE AND UNDERGRADUATE FELLOWSHIPS.--

5 Of the funds under subsection (a), the following sums are authorized to
6 be appropriated to carry out section 3(b)(1):

7 (1) \$3,000,000 for fiscal year 2002.

8 (2) \$3,100,000 for fiscal year 2003.

9 (3) \$3,200,000 for fiscal year 2004.

10 (4) \$3,200,000 for fiscal year 2005.

11 (5) \$3,200,000 for fiscal year 2006.

12 (c) JUNIOR FACULTY RESEARCH INITIATION GRANT
13 PROGRAM-- Of the funds under subsection (a), the following sums are
14 authorized to be appropriated to carry out section 3(b)(2):

15 (1) \$ 5,000,000 for fiscal year 2002.

16 (2) \$ 7,000,000 for fiscal year 2003.

17 (3) \$ 8,00,000 for fiscal year 2004.

18 (4) \$ 9,00,000 for fiscal year 2005.

19 (5) \$10,00,000 for fiscal year 2006.

20 (d) NUCLEAR ENGINEERING AND EDUCATION
21 RESEARCH PROGRAM-- Of the funds under subsection (a), the
22 following sums are authorized to be appropriated to carry out section
23 3(b)(3):

24 (1) \$ 8,000,000 for fiscal year 2002.

25 (2) \$12,000,000 for fiscal year 2003.

26 (3) \$13,000,000 for fiscal year 2004.

27 (4) \$15,000,000 for fiscal year 2005.

28 (5) \$20,000,000 for fiscal year 2006.

29 (e) COMMUNICATION AND OUTREACH RELATED TO
30 NUCLEAR SCIENCE AND ENGINEERING.--Of the funds under
31 subsection (a), the following sums are authorized to be appropriated to
32 carry out section 3(b)(5):

33 (1) \$200,000 for fiscal year 2002.

34 (2) \$200,000 for fiscal year 2003.

35 (3) \$300,000 for fiscal year 2004.

1 (4) \$300,000 for fiscal year 2005.

2 (5) \$300,000 for fiscal year 2006.

3 (f) REFUELING OF RESEARCH REACTORS AND
4 INSTRUMENTATION UPGRADES--Of the funds under subsection
5 (a), the following sums are authorized to be appropriated to carry out
6 section 3(c)(1):

7 (1) \$6,000,000 for fiscal year 2002.

8 (2) \$6,500,000 for fiscal year 2003.

9 (3) \$7,000,000 for fiscal year 2004.

10 (4) \$7,500,000 for fiscal year 2005.

11 (5) \$8,000,000 for fiscal year 2006.

12 (g) RE-LICENSING ASSISTANCE--Of the funds under
13 subsection (a), the following sums are authorized to be appropriated to
14 carry out section 3(c)(2):

15 (1) \$1,000,000 for fiscal year 2002.

16 (2) \$1,100,000 for fiscal year 2003.

17 (3) \$1,200,000 for fiscal year 2004.

18 (4) \$1,300,000 for fiscal year 2005.

19 (5) \$1,300,000 for fiscal year 2006.

20 (h) REACTOR RESEARCH AND TRAINING AWARD
21 PROGRAM--Of the funds under subsection (a), the following sums are
22 authorized to be appropriated to carry out section 3(c)(3):

23 (1) \$ 6,000,000 for fiscal year 2002.

24 (2) \$ 10,000,000 for fiscal year 2003.

25 (3) \$ 14,000,000 for fiscal year 2004.

26 (4) \$ 18,000,000 for fiscal year 2005.

27 (5) \$ 20,000,000 for fiscal year 2006.

28 (i) UNIVERSITY - DOE LABORATORY INTERACTIONS--
29 Of the funds under subsection (a), the following sums are authorized to
30 be appropriated to carry out section 3(d):

31 (1) \$1,000,000 for fiscal year 2002.

32 (2) \$1,100,000 for fiscal year 2003.

33 (3) \$1,200,000 for fiscal year 2004.

34 (4) \$1,300,000 for fiscal year 2005.

35 (5) \$1,300,000 for fiscal year 2006.