

107TH CONGRESS  
1ST SESSION

# S. 242

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

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## IN THE SENATE OF THE UNITED STATES

FEBRUARY 1, 2001

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

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## 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 Representa-*  
2       *tives of the United States of America in Congress assembled,*

3       **SECTION 1. SHORT TITLE.**

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

6       **SEC. 2. FINDINGS.**

7       The Congress finds the following:

8               (1) U.S. university nuclear science and engi-  
9       neering programs are in a state of serious decline.

1       The supply of bachelor degree nuclear science and  
2       engineering personnel in the United States is at a  
3       35-year-low. The number of four year degree nuclear  
4       engineering programs has declined 50 percent to ap-  
5       proximately 25 programs nationwide. Over two-  
6       thirds of the faculty in these programs are 45 years  
7       or older.

8               (2) Universities cannot afford to support their  
9       research and training reactors. Since 1980, the  
10      number of small training reactors in the United  
11      States have declined by over 50 percent to 28 reac-  
12      tors. Most of these reactors were built in the late  
13      1950s and 1960s with 30- to 40-year operating li-  
14      censes, and will require re-licensing in the next sev-  
15      eral years.

16              (3) The neglect in human investment and train-  
17      ing infrastructure is affecting 50 years of national  
18      R&D investment. The decline in a competent nuclear  
19      workforce, and the lack of adequately trained nu-  
20      clear scientists and engineers, will affect the ability  
21      of the United States to solve future waste storage  
22      issues, maintain basic nuclear health physics pro-  
23      grams, operate existing and design future fission re-  
24      actors in the United States, respond to future nu-  
25      clear events worldwide, help stem the proliferation of

1 nuclear weapons, and design and operate naval nu-  
2 clear reactors.

3 (4) Future neglect in the nation's investment in  
4 human resources for the nuclear sciences will lead to  
5 a downward spiral. As the number of nuclear science  
6 departments shrink, faculties age, and training reac-  
7 tors close, the appeal of nuclear science will be lost  
8 to future generations of students.

9 (5) Current projections are that 76 percent of  
10 the nation's professional nuclear workforce can re-  
11 tire in 5 years, a new supply of trained scientists  
12 and engineers is needed.

13 (6) The Department of Energy's Office of Nu-  
14 clear Energy, Science and Technology is well suited  
15 to help maintain tomorrow's human resource and  
16 training investment in the nuclear sciences. Through  
17 its support of research and development pursuant to  
18 the Department's statutory authorities, the Office of  
19 Nuclear Energy, Science and Technology is the prin-  
20 cipal federal agent for civilian research in the nu-  
21 clear sciences for the United States. The Office  
22 maintains the Nuclear Engineering and Education  
23 Research Program which funds basic nuclear science  
24 and engineering. The Office funds the Nuclear En-  
25 ergy and Research Initiative which funds applied

1 collaborative research among universities, industry  
2 and national laboratories in the areas of prolifera-  
3 tion resistant fuel cycles and future fission power  
4 systems. The Office funds Universities to refuel  
5 training reactors from highly enriched to low en-  
6 riched proliferation tolerant fuels, performs instru-  
7 mentation upgrades and maintains a program of  
8 student fellowships for nuclear science, engineering  
9 and health physics.

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

11 (a) ESTABLISHMENT.—The Secretary of Energy,  
12 through the Office of Nuclear Energy, Science and Tech-  
13 nology, shall support a program to maintain the nation's  
14 human resource investment and infrastructure in the nu-  
15 clear sciences and engineering consistent with the Depart-  
16 ment's statutory authorities related to civilian nuclear re-  
17 search and development.

18 (b) DUTIES OF THE OFFICE OF NUCLEAR ENERGY,  
19 SCIENCE AND TECHNOLOGY.—In carrying out the pro-  
20 gram under this Act, the Director of the Office of Nuclear  
21 Science and Technology shall—

22 (1) develop a robust graduate and under-  
23 graduate fellowship program to attract new and tal-  
24 ented students;

1           (2) assist universities in recruiting and retain-  
2           ing new faculty in the nuclear sciences and engineer-  
3           ing through a Junior Faculty Research Initiation  
4           Grant Program;

5           (3) maintain a robust investment in the funda-  
6           mental nuclear sciences and engineering through the  
7           Nuclear Engineering Education Research Program;

8           (4) encourage collaborative nuclear research be-  
9           tween industry, national laboratories and universities  
10          through the Nuclear Energy Research Initiative; and

11          (5) support communication and outreach re-  
12          lated to nuclear science and engineering.

13          (c) MAINTAINING UNIVERSITY RESEARCH AND  
14          TRAINING REACTORS AND ASSOCIATED INFRASTRUC-  
15          TURE.—Within the funds authorized to be appropriated  
16          pursuant to this Act, the amounts specified under section  
17          4(b) shall, subject to appropriations, be available for the  
18          following research and training reactor infrastructure  
19          maintenance and research:

20               (1) Refueling of research reactors with low en-  
21               riched fuels, upgrade of operational instrumentation,  
22               and sharing of reactors among universities.

23               (2) In collaboration with the U.S. nuclear in-  
24               dustry, assistance, where necessary, in re-licensing

1 and upgrading training reactors as part of a student  
2 training program.

3 (3) A reactor research and training award pro-  
4 gram that provides for reactor improvements as part  
5 of a focused effort that emphasizes research, train-  
6 ing, and education.

7 (d) UNIVERSITY-DOE LABORATORY INTER-  
8 ACTIONS.—The Secretary of Energy, through the Office  
9 of Nuclear Science and Technology, shall develop—

10 (1) a sabbatical fellowship program for univer-  
11 sity professors to spend extended periods of time at  
12 Department of Energy laboratories in the areas of  
13 nuclear science and technology; and

14 (2) a visiting scientist program in which labora-  
15 tory staff can spend time in academic nuclear  
16 science and engineering departments. The Secretary  
17 may under section 3(b)(1) provide for fellowships for  
18 students to spend time at Department of Energy  
19 laboratories in the area of nuclear science under the  
20 mentorship of laboratory staff.

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

1 (f) MERIT REVIEW REQUIRED.—All grants, con-  
 2 tracts, cooperative agreements, or other financial assist-  
 3 ance awards under this Act shall be made only after inde-  
 4 pendent merit review.

5 **SEC. 4. AUTHORIZATION OF APPROPRIATIONS.**

6 (a) TOTAL AUTHORIZATION.—The following sums  
 7 are authorized to be appropriated to the Secretary of En-  
 8 ergy, to remain available until expended, for the purposes  
 9 of carrying out this Act:

10 (1) \$30,200,000 for fiscal year 2002.

11 (2) \$42,000,000 for fiscal year 2003.

12 (3) \$47,850,000 for fiscal year 2004.

13 (4) \$55,600,000 for fiscal year 2005.

14 (5) \$64,100,000 for fiscal year 2006.

15 (b) GRADUATE AND UNDERGRADUATE FELLOW-  
 16 SHIPS.—Of the funds under subsection (a), the following  
 17 sums are authorized to be appropriated to carry out sec-  
 18 tion 3(b)(1):

19 (1) \$3,000,000 for fiscal year 2002.

20 (2) \$3,100,000 for fiscal year 2003.

21 (3) \$3,200,000 for fiscal year 2004.

22 (4) \$3,200,000 for fiscal year 2005.

23 (5) \$3,200,000 for fiscal year 2006.

24 (c) JUNIOR FACULTY RESEARCH INITIATION GRANT  
 25 PROGRAM.—Of the funds under subsection (a), the fol-

1    lowing sums are authorized to be appropriated to carry  
 2    out section 3(b)(2):

3            (1) \$5,000,000 for fiscal year 2002.

4            (2) \$7,000,000 for fiscal year 2003.

5            (3) \$8,000,000 for fiscal year 2004.

6            (4) \$9,000,000 for fiscal year 2005.

7            (5) \$10,000,000 for fiscal year 2006.

8            (d) NUCLEAR ENGINEERING AND EDUCATION RE-  
 9    SEARCH PROGRAM.—Of the funds under subsection (a),  
 10   the following sums are authorized to be appropriated to  
 11   carry out section 3(b)(3):

12           (1) \$8,000,000 for fiscal year 2002.

13           (2) \$12,000,000 for fiscal year 2003.

14           (3) \$13,000,000 for fiscal year 2004.

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

16           (5) \$20,000,000 for fiscal year 2006.

17           (e) COMMUNICATION AND OUTREACH RELATED TO  
 18   NUCLEAR SCIENCE AND ENGINEERING.—Of the funds  
 19   under subsection (a), the following sums are authorized  
 20   to be appropriated to carry out section 3(b)(5):

21           (1) \$200,000 for fiscal year 2002.

22           (2) \$200,000 for fiscal year 2003.

23           (3) \$300,000 for fiscal year 2004.

24           (4) \$300,000 for fiscal year 2005.

25           (5) \$300,000 for fiscal year 2006.



1       (f) REFUELING OF RESEARCH REACTORS AND IN-  
 2       STRUMENTATION UPGRADES.—Of the funds under sub-  
 3       section (a), the following sums are authorized to be appro-  
 4       priated to carry out section 3(c)(1):

- 5               (1) \$6,000,000 for fiscal year 2002.
- 6               (2) \$6,500,000 for fiscal year 2003.
- 7               (3) \$7,000,000 for fiscal year 2004.
- 8               (4) \$7,500,000 for fiscal year 2005.
- 9               (5) \$8,000,000 for fiscal year 2006.

10       (g) RE-LICENSING ASSISTANCE.—Of the funds under  
 11       subsection (a), the following sums are authorized to be ap-  
 12       propriated to carry out section 3(c)(2):

- 13              (1) \$1,000,000 for fiscal year 2002.
- 14              (2) \$1,100,000 for fiscal year 2003.
- 15              (3) \$1,200,000 for fiscal year 2004.
- 16              (4) \$1,300,000 for fiscal year 2005.
- 17              (5) \$1,300,000 for fiscal year 2006.

18       (h) REACTOR RESEARCH AND TRAINING AWARD  
 19       PROGRAM.—Of the funds under subsection (a), the fol-  
 20       lowing sums are authorized to be appropriated to carry  
 21       out section 3(c)(3):

- 22              (1) \$6,000,000 for fiscal year 2002.
- 23              (2) \$10,000,000 for fiscal year 2003.
- 24              (3) \$14,000,000 for fiscal year 2004.
- 25              (4) \$18,000,000 for fiscal year 2005.

1           (5) \$20,000,000 for fiscal year 2006.

2           (i)     UNIVERSITY-DOE     LABORATORY     INTER-  
3 ACTIONS.—Of the funds under subsection (a), the fol-  
4 lowing sums are authorized to be appropriated to carry  
5 out section 3(d):

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

7           (2) \$1,100,000 for fiscal year 2003.

8           (3) \$1,200,000 for fiscal year 2004.

9           (4) \$1,300,000 for fiscal year 2005.

10          (5) \$1,300,000 for fiscal year 2006.

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