

**(6) Alternative to ITER****(A) In general**

If at any time during the negotiations on the ITER, the Secretary determines that construction and operation of the ITER is unlikely or infeasible, the Secretary shall submit to Congress, along with the budget request of the President submitted to Congress for the following fiscal year, a plan for implementing a domestic burning plasma experiment such as the Fusion Ignition Research Experiment, including costs and schedules for the plan.

**(B) Administration**

The Secretary shall—

(i) refine the plan in full consultation with the Fusion Energy Sciences Advisory Committee; and

(ii) transmit the plan to the National Academy of Sciences for review.

(Pub. L. 109–58, title IX, §972, Aug. 8, 2005, 119 Stat. 899.)

**§ 16313. Catalysis research program****(a) Establishment**

The Secretary, acting through the Office of Science, shall support a program of research and development in catalysis science consistent with the statutory authorities of the Department related to research and development.

**(b) Components**

The program shall include efforts to—

(1) enable catalyst design using combinations of experimental and mechanistic methodologies coupled with computational modeling of catalytic reactions at the molecular level;

(2) develop techniques for high throughput synthesis, assay, and characterization at nanometer and subnanometer scales in-situ under actual operating conditions;

(3) synthesize catalysts with specific site architectures;

(4) conduct research on the use of precious metals for catalysis; and

(5) translate molecular understanding to the design of catalytic compounds.

**(c) Duties of the Office of Science**

In carrying out the program, the Director of the Office of Science shall—

(1) support both individual investigators and multidisciplinary teams of investigators to pioneer new approaches in catalytic design;

(2) develop, plan, construct, acquire, share, or operate special equipment or facilities for the use of investigators in collaboration with national user facilities, such as nanoscience and engineering centers;

(3) support technology transfer activities to benefit industry and other users of catalysis science and engineering; and

(4) coordinate research and development activities with industry and other Federal agencies.

**(d) Assessment**

Not later than 3 years after August 8, 2005, the Secretary shall enter into an arrangement with the National Academy of Sciences to—

(1) review the catalysis program to measure—

(A) gains made in the fundamental science of catalysis; and

(B) progress towards developing new fuels for energy production and material fabrication processes; and

(2) submit to Congress a report describing the results of the review.

(Pub. L. 109–58, title IX, §973, Aug. 8, 2005, 119 Stat. 902.)

**§ 16314. Hydrogen****(a) In general**

The Secretary shall conduct a program of fundamental research and development in support of programs authorized under subchapter VIII.

**(b) Methods**

The program shall include support for methods of generating hydrogen without the use of natural gas.

(Pub. L. 109–58, title IX, §974, Aug. 8, 2005, 119 Stat. 903.)

**§ 16315. Solid state lighting**

The Secretary shall conduct a program of fundamental research on solid state lighting in support of the Next Generation Lighting Initiative carried out under section 16192 of this title.

(Pub. L. 109–58, title IX, §975, Aug. 8, 2005, 119 Stat. 903.)

**§ 16316. Advanced scientific computing research and development program****(1) In general**

The Secretary shall conduct an advanced scientific computing research and development program that includes activities related to applied mathematics and activities authorized by the Department of Energy High-End Computing Revitalization Act of 2004 (15 U.S.C. 5541 et seq.).

**(2) Goal**

The Secretary shall carry out the program with the goal of supporting departmental missions, and providing the high-performance computational, networking, advanced visualization technologies, and workforce resources, that are required for world leadership in science.

(Pub. L. 109–58, title IX, §976(a), Aug. 8, 2005, 119 Stat. 903.)

## REFERENCES IN TEXT

The Department of Energy High-End Computing Revitalization Act of 2004, referred to in par. (1), is Pub. L. 108–423, Nov. 30, 2004, 118 Stat. 2400, which is classified principally to subchapter III (§5541 et seq.) of chapter 81 of Title 15, Commerce and Trade. For complete classification of this Act to the Code, see Short Title note set out under section 5501 of Title 15 and Tables.

**§ 16317. Systems biology program****(a) Program****(1) Establishment**

The Secretary shall establish a research, development, and demonstration program in microbial and plant systems biology, protein

science, computational biology, and environmental science to support the energy, national security, and environmental missions of the Department.

**(2) Grants**

The program shall support individual researchers and multidisciplinary teams of researchers through competitive, merit-reviewed grants.

**(3) Consultation**

In carrying out the program, the Secretary shall consult with other Federal agencies that conduct genetic and protein research.

**(b) Goals**

The program shall have the goal of developing technologies and methods based on the biological functions of genomes, microbes, and plants that—

- (1) can facilitate the production of fuels, including hydrogen in sustainable production systems that reduce greenhouse gas emissions;
- (2) convert carbon dioxide to organic carbon;
- (3) detoxify soils and water, including at facilities of the Department, contaminated with heavy metals and radiological materials;
- (4) develop cellulosic and other feedstocks that are less resource and land intensive and that promote sustainable use of resources, including soil, water, energy, forests, and land, and ensure protection of air, water, and soil quality; and
- (5) address other Department missions as identified by the Secretary.

**(c) Plan**

**(1) Development of plan**

Not later than 1 year after August 8, 2005, the Secretary shall prepare and transmit to Congress a research plan describing how the program authorized pursuant to this section will be undertaken to accomplish the program goals established in subsection (b).

**(2) Review of plan**

The Secretary shall contract with the National Academy of Sciences to review the research plan developed under this subsection. The Secretary shall transmit the review to Congress not later than 18 months after transmittal of the research plan under paragraph (1), along with the Secretary's response to the recommendations contained in the review.

**(d) User facilities and ancillary equipment**

Within the funds authorized to be appropriated pursuant to this part, amounts shall be available for projects to develop, plan, construct, acquire, or operate special equipment, instrumentation, or facilities, including user facilities at National Laboratories, for researchers conducting research, development, demonstration, and commercial application in systems biology and proteomics and associated biological disciplines.

**(e) Prohibition on biomedical and human cell and human subject research**

**(1) No biomedical research**

In carrying out the program under this section, the Secretary shall not conduct biomedical research.

**(2) Limitations**

Nothing in this section shall authorize the Secretary to conduct any research or demonstrations—

- (A) on human cells or human subjects; or
- (B) designed to have direct application with respect to human cells or human subjects.

**(f) Bioenergy research centers**

**(1) Establishment of centers**

In carrying out the program under subsection (a), the Secretary shall establish at least 7 bioenergy research centers, which may be of varying size.

**(2) Geographic distribution**

The Secretary shall establish at least 1 bioenergy research center in each Petroleum Administration for Defense District or Subdistrict of a Petroleum Administration for Defense District.

**(3) Goals**

The goals of the centers established under this subsection shall be to accelerate basic transformational research and development of biofuels, including biological processes.

**(4) Selection and duration**

**(A) In general**

A center under this subsection shall be selected on a competitive basis for a period of 5 years.

**(B) Reapplication**

After the end of the period described in subparagraph (A), a grantee may reapply for selection on a competitive basis.

**(5) Inclusion**

A center that is in existence on December 19, 2007—

(A) shall be counted towards the requirement for establishment of at least 7 bioenergy research centers; and

(B) may continue to receive support for a period of 5 years beginning on the date of establishment of the center.

(Pub. L. 109-58, title IX, §977, Aug. 8, 2005, 119 Stat. 903; Pub. L. 110-140, title II, §§232(a), 233, Dec. 19, 2007, 121 Stat. 1537.)

REFERENCES IN TEXT

This part, referred to in subsec. (d), was in the original "this subtitle", meaning subtitle G (§§971-984A) of title IX of Pub. L. 109-58, Aug. 8, 2005, 119 Stat. 898, which enacted this part and amended section 5523 of Title 15, Commerce and Trade. For complete classification of subtitle G to the Code, see Tables.

AMENDMENTS

2007—Subsec. (a)(1). Pub. L. 110-140, §232(a)(1), substituted "computational biology, and environmental science" for "and computational biology".

Subsec. (b)(1). Pub. L. 110-140, §232(a)(2)(A), inserted "in sustainable production systems that reduce greenhouse gas emissions" after "hydrogen".

Subsec. (b)(4), (5). Pub. L. 110-140, §232(a)(2)(B)-(D), added par. (4) and redesignated former par. (4) as (5).

Subsec. (f). Pub. L. 110-140, §233, added subsec. (f).

EFFECTIVE DATE OF 2007 AMENDMENT

Amendment by Pub. L. 110-140 effective on the date that is 1 day after Dec. 19, 2007, see section 1601 of Pub.

L. 110-140, set out as an Effective Date note under section 1824 of Title 2, The Congress.

**§ 16318. Fission and fusion energy materials research program**

**(a) In general**

Along with the budget request of the President submitted to Congress for fiscal year 2007, the Secretary shall establish a research and development program on material science issues presented by advanced fission reactors and the fusion energy program of the Department.

**(b) Administration**

In carrying out the program, the Secretary shall develop—

- (1) a catalog of material properties required for applications described in subsection (a);
- (2) theoretical models for materials possessing the required properties;
- (3) benchmark models against existing data; and
- (4) a roadmap to guide further research and development in the area covered by the program.

(Pub. L. 109-58, title IX, §978, Aug. 8, 2005, 119 Stat. 904.)

**§ 16319. Energy and water supplies**

**(a) In general**

The Secretary shall carry out a program of research, development, demonstration, and commercial application to—

- (1) address energy-related issues associated with provision of adequate water supplies, optimal management, and efficient use of water;
- (2) address water-related issues associated with the provision of adequate supplies, optimal management, and efficient use of energy; and
- (3) assess the effectiveness of existing programs within the Department and other Federal agencies to address these energy and water related issues.

**(b) Program elements**

- The program under this section shall include—
- (1) arsenic treatment;
  - (2) desalination; and
  - (3) planning, analysis, and modeling of energy and water supply and demand.

**(c) Collaboration**

In carrying out this section, the Secretary shall consult with the Administrator of the Environmental Protection Agency, the Secretary of the Interior, the Chief Engineer of the Army Corps of Engineers, the Secretary of Commerce, the Secretary of Defense, and other Federal agencies as appropriate.

**(d) Facilities**

The Secretary may utilize all existing facilities within the Department and may design and construct additional facilities as needed to carry out the purposes of this program.

**(e) Advisory committee**

The Secretary shall establish or utilize an advisory committee to provide independent advice and review of the program.

**(f) Reports**

Not later than 2 years after August 8, 2005, the Secretary shall submit to Congress a report on the assessment described in subsection (b) and recommendations for future actions.

(Pub. L. 109-58, title IX, §979, Aug. 8, 2005, 119 Stat. 905.)

**§ 16320. Spallation Neutron Source**

**(a) Definitions**

In this section:

**(1) SING**

The term “SING” means the Spallation Neutron Source Instruments Next Generation major item of equipment.

**(2) SNS power upgrade**

The term “SNS power upgrade” means the Spallation Neutron Source power upgrade described in the 20-year facilities plan of the Office of Science of the Department.

**(3) SNS second target station**

The term “SNS second target station” means the Spallation Neutron Source second target station described in the 20-year facilities plan of the Office of Science of the Department.

**(4) Spallation Neutron Source Facility**

The terms “Spallation Neutron Source Facility” and “Facility” mean the completed Spallation Neutron Source scientific user facility located at Oak Ridge National Laboratory, Oak Ridge, Tennessee.

**(5) Spallation Neutron Source Project**

The terms “Spallation Neutron Source Project” and “Project” means Department Project 99-E-334, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

**(b) Spallation Neutron Source Project**

**(1) In general**

The Secretary shall submit to Congress, as part of the annual budget request of the President submitted to Congress, a report on progress on the Spallation Neutron Source Project.

**(2) Contents**

The report shall include for the Project—

- (A) a description of the achievement of milestones;
- (B) a comparison of actual costs to estimated costs; and
- (C) any changes in estimated Project costs or schedule.

**(c) Spallation Neutron Source Facility plan**

**(1) In general**

The Secretary shall develop an operational plan for the Spallation Neutron Source Facility that ensures that the Facility is employed to the full capability of the Facility in support of the study of advanced materials, nanoscience, and other missions of the Office of Science of the Department.

**(2) Plan**

The operational plan shall—