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111TH CONGRESS, 2d Session } HOUSE OF REPRESENTATIVES { REPORT 111–658

NUCLEAR ENERGY RESEARCH AND DEVELOPMENT ACT OF 2010

NOVEMBER 18, 2010.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. GORDON of Tennessee, from the Committee on Science, submitted the following

R E P O R T

together with

ADDITIONAL VIEWS

[To accompany H.R. 5866]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science, to whom was referred the bill (H.R. 5866) to amend the Energy Policy Act of 2005 requiring the Secretary of Energy to carry out initiatives to advance innovation in nuclear energy technologies, to make nuclear energy systems more competitive, to increase efficiency and safety of civilian nuclear power, and for other purposes, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

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I. BILL

The amendment is as follows:

Strike all after the enacting clause and insert the following:

SECTION 1. SHORT TITLE.

This Act may be cited as the "Nuclear Energy Research and Development Act of 2010".

SEC. 2. OBJECTIVES.

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

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

(2) by inserting after paragraph (1) the following new paragraphs:

"(2) Reducing the costs of nuclear reactor systems.

"(3) Reducing used nuclear fuel and nuclear waste products generated by civilian nuclear energy.

"(4) Supporting technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty."; and

(3) by inserting after paragraph (11), as so redesignated, the following new paragraph:

"(12) Researching and developing technologies and processes so as to improve and streamline the process by which nuclear power systems meet Federal and State requirements and standards.".

SEC. 3. FUNDING.

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

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

"(1) $419,000,000 for fiscal year 2011;

"(2) $429,000,000 for fiscal year 2012; and

"(3) $439,000,000 for fiscal year 2013."; and

(2) in subsection (d)—

(A) by striking "under subsection (a)" and inserting "under subsection (b)";

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

"(1) For activities under section 953—

"(A) $201,000,000 for fiscal year 2011;

"(B) $201,000,000 for fiscal year 2012; and

"(C) $201,000,000 for fiscal year 2013."; and

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

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

"(A) $64,000,000 for fiscal year 2011;

"(B) $64,000,000 for fiscal year 2012; and

"(C) $64,000,000 for fiscal year 2013.

"(5) For activities under section 952(d)—

"(A) $55,000,000 for fiscal year 2011;

"(B) $65,000,000 for fiscal year 2012; and

"(C) $75,000,000 for fiscal year 2013.

"(6) For activities under section 958—

"(A) $99,000,000 for fiscal year 2011;

"(B) $99,000,000 for fiscal year 2012; and

"(C) $99,000,000 for fiscal year 2013.".

SEC. 4. PROGRAM OBJECTIVES STUDY.

Section 951 of the Energy Policy Act of 2005 (42 U.S.C. 16271) is amended by adding at the end the following new subsection:

"(f) PROGRAM OBJECTIVES STUDY.—In furtherance of the program objectives listed in subsection (a) of this section, the Secretary shall, within one year after the date of enactment of this subsection, transmit to the Congress a report on the results of a study on the scientific and technical merit of major State requirements and standards, including moratoria, that delay or impede the further development and commercialization of nuclear power, and how the Federal Government can assist in overcoming such delays or impediments.".

SEC. 5. NUCLEAR ENERGY RESEARCH AND DEVELOPMENT PROGRAMS.

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

"(c) REACTOR CONCEPTS.—

"(1) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application to advance nuclear power systems as well as technologies to sustain currently deployed systems.

"(2) DESIGNS AND TECHNOLOGIES.—In conducting the program under this subsection, the Secretary shall examine advanced reactor designs and nuclear technologies, including those that—

"(A) are economically competitive with other electric power generation plants;

"(B) have higher efficiency, lower cost, and improved safety compared to reactors in operation as of the date of enactment of the Nuclear Energy Research and Development Act of 2010;

"(C) utilize passive safety features;

"(D) minimize proliferation risks;

"(E) substantially reduce production of high-level waste per unit of output;

"(F) increase the life and sustainability of reactor systems currently deployed;

"(G) use improved instrumentation;

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

"(I) minimize water usage or use alternatives to water as a cooling mechanism.

"(3) INTERNATIONAL COOPERATION.—In carrying out the program under this subsection, the Secretary shall seek opportunities to enhance the progress of the program through international cooperation through such organizations as the Generation IV International Forum, or any other international collaboration the Secretary considers appropriate.

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

SEC. 6. SMALL MODULAR REACTOR PROGRAM.

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

"(d) SMALL MODULAR REACTOR PROGRAM.—

"(1) IN GENERAL.—

"(A) The Secretary shall carry out a small modular reactor program to promote research, development, demonstration, and commercial application of small modular reactors, including through cost-shared projects for commercial application of reactor systems designs.

"(B) The Secretary shall consult with and utilize the expertise of the Secretary of the Navy in establishing and carrying out such program.

"(C) Activities may also include development of advanced computer modeling and simulation tools, by Federal and non-Federal entities, which demonstrate and validate new design capabilities of innovative small modular reactor designs.

"(2) DEFINITION.—For the purposes of this subsection, the term 'small modular reactor' means a nuclear reactor—

"(A) with a rated capacity of less than 300 electrical megawatts;

"(B) with respect to which most parts can be factory assembled and shipped as modules to a reactor plant site for assembly; and

"(C) that can be constructed and operated in combination with similar reactors at a single site.

"(3) LIMITATION.—Demonstration activities carried out under this section shall be limited to individual technologies and systems, and shall not include demonstration of full reactor systems or full plant operations.

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

"(A) lower capital costs or increased access to private financing in comparison to current large reactor designs;

"(B) reduced long-term radiotoxicity, mass, or decay heat of the nuclear waste produced by generation;

"(C) increased operating safety of nuclear facilities;

"(D) reduced dependence of reactor systems on water resources;

"(E) increased seismic resistance of nuclear generation;

"(F) reduced proliferation risks through integrated safeguards and security proliferation controls; and

"(G) increased efficiency in reactor manufacturing and construction.

"(5) APPLICATION.—To be eligible to enter into a cooperative agreement with the Secretary under this subsection, an applicant shall submit to the Secretary a proposal for the small modular reactor project to be undertaken. The proposal shall document—

"(A) all partners and suppliers that will be active in the small modular reactor project, including a description of each partner or supplier's anticipated domestic and international activities;

"(B) measures to be undertaken to enable cost-effective implementation of the small modular reactor project;

"(C) an accounting structure approved by the Secretary;

"(D) all known assets that shall be contributed to satisfy the cost-sharing requirement under paragraph (6); and

"(E) the extent to which the proposal will increase domestic manufacturing activity, exports, or employment.

"(6) COST SHARING.—Notwithstanding section 988, the Secretary shall require the parties to a cooperative agreement under this subsection to be responsible for not less than 50 percent of the costs of the small modular reactor project.

"(7) CALCULATION OF COST SHARING AMOUNT.—A recipient of financial assistance under this section may not satisfy the cost sharing requirement under paragraph (6) by using funds received from the Federal Government through appropriation Acts.

"(8) PROJECT SELECTION CRITERIA.—The Secretary shall consider the following factors in entering into a cooperative agreement under this subsection:

"(A) The domestic manufacturing capabilities of the parties to the cooperative agreement and their partners and suppliers.

"(B) The viability of the reactor design and the business plan or plans of the parties to the cooperative agreement.

"(C) The parties to the cooperative agreement's potential to continue the development of small modular reactors without Federal subsidies or loan guarantees.

"(D) The cost share to be provided.

"(E) The degree to which the following goals will be advanced:

"(i) Lower capital costs or increased access to private financing in comparison to current large reactor designs.

"(ii) Reduced long-term radiotoxicity, mass, or decay heat of the nuclear waste produced by generation.

"(iii) Increased operating safety of nuclear facilities.

"(iv) Reduced dependence of reactor systems on water resources.

"(v) Increased seismic resistance of nuclear generation.

"(vi) Reduced proliferation risks through integrated safeguards and security proliferation controls.

"(vii) Increased efficiency in reactor manufacturing and construction.".

SEC. 7. CONVENTIONAL IMPROVEMENTS TO NUCLEAR POWER PLANTS.

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

"(e) CONVENTIONAL IMPROVEMENTS TO NUCLEAR POWER PLANTS.—

"(1) IN GENERAL.—The Secretary may carry out a Nuclear Energy Research Initiative for research and development related to steam-side improvements to nuclear power plants to promote the research, development, demonstration, and commercial application of—

"(A) cooling systems;

"(B) turbine technologies;

"(C) heat exchangers and pump design;

"(D) special coatings to improve lifetime of components and performance of heat exchangers; and

"(E) advanced power conversion systems for advanced reactor technologies.

"(2) ADMINISTRATION.—The Secretary may undertake initiatives under this subsection only when the goals are relevant and proper to enhance the performance of technologies developed under subsection (c). Not more than $10,000,000 of funds authorized for this section may be used for carrying out this subsection.".

SEC. 8. FUEL CYCLE RESEARCH AND DEVELOPMENT.

(a) AMENDMENTS.—Section 953 of the Energy Policy Act of 2005 (42 U.S.C. 16273) is amended—

(1) in the section heading by striking "**ADVANCED FUEL CYCLE INITIATIVE**" and inserting "**FUEL CYCLE RESEARCH AND DEVELOPMENT**";

(2) by striking subsection (a);

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

(4) by inserting before subsection (e), as so redesignated by paragraph (3) of this subsection, the following new subsections:

"(a) IN GENERAL.—The Secretary shall conduct a fuel cycle research, development, demonstration, and commercial application program (referred to in this section as the 'program') on fuel cycle options that improve uranium resource utilization, maximize energy generation, minimize nuclear waste creation, improve safety, mitigate risk of proliferation, and improve waste management in support of a national strategy for spent nuclear fuel and the reactor concepts research, development, demonstration, and commercial application program under section 952(c).

"(b) FUEL CYCLE OPTIONS.—Under this section the Secretary may consider implementing the following initiatives:

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

"(2) MODIFIED OPEN CYCLE.—Developing fuel forms, reactors, and limited separation and transmutation methods that increase fuel utilization and reduce nuclear waste in a modified open fuel cycle.

"(3) FULL RECYCLE.—Developing advanced recycling technologies, including Generation IV Reactors, to reduce the risk of proliferation, radiotoxicity, mass, and decay heat to the greatest extent possible.

"(4) ADVANCED STORAGE METHODS.—Developing advanced storage technologies for both onsite and long-term storage that substantially prolong the effective life of current storage devices or that substantially improve upon existing nuclear waste storage technologies and methods, including repositories.

"(5) ALTERNATIVE AND DEEP BOREHOLE STORAGE METHODS.—Developing alternative storage methods for long-term storage, including deep boreholes into stable crystalline rock formations and mined repositories in a range of geologic media.

"(6) OTHER TECHNOLOGIES.—Developing any other technology or initiative that the Secretary determines is likely to advance the objectives of the program established under subsection (a).

"(c) ADDITIONAL ADVANCED RECYCLING AND CROSSCUTTING ACTIVITIES.—In addition to and in support of the specific initiatives described in paragraphs (1) through (6), the Secretary may support the following activities:

"(1) Development and testing of integrated process flow sheets for advanced nuclear fuel recycling processes.

"(2) Research to characterize the byproducts and waste streams resulting from fuel recycling processes.

"(3) Research and development on reactor concepts or transmutation technologies that improve resource utilization or reduce the radiotoxicity of waste streams.

"(4) Research and development on waste treatment processes and separations technologies, advanced waste forms, and quantification of proliferation risks.

"(5) Identification and evaluation of test and experimental facilities necessary to successfully implement the advanced fuel cycle initiative.

"(6) Advancement of fuel cycle-related modeling and simulation capabilities.

"(d) BLUE RIBBON COMMISSION REPORT.—

"(1) In carrying out this section, the Secretary shall give consideration to the final report on a long-term nuclear waste solution produced by the Blue Ribbon Commission on America's Nuclear Future.

"(2) Not later than 180 days after the release of the Blue Ribbon Commission on America's Nuclear Future final report, the Secretary shall transmit to Congress a report, which shall include—

"(A) any plans the Department may have to incorporate any relevant recommendations from this report into the program; and

"(B) how those recommendations for long-term nuclear waste solutions that will be incorporated into the plan compare with plans for a long-term nuclear waste solution of a repository at Yucca Mountain, that may or may not be incorporated into the plan, with regard to the safety, security, legal, cost, and technological and site readiness factors associated with any recommendations related to final disposition pathways for spent nuclear fuel and high-level radioactive waste to the same factors associated with permanent deep geological disposal at the Yucca Mountain waste repository.

"(3) The analysis described in paragraph (2)(B) shall be conducted using scientific and technical materials and information used to support policy actions related to the Yucca Mountain project.".

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

"Sec. 953. Fuel cycle research and development.".

SEC. 9. NUCLEAR ENERGY ENABLING TECHNOLOGIES PROGRAM.

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

"SEC. 958. NUCLEAR ENERGY ENABLING TECHNOLOGIES.

"(a) IN GENERAL.—The Secretary shall conduct a program to support the integration of activities undertaken through the reactor concepts research, development, demonstration, and commercial application program under section 952(c) and the fuel cycle research and development program under section 953, and support crosscutting nuclear energy concepts. Activities commenced under this section shall be concentrated on broadly applicable research and development focus areas.

"(b) ACTIVITIES.—Activities conducted under this section may include research involving—

"(1) advanced reactor materials;

"(2) advanced radiation mitigation methods;

"(3) advanced proliferation and security risk assessment methods;

"(4) advanced sensors and instrumentation;

"(5) advanced nuclear manufacturing methods; or

"(6) any crosscutting technology or transformative concept aimed at establishing substantial and revolutionary enhancements in the performance of future nuclear energy systems that the Secretary considers relevant and appropriate to the purpose of this section.

"(c) REPORT.—The Secretary shall submit, as part of the annual budget submission of the Department, a report on the activities of the program conducted under this section, which shall include a brief evaluation of each activity's progress.".

(b) CONFORMING AMENDMENT.—The table of contents of the Energy Policy Act of 2005 is amended by adding at the end of the items for subtitle E of title IX the following new item:

"Sec. 958. Nuclear energy enabling technologies.".

SEC. 10. EMERGENCY RISK ASSESSMENT AND PREPAREDNESS REPORT.

Not later than 180 days after the date of enactment of this Act, the Secretary shall transmit to the Congress a report summarizing quantitative risks associated with the potential of a severe accident arising from the use of civilian nuclear energy technology, including reactor technology deployed or likely to be deployed as of the date of enactment of this Act, and outlining the technologies currently available to mitigate the consequences of such an accident. The report shall include recommendations of areas of technological development that should be pursued to reduce the potential public harm arising from such an incident.

SEC. 11. NEXT GENERATION NUCLEAR PLANT.

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

"(3) PROTOTYPE PLANT LOCATION.—The prototype nuclear reactor and associated plant shall be constructed at a location determined by the consortium through an open and transparent competitive selection process.".

(b) REPORT.—

(1) REQUIREMENT.—Not later than 1 year after the date of enactment of this Act, the Comptroller General shall transmit to the Congress a report providing a status update of the Next Generation Nuclear Plant program that provides analysis of—

(A) its progress;

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

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

(2) CONTENTS.—The report shall include—

(A) an analysis of the proposed facility's technical capabilities and remaining technological development challenges, and a cost estimate and construction schedule;

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

(C) an assessment of alternative construction sites proposed by private industry;

(D) an assessment of the extent to which the Department of Energy is working with industry and the Nuclear Regulatory Commission to ensure that the Next Generation Nuclear Plant program meets industry expectations for long-term application of technologies and addresses potential licensing procedures for deployment;

(E) an assessment of the known or anticipated challenges to securing private non-Federal cost share funds and any measures to overcome these challenges, including any alternative funding approaches such as front loading the Federal share;

(F) an assessment of project risks, including those related to—

(i) project scope, schedule, and resources;

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

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

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

SEC. 12. TECHNICAL STANDARDS COLLABORATION.

(a) IN GENERAL.—The Director of the National Institute of Standards and Technology shall establish a nuclear energy standards committee (in this section referred to as the "technical standards committee") to facilitate and support, consistent with the National Technology Transfer and Advancement Act of 1995, the development or revision of technical standards for new and existing nuclear power plants and advanced nuclear technologies.

(b) MEMBERSHIP.—

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

(2) CO-CHAIRS.—The technical standards committee shall be co-chaired by a representative from the National Institute of Standards and Technology and a representative from a private sector standards organization.

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

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

(2) formulate, coordinate, and recommend priorities for the development of new technical standards and the revision of existing technical standards to address the needs identified under paragraph (1);

(3) facilitate and support collaboration and cooperation among standards developers to address the needs and priorities identified under paragraphs (1) and (2);

(4) as appropriate, coordinate with other national, regional, or international efforts on nuclear energy-related technical standards in order to avoid conflict and duplication and to ensure global compatibility; and

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

(d) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated $1,000,000 for each of fiscal years 2011 through 2013 to the Director of the National Institute for Standards and Technology for activities under this section.

SEC. 13. EVALUATION OF LONG-TERM OPERATING NEEDS.

(a) IN GENERAL.—The Secretary of Energy shall enter into an arrangement with the National Academies to conduct an evaluation of the scientific and technological challenges to the long-term maintenance and safe operation of currently deployed nuclear power reactors up to and beyond the specified design-life of reactor systems.

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

SEC. 14. AVAILABLE FACILITIES DATABASE.

The Secretary of Energy shall prepare a database of non-Federal user facilities receiving Federal funds that may be used for unclassified nuclear energy research. The Secretary shall make this database accessible on the Department of Energy's website.

SEC. 15. NUCLEAR WASTE DISPOSAL.

Consistent with the requirements of current law, the Department of Energy shall be responsible for disposal of high-level radioactive waste or spent nuclear fuel generated by reactors under the programs authorized in this Act, or the amendments made by this Act.

II. PURPOSE

The purpose of H.R. 5866, sponsored by Rep. Gordon, is to update the Department of Energy's nuclear energy research and development programs and provide necessary funding to advance nuclear technologies to adequately address the issues of high capital costs and waste management associated with nuclear power.

III. BACKGROUND AND NEED FOR THE LEGISLATION

Today in the United States there are 104 nuclear reactors producing approximately 20 percent of our nation's electricity supply and 70 percent of our emissions-free energy. However, nuclear power as it exists today relies on a "once-through" fuel cycle that produces high level radioactive waste from enriched uranium. In the United States, there exists a stockpile of approximately 63,000 metric tons of nuclear waste from reactors which generate roughly 2,000 more tons per year. Furthermore, the capital costs of nuclear plants have risen steeply and present a high hurdle to deployment of new reactors. Some have argued that without a fully developed strategy to deal with these challenges, nuclear power will be unable to compete with other fuel sources. Furthermore, in any carbon dioxide restrained regime, nuclear power will play a large role in energy production. To attain the 2030 reduction goals set in the American Clean Energy and Security Act, H.R. 2454, the Energy Information Administration estimated that at least 96 gigawatts of new nuclear capacity would be needed.

To address these challenges, the Nuclear Energy Research & Development Act of 2010 amends the Energy Policy Act of 2005 to modify and augment existing nuclear research and development programs at the Department of Energy. The primary goals of this bill are to mitigate the problems associated with nuclear waste and reduce the capital costs of nuclear power through a robust and integrated research, development, demonstration and commercial application program.

IV. HEARING SUMMARY

The Committee on Science and Technology held a hearing on May 19th, 2010 to explore the Administration's strategy for re-

search and development to advance clean and affordable nuclear technology. Amongst the issues considered were how the federal government will enhance the safety and economic viability of nuclear power and what programs it recommends for managing nuclear waste, advancing reactor design, sustaining the existing nuclear fleet, and minimizing risk of proliferation of nuclear materials.

The hearing began with a presentation of the Administration's Nuclear Energy Research & Development Roadmap by Dr. Warren P. Miller, Assistant Secretary for the Office of Nuclear Energy at the Department of Energy. Dr. Miller's testimony focused heavily on providing the Committee with the context in which the plan was developed as well as a rationale for the course of action advocated in the roadmap. Amongst many points discussed, was Dr. Miller's assessment of challenges facing increased use of nuclear power including capital cost, maintaining safety performance, mitigating any risks of proliferation, and high-level waste management.

The Committee invited Christofer Mowry, President and CEO of Babcock and Wilcox Nuclear Energy, Inc. (B&W), to testify on Small Modular Reactor (SMR) technology and the role they could play in addressing the challenges noted by Dr. Miller. B&W currently has an SMR design that is currently being considered for development by industry groups, and the company plans to submit its design for Nuclear Regulatory Commission evaluation by 2012. Mr. Mowry indicated that in order to address climate change nuclear power must continue to play a large role in the nation's energy portfolio. However, he noted that capital costs continue to undermine attempts by utilities to roll out new plants that incorporate new technologies. Mr. Mowry suggested that by scaling down the size of reactors the costs would be reduced through greater use of automation and fabrication methods as well as making a more incremental approach available to utilities.

Also appearing before the Committee and commenting on capital cost alleviation by SMR designs was Mr. Gary Krellenstein, a managing Director in JP Morgan Chase & Co.'s Energy and Environmental Group. Mr. Krellenstein is a nuclear engineer by training and formerly worked at the Department of Energy and the Nuclear Regulatory Commission. Mr. Krellenstein was asked in his testimony to provide the viewpoint of private capital on the future of nuclear power and to discuss if he shared Mr. Mowry's optimism about SMR technologies. He suggested the smaller size and cost of SMRs give them several distinct advantages over conventional nuclear reactors. First, the construction of SMRs requires less capital, due to their size and other attributes, than conventional nuclear power plants. Second, the smaller capital requirements would allow a single company to build an SMR as opposed to the large and diverse consortium that can greatly complicate investors' required due diligence as well as their analysis of the management structure of what is already a complex undertaking. Third, the financing for large conventional nuclear plants require utilities to bear significant default risk such that the construction of each plant is essentially a "bet the company" event.

Dr. Charles Ferguson, President of the Federation of American Scientists, suggested that SMRs if developed and deployed irresponsibly could give certain malicious agents greater access to nu-

clear materials. He highlighted that this is all the more concerning due to the development of SMR technologies by other foreign nations with less rigorous safety regimes than the U.S. To this end, Dr. Ferguson suggested the United States has an opportunity to clearly state the criteria for successful use of SMRs and should take a leadership role in setting the standards for safe, secure, and proliferation-resistant SMRs that can compete in the market.

Dr. Thomas L. Sanders, President of the American Nuclear Society, provided an overall evaluation of the Administration's Roadmap and indicated it was a thorough and well thought-out overview for the nation's nuclear energy research and development strategy. Dr. Sanders noted his support of the Roadmap's cross-cutting approach to sustaining the current U.S. fleet of nuclear plants, developing new reactor designs and fuel cycles, ensuring a high level of operational safety, and minimizing the risks of proliferation. He noted that while the Roadmap is a good start and shows strong Administration engagement and support, he would urge the Congress to pass legislation giving DOE additional tools to accelerate deployment of next-generation reactors in order to meet environmental, national and economic security objectives in the next 10 to 20 years.

Rounding out the witnesses was Dr. Mark Peters, Deputy Director for Programs at Argonne National Lab, who provided an examination of the Administration's strategy for development of waste management technologies. In addition to supporting the Roadmap's findings and provisions, Dr. Peters noted that any strategy should be executed as part of robust public-private partnerships involving the Department of Energy (DOE), its national laboratories, universities, and industry; and conducted with a sense of urgency and purpose consistent with the U.S. retaining its intellectual capital and leadership in the international nuclear energy community.

The following related hearings were also held in the 110th and 111th Congresses:

On June 17, 2009 a Full Committee hearing titled: *Advancing Technology for Nuclear Fuel Recycling: What Should Our Research, Development and Demonstration Strategy Be*? The purpose of this hearing was to explore the benefits and risks of nuclear waste recycling and address the technical challenges and policy objectives of a waste management strategy.

On April 23, 2008 a Full Committee hearing titled: *Opportunities and Challenges for Nuclear Power*. The purpose of this hearing was to explore the potential for nuclear to increase its share of the U.S. energy mix, evaluate the capacity of DOE's programs to support and advance nuclear technologies, and to discuss the challenges of high capital costs, waste disposal, and proliferation concern.

V. Committee Actions

On July 27, 2010 Chairman Bart Gordon introduced H.R. 5866, the Nuclear Energy Research and Development Act of 2010, with original cosponsors Brian Baird (D–WA), Ralph Hall (R–TX), and Bob Inglis (R–SC), and Rep. Judy Biggert (R–IL) cosponsoring after introduction. The bill was referred to the House Committee on Science and Technology, Subcommittee on Energy and Environment.

On July 28, 2010 the Subcommittee on Energy and Environment met to consider H.R. 5866. The following amendments were offered:

• Mr. Baird offered a Manager's amendment to make technical corrections and conforming changes and to clarify how the cost-share requirement included in the Small Modular Reactor program is to be calculated. *The amendment was agreed to by voice vote.*

• Ms. Biggert offered an amendment to include in the list of objectives of the bill researching and developing technologies and processes so as to improve and streamline the process by which nuclear power systems meet Federal and State requirements and standards. *The amendment was agreed to by voice vote.*

• Mr. Bartlett offered an amendment to require the Secretary to consult with and utilize the expertise of the Secretary of the Navy in carrying out the Small Modular Reactor program. *The amendment was agreed to by voice vote.*

• Mr. Lujan offered an amendment to include in the project selection criteria of the Small Modular Reactor program those factors the Secretary must evaluate according to the program's Administration section. *The amendment was agreed to by voice vote.*

• Ms. Biggert and Mr. Garamendi offered an amendment to require the Secretary to include additional advanced recycling and crosscutting activities. *The amendment was agreed to by voice vote.*

• Mr. Garamendi offered an amendment to require the Secretary to research recycling including integral fast reactors in the Full Recycle Program. *The amendment was withdrawn.*

• Mr. Inglis offered an amendment to require the Secretary to transmit a report to the Congress describing any plans to adopt recommendations of the Blue Ribbon Commission and to provide a response to each Blue Ribbon Commission recommendation, including a comparison to data from the Yucca Mountain Project. *The amendment was withdrawn.*

• Ms. Johnson offered an amendment to require the Secretary to enter into a contract with the National Academies to conduct an evaluation of workforce and facility upgrades needed for the safe and reliable long-term operation of the Nation's nuclear power infrastructure. *The amendment was agreed to by voice vote.*

• Mr. Matheson and Ms. Giffords offered an amendment to include minimization of water usage as a goal to be achieved by new technologies researched under the Small Modular Reactors program. *The amendment was agreed to by voice vote.*

Mr. Inglis moved that the Subcommittee on Energy and Environment favorably report H.R. 5866, as amended, to the Full Committee. *The motion was agreed to by voice vote.*

On September 23, 2010, the Committee on Science and Technology met to consider H.R. 5866. The following amendments were offered:

• Mr. Gordon offered a Manager's amendment to make technical corrections and conforming changes and to clarify the definition of Small Modular Reactor. *The amendment was agreed to by voice vote.*

• Mr. Bilbray offered an amendment to include a Program Objectives Study that will examine the scientific merits of major State requirements and standards and the effect they have on nuclear power development. *The amendment was agreed to by voice vote.*

• Mr. Tonko offered an amendment to allow the Secretary to carry out a program to research technologies related to steam-side improvements to nuclear power plants. *The amendment was agreed to by voice vote*.

• Mr. Garamendi offered an amendment to clarify the Full Recycle program including the objectives of reducing the risk of proliferation, radiotoxicity, mass and decay heat of waste. *The amendment was agreed to by voice vote*.

• Mr. Inglis offered an amendment to require the Secretary to present in the Blue Ribbon Commission (BRC) Report any plans the Department may have to incorporate recommendations from the BRC and an evaluation of how those recommendations compared to the Yucca Mountain Project. *The amendment was agreed to by voice vote*.

• Mr. Wu offered an amendment to require the Secretary to prepare and make publicly available a database of non-Federal user facilities receiving federal funds that may be used for unclassified nuclear energy research. *The amendment was agreed to by voice vote*.

• Mr. Sensenbrenner offered an amendment to require the Department of Energy to be responsible for disposal of high-level radioactive waste generated by reactors under the programs authorized in this Act. *The amendment was agreed to by voice vote*.

Mr. Hall moved that the Committee on Science and Technology favorably reported H.R. 5866, as amended. *The motion was agreed to by voice vote*.

VI. Summary of Major Provisions of the Bill, as Reported

The proposed bill will authorize a reorganization of programs within the Department of Energy's Office of Nuclear Energy to best effectuate a nuclear energy research and development strategy aimed at minimizing nuclear waste, reducing capital costs of nuclear power systems, and enhancing an already safe and proliferation resistant nuclear industry. To this end, this bill amends the Energy Policy Act of 2005 and updates the relevant programs required to best achieve these primary objectives.

This legislation requires the Secretary of Energy to develop a Reactor Concepts program in order to further advanced reactor research and development. Additionally, this program requires that initiatives be undertaken that seek to prolong the life of currently operating reactors. However, only those technologies that address certain key goals of the program may be researched. Those goals include development of technologies that are economically competitive with other electric power generation plants, have higher energy efficiency, lower cost and improved safety compared to current reactors, utilize passive safety systems, minimize proliferation risks, reduce production of high-level waste per unit of output, increase the life and sustainability of deployed reactor systems, use improved instrumentation, or are capable of producing large-scale quantities of hydrogen or process heat.

Also created by this bill is a Small Modular Reactor program to develop reactors with a size less than 300 MWe and can be assembled en masse in factories and used in combination with other similar small reactors. Work in this program is expected to result in small reactor technologies that, amongst other objectives, can lower

capital costs and increase access to private financing for nuclear power projects. In conducting this program, the Secretary may enter into cooperative agreements to support development of SMR designs with eligible applicants as defined by the bill. Furthermore, this bill requires adherence to a cost-share requirement of 50% non-federal funds.

This Act will also update and streamline the advanced nuclear waste recycling activities at DOE under its Advanced Fuel Cycle Initiative program through adoption of a more advanced and well-rounded Fuel Cycle Research and Development program. This program aims to improve uranium resource utilization and waste management through research of three fuel cycle options now widely considered the most likely options for any national waste strategy that includes reprocessing. Those cycles are: open cycle; modified open cycle; and full recycle. In addition, this program will consider advanced and alternative storage methods. The Secretary is also required to make Congress aware of how any recommendations from the Blue Ribbon Commission of America's Nuclear Future will be adopted by the Office of Nuclear Energy. Furthermore, the Secretary must submit an analysis of how any plans implemented compare to the proposed Yucca Mountain repository.

Also included in this bill is the creation of a Nuclear Energy Enabling Technologies program to provide the programmatic infrastructure to develop cross cutting technologies and ensure coordination between the Reactor Concepts and Fuel Cycle Research and Development programs as well as between the Office of Nuclear Energy and the rest of the Department of Energy, including the Office of Science. Activities commenced under this program will be focused on broadly applicable research and development areas including but not limited to, advanced reactor materials, radiation mitigation methods, proliferation and security risk assessment methods, advanced sensors and instrumentation, and advanced manufacturing methods.

In addition to these major programmatic provisions, this legislation requires the Secretary to assemble certain reports for Congress and the public that will provide needed oversight in a select number of areas. First, the Secretary is required to transmit to Congress a report summarizing the quantitative risks associated with the potential of a severe accident arising from civilian nuclear power use and providing an overview of technologies available to mitigate any such incident. Also, the Secretary will undertake a program objectives study analyzing how state requirements and standards might delay or impede further development of nuclear power. Furthermore, the Secretary is required to commission a National Academies study on the long-term operating needs of plants and their maintenance activities. Finally, the Secretary shall compile and make available to the public a list of all non-Federal user facilities receiving Federal funds that may be used for unclassified nuclear energy research.

With regards to the Next Generation Nuclear Plant (NGNP) project currently under development, this legislation opens up the potential location of the reactor site to one determined by the consortium created by the Energy Policy Act of 2005. To this end and for general oversight purposes, this bill also requires that the Government Accountability Office prepare a report on NGNP that in-

cludes its status and an analysis of factors that could be responsible for the delays in the project's development.

The bill also requires that the Department of Energy be responsible for all waste created by the operation of nuclear reactors under the programs authorized by this Act.

Finally, separate and apart from the requirements placed upon the Department of Energy, this bill authorizes the establishment of a nuclear energy standards committee at the National Institute of Standards and Technology to facilitate and support the development and revision of standards for nuclear power systems.

VII. SECTION-BY-SECTION ANALYSIS

H.R. 5866—NUCLEAR ENERGY RESEARCH AND DEVELOPMENT ACT OF 2010

Section 1. Short title

Nuclear Energy Research and Development Act of 2010

Section 2. Objectives

Amends Section 951(a) of the Energy Policy Act of 2005 to include the following objectives:

(1) Reducing the costs of nuclear reactor systems

(2) Reducing used nuclear fuel and nuclear waste products generated by civilian nuclear energy

(3) Supporting technological advances in areas that industry is not likely to undertake because of technical and financial uncertainty

(4) Researching and developing technologies to improve the process by which nuclear power systems meets government requirements

Section 3. Funding

Amends Section 951 of the Energy Policy Act of 2005 to provide the following authorizations for Subtitle E programs:

A. Total Program's Authorization

(1) $419,000,000 for fiscal year 2011

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

(3) $439,000,000 for fiscal year 2013.

B. Breakout of total Authorization for Activities under Section 953 for the Fuel Cycle Research and Development Program

(1) $201,000,000 for fiscal year 2011;

(2) $201,000,000 for fiscal year 2012; and

(3) $201,000,000 for fiscal year 2013.

C. Breakout of total Authorization for Activities under Section 952 for Nuclear Energy Research and Development Programs other than those described in 952(d)

(1) $64,000,000 for fiscal year 2011;

(2) $64,000,000 for fiscal year 2012; and

(3) $64,000,000 for fiscal year 2013.

D. Breakout of total Authorization for Activities under Section 952(d) for the Small Modular Reactor Program

(1) $55,000,000 for fiscal year 2011;

(2) $65,000,000 for fiscal year 2012; and

(3) $75,000,000 for fiscal year 2013.

E. Breakout of total Authorization for Activities under Section 958 for the Nuclear Energy Enabling Technologies Program

(1) $99,000,000 for fiscal year 2011;
(2) $99,000,000 for fiscal year 2012; and
(3) $99,000,000 for fiscal year 2013.

Section 4. Program objectives study

This section requires the Secretary to report to Congress the results of a study on state requirements and standards that might delay or impede further development of nuclear power.

Section 5. Nuclear Energy Research and Development Programs

This section amends Section 952 of the Energy Policy Act of 2005 by striking subsections (c) through (e) and inserting a Reactor Concepts Program that authorizes research into advanced reactor designs and technologies to prolong the life of currently deployed reactor systems. Technologies that may be researched under this section include those that are economically competitive with other electric power generation plants, have higher energy efficiency, lower cost and improved safety compared to current reactors, utilize passive safety systems, minimize proliferation risks, reduce production of high-level waste per unit of output, increase the life and sustainability of deployed reactor systems, use improved instrumentation, or are capable of producing large quantities of hydrogen or process heat. This section also requires the Secretary to seek opportunities for international cooperation.

Section 6. Small Modular Reactor Program

This section amends Section 952 of the Energy Policy Act of 2005 by creating a Small Modular Reactor Program to promote the research, development, demonstration, and commercial application of small modular reactors (SMRs). Under this section, SMRs are defined as reactors with a rated capacity of 300MWe or less and can be constructed and operated in combination with similar reactors at a single site.

In conducting this Program, the Secretary may enter into cooperative agreements to support SMR designs that enable lower capital costs or increased access to private financing, reduced long-term radio-toxicity, mass, or decay heat of waste, increased operating safety of nuclear facilities, reduced dependence of reactor systems on water resources, increased seismic resistance of nuclear generation, reduced proliferation risk, and increased efficiency in reactor manufacturing.

To be eligible to enter into the agreement an applicant must submit a proposal that documents all partners and suppliers involved in the project and a description of anticipated domestic and international activities, the measures to be undertaken to enable cost-effective implementation of the SMR project, an accounting structure approved by the Secretary, and all known assets that shall be contributed to satisfy the non-Federal cost share requirement.

This program will require any applicant to be responsible for at least 50% of the cost of the project and that cost may only be satisfied through the use of non-Federal dollars.

In selecting winners of awards or cooperative agreements, the Secretary shall consider the domestic manufacturing capabilities of the parties and of their partners and suppliers, the viability of the reactor design and business plan of the parties, the potential of the reactor design to be developed without future federal subsidy, and the non-Federal share to be provided.

Section 7. Conventional improvements to nuclear power plants

This section allows the Secretary to carry out a program to research technologies related to steam-side improvements to nuclear power plants. Funds may only be used in furtherance of this section only if the goals are relevant and proper to enhance technologies developed under the Reactor Concepts program.

Section 8. Fuel Cycle Research and Development

This section amends Section 953 of the Energy Policy Act of 2005 by renaming the program "Fuel Cycle Research and Development." Under this program, the Secretary shall conduct fuel cycle research and development of technologies to improve uranium resource utilization, maximize energy generation, minimize nuclear waste creation, improve safety, and mitigate risk of proliferation in support of a national strategy for spent nuclear fuel.

The fuel management options that may be considered under this program are open fuel cycle, modified open cycle, full recycle, advanced storage, alternative storage, or other appropriate technology areas. Open fuel cycle includes development of fuels for use in reactors that minimize waste creation. Modified open cycle includes development of fuel forms, reactors and limited separations of waste. Full recycle includes development of technologies to repeatedly recycle nuclear waste products to minimize total waste to the greatest extent possible. Advanced storage includes development of innovative storage technologies for both onsite and long-term storage. Alternative storage includes development of innovative long-term storage methods, including deep borehole storage or salt dome storage.

Furthermore, under this section, the Secretary must consider the final Blue Ribbon Commission report. Within 180 days after the release of the Blue Ribbon Commission Report, the Secretary must transmit to Congress a report describing any plans the Department may have to incorporate relevant recommendations from the Commission. This report must also those plans compare with a long-term waste repository at Yucca Mountain.

Section 9. Nuclear Energy Enabling Technologies

This section amends the Energy Policy Act of 2005 by adding a new section 958 titled "Nuclear Enabling Technologies." This program is to support integration of activities undertaken in 952(c) and 953 and support crosscutting technology development. Research activities may include those pertaining to advanced reactor materials, catastrophic radiation mitigation methods, proliferation and security risk assessment methods, sensors and instrumentation, manufacturing methods, or any crosscutting technology or transformative concept the Secretary deems relevant.

In conducting this program, the Secretary must submit a report on and evaluation of these activities as part of the annual budget.

Section 10. Emergency risk assessment and preparedness report

This section requires the Secretary to transmit to the Congress a report summarizing quantitative risks associated with the potential of a severe accident arising from the use of nuclear power and outlining the technologies currently available to mitigate the consequences of such an accident. The report shall include recommendations of areas of technological development that should be pursued to reduce the potential public harm arising from such an incident.

Section 11. Next generation nuclear plant

This section amends Section 642(b)(3) of the Energy Policy Act of 2005 to allow the location of the prototype power plant to be constructed in a location chosen by the Consortium through an open and transparent competitive selection process.

This section also requires GAO to undertake a report to provide a status update on the Next Generation Nuclear Plant (NGNP) indicating its progress, how Federal appropriated funds have been distributed and spent, and the current and expected participation by non-federal entities. The report shall also include an analysis of various challenges facing the NGNP project.

Section 12. Technical standards collaboration

This section requires the Director of the National Institute of Standards and Technology (NIST) to establish a nuclear energy standards committee to facilitate and support the development or revision of technical standards for new and existing nuclear power plants and advanced nuclear technologies.

The committee shall include representatives from the Federal Government and the private sector and the committee shall be co-chaired by a representative from NIST and a representative from a private sector standards organization.

The duties of the committee shall include: (1) performing a technical standards needs assessment; (2) formulating, coordinating, and recommending priorities for new technical standards and the revision of existing technical standards; (3) facilitating and supporting collaboration and cooperation among standards developers; (4) coordinating with other national, regional, or international efforts on nuclear energy-related technical standards; and (5) promoting the establishment and maintenance of a database of nuclear energy-related technical standards.

$1 million is authorized to carry out this section for each of FY 2011 through FY 2013.

Section 13. Evaluation of long-term operating needs

This section requires the Secretary to contract with the National Academies to conduct an evaluation of the long-term operating needs of currently deployed nuclear reactors. This report must be submitted no later than one year after enactment of this act.

Section 14. Available facilities database

This section requires the Secretary to prepare and make publicly available a database of non-Federal user facilities receiving federal funds that may be used for unclassified nuclear energy research.

Section 15. Nuclear waste disposal

This section requires the Department of Energy to be responsible for disposal of high-level radioactive waste generated by reactors under the programs authorized in this Act.

VIII. Committee Views

The intent of the legislation is to update the Department of Energy's nuclear energy research and development programs, authorize funding to advance nuclear energy technologies, and address issues such as high capital costs and waste management associated with nuclear power. This requires the Department of Energy to augment or enhance existing programs for the necessary and proper execution of this legislation. Furthermore, the Department of Energy will be required to support and encourage development of new initiatives and technologies to accomplish the stated purpose of this Act.

It is the Committee's view that the consultation provisions in Section 6 are important to efficiently execute the Small Modular Reactor program. This section requires the Secretary of Energy to consult with and utilize the expertise of the Secretary of the Navy in establishing and administering the SMR program. The Committee recognizes that the Navy's nuclear reactor expertise resides within the Naval Nuclear Propulsion Program (NNPP), whose mission it is to provide militarily effective nuclear propulsion plants and ensure their safe, reliable and long-lived operation. Considering the design requirements associated with their military-specific application, the Committee also recognizes that Naval nuclear reactors are not suitable for commercial use. However, the Committee encourages the SMR program to consult with NNPP and solicit NNPP's advice, where appropriate.

Furthermore, it is the intention of the Committee that the federal Power Marketing Administrations and the Tennessee Valley Authority not be excluded from participating in the Small Modular Reactor program authorized under Section 6. As such, while recipients of financial assistance may not use funds received through appropriation Acts to satisfy the program's cost-sharing requirement, funds generated by any federal Power Marketing Administration or the Tennessee Valley Authority through power sales and borrowings will be treated as private funds for the purposes of satisfying the private cost-share requirement in this section.

The Committee acknowledges the expertise of the Nuclear Regulatory Commission (NRC) in severe accident analysis at nuclear power plants. NRC has extensive regulatory controls in place to address severe accident risks. NRC and the nuclear industry are world leaders in the development and use of probabilistic risk assessment techniques to quantify the risk of accidents. Severe accident risks have been analyzed for all operating nuclear power plants and have been demonstrated to be of extremely low likelihood and a minor contributor to overall public risk. Nevertheless, mitigation strategies have been developed to address the unlikely event of a reactor core damaging accident, and all plants have procedures and guidelines in place in this regard. The Secretary shall prepare a report under Section 10 of this Act that compiles NRC and Licensee recommendations regarding severe accident risk to

improve technological development in the areas of emergency planning, characterization of radionuclide release dose pathways, and probabilistic risk assessment. Also, in furtherance of this report, DOE shall not undertake any analysis or investigation that is already the responsibility of the NRC.

IX. Cost Estimate

A cost estimate and comparison prepared by the Director of the Congressional Budget Office under section 402 of the Congressional Budget Act of 1974 has been timely submitted to the Committee on Science and Technology prior to the filing of this report and is included in Section X of this report pursuant to House Rule XIII, clause 3(c)(3).

H.R. 5866 does not contain new budget authority, credit authority, or changes in revenues or tax expenditures. Assuming that the sums authorized under the bill are appropriated, H.R. 5866 does authorize additional discretionary spending, as described in the Congressional Budget Office report on the bill, which is contained in Section X of this report.

X. Congressional Budget Office Cost Estimate

H.R. 5866—Nuclear Energy Research and Development Act of 2010

Summary: H.R. 5866 would authorize the appropriation of nearly $1.3 billion over the 2011–2013 period to the Department of Energy (DOE) for programs related to nuclear energy. Assuming appropriation of the authorized amounts, CBO estimates that implementing H.R. 5866 would cost $1.3 billion over the 2011–2015 period. Enacting the bill would not affect direct spending or receipts; therefore, pay-as-you-go procedures do not apply.

H.R. 5866 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act (UMRA) and would impose no costs on state, local, or tribal governments.

Estimated cost to the Federal Government: The estimated budgetary impact of H.R. 5866 is shown in the following table. The costs of this legislation fall within budget function 270 (energy).

	By fiscal year, in millions of dollars—					
	2011	2012	2013	2014	2015	2011–2015
CHANGES IN SPENDING SUBJECT TO APPROPRIATION						
Authorization Level	420	430	440	0	0	1,290
Estimated Outlays	252	376	431	175	56	1,290

Basis of estimate: For this estimate, CBO assumes that H.R. 5866 will be enacted in 2010 and that appropriations will be provided as specified by the bill. Estimated outlays are based on the historical rate of spending for DOE's nuclear energy research programs. H.R. 5866 would authorize appropriations totaling about $1.3 billion over the 2011–2013 period, primarily for DOE to carry out a variety of research programs related to nuclear power. (DOE received a total of nearly $800 million for nuclear energy programs in 2010.) The authorization includes:

- $603 million for research and development related to the nuclear fuel cycle;

- $297 million for research on crosscutting nuclear technologies and efforts to integrate research on specific elements of nuclear energy;
- $195 million to support efforts to design and license small modular nuclear reactors;
- $192 million for nuclear energy research and development and activities to demonstrate commercial applications of nuclear technologies; and
- $3 million for the National Institute for Standards and Technology to establish a committee to revise and establish standards for nuclear technologies.

Pay-As-You-Go considerations: None.

Intergovernmental and private-sector impact: H.R. 5866 contains no intergovernmental or private-sector mandates as defined in UMRA and would impose no costs on state, local, or tribal governments.

Estimate prepared by: Federal costs: Megan Carroll; Impact on state, local, and tribal governments: Ryan Miller; Impact on the private sector: Amy Petz.

Estimate approved by: Theresa Gullo, Deputy Assistant Director for Budget Analysis.

XI. Compliance With Public Law 104–4

H.R. 5866 contains no unfunded mandates.

XII. Committee Oversight Findings and Recommendations

The oversight findings and recommendations of the Committee on Science and Technology are reflected in the body of this report.

XIII. Statement on General Performance Goals and Objectives

Pursuant to clause 3(c) of House Rule XIII, the goal of H.R. 5866 is to authorize research, development, and demonstration programs into nuclear energy, and for other purposes.

XIV. Constitutional Authority Statement

Article I, section 8 of the Constitution of the United States grants Congress the authority to enact H.R. 5866.

XV. Federal Advisory Committee Statement

H.R. 5866 does not establish nor authorize the establishment of any advisory committee.

XVI. Congressional Accountability Act

The Committee finds that H.R. 5866 does not relate to the terms and conditions of employment or access to public services or accommodations within the meaning of section 102(b)(3) of the Congressional Accountability Act (Public Law 104–1).

XVII. Earmark Identification

H.R. 5866 does not contain any congressional earmarks, limited tax benefits, or limited tariff benefits as defined in clause 9 of Rule XXI.

XVIII. Statement on Preemption of State, Local, or Tribal Law

This bill is not intended to preempt any state, local, or tribal law.

XIX. Changes in Existing Law Made by the Bill, as Reported

In compliance with clause 3(e) of rule XIII of the Rules of the House of Representatives, changes in existing law made by the bill, as reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italic, existing law in which no change is proposed is shown in roman):

ENERGY POLICY ACT OF 2005

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) * * *

* * * * * * *

(b) Table of Contents.—The table of contents for this Act is as follows:

* * * * * * *

TITLE IX—RESEARCH AND DEVELOPMENT

* * * * * * *

Subtitle E—Nuclear Energy

* * * * * * *

[Sec. 953. Advanced fuel cycle initiative.]
Sec. 953. Fuel cycle research and development.

* * * * * * *

Sec. 958. Nuclear energy enabling technologies.

* * * * * * *

TITLE VI—NUCLEAR MATTERS

* * * * * * *

Subtitle C—Next Generation Nuclear Plant Project

* * * * * * *

SEC. 642. PROJECT MANAGEMENT.

(a) * * *

(b) Laboratory Management.—

(1) * * *

* * * * * * *

[(3) PROTOTYPE PLANT SITING.—The prototype nuclear reactor and associated plant shall be sited at the Idaho National Laboratory in Idaho.]

(3) PROTOTYPE PLANT LOCATION.—The prototype nuclear reactor and associated plant shall be constructed at a location determined by the consortium through an open and transparent competitive selection process.

* * * * * * *

TITLE IX—RESEARCH AND DEVELOPMENT

* * * * * * *

Subtitle E—Nuclear Energy

SEC. 951. NUCLEAR ENERGY.

(a) IN GENERAL.—The Secretary shall conduct programs of civilian nuclear energy research, development, demonstration, and commercial application, including activities described in this subtitle. Programs under this subtitle shall take into consideration the following objectives:

(1) * * *

(2) Reducing the costs of nuclear reactor systems.

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

(4) Supporting technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty.

[(2)] *(5)* Providing the technical means to reduce the likelihood of nuclear proliferation.

[(3)] *(6)* Maintaining a cadre of nuclear scientists and engineers.

[(4)] *(7)* Maintaining National Laboratory and university nuclear programs, including their infrastructure.

[(5)] *(8)* Supporting both individual researchers and multidisciplinary teams of researchers to pioneer new approaches in nuclear energy, science, and technology.

[(6)] *(9)* Developing, planning, constructing, acquiring, and operating special equipment and facilities for the use of researchers.

[(7)] *(10)* Supporting technology transfer and other appropriate activities to assist the nuclear energy industry, and other users of nuclear science and engineering, including activities addressing reliability, availability, productivity, component aging, safety, and security of nuclear power plants.

[(8)] *(11)* Reducing the environmental impact of nuclear energy-related activities.

(12) Researching and developing technologies and processes so as to improve and streamline the process by which nuclear power systems meet Federal and State requirements and standards.

(b) AUTHORIZATION OF APPROPRIATIONS FOR CORE PROGRAMS.—There are authorized to be appropriated to the Secretary to carry out nuclear energy research, development, demonstration, and commercial application activities, including activities authorized under this subtitle, other than those described in subsection (c)—

[(1) $330,000,000 for fiscal year 2007;
[(2) $355,000,000 for fiscal year 2008; and
[(3) $495,000,000 for fiscal year 2009.]
(1) $419,000,000 for fiscal year 2011;
(2) $429,000,000 for fiscal year 2012; and
(3) $439,000,000 for fiscal year 2013.

* * * * * * *

(d) ALLOCATIONS.—From amounts authorized [under subsection (a)] *under subsection (b)*, the following sums are authorized:

[(1) For activities under section 953—
[(A) $150,000,000 for fiscal year 2007;
[(B) $155,000,000 for fiscal year 2008; and
[(C) $275,000,000 for fiscal year 2009.]
(1) For activities under section 953—
(A) $201,000,000 for fiscal year 2011;
(B) $201,000,000 for fiscal year 2012; and
(C) $201,000,000 for fiscal year 2013.

* * * * * * *

(4) For activities under section 952, other than those described in section 952(d)—
(A) $64,000,000 for fiscal year 2011;
(B) $64,000,000 for fiscal year 2012; and
(C) $64,000,000 for fiscal year 2013.
(5) For activities under section 952(d)—
(A) $55,000,000 for fiscal year 2011;
(B) $65,000,000 for fiscal year 2012; and
(C) $75,000,000 for fiscal year 2013.
(6) For activities under section 958—
(A) $99,000,000 for fiscal year 2011;
(B) $99,000,000 for fiscal year 2012; and
(C) $99,000,000 for fiscal year 2013.

* * * * * * *

(f) PROGRAM OBJECTIVES STUDY.—In furtherance of the program objectives listed in subsection (a) of this section, the Secretary shall, within one year after the date of enactment of this subsection, transmit to the Congress a report on the results of a study on the scientific and technical merit of major State requirements and standards, including moratoria, that delay or impede the further development and commercialization of nuclear power, and how the Federal Government can assist in overcoming such delays or impediments.

SEC. 952. NUCLEAR ENERGY RESEARCH PROGRAMS.

(a) * * *

* * * * * * *

[(c) NUCLEAR POWER 2010 PROGRAM.—

[(1) IN GENERAL.—The Secretary shall carry out a Nuclear Power 2010 Program, consistent with recommendations of the Nuclear Energy Research Advisory Committee of the Department in the report entitled "A Roadmap to Deploy New Nu-

clear Power Plants in the United States by 2010" and dated October 2001.

[(2) ADMINISTRATION.—The Program shall include—

[(A) use of the expertise and capabilities of industry, institutions of higher education, and National Laboratories in evaluation of advanced nuclear fuel cycles and fuels testing;

[(B) consideration of a variety of reactor designs suitable for both developed and developing nations;

[(C) participation of international collaborators in research, development, and design efforts, as appropriate; and

[(D) encouragement for participation by institutions of higher education and industry.

[(d) GENERATION IV NUCLEAR ENERGY SYSTEMS INITIATIVE.—

[(1) IN GENERAL.—The Secretary shall carry out a Generation IV Nuclear Energy Systems Initiative to develop an overall technology plan for and to support research and development necessary to make an informed technical decision about the most promising candidates for eventual commercial application.

[(2) ADMINISTRATION.—In conducting the Initiative, the Secretary shall examine advanced proliferation-resistant and passively safe reactor designs, including designs that—

[(A) are economically competitive with other electric power generation plants;

[(B) have higher efficiency, lower cost, and improved safety compared to reactors in operation on the date of enactment of this Act;

[(C) use fuels that are proliferation resistant and have substantially reduced production of high-level waste per unit of output; and

[(D) use improved instrumentation.

[(e) REACTOR PRODUCTION OF HYDROGEN.—The Secretary shall carry out research to examine designs for high-temperature reactors capable of producing large-scale quantities of hydrogen.]

(c) REACTOR CONCEPTS.—

(1) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application to advance nuclear power systems as well as technologies to sustain currently deployed systems.

(2) DESIGNS AND TECHNOLOGIES.—In conducting the program under this subsection, the Secretary shall examine advanced reactor designs and nuclear technologies, including those that—

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

(B) have higher efficiency, lower cost, and improved safety compared to reactors in operation as of the date of enactment of the Nuclear Energy Research and Development Act of 2010;

(C) utilize passive safety features;

(D) minimize proliferation risks;

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

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

(G) use improved instrumentation;

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

(I) minimize water usage or use alternatives to water as a cooling mechanism.

(3) INTERNATIONAL COOPERATION.—In carrying out the program under this subsection, the Secretary shall seek opportunities to enhance the progress of the program through international cooperation through such organizations as the Generation IV International Forum, or any other international collaboration the Secretary considers appropriate.

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

(d) SMALL MODULAR REACTOR PROGRAM.—

(1) IN GENERAL.—

(A) The Secretary shall carry out a small modular reactor program to promote research, development, demonstration, and commercial application of small modular reactors, including through cost-shared projects for commercial application of reactor systems designs.

(B) The Secretary shall consult with and utilize the expertise of the Secretary of the Navy in establishing and carrying out such program.

(C) Activities may also include development of advanced computer modeling and simulation tools, by Federal and non-Federal entities, which demonstrate and validate new design capabilities of innovative small modular reactor designs.

(2) DEFINITION.—For the purposes of this subsection, the term "small modular reactor" means a nuclear reactor—

(A) with a rated capacity of less than 300 electrical megawatts;

(B) with respect to which most parts can be factory assembled and shipped as modules to a reactor plant site for assembly; and

(C) that can be constructed and operated in combination with similar reactors at a single site.

(3) LIMITATION.—Demonstration activities carried out under this section shall be limited to individual technologies and systems, and shall not include demonstration of full reactor systems or full plant operations.

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

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

(B) reduced long-term radiotoxicity, mass, or decay heat of the nuclear waste produced by generation;

(C) increased operating safety of nuclear facilities;

(D) reduced dependence of reactor systems on water resources;

(E) increased seismic resistance of nuclear generation;

(F) reduced proliferation risks through integrated safeguards and security proliferation controls; and

(G) increased efficiency in reactor manufacturing and construction.

(5) APPLICATION.—To be eligible to enter into a cooperative agreement with the Secretary under this subsection, an applicant shall submit to the Secretary a proposal for the small modular reactor project to be undertaken. The proposal shall document—

(A) all partners and suppliers that will be active in the small modular reactor project, including a description of each partner or supplier's anticipated domestic and international activities;

(B) measures to be undertaken to enable cost-effective implementation of the small modular reactor project;

(C) an accounting structure approved by the Secretary;

(D) all known assets that shall be contributed to satisfy the cost-sharing requirement under paragraph (6); and

(E) the extent to which the proposal will increase domestic manufacturing activity, exports, or employment.

(6) COST SHARING.—Notwithstanding section 988, the Secretary shall require the parties to a cooperative agreement under this subsection to be responsible for not less than 50 percent of the costs of the small modular reactor project.

(7) CALCULATION OF COST SHARING AMOUNT.—A recipient of financial assistance under this section may not satisfy the cost sharing requirement under paragraph (6) by using funds received from the Federal Government through appropriation Acts.

(8) PROJECT SELECTION CRITERIA.—The Secretary shall consider the following factors in entering into a cooperative agreement under this subsection:

(A) The domestic manufacturing capabilities of the parties to the cooperative agreement and their partners and suppliers.

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

(C) The parties to the cooperative agreement's potential to continue the development of small modular reactors without Federal subsidies or loan guarantees.

(D) The cost share to be provided.

(E) The degree to which the following goals will be advanced:

(i) Lower capital costs or increased access to private financing in comparison to current large reactor designs.

(ii) Reduced long-term radiotoxicity, mass, or decay heat of the nuclear waste produced by generation.

(iii) Increased operating safety of nuclear facilities.

(iv) Reduced dependence of reactor systems on water resources.

(v) Increased seismic resistance of nuclear generation.

(vi) Reduced proliferation risks through integrated safeguards and security proliferation controls.

(vii) Increased efficiency in reactor manufacturing and construction.

(e) CONVENTIONAL IMPROVEMENTS TO NUCLEAR POWER PLANTS.—

(1) IN GENERAL.—The Secretary may carry out a Nuclear Energy Research Initiative for research and development related to steam-side improvements to nuclear power plants to promote the research, development, demonstration, and commercial application of—

(A) cooling systems;

(B) turbine technologies;

(C) heat exchangers and pump design;

(D) special coatings to improve lifetime of components and performance of heat exchangers; and

(E) advanced power conversion systems for advanced reactor technologies.

(2) ADMINISTRATION.—The Secretary may undertake initiatives under this subsection only when the goals are relevant and proper to enhance the performance of technologies developed under subsection (c). Not more than $10,000,000 of funds authorized for this section may be used for carrying out this subsection.

SEC. 953. [ADVANCED FUEL CYCLE INITIATIVE] *FUEL CYCLE RESEARCH AND DEVELOPMENT.*

[(a) IN GENERAL.—The Secretary, acting through the Director of the Office of Nuclear Energy, Science and Technology, shall conduct an advanced fuel recycling technology research, development, and demonstration program (referred to in this section as the "program") to evaluate proliferation-resistant fuel recycling and transmutation technologies that minimize environmental and public health and safety impacts as an alternative to aqueous reprocessing technologies deployed as of the date of enactment of this Act in support of evaluation of alternative national strategies for spent nuclear fuel and the Generation IV advanced reactor concepts.]

"(a) IN GENERAL.—The Secretary shall conduct a fuel cycle research, development, demonstration, and commercial application program (referred to in this section as the 'program') on fuel cycle options that improve uranium resource utilization, maximize energy generation, minimize nuclear waste creation, improve safety, mitigate risk of proliferation, and improve waste management in support of a national strategy for spent nuclear fuel and the reactor concepts research, development, demonstration, and commercial application program under section 952(c).

"(b) FUEL CYCLE OPTIONS.—Under this section the Secretary may consider implementing the following initiatives:

"(1) OPEN CYCLE.—Developing fuels, including the use of non-uranium materials, for use in reactors that increase energy generation and minimize the amount of nuclear waste produced in an open fuel cycle.

"(2) MODIFIED OPEN CYCLE.—Developing fuel forms, reactors, and limited separation and transmutation methods that increase fuel utilization and reduce nuclear waste in a modified open fuel cycle.

"(3) FULL RECYCLE.—Developing advanced recycling technologies, including Generation IV Reactors, to reduce the risk of proliferation, radiotoxicity, mass, and decay heat to the greatest extent possible.

"(4) ADVANCED STORAGE METHODS.—Developing advanced storage technologies for both onsite and long-term storage that substantially prolong the effective life of current storage devices or that substantially improve upon existing nuclear waste storage technologies and methods, including repositories.

"(5) ALTERNATIVE AND DEEP BOREHOLE STORAGE METHODS.—Developing alternative storage methods for long-term storage, including deep boreholes into stable crystalline rock formations and mined repositories in a range of geologic media.

"(6) OTHER TECHNOLOGIES.—Developing any other technology or initiative that the Secretary determines is likely to advance the objectives of the program established under subsection (a).

"(c) ADDITIONAL ADVANCED RECYCLING AND CROSSCUTTING ACTIVITIES.—In addition to and in support of the specific initiatives described in paragraphs (1) through (6), the Secretary may support the following activities:

"(1) Development and testing of integrated process flow sheets for advanced nuclear fuel recycling processes.

"(2) Research to characterize the byproducts and waste streams resulting from fuel recycling processes.

"(3) Research and development on reactor concepts or transmutation technologies that improve resource utilization or reduce the radiotoxicity of waste streams.

"(4) Research and development on waste treatment processes and separations technologies, advanced waste forms, and quantification of proliferation risks.

"(5) Identification and evaluation of test and experimental facilities necessary to successfully implement the advanced fuel cycle initiative.

"(6) Advancement of fuel cycle-related modeling and simulation capabilities.

"(d) BLUE RIBBON COMMISSION REPORT.—

"(1) In carrying out this section, the Secretary shall give consideration to the final report on a long-term nuclear waste solution produced by the Blue Ribbon Commission on America's Nuclear Future.

"(2) Not later than 180 days after the release of the Blue Ribbon Commission on America's Nuclear Future final report, the Secretary shall transmit to Congress a report, which shall include—

"(A) any plans the Department may have to incorporate any relevant recommendations from this report into the program; and

"(B) how those recommendations for long-term nuclear waste solutions that will be incorporated into the plan compare with plans for a long-term nuclear waste solution of a repository at Yucca Mountain, that may or may not be incorporated into the plan, with regard to the safety, security, legal, cost, and technological and site readiness factors associated with any recommendations related to final disposition pathways for spent nuclear fuel and high-level radio-

active waste to the same factors associated with permanent deep geological disposal at the Yucca Mountain waste repository.

"(3) The analysis described in paragraph (2)(B) shall be conducted using scientific and technical materials and information used to support policy actions related to the Yucca Mountain project.".

[(b)**]** *(e)* ANNUAL REVIEW.—The program shall be subject to annual review by the Nuclear Energy Research Advisory Committee of the Department or other independent entity, as appropriate.

[(c)**]** *(f)* INTERNATIONAL COOPERATION.—In carrying out the program, the Secretary is encouraged to seek opportunities to enhance the progress of the program through international cooperation.

[(d)**]** *(g)* REPORTS.—The Secretary shall submit, as part of the annual budget submission of the Department, a report on the activities of the program.

* * * * * * *

SEC. 958. NUCLEAR ENERGY ENABLING TECHNOLOGIES.

(a) IN GENERAL.—The Secretary shall conduct a program to support the integration of activities undertaken through the reactor concepts research, development, demonstration, and commercial application program under section 952(c) and the fuel cycle research and development program under section 953, and support crosscutting nuclear energy concepts. Activities commenced under this section shall be concentrated on broadly applicable research and development focus areas.

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

(1) advanced reactor materials;

(2) advanced radiation mitigation methods;

(3) advanced proliferation and security risk assessment methods;

(4) advanced sensors and instrumentation;

(5) advanced nuclear manufacturing methods; or

(6) any crosscutting technology or transformative concept aimed at establishing substantial and revolutionary enhancements in the performance of future nuclear energy systems that the Secretary considers relevant and appropriate to the purpose of this section.

(c) REPORT.—The Secretary shall submit, as part of the annual budget submission of the Department, a report on the activities of the program conducted under this section, which shall include a brief evaluation of each activity's progress.

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XX. COMMITTEE RECOMMENDATIONS

On September 23, 2010, the Committee on Science and Technology favorably reported H.R. 5866 by voice vote and recommended its enactment.

XXI. Additional Views

ADDITIONAL VIEWS OFFERED BY REPRESENTATIVES RALPH HALL, LAMAR SMITH, DANA ROHRABACHER, ROSCOE BARTLETT, JUDY BIGGERT, TODD AKIN, RANDY NEUGEBAUER, BOB INGLIS, MICHAEL MCCAUL, ADRIAN SMITH AND PETE OLSON ON H.R. 5866, THE NUCLEAR ENERGY RESEARCH AND DEVELOPMENT ACT OF 2010

After several decades of setbacks and inaction, a growing consensus is emerging in support of expanding the role of nuclear power in our Nation's energy portfolio. We support this expansion, noting that nuclear energy provides a safe, reliable, and cost-competitive source of baseload power to meet the expected 30 percent increase in electricity demand over the next 25 years.

While much of the current "nuclear revival" involves licensing and building more reactors using existing light water reactor technology, a host of longer-term research and development activities exist that must also be pursued. Key among these are finding new and innovative ways of dealing with the management of spent nuclear fuel, supporting research and development (R&D) to facilitate advances in and licensing of new reactor designs, and supporting research into extending the life of the existing reactor fleet.

H.R. 5866 contributes to these goals through a comprehensive approach that authorizes existing R&D activities at the Department of Energy (DOE). Specifically, the bill amends Title IX of the Energy Policy Act of 2005 to focus DOE R&D activities on advancing new reactor concepts, fuel cycle R&D, and enabling and cross-cutting activities such as materials R&D and computer modeling and simulation. Within these activities, the legislation emphasizes R&D efforts to support the advancement and eventual licensing of small modular reactors.

We are pleased with improvements made to the bill through successful passage of amendments offered during the full committee markup, such as amendments to (1) require a DOE study on specific State requirements that delay or impede commercialization of nuclear power, including moratoria; (2) reinforce the Federal government's responsibility for managing spent nuclear fuel generated under the programs in the act; and (3) directing DOE to compare the recommendations of the Blue Ribbon Commission on America's Nuclear Future with the corresponding features of the proposed Yucca Mountain waste repository.

These amendments highlight a fundamental priority in the effort to ensure the long-term viability of nuclear power: addressing nuclear waste management challenges and completing the review and license application of the Yucca Mountain waste repository. We

simply cannot have a revival of nuclear energy in the United States without addressing these challenges.

We support pursuit of the objectives and activities outlined in H.R. 5866, and remain committed to working with Democrats and key stakeholders to make continued improvements to this bill as it moves through the legislative process.

ADRIAN SMITH.
BOB INGLIS.
MICHAEL T. MCCAUL.
ROSCOE BARTLETT.
LAMAR SMITH.
RANDY NEUGEBAUER.
PETE OLSON.
JUDY BIGGERT.
DANA ROHRABACHER.
RALPH M. HALL.
TODD AKIN.

XXII: PROCEEDINGS OF THE MARKUP BY THE SUBCOMMITTEE ON ENERGY AND ENVIRONMENT ON H.R. 5866, THE NUCLEAR ENERGY RESEARCH AND DEVELOPMENT ACT OF 2010

WEDNESDAY, JULY 28, 2010

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT,
COMMITTEE ON SCIENCE AND TECHNOLOGY,
Washington, DC.

The Subcommittee met, pursuant to call, at 10:10 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Brian Baird [Chairman of the Subcommittee] presiding.

Chairman BAIRD. Good morning. The subcommittee will come to order. Pursuant to notice the Subcommittee on Energy and Environment meets to consider the following measure, H.R. 5866, the *Nuclear Energy Research and Development Act of 2010*.

Today the Energy and Environment Subcommittee meets to consider the *Nuclear Energy Research and Development Act of 2010*, H.R. 5866, sponsored by Chairman Gordon and cosponsored by myself, Ranking Member Hall and Ranking Member Inglis.

The legislation before us today amends the *Energy Policy Act of 2005*, to update and enhance our Federal nuclear energy R&D programs. Nuclear energy is one of the largest sources of low-emission power in the United States. If we are to increase our energy independence and mitigate the effects of climate change, nuclear will likely have to be a large part of that energy mix.

However, management of nuclear waste and increasing capital costs have heavily burdened the industry and caused great concern over its reliability and long-term safety. This bill integrates the Office of Nuclear Energy's activities and provides a more comprehensive approach to overcome these fundamental challenges.

Among the initiatives promoted by this legislation is a small modular reactor or SMR Program. In a recent hearing we heard testimony from a number of witnesses from a variety of disciplines who argued or who agreed that SMRs have the potential to reduce the capital costs and default risks of nuclear energy providers while increasing the safety and reliability of nuclear generation.

Under this bill the SMR Program will promote both the near term and advanced research and development needed to make these small reactors a reality and position our Nation once again as a leader in the nuclear industry.

Furthermore, the bill creates a fuel cycle R&D Program to move the Department of Energy away from program focus on the failed GNEP model to one that makes a comprehensive approach to management of nuclear waste, including research into fuel forms, advanced reactor designs, reprocessing technologies, and advanced storage methods.

This bill is the result of a bipartisan effort over the past three months, and I would like to thank Mr. Hall and Mr. Inglis, as well as the Committee staff on both the majority and minority sides for their continued good work as we move this legislation through the Committee and to the Floor. I thank all of you for attendance and participation, and I look forward to a productive meeting.

[The prepared statement of Chairman Baird follows:]

PREPARED STATEMENT OF CHAIRMAN BRIAN BAIRD

Good morning. Today the Energy and Environment Subcommittee meets to consider the "Nuclear Energy Research and Development Act of 2010." H.R. 5866 is sponsored by Chairman Gordon and co-sponsored by myself, Ranking Member Hall and Ranking Member Inglis.

The legislation before us today amends the Energy Policy Act of 2005 to update and enhance our Federal nuclear energy R&D programs. Nuclear energy is the single largest source of low-emissions power in the United States. If we are to increase our energy independence and mitigate the effects of climate change, nuclear will likely have to be a large part of the energy mix.

However, management of nuclear waste and increasing capital costs have heavily burdened the industry and caused great concern over its reliability and long-term safety. This bill integrates the Office of Nuclear Energy's activities and provides a more comprehensive approach to overcome these fundamental challenges.

Amongst the initiatives promoted by this legislation is a Small Modular Reactor, or "SMR" program. In a recent hearing we heard testimony from a number of witnesses from a variety of disciplines who agreed that SMRs have the potential to reduce the capital costs and default risk of nuclear energy providers while increasing the safety and reliability of nuclear

generation. Under this bill, the SMR program will promote both the nearterm and advanced research and development needed to make these small reactors a reality and position our nation once again as a leader in the nuclear industry.

Furthermore, this bill creates a Fuel Cycle R&D program to move the Department of Energy away from programs focused on the failed GNEP model to one that takes a comprehensive approach to management of nuclear waste including research into fuel forms, advanced reactor designs, reprocessing technologies, and advanced storage methods.

This bill is the result of a truly bipartisan effort over the past three months and I would like to thank Mr. Hall and Mr. Inglis, as well as the Committee Staff of both the Majority and Minority, for their continued good work as we move this legislation through the Committee and to the floor.

I thank you all for your attendance and participation this morning, and I look forward to a productive markup.

Chairman BAIRD. I now recognize Mr. Inglis to present his remarks.

Mr. INGLIS. Thank you, Mr. Chairman. Thank you for holding this markup. I am looking forward to working with you and the committee to revamp our Nuclear Energy Research and Development Program and to push the nuclear industry into the future.

I am happy to cosponsor the bill before us today. Our country is eagerly pursuing new energy solutions that will wean us off of foreign oil, create American jobs, and clean up our air. Nuclear power fits the bill in every way. Right now the U.S. gets a fifth of our electricity from nuclear power. South Carolina I am happy to say gets more than half. The nuclear fleet supplying this abundant power is efficient, reliable, and clean. It is also getting old.

To meet our growing energy needs we are going to need to keep building our nuclear power strength. With this opportunity to reinvest in nuclear research we have an opportunity to tackle two important issues; the nuclear fuel cycle and capital costs.

For so long as we have been powering our light bulbs off the atom, we have been generating nuclear waste. The current disposal policy is insufficient. Nuclear power plants have been stockpiling this waste waiting for the Federal Government to open Yucca Mountain. It would be all the better if we could substantially reduce this volume of waste that comes from nuclear power.

Capital costs of a new nuclear facility is unfortunately prohibitive in the current market. While this undoubtedly is due to the competition with artificially-cheap coal facilities, artificially cheap because the negative externalities aren't recognized, there are also strategies and techniques we can employ to bring down those costs. This bill will help us to do that.

Thankfully the nuclear industry and DOE are eager to solve these problems. For example, GE Hitachi has been working on the prism reactor, a small modular reactor fueled from commercial grade and defense grade nuclear waste. The reactor vessel can be built quickly and scaled up at new sites or at existing nuclear facilities. Drawing our power from a prism reactor will reduce proliferation concerns and simplify the design requirements for a waste repository. The bill before us will help us reach more novel solutions like that one.

I want to briefly mention two issues beyond the scope of this legislation and the jurisdiction of this committee that remain important to the future of the nuclear industry. First, we need to get nuclear facilities approved and online faster. I hope that a robust research program at DOE will maintain steady communication with the NRC, allowing them to be familiar with the new technologies before applications even come in.

Second, Yucca Mountain needs to be completed as quickly as possible. Unfortunately, responsible long-term storage of our nuclear waste has become strongly politicized, and the Administration continues to snub the explicit will of Congress, the nuclear industry, and electricity rate payers. The sooner we resolve uncertainty around nuclear waste storage, the sooner we will get to more investment in the nuclear industry.

Thank you again, Mr. Chairman. I yield back the balance of my time.

[The prepared statement of Mr. Inglis follows:]

PREPARED STATEMENT OF REPRESENTATIVE BOB INGLIS

Chairman Baird, thank you for holding this markup. I'm looking forward to working with you and the Committee to revamp our nuclear energy research and development program and push the nuclear industry into the future. I'm happy to cosponsor the bill before us today.

Our country is eagerly pursuing new energy solutions that will wean us off foreign oil, create American jobs, and clean up our air. Nuclear power fits the bill in every way. Right now, the U.S. gets a fifth of our electricity from nuclear power; South Carolina, I'm happy to say, gets more than half. The nuclear fleet supplying this abundant power is efficient, reliable, and clean. It's also getting old.

To meet our growing energy needs, we're going to need to keep building our nuclear power strength. With this opportunity to reinvest in nuclear research, we have an opportunity to tackle two important issues: the nuclear fuel cycle and capital costs.

For as long as we've been powering our light bulbs off the atom, we've been generating nuclear waste. Our current disposal policy is insufficient; nuclear plants have been stockpiling this waste waiting for the Federal Government to open Yucca Mountain. It would be all the better if we could substantially reduce this volume of waste that comes from nuclear power.

Capital costs of a new nuclear facility are unfortunately prohibitive in the current market. While this undoubtedly is due to competition with artificially cheap coal facilities, there are also strategies and techniques we can employ to bring those costs down. This bill will help us do that.

Thankfully, the nuclear industry and DOE are eager to solve these problems. For example, GE/Hitachi has been working on the "PRISM" reactor, a small modular reactor fueled from commercial-grade and defense-grade nuclear waste. The reactor vessel can be built quickly and scaled up at new sites or at existing nuclear facilities. Drawing our power from a PRISM reactor will reduce proliferation concerns and simplify the design requirements for a waste repository.

The bill before us will help us reach more novel solutions like this one.

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First, we need to get nuclear facilities approved and on-line faster. I hope that a robust research program at DOE will maintain steady communication with the NRC, allowing them to be familiar with new technologies before applications come in.

Second, Yucca Mountain needs to be completed as quickly as possible. Unfortunately, responsible long-term storage of our nuclear waste has become strongly politicized, and the Administration continues to snub the explicit will of Congress, the nuclear, industry, and electricity rate payers. The sooner we resolve uncertainty around nuclear waste storage, the sooner we'll get more investment in the nuclear industry.

Again, thank you Mr. Chairman. I yield back the balance of my time.

Chairman BAIRD. Thank you, Mr. Inglis. I recognize now the sponsor of the bill, Chairman Gordon, to present any remarks on the bill.

Chairman GORDON. Thank you, Mr. Baird. We need to get moving, so let me just briefly say that whether you believe in climate change or energy independence or both as I do, nuclear energy has to play a role in achieving those two goals.

And so I want to thank you, Mr. Inglis, the members here that have spent time and certainly the staff that has spent time on this I think excellent bill, and also I want to associate myself with Mr. Inglis's I guess final two addendums that we couldn't deal with here.

And I yield back.

Chairman BAIRD. Thank the Chairman. Does anyone else wish to be recognized?

If not, I ask unanimous consent the bill is considered as read and open to amendment at any point, that the Members proceed with the amendments in the order of the roster.

Without objection, so ordered.

Chairman BAIRD. The first amendment on the roster is a manager's amendment offered by the Chair. The clerk will report the amendment.

The CLERK. Amendment number 052, amendment to H.R. 5866, offered by Mr. Baird of Washington.

Chairman BAIRD. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize myself for five minutes to explain the amendment.

In addition to making clarifying and conforming changes, my manager's amendment incorporates a number of our Members' con-

cerns that has been worked out in advance with Mr. Hall through this amendment. We assure that federally-appropriated funds cannot be used to satisfy the non-Federal cost share requirement under the Small Modular Reactor Program, and we include civilian reactor technologies that are either deployed or likely to be deployed in the Emergency Risk Assessment and Preparedness Report.

I appreciate the time Mr. Hall and staff have put into this, make it a better bill through the manager's amendment, and I would urge adoption.

Is there further discussion on the amendment?

If no, the vote occurs on the amendment. All in favor, say aye. Those opposed, no. The ayes have it. The amendment is agreed to.

The second amendment on the roster is an amendment offered by the gentlelady from Illinois, Ms. Biggert. Are you ready to proceed with your amendment?

Ms. BIGGERT. Yes, I am. I have an amendment at the desk.

Chairman BAIRD. The clerk will report the amendment.

The CLERK. Amendment number 116, amendment to H.R. 5866, offered by Mrs. Biggert of Illinois.

Chairman BAIRD. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentlelady for five minutes to explain the amendment.

Ms. BIGGERT. Thank you, Mr. Chairman, and thank you for holding this important markup today.

My amendment expands the research objectives of the underlying bill to include compliance as we consider small modular reactor and fuel cycle research.

On the heels of the successful Nuclear Power 2010 Program, we should not overlook the importance of improving the licensing and permitting process for new nuclear. I think this is particularly true for more advanced reactor designs that could be deployed in the very near future.

In fact, the approval process for new nuclear designs is one of the industry's greatest obstacles to a domestic nuclear resurgence. If we are serious about moving forward with the underlying bill, we must move forward with the most comprehensive approach. By including my amendment we will not only improve and demonstrate new nuclear technologies but reduce the barriers to their deployment as well.

I would urge my colleagues to support the amendment and yield back.

[The prepared statement of Ms. Biggert follows:]

PREPARED STATEMENT OF REPRESENTATIVE JUDY BIGGERT

Mr. Chairman, I have an amendment at the desk.

Thank you—and thank you Mr. Chairman for holding this important markup today.

My amendment expands the research objectives of the underlying bill to include compliance as we consider small modular reactor and fuel cycle research.

On the heels of the successful NP 2010 program, we should not overlook the importance of improving the licensing and permitting process for new nuclear. This is particularly true for more advanced reactor designs that could be deployed in the very near future.

In fact, the approval process for new nuclear designs is one of the industry's greatest obstacles to a domestic nuclear resurgence. If we are serious about moving forward with the underlying bill, we must move forward with the most comprehensive approach. By including my amendment, we will not only improve and demonstrate new nuclear technologies, but reduce barriers to their deployment as well.

I urge my colleagues to support this amendment and I yield back.

Chairman BAIRD. Thank the gentlelady from Illinois.

Is there any further comment?

If no, then the vote occurs on the amendment. All those in favor, say aye. Those opposed, no. The ayes have it. The amendment is agreed to.

The third amendment on the roster is by the gentleman from Utah and the gentlelady from Arizona. They are not present, so with colleagues' consent we will move that until later until they can arrive.

The fourth amendment is an amendment by Mr. Bartlett, the gentleman from Maryland. Dr. Bartlett, are you ready to proceed with your amendment?

Mr. BARTLETT. Yes, Mr. Chairman. I have an amendment at the desk.

Chairman BAIRD. The clerk will report the amendment.

The CLERK. Amendment number 027, amendment to H.R. 5866, offered by Mr. Bartlett of Maryland.

Chairman BAIRD. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentleman from Maryland for five minutes to explain the amendment.

Mr. BARTLETT. Thank you, Mr. Chairman. This amendment is a good government approach aimed at maximizing efficiency. The Nuclear R&D Bill we are marking up today aims to advance innovation and nuclear energy technologies and establishes a new program to advance development of small modular reactors for commercial application.

This amendment ensures that the Secretary of Energy consults with the Secretary of the Navy because the Navy has managed similar small nuclear reactors that powered ships for several decades. This consultation will help the DOE build on the Navy's expertise and avoid needless duplication.

I yield back.

[The prepared statement of Mr. Bartlett follows:]

PREPARED STATEMENT OF REPRESENTATIVE ROSCOE G. BARTLETT

Mr. Chairman, I have an amendment at the desk.

Thank you, Mr. Chairman. This amendment is a good government approach aimed at maximizing efficiency. The Nuclear R&D bill we are marking up today aims to advance innovation in nuclear energy technologies, and establishes a new program to advance development of small modular reactors for commercial application. This amendment ensures that the Secretary of Energy consults with the Secretary of the Navy, which has managed similar small nuclear reactors to power its warships for several decades. This consultation will help DOE build on the Navy's expertise and avoid needless duplication.

Chairman BAIRD. I thank the gentleman. As with Ms. Biggert's amendment, a very constructive and thoughtful amendment.

Is there further discussion on the amendment?

If no, then the vote occurs on the amendment. All those in favor, say aye. Those opposed, no. The ayes have it, and the amendment is agreed to.

Okay. We are told Mr. Lipinski is not going to offer his amendment, so we will move now to the sixth amendment offered by Mr. Luján. Mr. Luján, are you ready to proceed with your amendment?

Mr. LUJÁN. Yes, Mr. Chairman. I have an amendment at the desk.

Chairman BAIRD. The clerk will report the amendment.

The CLERK. Amendment number 066, amendment to H.R. 5866, offered by Mr. Luján of New Mexico.

Chairman BAIRD. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

And I recognize the gentleman from New Mexico for five minutes to explain his amendment.

Mr. LUJÁN. Thank you, Mr. Chairman.

The current bill specifies a number of goals in Section 5 under the Administration subsection, but these goals are currently not listed as part of the selection criteria for the Secretary to use in selecting which cooperative agreements to enter into. My amendment adds the selection criteria consisting of the degree to which the goals of the program will be advanced.

This will ensure that in project selection criteria where the cooperative agreements that are selected will be aligned with the goals that we have set forth in Section 5.

I urge the adoption of this amendment.

Chairman BAIRD. Again, a constructive amendment.

Is there further discussion on the amendment?

If no, then the vote occurs on the amendment. All those in favor, say aye. Those opposed, no. The ayes have it, and the amendment is agreed to.

The seventh amendment on the roster is an amendment offered by the gentlelady from Illinois, Ms. Biggert. Are you ready to proceed with this amendment?

Ms. BIGGERT. Yes, Mr. Chairman. I have an amendment at the desk with Mr. Garamendi.

Chairman BAIRD. The clerk will report the amendment.

The CLERK. Amendment number 115, amendment to H.R. 5866, offered by Mrs. Biggert of Illinois and Mr. Garamendi of California.

Chairman BAIRD. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentlelady for five minutes to explain the amendment.

Ms. BIGGERT. Thank you, Mr. Chairman. Our amendment would enhance the range of research in the Fuel Cycle Research and Development Program. Specifically, this amendment suggests the Secretary provide additional research to support open, modified, and full fuel cycle research and development.

More progress is needed in the areas of waste streams, waste treatment processes, and new reactor concepts that better utilize waste resources and decrease toxicity. Using the Department's advanced computing resources will be integral to this.

With our amendment I hope the Department can finally make recycling a priority as it should have been all these years.

I want to thank the Chairman, minority and majority staff for their help throughout this process. I would also like to recognize my colleague, Mr. Garamendi, for his support of my amendment and for his support of recycling in general, and I would yield back.

[The prepared statement of Ms. Biggert follows:]

PREPARED STATEMENT OF REPRESENTATIVE JUDY BIGGERT

Mr. Chairman, I have an amendment at the desk.

Thank you, Mr. Chairman, my amendment would enhance the range of research in the fuel cycle research and development program.

Specifically, this amendment suggests the Secretary provide additional research to support open, modified, and full fuel cycle research and development. More progress is needed in the areas of waste streams, waste treatment processes, and new reactor concepts that better utilize waste resources and decrease toxicity. Using the Department's advanced computing resources will be integral to this.

With my amendment, I hope the Department can finally make recycling a priority—as it should've been all these years.

I want to thank the Chairman, Minority, and Majority staff for their help throughout this process. And, I would also like to recognize my colleague, Mr. Garamendi, for his support of my amendment and for his support of recycling in general.

I yield back.

Chairman BAIRD. The gentlelady yields back.

Is there further discussion?

Mr. Garamendi.

Mr. GARAMENDI. Ms. Biggert correctly points out a significant issue and that is the need to really advance the fuel recycling. Her amendment accomplishes that. I am delighted to join with her in that process.

Chairman BAIRD. I thank both of our colleagues for, again, a very constructive, thoughtful, and beneficial amendment.

Any further discussion?

Mr. Luján.

Mr. LUJÁN. Mr. Chairman, I very much appreciate the sponsors bringing this forward as well. We definitely have to be smarter about the way that we are taking on this issue of spent fuel, and this amendment will help achieve that as well.

So thank you very much, Mr. Chairman.

Chairman BAIRD. Thank you, Mr. Luján.

Is there further discussion on the amendment?

If no, then the vote occurs on the amendment. All those in favor, say aye. Those opposed, no. The ayes have it, and the amendment is agreed to.

The eighth amendment on the roster is an amendment offered by the gentleman from California, Mr. Garamendi. Mr. Garamendi, are you ready to proceed with your amendment?

Mr. GARAMENDI. I am, and the amendment is at the desk.

Chairman BAIRD. The clerk will report the amendment.

The CLERK. Amendment number 021, amendment to H.R. 5866, offered by Mr. Garamendi of California.

Chairman BAIRD. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentleman from California for five minutes to explain his amendment.

Mr. GARAMENDI. Thank you, Mr. Chairman.

Looking at the docket here I noticed that this one may not be wise and beneficial, at least in the view of the Committee, but despite that I want to push it forward.

This goes one step beyond the previous amendment by Ms. Biggert and myself to advance the recycling programs and to move beyond endless research.

The proposed—or the document delivered to us by the Department of Energy basically is an unending research project. We need to move beyond that. We found a lot of research advanced to what are known as Gen IV reactors have existed for some 30 years and operated successfully for 30 years here in the United States and in other countries.

It is time for us to get on with Generation IV reactors and full fuel recycling. The problem of nuclear waste has stalled the development of the nuclear industry in the United States for some 30 years. The previous amendment that was just approved moves us well down the road. My amendment moves us further down the road by specifying that the Department shall engage in full fuel recycling research and development and an integral fast reactor.

Apparently there are many that think that selects a winner. It does, and in fact, that winner has existed for 30 years, and it is time to get on with it. I note the opposition that staff has but I want us to get on with it. I don't want use to waste any more time. We need to for the reasons stated in the opening statement of the Chair that we have to address climate change, we have to address the energy. This would move us rapidly in that direction.

And I offer the amendment for that purpose, and I note the opposition.

Chairman BAIRD. Okay. Thank you, Mr. Garamendi.

I recognize myself for five minutes in response.

My understanding and discussion with staff, first of all, I agree with the gentleman's intent that we have to move forward with these, that we have a growing problem with waste, and if we are going to move to the next generation, we have to address that.

In discussing this with staff, the concern that is put forward is that the particular language insofar as it only identifies one technology, even though it says including, by including only one that would imply that that should be the focus.

And I know the gentleman is passionate about that particular technology and with good reason, but there is a sense that there ought to be an opportunity at least for other competitive technologies to be allowed, and I am wondering if the gentleman would be willing to consider withdrawing the amendment and that we could wordsmith the language between now and the markup in full committee so that we could try to address his concern and effort to put a marker down to push this technology but also not exclude others in so doing.

Chairman GORDON. Would the gentleman yield?

Chairman BAIRD. I would be happy to yield to the Chairman.

Chairman GORDON. You know, part of the reason, one of the benefits for going through regular order of subcommittee and then Full Committee gives you a chance to vent different types of concerns, and so I would certainly—we are not going to be able to bring this

up to Full Committee until we get back in September, and I think this is an area that we need to continue to—or I will tell Mr. Garamendi that we will continue to discuss and try to find a way. I think we all agree that we want to get on with deployment as soon as we can and just how can we best do that without, as you say, getting into being prescriptive.

I yield back to——

Ms. BIGGERT. Will the gentleman yield?

Chairman BAIRD. Yes. I will yield to Ms. Biggert and then Mr. Garamendi. Ms. Biggert.

Ms. BIGGERT. I think this is a really good amendment, but I can understand the wanting to broaden it a little bit so that it doesn't just define one area because it might then make the bill fail.

So I would support the amendment and but hope that it could be addressed by the time we come back in September.

Chairman BAIRD. I thank the gentlelady.

Mr. Garamendi.

Mr. GARAMENDI. Yeah. I will—just a couple of comments and then address the request of the Chair.

We know that there are many different types of advanced fuel recycling. Some of those while they will create full fuel recycling also create very significant problems in that they produce pure plutonium and all of the risks associated with proliferation and the like.

There are other technologies, at least one, pyroprocessing technologies, that do not produce pure plutonium but do allow for full recycling. When associated with an integral fast reactor, the prism reactor was mentioned by Mr. Inglis earlier, you can achieve both a relatively safe recycling program and dispose of the fuel, most all of the fuel and have a very short-lived residual waste product, which can be handled safely and I think securely.

Therefore, I push very hard for this technology because it answers the conundrum that we face with Generation III rectors, Generation II reactors in that they consume a very small portion of the energy and uranium, and they also leave an extraordinary amount of waste that has stalled nuclear energy development in the United States.

So I am all for getting on with the task, and I am pushing hard for it. I understand that it does direct the Department, and I am all for directing the Department. I was a Deputy Secretary, and I know that Congress can and should direct. So now that I am on this side, when I was on that side, I resented the direction. Now that I am on this side, I support direction.

So that is what this is all about. I would be happy to work with the Committee and try to figure out a way to achieve a balance here, but I really believe the Department of Energy needs to get on with the Fourth Generation and full recycling. Otherwise we will be left behind. The rest of the world is moving, and some of them are moving with recycling programs that do create pure plutonium and all the problems associated with that.

So I will withdraw the amendment at this time. I look forward to working with the Committee, but I want to be very clear to the committee about where I am coming from and why I am pushing hard.

So thank you very much, Mr. Chairman. I withdraw the amendment.

Chairman BAIRD. I thank the gentleman for withdrawing the amendment but more importantly for his eloquent discussion of the various merits of different approaches. One of the things that I find so gratifying about being on this particular committee is the fact that we can have this level of discussion and the caliber of intellect and contribution of all the Members on both sides is to me in my experience in this body unparalleled in other committees as well. I just am very impressed and grateful for the input.

Thank you for withdrawing. We—the Chairman has offered his commitment to working on this, and we will indeed proceed in that manner.

With the gentleman having withdrawn that amendment, the ninth amendment is before us now. It is an amendment offered by the gentleman from South Carolina, Mr. Inglis. Are you ready to proceed with your amendment?

Mr. INGLIS. Yes, Mr. Chairman. I have an amendment at the desk.

Chairman BAIRD. I reserve a point of order on this amendment, but would then ask the clerk to report the amendment.

The CLERK. Amendment number 027, amendment to H.R. 5866, offered by Mr. Inglis of South Carolina.

Chairman BAIRD. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

The gentleman is recognized for five minutes to explain his amendment.

Mr. INGLIS. Thank you, Mr. Chairman, and this one may well go the way of Mr. Garamendi's amendment, but I just want to as well lay down a marker here.

As I mentioned in my opening remarks, we expressed support time and again for responsible, long-term geologic disposal of nuclear waste. In the Nuclear Waste Policy Act Congress directed the Administration to take title to civilian nuclear waste and dispose of it and secure geologic storage at a nuclear waste repository in Yucca Mountain beginning in 1998. In good faith industry and nuclear electricity rate payers has been contributing to the nuclear waste fund, financing the project at Yucca. South Carolinians alone have contributed $1.2 billion to this national effort.

Unfortunately, progress at Yucca Mountain has been slow, and despite our investment South Carolinians are still storing 4,000 metric tons of nuclear waste in our state, and that is replicated in other states.

More unfortunate is that this Administration has decided to politicize this scientifically and technically-sound storage option for nuclear waste despite a long history of bipartisan support.

While this Administration inappropriately inserts politics into science, it puts millions of Americans at risk and exposes taxpayers to expensive lawsuits from the nuclear industry. It also discourages investment in nuclear power, slowing down any resurgence in this industry.

The Administration has proposed to find an alternative solution to managing nuclear waste through the Blue Ribbon Commission

on America's Nuclear Future. While I am confident that the Commission will come up with several innovative ideas to manage nuclear waste stockpile, none of these ideas will satisfy the Federal obligation to long-term geological storage at Yucca Mountain.

The amendment I offer for your consideration directs the Department of Energy to consider the recommendations of the Blue Ribbon Commission in the context of Yucca Mountain. In other words, the decision on whether to proceed with alternative ways to disposal recommendations made by the Commission can only be made after comparing those recommendations to disposal at Yucca Mountain.

The Federal Government has poured 23 years and $10 billion into this storage solution, and we have a great deal of understanding of this storage solution. We shouldn't through this work away over politics.

I do understand, however, that the amendment as I have, as we have drafted it, involves potential challenges with jurisdiction beyond the jurisdiction of this committee, and so Mr. Chairman, what I am hopeful of is that we can work perhaps to tailor this concept so that it stays within the jurisdiction of the Science Committee, between here and the Full Committee, and that being the case I would—having described my felt need here and South Carolinians felt need, and I think it is the felt need of many other states, not just South Carolina, we—well, I am actually—before I withdraw it I think I have got some folks on our side that would like to comment on that.

And so I suppose I will yield back for the moment and——

[The prepared statement of Mr. Inglis follows:]

PREPARED STATEMENT OF REPRESENTATIVE BOB INGLIS

Thank you Mr. Chairman. As I mentioned in my opening remarks, we have expressed support time and time again for responsible long-term geologic disposal of nuclear waste. In the *Nuclear Waste Policy Act*, Congress directed the Administration to take title to civilian nuclear waste and dispose of it in secure geologic storage at a nuclear waste repository in Yucca Mountain beginning in 1998.

In good faith, industry and nuclear electricity rate payers have been contributing to the nuclear waste fund financing the project at Yucca. South Carolinians alone have contributed $1.2 billion to this national effort. Unfortunately, progress at Yucca Mountain has been slow, and despite our investment, South Carolinians are still storing 4,000 metric tons of nuclear waste at home.

More unfortunate is that this Administration has decided to politicize this scientifically and technically sound storage option for nuclear waste, despite a long history of bipartisan support. While this Administration inappropriately inserts politics into science, it puts millions of Americans at risk and exposes tax payers to expensive law suits from-the nuclear industry. It also discourages investment in nuclear power, slowing down any resurgence in this industry.

The Administration has proposed to find an alternative solution to managing nuclear waste through the Blue Ribbon Commission on America's Nuclear Future. While I'm confident that the Commission will come up with several innovative ideas to manage the nuclear waste stockpile, none of these ideas will satisfy the Federal obligation to long-term geologic storage at Yucca Mountain.

The amendment I offer for your consideration directs the Department of Energy to consider the recommendations of the Blue Ribbon Commission in the context of Yucca Mountain. In other words, the decision on whether to proceed with alternative waste disposal recommendations made by the Commission can only be made after comparing those recommendations to disposal at Yucca Mountain. The Federal Government has poured 23 years and $10 billion into this storage solution, and we have a great deal of understanding of this storage solution. We shouldn't throw this work away over politics.

Thank you for your consideration; I urge adoption of this amendment.

Chairman BAIRD. If the gentleman wants to yield back and others wish to comment, we will be happy to recognize them for comments, and then you can—if you choose to withdraw after the comments.

Anyone further wishing to comment?

Ms. BIGGERT. Mr. Chairman.

Chairman BAIRD. I think Ms. Biggert had her hand up first, Dr. Bartlett, then yourself, and I think Mr. Diaz-Balart also and the Mr. Ehlers. So start with the gentlelady first and then proceed.

Ms. BIGGERT. Thank you very much, Mr. Chairman, and I support the gentleman's amendment and encourage my colleagues to do the same.

I know there must be jurisdictional problems, but Illinois currently holds more spent fuel than any other state, nearly 7,500 metric tons to be exact, and to make matters worse Illinois residents have paid $1.8 billion into the Nuclear Waste Fund with no return on their investment and waste stored locally could be moved or used today, but it is not because the—but it is not because the Administration decided to cancel plans for the repository, "as a matter of policy," and that is in quotes. "As a matter of policy." And I think that my constituents deserve a better explanation than one that lacks scientific or technical basis.

And, you know, we have been working on this for years, and there were six, at least six recycling plants that were built in the '70s when President Carter shut them all down, and so this has been ongoing and having Yucca Mountain ready. I just don't understand it.

So we have had years of engineering and construction and technical investment that has been made by the taxpayers at Yucca Mountain, and I don't think we should waste it.

And I would yield back.

[The prepared statement of Ms. Biggert follows:]

PREPARED STATEMENT OF REPRESENTATIVE JUDY BIGGERT

Would the gentleman yield?

Mr. Chairman, I support the gentleman's amendment and encourage my colleagues to do the same.

Illinois currently holds more spent fuel waste than any other state—nearly seventy-five hundred metric tons to be exact. To make matters worse, Illinois residents have paid $1.8 billion into the Nuclear Waste Fund with no return on their investment. Waste stored locally could be moved or used today. But it's not because the Administration decided to cancel plans for a repository "as a matter of policy". My constituents deserve a better explanation than one that lacks scientific or technical basis.

Mr. Chairman, years of engineering, construction, and technical investment have been made by the taxpayers at Yucca mountain. Let's not waste it.

I yield back.

Chairman BAIRD. I thank the gentlelady. I recognize Dr. Bartlett for comments. Dr. Bartlett, I am sorry. I am disregarding my own side.

Mr. BARTLETT. Okay.

Chairman BAIRD. I hadn't seen that comment.

Mr. BARTLETT. Go ahead.

Chairman BAIRD. Does the Chairman wish to comment on this?

Chairman GORDON. Well, I also agree that we need to have a permanent repository, and we have a responsibility to that. As a

practical matter, Yucca cannot hold all of the current waste and the future waste that will be produced by just the plants that we have now, and that is why I think this bill is important that we look at reprocessing in a different way. We look at reprocessing so that hopefully we can have, as Mr. Garamendi points out, a full cycle so that there is little or no waste, and that we can even reuse some of the waste we have now. And hopefully with this new technology we are going to move from thousands of years down to maybe a few hundred years of necessary storage, which then would make Yucca even, you know, more reasonable by virtue of less and less volume and a shorter period.

So I hope that this bill will help us to achieve what we all want and can be done in a more, again, achievable way, and I yield back my time.

Chairman BAIRD. I thank the Chair. Dr. Bartlett.

Mr. BARTLETT. I regret that the political climate necessitates an amendment like this. I would think it would be unthinkable that the Commission would not look at this endeavor where we have spent a number of years and billions of dollars in preparing it. We shouldn't have to remind them that they need to look at that.

I would like to thank our Chairman for the codell to France that I was privileged to go on, and if we use their nuclear electrical generation technologies, Yucca Mountain would hold the waste for 100 years, and so we really need to move to reprocessing, and I understand the potential for a sequential referral here, and I hope that we can rework this amendment between now and full committee markup so that we can put this marker down that certainly this Commission needs to look at all the money and all the time that has been invested in Yucca Mountain.

Thank you.

Chairman BAIRD. Thank you, Dr. Bartlett.

Mr. Garamendi.

Mr. GARAMENDI. There is an old adage in the trash or junk business that one person's junk is another person's treasure. The nuclear waste has been considered for many, many years to be a problem. It is actually a very valuable resource because there is an enormous amount of energy in that material, and what we need to do is to move beyond the politics of Nevada and other places, including California, and get on with using a very valuable resource, that is what is now called nuclear waste. It is actually a nuclear material that has extraordinary energy potential.

So, you know, we will deal with the politics, and we are all familiar with that, and it is not just one Administration. It has been going on for at least four Administrations now.

This bill, however, in its totality is extremely important because it moves us beyond a political dead-end street and to a potential, not a potential, a real resource in a what that is safe compared to all the other options available to us.

So we ought to, you know, let us get beyond it. I understand we got to do what we got to do, but this bill is extremely important.

So we will end it here and move onto full recycling and generation for technologies. Thank you.

Chairman BAIRD. Thank Mr. Garamendi.

Dr. Ehlers.

Mr. EHLERS. Thank you, Mr. Chairman. I am pleased to see this issue being taken up. I think this committee has for too long and too often neglected its role here and deferred to another committee, which as far as I am concerned, should not have anything to do with it.

And I think it was—well, I could go into great detail on this if you wish. I notice a few agreeable smiles, but just because someone attaches the name of energy to another committee, it doesn't mean they have either the background or the expertise to deal with it. And I think this committee does have the background and the expertise.

The Yucca Mountain is—it has really been a fiasco all the way along, and I think the original bill is flawed, and that has created a problem. Just by the way the bill is written, as I understand it, it is virtually impossible to meet the responsibilities because you are asking for absolute proof that no radioactivity will escape.

I would offer that it is impossible to generate a system that would guarantee that over 10,000 years nothing would leak out. There is another answer, however, real exciting, makes a lot more sense, and that is retrievable monitored storage, which is the direction that we are tending towards, but we should—I think we should make it official and hold a funeral for the original concept of the Yucca Mountain and adapt it to a system that can be made to work. Let us monitor retrievable storage. You simply watch it carefully, and if there is a problem that develops, you remove it, re-encapsulate it in some fashion, and put it back in. This is imminently workable, and it gets away from many of the objections that have been generated on this.

There are other issues that have come forward such as the transportation of radioactive waste, and it is very easy to scare the public on this and put it in terms that every little town in America is going to have trucks rolling through that are carrying dangerous amounts of radioactivity, and that, again, is fiction.

So there is—I really think there has to be a very firm, very strong leadership on this issue. It should reside in one committee, not more than one, and we should involve the Department of Energy and the Administration, including the President, in a very workable plan.

Too many people have seen one solution or another as the correct solution, and I think we have wasted a lot of time then. Clearly recycling plants have their role, but it is not the only way to do it, and I am not convinced it is the best way to do it.

But it clearly plays a role, and so we really have to take a much broader look than I think the Congress has ever taken at this issue and really come up with a solution. And it may be that we need a special committee to handle this that involved representatives from the various committees that are currently involved in it. It could be for that matter bicameral and involve the Senate as well and actually come up with a solution that is workable. We know that there are workable solutions out there. We just keep getting sidetracked on all sorts of solutions that are not as workable and then the objections proliferate.

So I apologize again. I told you before I am the son of a pastor, so I tend to sermonize quite a bit, but I just wanted to get this on

the record and say there are ways to do it, and we have to do it in a systematic, careful, thoughtful, scientifically-accurate way and not let the inner mechanics of the Congress or of the Administration mess us up once again.

I yield back.

Chairman BAIRD. I thank the gentleman. Just for clarification, the gentleman in his remarks I think referred to the original bill. I don't think he is referring to the bill before us today but for the Yucca Mountain Bill.

Mr. EHLERS. No. I am reliving the past and saying I really think we have to do more than is done in this bill.

Chairman BAIRD. I appreciate that. One other point of clarification. When you refer to establishing a location where nothing can escape for 10,000 years, you were not referring to the other body, were you?

Mr. EHLERS. I will let your comment speak for itself.

Chairman BAIRD. Mr. Diaz-Balart is recognized.

Mr. DIAZ-BALART. Thank you, Mr. Chairman. You know, we do need—look, this is an issue that has been politicized forever. It continues to be politicized, and that is a reality, and you know, and we would all like to move forward, but the reality is that without necessarily pointing fingers but it continues to be politicized even by this Administration.

Now, Mr. Chairman, what I would like to do now is ask for unanimous consent to submit just a CBO report on the cost of closing Yucca Mountain and also there is an article by Energy and Environmental Daily, which talks about how CBO report, mentions how the taxpayer, the Federal Government and the taxpayer will have to pay electric utilities of about half a billion dollars a year, that its acceptance in nuclear waste is delayed because of the Administration's decision to shut down Yucca Mountain, and all I would like to do now, because, again, it is important that we look at all the facts and unfortunately, there seems to be a reluctance again. Call it whatever you might want to call it. Is it politicized or whatever? There seems to be a reluctance to want to look at all the facts.

All I would like to do, Mr. Chairman, is ask unanimous consent to, again, submit the CBO report that I just mentioned and the article that I just mentioned.

Chairman BAIRD. Without objection, so ordered.

Mr. DIAZ-BALART. Thank you, Mr. Chairman.

Chairman BAIRD. Any further discussion?

With that I want to thank the gentleman from South Carolina. Indeed, the concern he recognizes is precisely that the language as currently drafted would likely lead to multiple referrals and as Dr. Ehlers said, well, his comments—but I share Dr. Ehlers' concerns. In order to be able to move the bill forward, I appreciate the gentleman's willingness to withdraw and would be happy to work with him to try to craft other language if he so choose.

Does the gentleman wish to withdraw?

Mr. INGLIS. Yes, Mr. Chairman, and just add this. It is heartening here to see so much agreement that, A, that our committee should have jurisdiction, and, B, that something needs to be done, and you know, this is a great country with 50 states, and if we all

engage in not in my backyard, we would have a real problem. And, you know, South Carolina has taken a lot of low-level radioactive waste. We are not the perfect place for that, but we have taken a lot of it. We have got a lot of, in fact, 35 million gallons of high level liquid radioactive waste at the Savannah River Site.

We have taken one or two or 35 million gallons worth of—for the team. It seems to me that there are some other places that can take one for the team, the 50-state team, and figure out a way to deal with this problem long term.

And but it is because of the practical problems I'm happy to withdraw the amendment at this point but hope that between here and the Full Committee we can craft it in such a way that it would give some direction to the Commission but avoid the sequential referral problem.

So we are confident that we can get there with the proper drafting of it. So with that, Mr. Chairman, I am happy to withdraw the amendment.

Chairman BAIRD. I thank the gentleman for withdrawing and appreciate his standing up for the concerns of his state with such high volumes of nuclear waste present. I had not been aware that there were those volumes present, but being aware of that helps explain certain electoral results that have occurred in recent months, and I will leave that to speculate on what I mean by that.

The Chair will recognize Chairman Gordon to fill the chair for now.

Chairman GORDON. [Presiding] Thank you, Chairman Baird. He has to, as many of us have to do periodically, testify somewhere else, so now we move on, and the tenth amendment on the roster is an amendment offered by the gentlelady from Texas, Ms. Johnson. Are you ready to proceed with your amendment?

Ms. JOHNSON. Yes, Mr. Chairman. I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 128, amendment offered by Ms. Eddie Bernice Johnson of Texas.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentlelady for five minutes to explain her amendment.

Ms. JOHNSON. Thank you very much, Mr. Chairman and Ranking Member for considering the amendment, and before I explain the amendment I would like to associate myself with the remarks of Mr. Garamendi and Dr. Ehlers.

My amendment calls for the Secretary of Energy to work with the National Academies to conduct a long-term operating study of our Nation's existing nuclear power plants. The United States currently has 104 reactors in 31 states that generate approximately 20 percent of our Nation's electricity.

Data indicates that it is possible that 1/3 of the nuclear facilities in our country will be retired in the next 20 to 25 years. Given that nuclear power provides approximately 20 percent of the electricity in the United States, this topic is of critical national concern.

My existing nuclear facilities, many exist in nuclear facilities of the U.S. are nearing the end of their initial 40-year license. Many of these facilities are likely to seek and receive license renewal for an additional 20 years. As the demand for low carbon electricity grows, it is not too soon to identify options for these plants beyond the 60-year mark.

The most recent U.S. nuclear unit to be completed was TVA's Watts Bar I reactor ordered in 1970, and licensed to operate in 1996. The dearth of new nuclear units necessitates that our current nuclear infrastructure must continue to operate reliably, safely, and efficiently.

In the U.S. there are 59 nuclear plants that have reapplied for license through the Nuclear Regulatory Commission for an additional 20 years, taking the age of their plants from 40 to 60. The need to demonstrate the technical and financial feasibility of extending the life of nuclear facilities beyond 60 years is evident. How long can these facilities last safely, what can be done to maintain these facilities better, what major impediments do they face to their long-term operational viability, to help transition to a low-carbon economy? Congress needs these questions answered.

Mr. Chairman and Ranking Member, I appreciate your considering this commonsense amendment. I have lived with nuclear energy for the last 30 some years. I encourage my colleagues to support this amendment and yield back the balance of my time.

Chairman GORDON. Thank you, Ms. Johnson, for that excellent amendment.

Is there further discussion? Mr. Garamendi is recognized.

Mr. GARAMENDI. This is a very good amendment. I—there is an energy hub, simulation hub that the Department has developed. I believe it is near or close to your district, Mr. Chairman, as the center of the hub with an extension into the Lawrence Livermore and Sandia Laboratories, and I think Los Alamos is also included in this, to do advanced simulation of the existing nuclear power plants so that their life might be extended. It may be that between now and when we finalize this bill in Full Committee we may want to tie these two things together with this amendment so that the amendment, that is the law supports the simulation hubs, a hub that has been already authorized by the Department of Energy.

And I think these two things might ties together in a way that would be beneficial in supporting the existing direction that the Department of Energy is going.

So I just leave that out there, something that we would want to work on in the interim period.

Thank you, Mr. Chairman.

Chairman GORDON. I thank you. I will point out that is in Oak Ridge, Tennessee, not in my district and further to the east, but I am sure that they would welcome a— you or we might take codell down there, folks that are interested in seeing what they are doing and hearing what they are doing.

Is there further discussion?

If there is not further discussion?

If there is no further discussion, then the vote occurs on the amendment. All in favor, say aye. Opposed, no. The ayes have it. The amendment is agreed to.

We will now as agreed earlier go back to our third amendment, Mr. Matheson and along with Ms. Giffords, has an—are you prepared to offer your amendment?

Mr. MATHESON. Yeah. There is an amendment at the desk, Mr. Chairman.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 0666, amendment to H.R. 5866, offered by Mr. Matheson of Utah and Ms. Giffords of Arizona.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I now recognize the gentleman for five minutes to explain his amendment.

Mr. MATHESON. Well, thanks, Mr. Chairman. I appreciate Subcommittee Chairman Baird and Ranking Member Inglis for their thoughtful approach to this issue.

I have always supported a diverse domestic energy portfolio that includes nuclear power. One thing about nuclear power under our current technology is when you have a nuclear power plant, it consumes a lot of water. It is probably no coincidence that Members from Utah and Arizona, two of the driest states in the country, are offering this amendment that suggest that as part of the research effort, we ought to be looking for ways to be more efficient in terms of water use in these plants. It wasn't included in the original text. I think this is a good addition to include that as part of the research perspective, searching for ways to be either more efficient and how water is used or different technologies that may not require water.

I think it is an important mechanism to include in terms of this research effort, and that is really the substance of this amendment.

With that I would yield the rest of my time to Ms. Giffords.

Ms. GIFFORDS. Thank you, Mr. Matheson, and thank you, Mr. Chairman, and I am looking at Mr. Garamendi from California, also from the west, and even states that have historically had a lot of water but are becoming increasingly concerned about our water supply.

This is an excellent amendment, and I think also a really critical aspect to moving nuclear energy forward in this country. A lot of folks on this committee know that I am a strong proponent of solar energy. I am also a strong proponent, like many of us, of making America's energy in America. I think it is a national security issue, it is an environmental issue. It is an issue that promotes jobs in our country rather than importing jobs from abroad in the energy sector.

And frankly, one of the greatest challenges that this country faces is how we are going to get our energy, and the interconnection between energy and water is one that you just cannot separate.

So I applaud the Chairman for working on this bipartisan legislation and Chairman Baird and Ranking Member Hall as well and Congressman Inglis, this bill funds the research that will reduce the capital cost and make nuclear safer, both in terms of proliferation by protecting Americans and habitats from nuclear waste, but

in terms of this amendment one of the—the biggest problems we are going to be able to solve with this amendment.

As America continues to develop a new energy future, we are going to have to be cognizant of our previous water supplies, and I think about even those of us who live in Arizona, I think we have over 25 million users on the Colorado now and for the fastest growing states are the states in the west, so this is something that we really have to take into consideration.

We looked at a recent CRS report that says nuclear plants consume 430 to 750 gallons of water for every megawatt hour of electricity generated plus an additional 45 to 150 gallons for processing the fuel source. That is as much as 900 gallons of water total, which is a staggering sum. In particular Arizona has the largest nuclear power plant in the country, the Palo Verde Nuclear Generating Station. It consumes 750 gallons per megawatt, which puts that plant at the top of the range. That is a total of 20 billion gallons of water a year, enough to meet the needs of about 300,000 individuals.

By comparison when you look at other aspects of what this committee is working to promote like solar energy and wind generation requires virtually no water. Concentrated solar power does consume some, but new dry cooling technologies can reduce the consumption by 90 percent.

So we need to make these similar advances that we have made in renewables like solar and wind with nuclear power, and this is why we have this amendment. It tasks the Department of Energy to develop new cooling technologies for nuclear power plants that are water efficient. It is a necessary improvement to make new nuclear power a reality and to assure that we move forward in this way when we address our energy resources. We cannot deplete the most important life-sustaining element which is water.

So I hope that our colleagues join us in this very important commonsense amendment, and with that I yield back.

Chairman GORDON. Thank you, Ms. Giffords. Is there further discussion?

If there is no further discussion then, the vote occurs on the amendment. All in favor, say aye. Those opposed, no. The ayes have it. The amendment is agreed to.

Are there further amendments?

If not, before we conclude let me just once again thank Dr. Baird, Mr. Inglis, the other Members of this Committee who really have gotten involved in this bill and our staff.

You know, it is very rewarding, I hope for you, it certainly is for me to see us proceed in an adult, thoughtful way to do what I think we all came here to do, and think this is an excellent bill.

We will complete it, take that to the Full Committee level when we get back in September.

I now recognize Mr. Inglis—oh excuse me. Excuse me. Since there are no other amendments, then the vote now occurs on the bill, H.R. 5866, as amended. All those in favor, say aye, All opposed, no. In the opinion of the chair, the ayes have it.

I now recognize Mr. Inglis for a motion.

Mr. INGLIS. I move, Mr. Chairman, that the Subcommittee favorably report H.R. 5866 as amended to Full Committee.

Furthermore, I move that staff be instructed to prepare the subcommittee report and make necessary technical and conforming changes to the bill in accordance with the recommendations of the subcommittee.

Chairman GORDON. The question is on the motion to report the bill favorably. Those in favor of the motion will signify by saying, aye. Opposed, no. The ayes have it. The bill is favorably reported.

Without objection, the motion to reconsider is laid upon the table. The members will have two subsequent calendar days in which to submit supplemental, Minority, or additional views on the measure.

I, once again, thank all the Members for being a part of this good legislation, and this concludes our subcommittee markup.

[Whereupon, at 11:01 a.m., the Subcommittee was adjourned.]

Appendix:

H.R. 5866, Section-by-Section Analysis, Amendment Roster

.....

(Original Signature of Member)

111TH CONGRESS
2D SESSION

H. R. 5866

To amend the Energy Policy Act of 2005 requiring the Secretary of Energy to carry out initiatives to advance innovation in nuclear energy technologies, to make nuclear energy systems more competitive, to increase efficiency and safety of civilian nuclear power, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

Mr. GORDON of Tennessee (for himself and [see ATTACHED LIST of cosponsors]) introduced the following bill; which was referred to the Committee on _____

A BILL

To amend the Energy Policy Act of 2005 requiring the Secretary of Energy to carry out initiatives to advance innovation in nuclear energy technologies, to make nuclear energy systems more competitive, to increase efficiency and safety of civilian nuclear power, 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,*

SECTION 1. SHORT TITLE.

This Act may be cited as the ''Nuclear Energy Research and Development Act of 2010''.

SEC. 2. OBJECTIVES.

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

(1) by redesignating paragraphs (2) through (7) as paragraphs (5) through (10), respectively; and

(2) by inserting after paragraph (1) the following new paragraphs:

''(2) Reducing the costs of nuclear reactor systems.

''(3) Reducing used nuclear fuel and nuclear waste products generated by civilian nuclear energy.

''(4) Supporting technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty.''.

SEC. 3. FUNDING.

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

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

''(1) $419,000,000 for fiscal year 2011;

''(2) $429,000,000 for fiscal year 2012; and

''(3) $439,000,000 for fiscal year 2013.''; and

1 (2) in subsection (d)—

2 (A) by striking "under subsection (a)" and

3 inserting "under subsection (b)";

4 (B) by amending paragraph (1) to read as

5 follows:

6 "(1) For activities under section 953—

7 "(A) $201,000,000 for fiscal year 2011;

8 "(B) $201,000,000 for fiscal year 2012;

9 and

10 "(C) $201,000,000 for fiscal year 2013.";

11 and

12 (C) by inserting after paragraph (3) the

13 following new paragraphs:

14 "(4) For activities under section 952, other

15 than those described in section 952(d)—

16 "(A) $64,000,000 for fiscal year 2011;

17 "(B) $64,000,000 for fiscal year 2012; and

18 "(C) $64,000,000 for fiscal year 2013.

19 "(5) For activities under section 952(d)—

20 "(A) $55,000,000 for fiscal year 2011;

21 "(B) $65,000,000 for fiscal year 2012; and

22 "(C) $75,000,000 for fiscal year 2013.

23 "(6) For activities under section 958—

24 "(A) $99,000,000 for fiscal year 2011;

25 "(B) $99,000,000 for fiscal year 2012; and

"(C) $99,000,000 for fiscal year 2013.".

SEC. 4. NUCLEAR ENERGY RESEARCH AND DEVELOPMENT PROGRAMS.

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

"(c) REACTOR CONCEPTS.—

"(1) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application to advance fission power systems as well as technologies to sustain currently deployed systems.

"(2) DESIGNS AND TECHNOLOGIES.—In conducting the program under this subsection, the Secretary shall examine advanced reactor designs and nuclear technologies, including those that—

"(A) are economically competitive with other electric power generation plants;

"(B) have higher efficiency, lower cost, and improved safety compared to reactors in operation as of the date of enactment of the Nuclear Energy Research and Development Act of 2010;

"(C) utilize passive safety features;

"(D) minimize proliferation risks;

"(E) substantially reduce production of high-level waste per unit of output;

"(F) increase the life and sustainability of reactor systems currently deployed;

"(G) use improved instrumentation; or

"(H) are capable of producing large-scale quantities of hydrogen or process heat.

"(3) INTERNATIONAL COOPERATION.—In carrying out the program under this subsection, the Secretary shall seek opportunities to enhance the progress of the program through international cooperation through such organizations as the Generation IV International Forum, or any other international collaboration the Secretary considers appropriate.

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

SEC. 5. SMALL MODULAR REACTOR PROGRAM.

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

"(d) SMALL MODULAR REACTOR PROGRAM.—

"(1) IN GENERAL.—The Secretary shall carry out a small modular reactor program to promote the research, development, demonstration, and commercial application of small modular reactors, including through cost-shared projects for commercial application of reactor system designs. Activities may also include development of advanced computer modeling and simulation tools, by Federal or non-Federal entities, that demonstrate and validate new design capabilities of innovative small modular reactor designs.

"(2) DEFINITION.—For the purposes of this subsection, the term 'small modular reactor' means a nuclear reactor—

"(A) with a rated capacity of less than 300 electrical megawatts; and

"(B) that can be constructed and operated in combination with similar reactors at a single site.

"(3) LIMITATION.—Demonstration activities carried out under this section shall be limited to individual technologies and systems, and shall not include demonstration of full reactor systems or full plant operations.

1 "(4) ADMINISTRATION.—In conducting the
2 small modular reactor program, the Secretary may
3 enter into cooperative agreements to support small
4 modular reactor designs that enable—
5 "(A) lower capital costs or increased access
6 to private financing in comparison to current
7 large reactor designs;
8 "(B) reduced long-term radiotoxicity,
9 mass, or decay heat of the nuclear waste pro-
10 duced by generation;
11 "(C) increased operating safety of nuclear
12 facilities;
13 "(D) reduced dependence of reactor sys-
14 tems on water resources;
15 "(E) increased seismic resistance of nu-
16 clear generation;
17 "(F) reduced proliferation risks through
18 integrated safeguards and security proliferation
19 controls; and
20 "(G) increased efficiency in reactor manu-
21 facturing and construction.
22 "(5) APPLICATION.—To be eligible to enter into
23 a cooperative agreement with the Secretary under
24 this subsection, an applicant shall submit to the Sec-
25 retary a proposal for the small modular reactor

1 project to be undertaken. The proposal shall docu-
2 ment—
3 "(A) all partners and suppliers that will be
4 active in the small modular reactor project, in-
5 cluding a description of each partner or sup-
6 plier's anticipated domestic and international
7 activities;
8 "(B) measures to be undertaken to enable
9 cost-effective implementation of the small mod-
10 ular reactor project;
11 "(C) an accounting structure approved by
12 the Secretary; and
13 "(D) all known assets that shall be con-
14 tributed to satisfy the non-Federal share re-
15 quirement under paragraph (6).
16 "(6) NON-FEDERAL SHARE.—Notwithstanding
17 section 988, the Secretary shall require the parties
18 to a cooperative agreement under this subsection to
19 be responsible for not less than 50 percent of the
20 costs of the small modular reactor project.
21 "(7) CALCULATION OF NON-FEDERAL SHARE
22 AMOUNT.—Section 988(d) of the Energy Policy Act
23 of 2005 (42 U.S.C. 16352(d)) shall apply in deter-
24 mining the non-Federal share in conjunction with an
25 award of financial assistance under this section.

1 "(8) PROJECT SELECTION CRITERIA.—The Sec-
2 retary shall consider the following factors in entering
3 into a cooperative agreement under this subsection:
4 "(A) The domestic manufacturing capabili-
5 ties of the parties to the cooperative agreement
6 and their partners and suppliers.
7 "(B) The viability of the reactor design
8 and the business plan or plans of the parties to
9 the cooperative agreement.
10 "(C) The parties to the cooperative agree-
11 ment's potential to continue the development of
12 small modular reactors without Federal sub-
13 sidies or loan guarantees.
14 "(D) The non-Federal share to be pro-
15 vided.".

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

17 (a) AMENDMENTS.—Section 953 of the Energy Pol-
18 icy Act of 2005 (42 U.S.C. 16273) is amended—
19 (1) in the section heading by striking "**AD-**
20 **VANCED FUEL CYCLE INITIATIVE**" and inserting
21 "**FUEL CYCLE RESEARCH AND DEVELOPMENT**";
22 (2) by striking subsection (a);
23 (3) by redesignating subsections (b) through (d)
24 as subsections (d) through (f), respectively; and

1 (4) by inserting before subsection (d), 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, and mitigate risk of proliferation in support of a na-
10 tional strategy for spent nuclear fuel and the reactor con-
11 cepts research, development, demonstration, and commer-
12 cial application program under section 952(c).
13 "(b) FUEL CYCLE OPTIONS.—Under this section the
14 Secretary may consider implementing the following initia-
15 tives:
16 "(1) OPEN CYCLE.—Developing fuels, including
17 the use of nonuranium materials, for use in reactors
18 that increase energy generation and minimize the
19 amount of nuclear waste produced in an open fuel
20 cycle.
21 "(2) MODIFIED OPEN CYCLE.—Developing fuel
22 forms, reactors, and limited separation and trans-
23 mutation methods that increase fuel utilization and
24 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) BLUE RIBBON COMMISSION REPORT.—In car-
21 rying out this section the Secretary shall give consider-
22 ation to the final report on a long-term nuclear waste solu-
23 tion produced by the Blue Ribbon Commission on Amer-
24 ica's Nuclear Future. Not later than 180 days after the
25 release of the Blue Ribbon Commission on America's Nu-

1 clear Future final report, the Secretary shall transmit to
2 Congress a report describing any plans the Department
3 may have to incorporate any relevant recommendations
4 from this report into the program.''.

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

"Sec. 953. Fuel cycle research and development.".

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

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

13 **"SEC. 958. NUCLEAR ENERGY ENABLING TECHNOLOGIES.**

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

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

25 ''(1) advanced reactor materials;

1 "(2) advanced catastrophic radiation mitigation
2 methods;
3 "(3) advanced proliferation and security risk
4 assessment methods;
5 "(4) advanced sensors and instrumentation;
6 "(5) advanced nuclear manufacturing methods;
7 or
8 "(6) any crosscutting technology or trans-
9 formative concept aimed at establishing substantial
10 and revolutionary enhancements in the performance
11 of future nuclear energy systems that the Secretary
12 considers relevant and appropriate to the purpose of
13 this section.
14 "(c) REPORT.—The Secretary shall submit, as part
15 of the annual budget submission of the Department, a re-
16 port on the activities of the program conducted under this
17 section, which shall include a brief evaluation of each ac-
18 tivity's progress.".
19 (b) CONFORMING AMENDMENT.—The table of con-
20 tents of the Energy Policy Act of 2005 is amended by
21 adding at the end of the items for subtitle E of title IX
22 the following new item:

"Sec. 958. Nuclear energy enabling technologies.".

1 **SEC. 8. EMERGENCY RISK ASSESSMENT AND PREPARED-**
2 **NESS REPORT.**

3 Not later than 180 days after the date of enactment
4 of this Act, the Secretary shall transmit to the Congress
5 a report summarizing quantitative risks associated with
6 the potential of a severe accident arising from the use of
7 nuclear power, and outlining the technologies currently
8 available to mitigate the consequences of such an accident.
9 The report shall include recommendations of areas of tech-
10 nological development that should be pursued to reduce
11 the public harm arising from such an incident.

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

13 (a) PROTOTYPE PLANT LOCATION.—Section
14 642(b)(3) of the Energy Policy Act of 2005 (42 U.S.C.
15 16022(b)(3)) is amended to read as follows:

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

21 (b) REPORT.—

22 (1) REQUIREMENT.—Not later than 1 year
23 after the date of enactment of this Act, the Comp-
24 troller General shall transmit to the Congress a re-
25 port providing a status update of the Next Genera-

1 tion Nuclear Plant program that provides analysis
2 of—
3 (A) its progress;
4 (B) how Federal funds appropriated for
5 the project have been distributed and spent;
6 and
7 (C) the current and expected participation
8 by non-Federal entities.
9 (2) CONTENTS.—The report shall include—
10 (A) an analysis of the proposed facility's
11 technical capabilities and remaining techno-
12 logical development challenges, and a cost esti-
13 mate and construction schedule;
14 (B) an assessment of the advantages and
15 disadvantages of funding a pilot-scale research
16 reactor project in lieu of a full-scale commercial
17 power reactor;
18 (C) an assessment of alternative construc-
19 tion sites proposed by private industry;
20 (D) an assessment of the extent to which
21 the Department of Energy is working with in-
22 dustry and the Nuclear Regulatory Commission
23 to ensure that the Next Generation Nuclear
24 Plant program meets industry expectations for
25 long-term application of technologies and ad-

1 dresses potential licensing procedures for de-
2 ployment;
3 (E) an assessment of the known or antici-
4 pated challenges to securing private non-Fed-
5 eral cost share funds and any measures to over-
6 come these challenges, including any alternative
7 funding approaches such as front loading the
8 Federal share;
9 (F) an assessment of project risks, includ-
10 ing those related to—
11 (i) project scope, schedule, and re-
12 sources;
13 (ii) the formation of partnerships or
14 agreements between the Department and
15 the private sector necessary for the
16 project's success; and
17 (iii) the Department's capabilities to
18 identify and manage such risks; and
19 (G) an assessment of what is known about
20 the potential impact of natural gas and other
21 fossil fuel prices on private entity participation
22 in the project.
23 **SEC. 10. TECHNICAL STANDARDS COLLABORATION.**
24 (a) IN GENERAL.—The Director of the National In-
25 stitute of Standards and Technology shall establish a nu-

1 clear energy standards committee (in this section referred
2 to as the "technical standards committee") to facilitate
3 and support, consistent with the National Technology
4 Transfer and Advancement Act of 1995, the development
5 or revision of technical standards for new and existing nu-
6 clear power plants and advanced nuclear technologies.

7 (b) MEMBERSHIP.—

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

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

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

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

1 (2) formulate, coordinate, and recommend pri-
2 orities for the development of new technical stand-
3 ards and the revision of existing technical standards
4 to address the needs identified under paragraph (1);
5 (3) facilitate and support collaboration and co-
6 operation among standards developers to address the
7 needs and priorities identified under paragraphs (1)
8 and (2);
9 (4) as appropriate, coordinate with other na-
10 tional, regional, or international efforts on nuclear
11 energy-related technical standards in order to avoid
12 conflict and duplication and to ensure global com-
13 patibility; and
14 (5) promote the establishment and maintenance
15 of a database of nuclear energy-related technical
16 standards.
17 (d) AUTHORIZATION OF APPROPRIATIONS.—There
18 are authorized to be appropriated $1,000,000 for each of
19 fiscal years 2011 through 2013 to the Director of the Na-
20 tional Institute for Standards and Technology for activi-
21 ties under this section.

SECTION-BY-SECTION ANALYSIS OF
H.R. 5866, NUCLEAR ENERGY RESEARCH AND DEVELOPMENT ACT OF 2010

Section 1. Short Title

Nuclear Energy Research and Development Act of 2010

Section 2. Objectives

Amends Section 951(a) of the *Energy Policy Act of 2005* to include the following objectives:

1) Reducing the costs of nuclear reactor systems
2) Reducing used nuclear fuel and nuclear waste products generated by civilian nuclear energy
3) Supporting technological advances in areas that industry is not likely to undertake because of technical and financial uncertainty

Section 3. Funding

Amends Section 951 of the *Energy Policy Act of 2005* to provide the following authorizations for Subtitle E programs:

A. Total Program's Authorization
   1) $419,000,000 in FY 2011;
   2) $429,000,000 for fiscal year 2012; and
   3) $439,000,000 for fiscal year 2013.
B. Breakout of total Authorization for Activities under Section 953 for the Fuel Cycle Research and Development Program
   1) $201,000,000 for fiscal year 2011;
   2) $201,000,000 for fiscal year 2012; and
   3) $201,000,000 for fiscal year 2013.
C. Breakout of total Authorization for Activities under Section 952 for Nuclear Energy Research and Development Programs other than those described in 952(d)
   1) $64,000,000 for fiscal year 2011;
   2) $64,000,000 for fiscal year 2012; and
   3) $64,000,000 for fiscal year 2013.
D. Breakout of total Authorization for Activities under Section 952(d) for the Small Modular Reactor Program
   1) $55,000,000 for fiscal year 2011;
   2) $65,000,000 for fiscal year 2012; and
   3) $75,000,000 for fiscal year 2013.
E. Breakout of total Authorization for Activities under Section 958 for the Nuclear Energy Enabling Technologies Program
   1) $99,000,000 for fiscal year 2011;
   2) $99,000,000 for fiscal year 2012; and
   3) $99,000,000 for fiscal year 2013.

Section 4. Nuclear Energy Research and Development Programs

This section amends Section 952 of the *Energy Policy Act of 2005* by striking subsections (c) through (e) and inserting a Reactor Concepts Program that authorizes research into advanced reactor designs and technologies to prolong the life of currently deployed reactor systems. Technologies that may be researched under this section include those that are economically competitive with other electric power generation plants, have higher energy efficiency, lower cost and improved safety compared to current reactors, utilize passive safety systems, minimize proliferation risks, reduce production of high-level waste per unit of output, increase the life and sustainability of deployed reactor systems, use improved instrumentation, or are capable of producing large-scale quantities of hydrogen or process heat. This section also requires the Secretary to seek opportunities for international cooperation.

Section 5. Small Modular Reactor Program

This section amends Section 952 of the *Energy Policy Act of 2005* by creating a Small Modular Reactor program to promote the research, development, demonstra-

tion, and commercial application of small modular reactors (SMRs). Under this section SMRs are defined as reactors with a rated capacity of 300MWe or less and can be constructed and operated in combination with similar reactors at a single site.

In conducting this program the Secretary may enter into cooperative agreements to support SMR designs that enable lower capital costs or increased access to private financing, reduced long-term radio-toxicity, mass, or decay heat of waste, increased operating safety of nuclear facilities, reduced dependence of reactor systems on water resources, increased seismic resistance of nuclear generation, reduced proliferation risk, and increased efficiency in reactor manufacturing.

To be eligible to enter into the agreement an applicant must submit a proposal that documents all partners and suppliers involved in the project and a description of anticipated domestic and international activities, measures to be undertaken to enable cost-effective implementation of the SMR project, an accounting structure approved by the Secretary, and all known assets that shall be contributed to satisfy the non-Federal share requirement.

This program will require any applicant to be responsible for at least 50% of the cost of the project and that cost may only be satisfied through the use of non-Federal dollars.

In selecting winners of awards or cooperative agreements the Secretary shall consider the domestic manufacturing capabilities of the parties and of their partners and suppliers, the viability of the reactor design and business plan of the parties, the potential of the reactor design to be developed without future Federal subsidy, and the non-Federal share to be provided.

Section 6. Fuel Cycle Research and Development

This section amends Section 953 of the *Energy Policy Act of 2005* by renaming the program "Fuel Cycle Research and Development." Under this program the Secretary shall conduct fuel cycle research and development of technologies to improve uranium resource utilization, maximize energy generation, minimize nuclear waste creation, improve safety, and mitigate risk of proliferation in support of a national strategy for spent nuclear fuel.

The fuel management options that may be considered under this program are open fuel cycle, modified open cycle, full recycle, advanced storage, alternative storage, or other appropriate technology areas. Open fuel cycle includes development of fuels for use in reactors that minimize waste creation. Modified open cycle includes development of fuel forms, reactors and limited separations of waste. Full recycle includes development of technologies to repeatedly recycle nuclear waste products to minimize total waste to the greatest extent possible. Advanced storage includes development of innovative storage technologies for both onsite and long-term storage. Alternative storage includes development of innovative long-term storage methods including deep borehole storage or salt dome storage.

Furthermore, under this section, the Secretary must consider the final Blue Ribbon Commission report. Within 180 days after release of the Blue Ribbon Commission Report the Secretary must transmit to Congress a report describing any plans the Department may have to incorporate relevant recommendations from the Commission.

Section 7. Nuclear Energy Enabling Technologies

This section amends the *Energy Policy Act of 2005* by adding a new section 958 titled "Nuclear Enabling Technologies." This program is to support integration of activities undertaken in 952(c) and 953 and support crosscutting technology development. Research activities may include those pertaining to advanced reactor materials, catastrophic radiation mitigation methods, proliferation and security risk assessment methods, sensors and instrumentation, manufacturing methods, or any crosscutting technology or transformative concept the Secretary deems relevant.

In conducting this program the Secretary must submit a report on and evaluation of these activities as part of the annual budget.

Section 8. Emergency Risk Assessment and Preparedness Report

This section requires the Secretary to transmit to the Congress a report summarizing quantitative risks associated with the potential of a severe accident arising from the use of nuclear power, and outlining the technologies currently available to mitigate the consequences of such an accident. The report shall include recommendations of areas of technological development that should be pursued to reduce the public harm arising from such an incident.

Section 9. Next Generation Nuclear Plant

This section amends Section 642(b)(3) of the *Energy Policy Act of 2005* to allow the location of the prototype power plant to be constructed in a location chosen by the Consortium through an open and transparent competitive selection process.

This section also requires GAO to undertake a report to provide a status update on the Next Generation Nuclear Plant (NGNP) indicating its progress, how Federal appropriated funds have been distributed and spent, and the current and expected participation by non-Federal entities. The report shall also include an analysis of various challenges facing the NGNP project.

Section 10. Technical Standards Collaboration

This section requires the Director of the National Institute of Standards and Technology (NIST) to establish a nuclear energy standards committee to facilitate and support the development or revision of technical standards for new and existing nuclear power plants and advanced nuclear technologies.

The committee shall include representatives from the Federal Government and the private sector and the committee shall be co-chaired by a representative from NIST and a representative from a private sector standards organization.

The duties of the committee shall include: (1) performing a technical standards needs assessment; (2) formulating, coordinating, and recommending priorities for new technical standards and the revision of existing technical standards; (3) facilitating and supporting collaboration and cooperation among standards developers; (4) coordinating with other national, regional, or international efforts on nuclear energy-related technical standards; and (5) promoting the establishment and maintenance of a database of nuclear energy-related technical standards.

$1 million is authorized to carry out this section for each of FY 2011 through FY 2013.

COMMITTEE ON SCIENCE AND TECHNOLOGY
ENERGY & ENVIRONMENT SUBCOMMITTEE MARKUP
July 28, 2010

AMENDMENT ROSTER

H. R. 5866, the *Nuclear Energy Research and Development Act of 2010*

No.	Amendment	Summary	Results
1	Mr. Baird (052)	Manager's amendment makes technical and clarifying changes to the bill. Amends Section 5 by changing the term "Non-Federal Share" to "Cost-Sharing" throughout the Section, and clarifies that federally appropriated funds may not be used to satisfy the Non-Federal cost share requirement. Amends Section 6 by adding "improve waste management" to the fuel cycle research and development program directives. Amends the contents of the emergency risk assessment and preparedness report required under Section 8.	Agreed to by voice vote.
2	Ms. Biggert (116)	Amends Section 2 of the bill by adding the following new objective to Section 951(a) of the Energy Policy Act of 2005: "Researching and developing technologies and processes so as to improve and streamline the process by which nuclear power systems meet Federal and State requirements and standards."	Agreed to by voice vote.
3	Mr. Bartlett (027)	Amends Section 5 of the bill by requiring the Secretary to "consult with and utilize the expertise of the Secretary of the Navy in establishing and carrying out" the Small Modular Reactor program.	Agreed to by voice vote.
4	Mr. Luján (066)	Amends Section 5 of the bill by requiring the Secretary to consider the "degree to which the goals described in paragraphs (4)(A) through (G) [of Section 5] will be advanced" when evaluating a proposed cooperative agreement.	Agreed to by voice vote.
5	Ms. Biggert/ Mr. Garamendi (115)	Amends Section 6 by adding "improve waste management" to the fuel cycle research and development program directives. Adds a new subsection to Section 953 of the Energy Policy Act of 2005 authorizing additional advanced recycling and crosscutting activities.	Agreed to by voice vote.
6	Mr.	Amends the description of the "Full Recycle" fuel cycle	Offered and

	Garamendi (021)	option in Section 6 of the bill by striking the term "technologies" and inserting "recycling technologies, including advanced integral fast reactors".	withdrawn.
7	Mr. Inglis (027)	Amends Section 6 of the bill to require that the Secretary's report to Congress related to the Blue Ribbon Commission on America's Nuclear Future final report include "a response to each of the Commission's recommendations, including an analysis comparing the safety, security, legal, cost, and technological and site readiness factors associated with any recommendations related to final disposition pathways for spent nuclear fuel and high-level radioactive waste to the same factors associated with permanent deep geological disposal at the Yucca Mountain waste repository." Also requires the analysis described above to be conducted "using scientific and technical materials and information used to support policy actions related to the Yucca Mountain Project."	Offered and withdrawn.
8	Ms. Johnson (128)	Adds a new section to the bill requiring the Secretary to "enter into an arrangement with the National Academies to conduct an evaluation of the scientific and technological challenges to the long-term maintenance and safe operation of currently deployed nuclear power reactors up to and beyond the specified design-life of reactor systems." Requires the Secretary to make the results of the evaluation publicly available and to submit a report to Congress on the results no later than 1 year after the date of enactment of the Act.	Agreed to by voice vote.
9	Mr. Matheson/ Ms. Giffords (066)	Amends Section 4 of the bill by requiring the Secretary, in the course of conducting the reactor concepts program, to examine advanced reactor designs and nuclear technologies that "minimize water usage or use alternatives to water as a cooling mechanism."	Agreed to by voice vote.

AMENDMENT

OFFERED BY MR. BAIRD OF WASHINGTON

Page 2, line 8, strike "(7)" and insert "(8)".

Page 2, line 8, strike "(10)" and insert "(11)".

Page 8, line 14, strike "non-Federal share" and insert "cost-sharing".

Page 8, line 16, strike "NON-FEDERAL SHARE" and insert "COST SHARING".

Page 8, lines 21 through 25, amend paragraph (7) to read as follows:

1 "(7) CALCULATION OF COST SHARING
2 AMOUNT.—A recipient of financial assistance under
3 this section may not satisfy the cost sharing require-
4 ment under paragraph (6) by using federally appro-
5 priated funds.".

Page 9, line 14, strike "non-Federal" and insert "cost".

Page 10, line 9, strike "and mitigate risk of proliferation" and insert ", mitigate risk of proliferation, and improve waste management".

Page 13, line 1, strike "catastrophic".

Page 14, line 7, strike "nuclear power" and insert "civilian nuclear energy technology, including reactor technology deployed or likely to be deployed as of the date of enactment of this Act".

Page 14, line 11, insert "potential" after "to reduce the".

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AMENDMENT

OFFERED BY MRS. BIGGERT OF ILLINOIS

Page 2, after line 18, insert the following new paragraph:

1 (3) by inserting after paragraph (10), as so re-
2 designated, the following new paragraph:
3 "(11) Researching and developing technologies
4 and processes so as to improve and streamline the
5 process by which nuclear power systems meet Fed-
6 eral and State requirements and standards.".

AMENDMENT

OFFERED BY MR. BARTLETT OF MARYLAND

Page 6, lines 1 through 11, amend paragraph (1) to read as follows:

1 "(1) IN GENERAL.—

2 "(A) The Secretary shall carry out a small
3 modular reactor program to promote research,
4 development, demonstration, and commercial
5 application of small modular reactors, including
6 through cost-shared projects for commercial ap-
7 plication of reactor systems designs.

8 "(B) The Secretary shall consult with and
9 utilize the expertise of the Secretary of the
10 Navy in establishing and carrying out such pro-
11 gram.

12 "(C) Activities may also include develop-
13 ment of advanced computer modeling and sim-
14 ulation tools, by Federal and non-Federal enti-
15 ties, which demonstrate and validate new design
16 capabilities of innovative small modular reactor
17 designs.".

AMENDMENT

OFFERED BY MR. LUJÁN OF NEW MEXICO

Page 9, after line 15, insert the following new subparagraph:

1 "(E) The degree to which the goals de-
2 scribed in paragraph (4)(A) through (G) will be
3 advanced.".

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AMENDMENT

OFFERED BY MRS. BIGGERT and Mr. Garamendi OF ILLINOIS

Page 9, line 24, strike "(d) through (f)" and insert "(e) through (g)".

Page 10, line 1, strike "subsection (d)" and insert "subsection (e)".

Page 10, line 9, strike "and mitigation risk of proliferation" and insert "mitigate risk of proliferation, and improve waste management".

Page 11, line 20, redesignate subsection (c) as subsection (d).

page 11, after line 19, insert the following new subsection:

1 "(c) ADDITIONAL ADVANCED RECYCLING AND
2 CROSSCUTTING ACTIVITIES.—In addition to and in sup-
3 port of the specific initiatives described in paragraphs (1)
4 through (6), the Secretary may support the following ac-
5 tivities:
6 "(1) Development and testing of integrated
7 process flow sheets nuclear fuel recycling processes.

"(2) Research to characterize the byproducts and waste streams resulting from fuel recycling processes.

"(3) Research and development on reactor concepts or transmutation technologies that improve resource utilization or reduce the radiotoxicity of waste streams.

"(4) Research and development on waste treatment processes and separations technologies, advanced waste forms, and quantification of proliferation risks.

"(5) Identification and evaluation of test and experimental facilities necessary to successfully implement the advanced fuel cycle initiative.

"(6) Advancement of fuel cycle-related modeling and simulation capabilities.

AMENDMENT

OFFERED BY MR. GARAMENDI OF CALIFORNIA

Page 11, line 1, strike ''technologies'' and insert ''recycling technologies, including advanced integral fast reactors,''.

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AMENDMENT

OFFERED BY MR. INGLIS OF SOUTH CAROLINA

Page 11, line 20, through page 12, line 4, amend subsection (c) to read as follows:

1 "(c) BLUE RIBBON COMMISSION REPORT.—
2 "(1) In carrying out this section the Secretary
3 shall give consideration to the final report on a long-
4 term nuclear waste solution produced by the Blue
5 Ribbon Commission on America's Nuclear Future.
6 "(2) Not later than 180 days after the release
7 of the Blue Ribbon Commission on America's Nu-
8 clear Future final report, the Secretary shall trans-
9 mit to Congress a report, which shall include—
10 "(A) any plans the Department may have
11 to incorporate any relevant recommendations
12 from this report into the program; and
13 "(B) a response to each of the Commis-
14 sion's recommendations, including an analysis
15 comparing the safety, security, legal, cost, and
16 technological and site readiness factors associ-
17 ated with any recommendations related to final
18 disposition pathways for spent nuclear fuel and
19 high-level radioactive waste to the same factors

1 associated with permanent deep geological dis-
2 posal at the Yucca Mountain waste repository.
3 "(3) The analysis described in paragraph
4 (2)(B) shall be conducted using scientific and tech-
5 nical materials and information used to support pol-
6 icy actions related to the Yucca Mountain project.".

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AMENDMENT

OFFERED BY MS. EDDIE BERNICE JOHNSON OF TEXAS

At the end of the bill, add the following new section:

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

2 (a) IN GENERAL.—Secretary of Energy shall enter
3 into an arrangement with the National Academies to con-
4 duct an evaluation of the scientific and technological chal-
5 lenges to the long-term maintenance and safe operation
6 of currently deployed nuclear power reactors up to and
7 beyond the specified design-life of reactor systems.

8 (b) REPORT.—Not later than 1 year after the date
9 of enactment of this Act, the Secretary shall transmit to
10 the Congress, and make publically available, the results
11 of the evaluation undertaken by the Academies pursuant
12 to subsection (a).

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AMENDMENT

OFFERED BY MR. MATHESON OF UTAH AND MS. GIFFORDS OF ARIZONA

Page 5, line 5, strike "or".

Page 5, line 7, strike the period and insert "; or".

Page 5, after line 7, insert the following new subparagraph:

1 "(I) minimize water usage or use alter-
2 natives to water as a cooling mechanism.".

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XXIII: PROCEEDINGS OF THE FULL COMMITTEE MARKUP ON H.R. 5866, THE NUCLEAR ENERGY RESEARCH AND DEVELOPMENT ACT OF 2010

THURSDAY, SEPTEMBER 23, 2010

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE AND TECHNOLOGY,
Washington, DC.

The Committee met, pursuant to call, at 10:07 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Bart Gordon [Chairman of the Committee] presiding.

Chairman GORDON. Good morning. The Committee will come to order. Pursuit to notice the Committee on Science and Technology meets to consider the following measures. H.R. 5866, *The Nuclear Energy Research and Development Act of 2010*, and H.R. 6160, *The Rare Earth and Critical Materials Revitalization Act of 2010*.

Also I want to welcome our interns today. I think we have a lot of interns here. They have come to see how sausage is made. I think you will be pleased that we are doing it in a good way.

We will now proceed with the markup. Today we will consider two important pieces of legislation that will help America recapture a technological lead in a wide range of industries critical to our economy, our national defense, and a clean and secure energy future.

First, we will consider H.R. 5866, cosponsored by myself, Subcommittee Chairman Baird, Ranking Member Hall, and Subcommittee Ranking Member Inglis. This bill amends the *Energy Policy Act of 2005*, to modernize and improve our Federal nuclear energy R&D programs. Our Nation's 104 commercial reactors today produce 20 percent of our electricity and 70 percent of our emission-free energy. If we are to increase our energy independence and mitigate the effects of climate change, nuclear must continue to be a part of our Nation's energy mix.

However, capital costs continue to rise for construction of new plants and the question of how to manage the waste byproducts of nuclear fission remains.

H.R. 5866 provides the programmatic architecture needed at DOE to answer and solve these outstanding issues. This bill is the result of a truly bipartisan effort over the past six months, and I would like to thank Mr. Hall, Mr. Inglis, Dr. Baird, as well as the Committee staff of both the majority and the minority for their continued good work as we move this legislation through the Committee and to the Floor.

The second bill on the roster is H.R. 6160, introduced by the gentlewoman from Pennsylvania, Mrs. Dahlkemper, and cosponsored by Mr. Carnahan, Mr. Jerry Lewis, Mr. Coffman, and myself.

As the I&O Subcommittee hearing in March highlighted and Mrs. Dahlkemper understands well, rare earths are an essential component of the technologies in a wide range of emerging and established industries, for everything for oil refining to hybrid cars, wind turbines to weapon systems. And the demand for rare earths is only expected to grow.

However, despite the fact that the U.S. at one time was the global leader in this field, we are now 95 percent dependent on China for rare earths. Making matters more urgent, China has begun limiting production in the export of rare earths and requiring that products using rare earth be manufactured in China and largely for Chinese consumption. And for the ones of you that have not had a chance to see the paper this morning, I wanted you to see the front page of the *New York Times* business section. The headline is, "In Dispute, China Blocks Rare Earths Exports to Japan."

Now, let me just suggest that I suspect in the next few days that Congress is going to take action on some concerns about the Chinese currency, and with that action we could well see next week that the headline could be, "In Dispute, China Blocks Rare Earth Mineral Exports to the United States." That would be devastating to our economy as well as to our national security.

This is clearly an untenable position for the U.S. I believe it would be foolish to stake our national defense and economic security on China's goodwill or hope that it will choose to compete in a fair and open global marketplace for rare earths. The stakes are simply too high. This is not the first time the Committee has been concerned with competitive implications of materials such as rare earths. In 1980, 30 years ago, this committee established a National Minerals and Materials Policy. One core element in the legislation was the call for support for a vigorous and comprehensive and coordinated program for materials research and development.

Unfortunately, over successive Administrations the effort to sustain the program fell apart. Now it is time to revise a coordinated effort to level the global playing field in rare earths.

Mrs. Dahlkemper's bill calls for increased research and development to help address the Nation's rare earths shortage and reinvigorates the national policy for critical materials.

With that I thank you for your attendance and participation this morning and look forward to a productive markup.

[The prepared statement of Chairman Gordon follows:]

PREPARED STATEMENT OF CHAIRMAN BART GORDON

Today we will consider two important pieces of legislation that will help America recapture a technological lead in a wide range of industries critical to our economy, our national defense, and a clean and secure energy future.

First, we will consider H.R. 5866 sponsored by myself and co-sponsored by Subcommittee Chairman Baird, Ranking Member Hall and Subcommittee Ranking Member Inglis.

This bill amends the *Energy Policy Act of 2005* to modernize and improve our Federal nuclear energy R&D programs. Our nation's 104 commercial reactors today produce 20 percent of our electricity and 70 percent of our emissions free energy.

If we are to increase our energy independence and mitigate the effects of climate change, nuclear must continue to be a large part of our nation's energy mix.

However, despite a strong record of safety and operating efficiency, capital costs continue to rise for construction of new plants, and the question of how to manage the waste byproducts of nuclear fission remains.

H.R. 5866 provides the programmatic architecture needed at DOE to answer and solve these outstanding issues.

This bill is the result of a truly bipartisan effort over the past six months and I would like to thank Mr. Hall, Mr. Inglis, and Mr. Baird, as well as the Committee Staff of both the Majority and Minority, for their continued good work as we move this legislation through the Committee and to the floor.

The second bill on the roster is H.R. 6160 introduced by the gentlewoman from Pennsylvania, Mrs. Dahlkemper, and cosponsored by Mr. Carnahan, Mr. Jerry Lewis, Mr. Coffman, and myself.

As the I&O Subcommittee hearing in March highlighted, and as Mrs. Dahlkemper understands well, rare earths are an essential component of technologies in a wide array of emerging and established industries. For everything from oil refining to hybrid cars, wind turbines to weapons systems, the demand for rare earths is only expected to grow.

However, despite the U.S. at one time being the global leader in this field, we are now 95% dependent on China for rare earths. Making matters more urgent, China has begun limiting production and export of rare earths and requiring that products using rare earths be manufactured in China, and largely for Chinese consumption.

This is clearly an untenable position for the U.S. I believe it would be foolish to stake our national defense and economic security on China's goodwill or a hope that it will choose to compete in a fair and open global marketplace for rare earths.

This is not the first time the Committee has been concerned with the competitive implications of materials such as rare earths. In 1980—30 years ago—this Committee established a national minerals and materials policy. One core element in that legislation was the call to support for "a vigorous, comprehensive and coordinated program of materials research and development."

Unfortunately, over successive administrations, the effort to sustain that program fell apart. Now, it is time to revive a coordinated effort to level the global playing field in rare earths.

Mrs. Dahlkemper's bill calls for increased research and development to help address the Nation's rare earth shortage, and reinvigorates the national policy for critical materials.

With that, I thank you all for your attendance and participation this morning, and I look forward to a productive markup.

Chairman GORDON. And I now recognize Mr. Hall to present his opening statement.

Mr. HALL. Thank you for holding the markup of H.R. 5866, the Nuclear Research Bill, and H.R. 6160, the *Rare Earth and Critical Materials Revitalization Act*, and as this is expected to be maybe our last markup of the 111th Congress, and at my age I don't ever like to say this is our last vote or this is our last day up here, this is our—my last day in Congress or anything, but I want to take the opportunity really to thank you personally for your service to the committee and your very fair and bipartisan approach to working with us and the Members of the Committee over the years. We all feel that way, and we certainly wish you well.

The first bill we will consider authorizes the Nuclear Energy R&D Program to the Department of Energy, and we are all aware of the importance of nuclear energy to America's future. It provides a safe, reliable, and cost-competitive source of energy to meet future increases in electricity demand. And it is not battled by a lot of the goofy people that are opposed to a lot of the other types of energy that we have.

It is safe, and we should have been—other than having about 20 percent, we ought to have somewhere closer to 50 percent nuclear outgo. It didn't happen, and there is a lot of other things that we could look back for and repeat the words from that famous poem, Maud Muller. The last sentence of it said, "Of all sad words of

tongue or pen the saddest of these it might have been." And if we would have worked harder on nuclear and supported it more and looked more toward the proper energy thrust of the future, I think we would be better off.

In the short term we need to license and build more reactors or use an existing light water technology, but over the longer term we need to advance the development and licensing of new reactor designs, extend the life of the existing reactor fleet, and address the serious issue of managing waste and spent nuclear fuel. That is a big order.

Continued research and development is necessary to overcome all of these challenges, and this bill will help us to get through a comprehensive approach that authorizes existing R&D activities at DOE with an emphasis on accelerating the advancement and eventual licensing of small modular reactors.

It is a good bill. I thank the majority for working with us throughout the summer to craft it, and I am pleased to join Chairman Gordon, Energy Subcommittee Chairman Baird, and Ranking Member Inglis as a cosponsor.

We—I know that the second bill we consider creates a "Rare Earth Mineral," R&D Program at DOE and authorizes DOE to make loan guarantees for mining, processing, and industrial production of rare earth minerals. This is an important issue that warrants our attention.

Rare earths are used in many different high-tech applications, including certain military and weapons systems, and China controls the bulk of world supply and recently announced its intention to reduce exports, triggering concerns that the U.S. could face a supply gap.

The obvious question we face is how best to address this concern with respect to potential and national security ramifications. I understand that the Department of Defense will soon complete a study regarding its need for a domestic rare earth supply capability, a question that appropriately will be addressed by DOD and the Armed Services Committee.

With respect to commercial supply needs, it appears that increased demand and actions by China have resulted in sharp price increases for rare earth materials. Now, this in turn has stimulated an immediate market response as companies around the world are aggressively pursuing new rare earth mining and progressing—processing opportunities. A suggestion that a taxpayer subsidy for such activity may not be necessary.

Important questions remain unanswered because we have—because we bypass regular order with this legislation, and members have had only a brief opportunity consider this issue and legislation. I am uncomfortable supporting passage of this bill. I am not positive as to how I feel about the bill, but I am very understanding that we have a problem that we probably need to settle for ourselves without selecting one single entity to support, that we get some competitive approach to it, and with that I yield back the balance of my time.

Mr. HALL. Pardon. If I might retract that, I want to—if I have any time left I want to yield it to Mr. Bilbray.

Mr. BILBRAY. Mr. Chairman—thank you. I appreciate the Ranking Member yielding. Look, I just want to—regardless of the details of how we work this out, I want to thank the Chair and the Ranking Member for raising these two issues, because I think too often here in Washington and around this country we talk about lofty ideas, things like clean air, clean, affordable energy. We talk about electrification of automobiles and more efficient use of what energy we have.

These two items you have brought up are those essential things that are put on backburners and are not bothered with because they may be politically hot, but they are the foundations that are essential to lay if you are ever going to see things like clean, affordable energy, if you are going to see electrification of our fleets, and especially these two. It is the fact that the nuclear power issue is one that has been a third—political third rail, but you are brave enough to address it, and I congratulate and thank you for the American people on that.

And the issue of rare earths is one of those detailed things that are essential. If you think about this, it is the permanent magnet, high-efficiency electric motors that are driving Priuses and our troop carriers are essential for this. So if you believe in a clean, electrified fleet, then you have got to be brave enough to stand up on rare earth. If you believe in a clean air and want to address climate change, then you got to be brave enough to stand up for next generation nuclear.

And I appreciate the fact that, Mr. Chairman, that you have been brave enough to be able to do that, and I hope that the committee over at E and C and in Interior are brave enough to stand up and talk frankly about this because we are not going to see those great opportunities for the future if the committees and this Congress aren't brave enough to do what you are doing today.

And I want to yield back.

Mr. HALL. Mr. Chairman, I, too, appreciate your interest and involving the committee in this very, very important issue. I will continue to work with you on issues as we move forward. I yield back. Thank you.

Mrs. BIGGERT. Mr. Chairman. Mr. Chairman. Could I ask unanimous consent——

Chairman GORDON. I think Mr. Hall yields to the lady from Illinois.

Mrs. BIGGERT. Okay. Thank you, and I would ask unanimous consent to include in the record my opening statement on H.R. 5866.

Chairman GORDON. Everybody's statements——

Mr. BARTLETT. Mr. Chairman.

Chairman GORDON. Let me first say that everyone's statement will be included in the record at this time, and Dr. Bartlett is recognized.

[The prepared statement of Mrs. Biggert follows:]

PREPARED STATEMENT OF REPRESENTATIVE JUDY BIGGERT

Thank you Mr. Chairman, for holding this important markup today.

I am pleased to be a cosponsor of H.R. 5866 and thank Chairman Gordon and Ranking Member Hall for their leadership on this legislation.

Due to population and estimated economic growth over the next twenty-five years, the United States demand for electricity is expected to rise by thirty percent. To meet rising demand for power for our homes and businesses, we need to expand our domestic electricity production and create affordable, reliable electricity in an environmentally responsible way. Nuclear power is the only way to do this.

Illinois already leads the way, deriving half of its electricity from nuclear energy. But we need to do more to expand nuclear here and across the country. That's why I co-sponsored HR 5866, legislation to support the deployment of small modular nuclear reactors and to reauthorize nuclear research and development activities at the Department of Energy.

A complement to existing large-scale reactors, small modular reactors require less time to construct and are based on current reactor designs, thereby reducing the burdensome licensing process. This is an ideal solution for growing communities and cash-strapped utilities that need extra generation capacity at a fraction of the cost.

More importantly, HR 5866, extends and modifies R&D activities that promote advanced research to close the nuclear fuel cycle and recycle spent nuclear fuel. In my district, scientists and engineers at Argonne National Lab lead the Nation in research and development for nuclear fuel recycling. Recycling is not just important for the reduction of waste created, but also for the conservation of worldwide uranium resources. It will also encourage the deployment of expanded nuclear power for industry and states that want to provide affordable electricity without unnecessary liabilities.

Thank you, Mr. Chairman, for working with us to craft a strong, bipartisan bill.

I yield back.

[The prepared statement of Mr. Mitchell follows:]

PREPARED STATEMENT OF REPRESENTATIVE HARRY E. MITCHELL

Thank you, Mr. Chairman.

Today we will consider H.R. 5866, the Nuclear Energy Research and Development Act, and H.R. 6160, the Rare Earths and Critical Materials Revitalization Act.

I'd like to take a few moments to speak about H.R. 5866, the Nuclear Energy Research and Development Act.

Nuclear power provides a significant portion of our nation's electricity supply. According to the Nuclear Regulatory Commission, there are commercial nuclear power reactors licensed to operate in 31 states. These reactors provide approximately 20 percent of our nation's electricity supply.

Nuclear power is a critical electricity source in Arizona where we have the largest nuclear generation facility in the nation, the Palo Verde Nuclear Generating Station.

However, as these nuclear power reactors continue to operate, spent nuclear fuel continues to accumulate without a clear strategy of how to store this waste.

H.R. 5866 seeks to address this issue through the creation of a robust and integrated research, development, demonstration and commercial application program that will seek to mitigate the problems associated with nuclear waste.

I look forward to our discussion here today. At this time, I yield back.

Mr. BARTLETT. Mr. Chairman, I would like to request a colloquy to address concerns about Section A raised by Constellation Energy, which serves many constituents in my district. That same concern is expressed by a number of other utilities.

Chairman GORDON. Dr. Bartlett, why don't we wait until we start the bill and then I will be happy to have a colloquy with you if that——

Mr. BARTLETT. Oh, thank you.

Chairman GORDON. Just try to keep in proper order here.

We will now consider H.R. 5866, the *Nuclear Energy Research Development Act of 2010*. I recognize myself for five minutes to describe the bill.

As I noted before, the bill before you is a product of a bipartisan collaboration aimed at pursuing nuclear power technologies that address concerns of waste as well as to reduce the cost of building new reactors. It enjoys the support of many utilities, vendors, customers, and trade associations, including General Electric, Wes-

tinghouse, Babcock and Wilcox, NuScale, the American Chemical Society, the New Generation of Nuclear Plants Industry Alliance, and the Nuclear Energy Institute.

Among the initiatives authored or authorized under the bill is a Small Modular Reactor Program that will provide the necessary funding to research, development, and demonstrate SMR technologies that could bridge the gap that now exists between the nuclear industry and the private investment community.

This legislation will also promote the development of a well-rounded and pragmatic approach to our Nations' nuclear waste. As the country continues to debate the waste strategy, it has become clear that the new technological solutions can exist if given the proper support and resources to develop. The fuel cycle R&D initiative in this bill provides the necessary direction and resources to support cutting-edge research in this critical area.

Furthermore, in addition to looking at advanced technologies, H.R. 5866 recognizes the important role our current fleet must play in addressing our emission-free energy needs for years to come. To that end, we authorize a program that would explore new ways to extend the life of reactors already supplying us electricity today.

I appreciate the Ranking Member and his staff's work on this bill and look forward to working with him as we move forward.

Chairman GORDON. I now recognize Mr. Hall to present any remarks on the bill.

Mr. HALL. I thank you, Mr. Chairman, and I will be very brief.

Just to reiterate from my opening remarks, this is a good bill that was crafted in a bipartisan fashion that included extensive interaction with nuclear energy stakeholders, and I think that is important. I know members on our side are going to be offering some amendments, important amendments to improve the bill further, particularly with respect to how we address nuclear waste storage and the future of Yucca Mountain.

This is a very important topic, and I look forward to a good debate and discussion on it, and I thank you, sir, and I yield back.

[The prepared statement of Mr. Hall follows:]

PREPARED STATEMENT OF REPRESENTATIVE RALPH M. HALL

Thank you, Mr. Chairman. I will be brief. Just to reiterate from my opening remarks—this is a good bill. It was crafted in a bipartisan fashion that included extensive interaction with nuclear energy stakeholders.

I know Members on our side will be offering some important amendments to improve the bill further—particularly with respect to how we address nuclear waste storage and the future of Yucca Mountain—this is a very important topic and I look forward to a good debate and discussion on it.

I yield back.

Chairman GORDON. Dr. Bartlett is recognized.

Mr. BARTLETT. Thank you. Constellation Energy came to us with a concern, and when I read Section 8 I have the same concern. It says, not later than 180 days after the date of enactment of this Act the Secretary shall transmit to the Congress a report summarizing quantitative risks associated with the potential—with severe accident arising from the use of civilian nuclear energy technology, including reactor technology deployed or likely to be deployed as of the enactment of this Act. This gives the impression that we don't now have that, and it gives the impression the industry fells that,

gee, nuclear, the production of nuclear electricity may not be safe, and I would appreciate a colloquy to address this.

Chairman GORDON. Thank you, Dr. Bartlett. I would like to, again, share—I appreciate you sharing your concerns with the Committee, and I want to thank you for bringing this concern to the Committee's attention. As I have said before, I am supportive of nuclear power, as I believe it is a part of the solution to the challenges of energy independence and climate change.

The gentleman is correct that our 104 commercial reactors have run with strong records of safety and operating efficiency. I share your concern that Section 8 might be misinterpreted. In light of the fact that these concerns have been brought forward only recently, I concur with your assessment that the report language would be the most appropriate way to address them, and I am confident that staff from both sides will work together as they have throughout this process and address these concerns as we move forward to the Floor.

Mr. BARTLETT. A more than 50 year great track record of completely safe and economic production of nuclear energy, and it is unfortunate that we might give the impression that somehow it is not safe because we are going to require all these regulations.

Thank you for committing to address this in report language.

Chairman GORDON. Thank you, Dr. Bartlett.

Does anyone else wish to be recognized?

Mr.—Governor Garamendi is recognized.

Mr. GARAMENDI. Thank you, Mr. Chairman. This report is going to be very important. For example, California has a law that prohibits new nuclear power plants unless they are safe, and because of the safety issue, a report about the safety of the existing and future plants could open the door for the development of nuclear power in California without such a report from the national level. It is less likely that that hurdle would be overcome.

So I think the report is going to be useful. Exactly how it is going to be written in the tone and tenor, I will leave that to the Chairman to work out.

Chairman GORDON. Thank you, Governor. I don't think anybody on this committee, certainly you are much more aware of the issue than I am, and we look forward for your continued stewardship. This is not just one bill and out. This committee needs to continue to have oversight as this goes forward.

So thank you.

Does anyone else wish to be recognized?

If not, I ask unanimous consent that the bill is considered as read and open to amendment at any point and that the members proceed with the amendments in the order of the roster.

Without objection, so ordered.

The first amendment on the roster is a manager's amendment offered by the Chair. The clerk will report the amendment.

The CLERK. Amendment number 051, amendment to H.R. 5866 offered by Mr. Gordon of Tennessee.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize myself for five minutes to explain the amendment.

In addition to making clarifying and conforming changes, my manager's amendment incorporates a number of our members' concerns and has been worked out in advance with Mr. Hall through this amendment.

Mr. Luján ensures that a range geologic media are considered for storage options in the alternative and deep borehole storage methods subsection. Mr. Luján also ensures that the factors to be considered in the project selection criteria are independent of the Administration's provisions and would ensure that small modular reactors are defined as having a high degree of fabrication and modularity.

It would ensure that the power marketing administration, such as TVA, may use revenues generated through electricity sales toward the non-Federal cost share in the small modular reactor program, and I appreciate the time Mr. Luján and Mr. Hall have put into making this a better bill through the manager's amendment, and I urge its adoption.

Is there further discussion on the manager's amendment?

Mr. Hall is recognized.

Mr. HALL. Thank you, and of course, this bill was crafted in a bipartisan fashion. These changes improve the underlying legislation. We urge its passage.

Yield back.

Chairman GORDON. If there is no further discussion, all in favor, say aye. Those opposed, no. The ayes have it. The amendment is agreed to.

The second amendment on the roster is offered by the gentleman from California, Mr. Bilbray. Are you ready to proceed with your amendment?

Mr. BILBRAY. Yes, sir, Mr. Chairman.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 057, amendment to H.R. 5866 offered by Mr. Bilbray of California.

Mr. BILBRAY. Thank you, Mr. Chairman.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentleman for five minutes to explain the amendment.

Mr. BILBRAY. Mr. Chairman, my amendment is simple and straightforward. It asks the DOE to conduct a report examining state requirements including moratoriums that delay development of nuclear power and ways that the United States Government can assist in overcoming these barriers.

Currently there are dozens of states that have moratoriums from building new nuclear plants. As our Nation grapples with the increased energy demands and the environmental concerns about traditional carbon-emitting problems, the increase in nuclear is one that is a national concern. Many individuals and groups from the President of Stanford University has addressed this issue and raised concerns about these kinds of obstructions.

I would just like to say that California has four nuclear reactors that furnish about 13 percent of the state's electricity, saving over $2.6 billion per year in natural gas and actually 22 metric tons of

greenhouse gases are avoided. Just by adding four more modern reactors we would allow the electric sector to reduce greenhouse emissions by 40 percent.

Now, Mr. Chairman and the Committee, you got to understand that traditionally our clean air strategies were based on air base and impacts which were local or state impacts. Now that we are talking about the climate change issue, it is now not just state by state, it is national and global, and when we start having one state following regulations, there is interstate and global impacts on that.

And just a good example is my own state which prouds—which prides itself at being environmental sensitive, has obstructed the construction of any new zero-emission generating reactors, when, in fact, it has gone out of the state and purchased coal-fired plants instead, which to me really as somebody who has worked on clean air, is an embarrassment for a state that has been a traditional leader.

All I am asking is we take a look at this, we get the facts, and I think it is essential, especially under the latest climate change issues and the interstate commerce issue that the Federal Government look at the obstructions that are being created by states that will block the implementation of our clean air strategies and this energy independence concept.

I yield back.

Chairman GORDON. Thank you, Mr. Bilbray. We will recommend that this amendment be accepted.

I would like to say to you that we have some concerns about jurisdiction that might be raised, and so I would like to work with you as we go to the Floor if we need to tweak that for those purposes.

Is there further discussion on the amendment?

If no, the vote occurs on the amendment. All in favor, say aye. All opposed, no. The ayes have it. The amendment is agreed to.

The third amendment on the roster is an amendment offered by the gentleman from Illinois, Mr. Lipinski, who is not here at this time, and so with—is Mr. Tonko going to do it, or we want to take unanimous consent?

Okay. So we will, without objection we will take that up at a later time.

The next amendment on the roster is an amendment offered by the gentleman from New York, Mr. Tonko. Are you ready to proceed with your amendment?

Mr. TONKO. Yes, sir, Mr. Chairman. I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 037, amendment to H.R. 5866 offered by Mr. Tonko of New York.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentleman for five minutes to explain the amendment.

Mr. TONKO. Thank you, Mr. Chairman.

H.R. 5866 currently focuses solely on the reactor side of nuclear power generation. However, the steam side presents numerous opportunities to make improvements that could increase turbine and generator efficiencies, leading to higher power outputs for the same steam flow.

I believe that it is important to address efficiency improvements on the steam side as well as the reactor side. This amendment would allow that to happen. Adoption of this amendment would make H.R. 5866 a comprehensive approach to improving nuclear power plant efficiency.

Improvements in efficiency lead to higher electricity output. For every one percent improvement in efficiency, the available energy is increased by 2–1/2 percent. Not only will these improvements help improve efficiency, but the new technologies that this amendment will help develop will result in creating jobs and technology expertise.

Some of the areas that would be addressed by my amendment include cooling systems, heat exchangers and pumps, special coatings and advanced power conversation systems. Better cooling systems and heat exchangers would enable heat to be transferred from the reactor side to the steam side more efficiently. Better pumps would allow for lower losses of energy in circulating water and steam from the reactor side to the steam side and vice versa.

Special coatings would improve the lifetime of components by making them more resistant to erosion. Coatings could also aid in the rate of heat transfer, leading to better heat exchanger performance.

Finally, advanced power conversion systems would help convert mechanical energy from the steam turbine into electrical energy more efficiently, providing more electricity for the same steam flow.

In summary, my amendment would make H.R. 5866 a comprehensive approach to improving nuclear power plant efficiency. I ask, therefore, my colleagues to support this amendment, and I yield back the balance of my time, Mr. Chair.

Chairman GORDON. Thank you, Mr. Tonko, for that good amendment. Is there further discussion?

Mr. ROHRABACHER. Mr. Chairman.

Chairman GORDON. Comrade Rohrabacher.

Mr. ROHRABACHER. All right. Mr. Commissar. What can I say?

I don't think we need to oppose this amendment, but I think that we need to just a little clarification what we are really talking about here, and I think what we are talking about with this amendment is tweaking old technology, and the whole idea of light water reactors and steam, this is stuff that has been around for 60 years, and it is not something that is going to break new ground at all.

Now, it may well be worthwhile to find out if there are ways to tweak old technology. I mean, it is sometimes more cost effective to upgrade your old car rather than buy a new car that is based on an entirely new approach to providing the energy for your car.

So I would suggest, however, and let me ask to make sure this is clear, this amendment authorizes so that the funds can be used for this but doesn't mandate that they have to be used.

Mr. TONKO. Exactly right.

Mr. ROHRABACHER. And there is no reason for us not to keep that within the range of considerations by the Department of Energy to see if that is, indeed, a worthwhile investment to find new ways of using basically light water reactors and using the steam from them.

However, which we will hear later on in the amendments that are being offered today, there are new ways of producing nuclear energy that don't require steam that are much—and if we are going to—if we are actually going to cement ourselves into doing something in the future, it should be based on new technology like these small modular reactors, the gas cool reactors, et cetera. The reactors that will eat the waste from other reactors rather than the old process that left over—that left a lot of problems after the energy was actually generated.

So I just wanted to make sure that in the record we are—this amendment is just permitting the Department of Energy to do this rather than mandating it.

Chairman GORDON. Mr. Tonko is recognized.

Mr. TONKO. I concur. The language is enabling. It is not mandatory, and to your point or to use your language, if they see that the existing efficiency opportunities can be tweaked to a greater degree——

Mr. ROHRABACHER. Right.

Mr. TONKO [continuing]. Let us do so.

Mr. ROHRABACHER. Thank you very much, Mr. Chairman.

Chairman GORDON. Any further discussion?

Mr. Hall is recognized.

Mr. HALL. Mr. Chairman, I hadn't talked with Mr. Rohrabacher on this, but I think he feels if it is permissive, he has no real problem, and I probably am not in shape to speak for the entire—this side of the Committee, but it seems like the amendment simply authorizes DOE to pursue research on—to improve cooling steam generation, efficiencies of nuclear plants, and while the primary focus of and funding for DOE nuclear R&D activities ought to continue to be on reactor design and operations.

It seems to me that the steam side is also an important area of interest that DOE should consider pursuing, and I had planned to support the amendment, and I yield back.

Chairman GORDON. I think everyone is to the best I can understand.

If there is no further discussion, then the vote is on the amendment. All in favor, say aye. Opposed, no. The ayes have it. The amendment is agreed to.

The fifth amendment on the roster is an amendment offered by the gentleman from California, Mr. Garamendi. Are you ready to proceed with your amendment?

Mr. GARAMENDI. I am, Mr. Chairman. You can read it.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 032, amendment to H.R. 5866 offered by Mr. Garamendi of California and Mrs. Biggert of Illinois.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentleman for five minutes to explain the amendment.

Mr. GARAMENDI. I thank you, Mr. Chairman. This section deals with the necessity of how to handle nuclear fuels, not only in their initial but in their secondary and perhaps third, fourth, or fifth stage. It talks about recycling, what to do with the spent fuels.

The general thrust of the total section is that the Secretary "may consider". I would much prefer that that would be the Secretary "shall", but when I was over at the Department of Interior, I always wanted to have the flexibility. Now that I am here I think that is not so necessary.

Nevertheless, even with that this particular amendment goes to one part of this, which is the full recycling program, and provides somewhat more clear direction to the Secretary about what full recycling is. Specifically, making it clear that we are talking about Generation IV reactors. These are reactors that could ultimately significantly reduce the amount of nuclear waste by perhaps 90 percent by recycling repeatedly through Generation IV reactors, and in so doing dramatically reduce the toxicity and the decay heat.

And that is what the amendment does. Mrs. Biggert has joined me on this amendment, and I yield to her.

Mrs. BIGGERT. I thank the gentleman, and I appreciate being on this amendment. I think this is a very, very important concept, and whenever we think about the reactors now when we are really taking probably six percent of the nuclear energy and using that and then throwing away really 94 percent of the nuclear energy and whether we are going to have to store it or whatever while we—if we have these fast reactors that we really conserve that, you know.

Nuclear is not a substance that is without a limit, and so the more that we can protect that, because, yeah, I think the only way that we are really going to solve our problems with energy is to have long-term nuclear energy, and the fast reactors are the way to go, and then the recycling of that.

So I appreciate the gentleman allowing me to cosponsor and would ask for support.

Mr. GARAMENDI. I will wrap up on this amendment. The Generation IV reactors, often called integral fast reactors, are available. They have been around for some 30 or 40 years. They do work. We have never proceeded with them, I think because of a mistake that has been made over the years that these reactors could lead to proliferation of nuclear materials. In fact, there is a methodology called pyroprocessing that dramatically reduces the potential for proliferation. And so when joined with pyroprocessing, which this amendment would encourage but not only specify, together with the integral fast reactors could dramatically reduce the nuclear waste, increase the potential power of the nuclear fuels, and dramatically reduce proliferation concerns.

That is the direction this amendment pushes us, and as I said, if I had my choice, I would make this entire section the Secretary shall do, but we are not there yet. I will continue to push for that.

Mr. Chairman, thank you.

Chairman GORDON. And thank you for a very good amendment.

Is there further discussion on the amendment?

Mr. ROHRABACHER. Mr. Chairman.

Chairman GORDON. Mr. Rohrabacher is recognized for five minutes.

Mr. ROHRABACHER. Thank you very much. We are—let us just—I want to make sure that we are defining what we are doing here, and this does permit, again, this focus on Generation IV reactors.

There are—I am not certain whether or not that designation includes some of the other type of innovations that are taking place in the nuclear energy and the development field. So whereas there is not this contradiction because it just says they may, but it doesn't mean that they are not also going to be looking at the other ways of achieving the goals of this amendment.

So and I would like to ask my colleague whether or not that is the case.

Mr. GARAMENDI. This particular section goes to one kind of reaction, the Generation IV. The other three preceding sections really specifically deal with the alternative systems, partial recycling——

Mr. ROHRABACHER. Uh-huh.

Mr. GARAMENDI [continuing]. Once through, and the other, including modulars. So they are included throughout the legislation. This one speaks to one portion or one kind. The other sections speak to the other types of reactors——

Mr. ROHRABACHER. All right.

Mr. GARAMENDI [continuing]. And the other systems of recycling.

Mr. ROHRABACHER. So we are not limiting the other sections by this section and by your amendment.

Mr. GARAMENDI. That is correct.

Mr. ROHRABACHER. Let me just note—let me note that in the past the biggest arguments against nuclear energy have been that there is a, of course, there is a safety problem, people worrying about meltdowns, et cetera. There have been worries about the leftover material and the storage of that of which we have heard over and over again, a very passionate debate in the Congress on those issues.

Well, there are now technological solutions to those challenges, and we have now had—with newer technologies, whether it is the high-temperature gas cool reactor or pebble-based reactors, and we now have a way to prevent a project, a nuclear energy project from becoming something that gives us more problems with nuclear proliferation, and we now have a way of minimizing the storage of spent fuel with the old Yucca Mountain issue.

So I would just suggest that—and I support the amendment, but I just want to make sure for the record that there are many other ways rather than just specifically outlining one—if Generation IV means one system, there is a broad, another broad area that we should be looking at, and, again, this is not exclusive as we are putting it into the law.

Yield back.

Mr. GARAMENDI. Your concerns are addressed by the totality of the bill. The Chairman has written a bill that is very broad, covers virtually every kind of technology, recycling technology——

Mr. ROHRABACHER. Right.

Mr. GARAMENDI [continuing]. As well as the various kinds of reactors with the exception—even fusion is involved in this, I think, in some small way. So he has written a very comprehensive bill. Your concerns are fully addressed by the totality of the bill.

Mr. ROHRABACHER. And not changed by this amendment.

Mr. GARAMENDI. Well, the amendment provides more direction with regard to this specific type of reactor——

Mr. ROHRABACHER. Right.

Mr. GARAMENDI [continuing]. But does not preclude any of the other research and development that is called for in other sections of the bill.

Mr. ROHRABACHER. Thank you very much, Mr. Chairman.

Chairman GORDON. Is there further discussion on the amendment?

If not, the vote is on the amendment. All in favor, say aye. Opposed, no. The ayes have it. The amendment is agreed to.

The sixth amendment on the roster is an amendment offered by the gentleman from South Carolina, Mr. Inglis. Are you ready to proceed with your amendment?

Mr. INGLIS. Yes, Mr. Chairman. I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 029, amendment to H.R. 5866 offered by Mr. Inglis of South Carolina.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentleman for five minutes to explain the amendment.

Mr. INGLIS. Thank you, Mr. Chairman. My amendment basically makes it so that the Secretary would have to submit a report to us, to the Congress, comparing anything that comes out of the Blue Ribbon Commission to the Yucca Mountain Alternative.

So when we marked up this bill at Subcommittee, I offered an amendment encouraging the Administration to reconsider their decision on Yucca Mountain. I withdrew the amendment over concerns that as written it wasn't germane, but with the great help of Katy Crooks of the minority staff, we have gotten language now that is germane.

So in 1982, Congress passed a Nuclear Waste Policy Act to address the long-term management of nuclear waste. The Department of Energy was charged with collecting, transporting, storing, and disposing of the Nation's spent nuclear fuel. In 1987, Congress concluded that DOE would take title to waste and store it at Yucca Mountain in a permanent geological repository.

Over the past 27 years the nuclear industry and nuclear electricity rate payers have contributed $17 billion to the Nuclear Waste Fund. Of that 17 billion South Carolinians have contributed $1.2 billion. Rate payers and nuclear power generators contributed to the Waste Fund in anticipation that the Department of Energy would begin accepting and storing spent fuel waste starting in 1998.

Now it is 12 years later, and South Carolina continues to store 4,000 metric tons of waste in places that are not long-term storage.

It is no surprise that this delay is costly. The government has breached its contract with the Nuclear Industry, exposing taxpayers to expensive lawsuits. Millions of Americans continue to house nuclear waste in their communities, assuming undue risk. The delay has also discouraged investment in nuclear power, slowing down the resurgence of this very exciting industry and new way of making—or way of making power for our future.

What we need is a clear and achievable plan for dealing with waste. Despite a long history of clear bipartisan support and U.S. Congress for long-term storage has spent fuel at Yucca Mountain, this Administration has decided to reopen the question.

President Obama proposes to use the Blue Ribbon Commission on America's nuclear future to find an alternative solution to managing nuclear waste. This panel may well come up with some innovations in managing the nuclear waste stockpile, but the repeatedly expressed will of the U.S. Congress is long-term geologic storage at Yucca Mountain.

While some may disagree that geologic storage at Yucca is the best option, we cannot disagree on these facts, that the Nation has invested a lot of time and resources in Yucca Mountain. Twenty-three years, $10 billion.

So the amendment I offer today directs the Department of Energy to compare the recommendations of the Blue Ridge or the Blue Ribbon Commission to Yucca Mountain. If we abandon the solution, we should first have all, full accounting of what we are sacrificing in terms of safety, security, costs, technological expertise, and site readiness.

So the concept, again, is simply to take the Blue Ribbon Commission report and order them to compare it, comparing the options they come up with, to the Yucca Mountain option. And that seems to make sense because we have invested now these 27, 23 years or so, 23 years and $17 billion in Yucca, so any alternatives should be compared to the investment we have already made, and then we can decide whether to go forward with Yucca or we go forward with one of these other options.

But let us not just overlook the fact that it is 27 years and $17 billion. Mr. Chairman, so I hope we will have support for this amendment.

[The prepared statement of Mr. Inglis follows:]

PREPARED STATEMENT OF REPRESENTATIVE BOB INGLIS

Thank you Mr. Chairman. When we marked this bill at subcommittee, I offered an amendment encouraging the Administration to reconsider their decision on Yucca Mountain. I withdrew the amendment over concerns that, as written, it was not germane. I'd like to thank Katy Crooks from the minority staff for clarifying the language and giving us the opportunity to consider this amendment again.

In 1982, Congress passed the Nuclear Waste Policy Act to address the long-term management of nuclear waste. The Department of Energy was charged with collecting, transporting, storing, and disposing of the nation's spent nuclear fuel. In 1987, Congress concluded that DOE would take title to waste and store it at Yucca Mountain in a permanent geologic repository. Over the past 27 years, the nuclear industry and nuclear electricity rate payers have contributed $17 billion to the Nuclear Waste Fund. South Carolinians themselves have contributed $1.2 billion.

Rate payers and nuclear power generators contributed to the Waste Fund in anticipation that the Department of Energy would begin accepting and storing spent fuel waste starting in 1998. Now, 12 years later, South Carolina continues to store 4,000 metric tons of waste.

It's no surprise that this delay is costly. The government has breached its contract with the nuclear industry, exposing tax payers to expensive lawsuits. Millions of Americans continue to house nuclear waste in their communities and assume undue risk. The delay is also discouraging investment in nuclear power, slowing down resurgence in this industry.

What we need is a clear and achievable plan for dealing with waste. Despite a long history of clear, bipartisan support in the U.S. Congress for long-term storage of spent nuclear fuel at Yucca Mountain, this Administration has decided that they can come up with something better.

President Obama proposes to use the Blue Ribbon Commission on America's Nuclear Future to find an alternative solution to managing nuclear waste. I'm confident that this panel will come up with some great and innovative ideas to manage the nuclear waste stockpile. The only idea that will satisfy the repeatedly expressed will of the U.S. Congress is long term geologic storage at the Yucca site.

While some may disagree that geologic storage at Yucca Mountain is the best option, we cannot disagree that as a nation we have invested a lot of resources in this solution. To date, we've sunk 23 years and $10 billion into this project, and have gained a lot of knowledge about how best to store waste there.

The amendment that I offer for consideration today directs the Department of Energy to compare the recommendations of the Blue Ribbon Commission to Yucca Mountain. If we abandon this solution, we should first have a full accounting of what we are sacrificing in terms of safety, security, cost, technological expertise, and site readiness.

I hope you'll agree that we need a long term storage option for spent nuclear fuel and that the Federal Government is long overdue on supplying the American nuclear industry with a solution. We should know if we are sacrificing too much by ending progress at Yucca Mountain.

I encourage adoption of this amendment and I yield back the balance of my time.

Chairman GORDON. Thank you, Mr. Inglis, and thank you for working to craft the amendment in such a way that we feel more comfortable that we don't have a jurisdiction problem. If there is a claim anywhere, we may have to work a little bit more, but I know you have worked in good faith to do that.

And your good work has already resulted in several boxes of information coming to the Committee. So more importantly, thank you for your work on this bill and your stewardship as Ranking Member of the Energy Committee. I hope you will find this as one more highlight in what you have been able to get accomplished.

Mr. EHLERS. Mr. Chairman.

Chairman GORDON. Dr. Ehlers is recognized.

Mr. EHLERS. Thank you, Mr. Chairman. I would just like to comment in a general way on this proposed amendment and also the Sensenbrenner amendment and give a physicist's perception on this.

I think the original legislation that was passed by the Congress some years ago was deficient and perhaps because it went to—through a committee other than the Science Committee, and I think that continues to be a problem.

The constant use of the term disposal I think is a mistake. We are not disposing of the material. We are storing it, and using the word disposal implies that somehow we are getting rid of it, and it is not going to exist anymore. Now, we might possibly do that by blasting it out and sending to the sun, which would probably do a pretty good job of disintegrating much of it, but it really fools us into thinking that, well, if we can just put it in the ground at Yucca Mountain, then everything will be wonderful.

And that is why Yucca Mountain, I believe, has had so much trouble. I think the only way to do it is to realize we are storing it, we are not disposing of it, and that we turn to monitored, re-

trievable storage, which should satisfy the critics who say that Yucca Mountain is not safe because 10,000 years from now we will still have all that radioactivity there.

If we have monitored retrievable storage funded by the same sorts of funds that Mr. Inglis referred to, you can have a much more viable system where you store it in canisters, which are examined regularly. If one should leak, then they are transported out by robots, the leak is fixed, and they are put back in. It would be a very low-cost maintenance effort, and I think it would be far safer than anything that we have heard discussed before.

Now, it is a little extreme to try to bring that concept in here at this point, and we would probably seriously have jurisdictional problems, but I think the waste and the lack of good direction that Mr. Inglis referred to is something that has to be addressed by the Congress, and if the other committee which claims jurisdiction is not willing to work with us on this, I think then we have to fight hard to see that our method would prevail.

And I am not going to say that the only method would be monitored retrievable storage, but at least let us recognize that we are just storing it there, and it is not going to be gone, and if you are worried about leakage, then you should have a method of restoring—pardon me, observing it, which is where the monitored part comes in, because simply putting it underground doesn't mean that it is safe. It doesn't mean that it is being held properly. There is no way to examine it and see whether or not it is leaking or what other problems are developing.

So I just want to offer that at this point, and one of my regrets about leaving the Congress at the end of this session is that this is one problem that I felt should be addressed, and I have never been able to persuade enough people. They are all afraid of addressing this problem because of the political ramifications. I think there are ways of doing it that are politically more acceptable.

So I would appreciate comments of Mr. Inglis and others on this suggestion. Thank you.

Chairman GORDON. Thank you, Dr. Ehlers.

Governor Garamendi.

Mr. BARTLETT. Mr. Chairman.

Chairman GORDON. I think we need to go to this side of the aisle right now.

Mr. BARTLETT. Okay.

Chairman GORDON. Governor Garamendi.

Mr. GARAMENDI. Thank you, Mr. Chairman. Mr. Inglis and Mr. Ehlers are on a track that is really important. I would add one more thing to it and a couple of comments.

Is it waste, or is it a valuable asset? Mrs. Biggert earlier said that about six percent or less of the current energy in the nuclear fuel is actually consumed, leaving a significant potential energy source which has heretofore been considered to be a waste. When that waste is consumed in a Generation IV reactor, perhaps first in a Generation III reactor and then on into a Generation IV reactor, you then turn that 92, 96 percent waste into an extraordinary asset that could provide energy for many, many years, perhaps several hundred years.

So we need to look at this in a different way, and in order to get to that new way of looking at it, you have to have some sort of reactor and reprocessing system that can actually consume that material, which I would now call an asset, and that is where this Generation IV comes into play. Coupled with Generation III you can then move forward.

And the storage systems then become, as Dr. Ehlers said, a temporary retrievable storage system, because you want to get to the asset. That is what this is all about. The Chairman is quite correct in the direction of the bill and pushing us off in that direction.

So I thank the Chairman then for the discussion.

Mr. EHLERS. Would the gentleman yield?

Mr. GARAMENDI. Of course.

Mr. EHLERS. I want to thank you for your comment because that fits in my comment, in with my comment. We are not disposing of it. We are simply storing it, and there are ways we can use it. You have mentioned one way. There are other ways we can extract additional energy out of the so-called "waste."

And you are quite right. Instead of talking about disposal, we should talk about storage. Instead of talking about waste, let us talk about resources.

Thank you.

Mr. BROUN. Mr. Chairman.

Chairman GORDON. Couldn't go through a bill without hearing from Dr. Broun. I was wondering where you were.

I am sorry. Dr. Bartlett was—had asked to be recognized first.

Mr. BARTLETT. Thank you, Mr. Chairman.

You know, for the leading technology country in the world it is very sad that we are not leading the technology in nuclear power development. Our so-called "waste" is, of course, as was adequately shown to us in the codel you lead to France. We went through the Vigareva facility there is a very—is a feedstock for reactors that end up with a fraction of the waste that we have in volume and with a very much shorter half life. You have to store them securely for far lesser years.

I hope that this storage is retrievable because we darn well need to be retrieving it in the future to burn it in these new reactors. I don't know why we are so far behind, but, golly, we got to catch up here. The rest of the world is leading the charge, and we are behind, and you know, thank you for this bill which encourages us to catch up.

Thank you.

Chairman GORDON. Dr. Broun is recognized for five minutes.

Mr. BROUN. Mr. Chairman, I assure you I am not asleep over here, and I have a tremendous interest in this discussion and wanted to add my two cents.

We have a tremendous facility at Savannah River Site in South Carolina that—where we have a lab that will very happily research of how to expand our nuclear energy potential as a Nation, help us to determine alternative uses of these resources that have in the past been called waste, and I agree with Dr. Ehlers and Mr. Garamendi that these are resources that need to be utilized, and I highly recommend that we expand the utilization of the lab at Savannah River Site and others around this country to look into how

we can utilize this material because it is extremely important. It is extremely valuable. It is not just a resource to dump in the ground and just leave there. So it is a reusable resource, and we need to do everything we can in this committee as well as in Congress, as well as in the government overall to try to expand these types of research and development projects, and I highly encourage us to keep our eye on the ability to do that.

And I appreciate Mr. Garamendi's amendment, and I highly recommend that this committee continue to focus upon those resources and how we can expand the use.

Thank you, Mr. Chairman. I yield back.

Chairman GORDON. Thank you, Dr. Broun.

You know, a major thrust of this whole bill is really to get into research so that we can deal with proliferation issues, so we can deal with storage issues, and as Dr. Bartlett says, make us a world leader again.

Is there further discussion?

Mr. Hall is recognized.

Mr. HALL. Mr. Chairman, this is an important amendment. It highlights a fundamental priority for a lot of us in ensuring the long-term viability of nuclear power itself, completing the review and license application of the Yucca Mountain Waste Repository.

We simply can't have a revival of nuclear energy in this country if we don't find a way to safely dispose of it or maybe—I think the doctor didn't like the word, dispose of. Maybe we could use, getting rid of or divorcing or maybe funeralize it. And at Yucca Mountain we would have a sign that says, here lies nuclear waste, where the rest of us can rest in peace, and maybe as the governor set out, and I gleaned this from his suggestions that we might one day want to go back into that. There is some useful—it might be useful to future generations. The things that we don't know and the governor has brought his coffee back, and I will say that again for him.

Thank you, Governor, for your statements, because I think you are indicating that there may be some day a future use for that, and for the professor down here and the more sophisticated grammarians here, it might tell you that we may want to visit the nuclear cemetery over there at Yucca Mountain, and the Rubaiyat of Omar Khayyam said, "Man once buried wants dug up again." Maybe we could do that here.

At any rate, I just want to say that unfortunately the Obama Administration turned its back on Yucca Mountain and just like they ran a line through Constellation and put NASA to flight, they completely have taken it off the table. This amendment simply says that DOE shouldn't consider alternatives to Yucca in a vacuum, and I think that is what our Chairman is saying. They ought to be directly compared on a scientific and technical basis to see which solutions are the best.

This is a good amendment, I urge its passage, and I thank Mr. Inglis for offering it and for his leadership in this issue and the Chairman for being as open with us and giving us the opportunity to say some of the silly things some of us want to say.

Chairman GORDON. Thank you, Mr. Hall.

[The prepared statement of Mrs. Biggert follows:]

PREPARED STATEMENT OF REPRESENTATIVE JUDY BIGGERT

Would the gentleman yield?

Mr. Chairman, I support the gentleman's amendment and encourage my colleagues to do the same.

As I mentioned at subcommittee, Illinois holds more spent fuel waste than any other state.

And, Illinois residents have paid nearly $2 billion into the Nuclear Waste Fund.

The government has invested two decades and billions of taxpayer dollars on engineering, construction, and technical expertise to build a permanent repository.

It's only appropriate that we consider that in this legislation.

Thank you Mr. Chairman, I yield back.

Chairman GORDON. I think this well-discussed amendment now is ready for a vote.

All in favor, say aye. Opposed, no. The ayes have it. The amendment is agreed to.

The seventh amendment on the roster is an amendment offered by the gentleman from Oregon, Mr. Wu. Are you ready to proceed with your amendment?

Mr. WU. I am, Mr. Chairman.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 058, amendment to H.R. 5866 offered by Mr. Wu of Oregon.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentleman for five minutes to explain the amendment.

Mr. WU. Thank you very much, Mr. Chairman.

The American people justifiably want to see the most made of our existing resources before spending additional taxpayer dollars on equipment and facilities. I am, therefore, offering a straightforward, good government amendment to create a database of federally-funded research facilities capable of supporting unclassified nuclear energy research.

My amendment further directs the Secretary of Energy to make this database available on the Department's website so that researchers can easily locate available research facilities across the United States.

I hope that this database would also allow universities to make their facilities more widely available to outside researchers who may benefit from state-of-the-art resources already maintained at institutions nationwide.

I also believe that in creating a more-centrally-organized network of research facilities will benefit researchers and universities alike, while ensuring that taxpayers receive maximum return on their investment in federally-funded facilities.

The inspiration for this amendment came from one of the major research universities in my home State of Oregon. Oregon State University currently maintains a small research reactor for use in civilian nuclear research. Innovation is crucial to maintaining U.S. leadership in the 21st century global economy.

Ideas and idea-driven industries hold the key to developing the technology that will make our Nation's energy independence possible, and I believe the Department of Energy can play an impor-

tant role in helping to make future innovations in nuclear energy safe, clean, and affordable.

Toward this end we all have a responsibility to do what we can to facilitate a U.S. research community that is competitive, collaborative, and consumer oriented. At the same time we must ensure that we are doing everything we can to maximize the use of our prior investments in nuclear R&D facilities, and therefore, I think it is crucial that we help make our Nation's world-class research resources more easily accessible to the university research community.

I ask my colleagues to join me in supporting this amendment and yield back the balance of my time.

Chairman GORDON. Thank you, Mr. Wu, for this good amendment.

Is there further discussion?

If no further discussion then, the amendment—oh, Mr. Hall.

Mr. HALL. I was just turning my light off.

Chairman GORDON. Okay. Then the vote occurs on the amendment. All in favor, say aye. Opposed, no. The ayes have it. The amendment is agreed to.

The eighth amendment on the roster is an amendment offered by the gentleman from Wisconsin, Mr. Sensenbrenner. He is not here, so Mr. Hall is going to offer that in his behalf. Are you ready to proceed with your amendment?

Mr. HALL. I have an amendment at the desk—Mr. Sensenbrenner.

Chairman GORDON. I hope I don't have to, but I reserve a point of order on the amendment. The clerk will report the amendment.

The CLERK. Amendment number 044, amendment to H.R. 5866 offered by Mr. Sensenbrenner of Wisconsin.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentleman for five minutes to explain the amendment.

Mr. HALL. Mr. Chairman, this amendment highlights further the need to address the back end of the nuclear fuel cycle. It clarifies that DOE will be responsible to disposal of the high-level radioactive waste or spent fuel generated by the reactors developed through R&D programs in the bill.

The Nuclear Waste Policy Act requires DOE to dispose of high-level radioactive waste from commercial reactors by January 31, 1998, and in 1987, Congress amended then PWA to specify a national nuclear waste repository at Yucca Mountain.

The high-level radioactive waste produced by the small modular reactors and Next Generation nuclear plants authorized by this bill would fit the definition of high-level radioactive waste in the NWPA.

And the purpose of this amendment is to reinforce or maybe to message Congressional intent, the DOE license and construct Yucca Mountain. In spite of the law, President Obama and Secretary Chu have attempted or are attempting to permanently shutter Yucca Mountain, and Administrative Board Judges at the Nuclear Regulatory Commission called Secretary Chu's rationale to

shutter Yucca Mountain a logical, "contrary and not persuasive," insignificant, and sight-seeing PWA's detailed congressional record to repudiate DOE.

I support the amendment, and I think—and I understand your point of order is developed toward the Section 12 there. And we have an offer there to strike the word, develop, if that would help.

Chairman GORDON. Without objection, the amendment will be altered. The amendment will strike the word, "developed", and just for clarification, Mr. Hall, what this will mean is that the only disposal responsibility to the Department of Energy will be that within those programs that it is putting forth.

Mr. HALL. Yeah.

Chairman GORDON. Correct?

Mr. HALL. Yeah. When you take development out, it still says under the program's authorized in this act——

Chairman GORDON. This act.

Mr. HALL [continuing]. Or the amendments made by this act. It is inclusive to this act.

Chairman GORDON. Thank you, Mr. Hall.

Without objection, so ordered in terms of the altering of the amendment.

Mr. Hall, let me say quickly on this amendment that I have long put forth my opinion that Yucca should go forward. I am opposed to closing it. I was not opposed to this amendment other than the fact that we need to be sure that it was germane to this bill.

Also on a higher level, I want to be—this is a very important bill for our country as we have said on a number of occasions, and so I think we want to be sure that we do it in the right way, and there is no reason to do something that would jeopardize the completion of the bill.

Dr. Ehlers is recognized.

Mr. EHLERS. Mr. Chairman, on the basis of the comments made earlier, I am bothered that this talks about both disposal and radioactive waste, and I would—I hate to hold up the bill for this amendment since I don't have a real disagreement with the amendment, but I would hope that you would be willing to join me in a manager's amendment that would clarify it along the lines that Mr. Garamendi and Dr. Bartlett and I have indicated and also Dr. Broun, so that when it reaches the Floor, it will make more sense than it does right now.

Chairman GORDON. I have always found the gentleman reasonable, and certainly Dr. Ehlers, we will continue to work on this. We want to get it right.

Mr. EHLERS. Yeah. Thank you.

Chairman GORDON. If there is—Governor Garamendi is recognized for five minutes.

Mr. GARAMENDI. Mr. Chairman, I understand where Mr. Sensenbrenner wants to go here. This bill is an extremely important one as you just said for a variety of reasons. This new section is going to become a lightning rod with some and may very well cause opposition that we would not otherwise have.

And I would be cautious here because the intent of the amendment as was suggested is to deal with Yucca Mountain. I don't think we need to do that again. It is already there, the discussion,

the debate. I don't know all the politics, I haven't been around here long enough, but I can be pretty certain that the folks in Nevada don't want to have to have one more poke in the eye about Yucca Mountain and might very well raise significant objections to the bill itself as a result of this amendment which I think is unnecessary.

Chairman GORDON. Thank you.

Mr. HALL. Would the gentleman yield?

Mr. GARAMENDI. Of course.

Mr. HALL. I respectfully agree to your Excellency suggest that there is no change to current law here, and you are right that this one is very, very important. The Chairman is right. This is one of the most important bills that we will view—and I thank you for your input.

Chairman GORDON. Thank you. I think that we have concurrence here, that we have been cautious, that we have an amendment now that is both in virtue of politics and germaneness is appropriate.

Okay. I withdraw my reservation.

If there is no further discussion, then the vote is on the amendment. All in favor of the amendment, say aye. Opposed, no. The ayes have it. The amendment is agreed to.

And now we return to an amendment by Mr. Lipinski. Mr. Lipinski, are you ready to proceed?

Mr. LIPINSKI. Yes. I have an amendment at the desk.

Chairman GORDON. The clerk will report the amendment.

The CLERK. Amendment number 076, amendment to H.R. 5866 offered by Mr. Lipinski of Illinois.

Chairman GORDON. I ask unanimous consent to dispense with the reading.

Without objection, so ordered.

I recognize the gentleman for five minutes to explain the amendment.

Mr. LIPINSKI. Thank you, Chairman Gordon. I am very appreciative of the work that you, Chairman Baird, and Ranking Members Hall and Inglis have put into developing this important bipartisan legislation as Mr. Hall was just emphasizing, how truly important this bill is.

I would especially like to thank the Chairman for his leadership with respect to small modular reactors. My amendment is short, and I will keep my remarks similarly brief.

Like many of you, I am concerned the United States no longer manufactures the vessels and equipment needed to build conventional nuclear reactors. I am concerned that Westinghouse is no longer an American company. It is now part of Toshiba, and the Japan steel works has monopoly on manufacturing steel containment vessels.

I am excited about this bill because it would position us to take the lead on SMRs. We have the capability to manufacture everything needed for these reactors, and U.S. companies are far ahead of their competitors.

My amendment would require that applicants who want to participate in the Department of Energy's SMR Program explain how their proposal will increase domestic manufacturing activity, exports, and employment.

I think this provision will help translate our investments in SMRs into jobs, and I urge my colleagues to support this amendment. I yield back the balance of my time.

Chairman GORDON. Thank you, Mr. Lipinski, for a good amendment.

Is there further discussion?

If there is no further discussion, the vote is on the amendment. All in favor, say aye. The ayes appear to have it. Oh, excuse me. Are there no's? Hearing no no's, the ayes once again have it, and the amendment is passed.

The vote now occurs on the bill, H.R. 5688 as amended. All those in favor, say aye. All those opposed, say no. In the opinion of the Chair the ayes have it.

I now recognize Mr. Hall for a motion.

Mr. HALL. Mr. Chairman, I move that the Committee favorably report H.R. 5866 as amended to the House with the recommendation that the bill do pass.

Furthermore, I move that the staff be instructed to prepare the legislative report and make necessary technical and conforming changes and that the Chairman take all necessary steps to bring the bill before the House for consideration.

I yield back my time.

Chairman GORDON. The question on the motion to report the bill favorably. Those in favor of the motion will signify by saying aye. Opposed, no. The ayes have it. The bill is favorably reported.

Without objection, the motion to reconsider is laid upon the table. Members have two subsequent calendar days in which to submit supplemental minority or additional views on the measure.

Thank you. We passed a good bill there.

Let me also point out that I think a new indoor record was set in that we now, over the last four years, have passed 147 bills and resolutions from this committee in a bipartisan manner. So I thank you all for your cooperation.

And I want to thank Members for their attendance, and this concludes this markup.

[Whereupon, at 12:15 p.m., the Committee was adjourned.]

Appendix:

H.R. 5866 AS AMENDED, SUBCOMMITTEE ON ENERGY AND ENVIRONMENT MARKUP REPORT, SECTION-BY-SECTION ANALYSIS, AMENDMENT ROSTER

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:

"(11) Researching and developing technologies and processes so as to improve and streamline the process by which nuclear power systems meet Federal and State requirements and standards.".

SEC. 3. FUNDING.

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

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

"(1) $419,000,000 for fiscal year 2011;

"(2) $429,000,000 for fiscal year 2012; and

"(3) $439,000,000 for fiscal year 2013."; and

(2) in subsection (d)—

(A) by striking "under subsection (a)" and inserting "under subsection (b)";

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

"(1) For activities under section 953—

"(A) $201,000,000 for fiscal year 2011;

"(B) $201,000,000 for fiscal year 2012; and

"(C) $201,000,000 for fiscal year 2013."; and

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

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

"(A) $64,000,000 for fiscal year 2011;

"(B) $64,000,000 for fiscal year 2012; and

"(C) $64,000,000 for fiscal year 2013.

"(5) For activities under section 952(d)—

"(A) $55,000,000 for fiscal year 2011;

"(B) $65,000,000 for fiscal year 2012; and

"(C) $75,000,000 for fiscal year 2013.

"(6) For activities under section 958—

"(A) $99,000,000 for fiscal year 2011;

"(B) $99,000,000 for fiscal year 2012; and

"(C) $99,000,000 for fiscal year 2013.".

SEC. 4. NUCLEAR ENERGY RESEARCH AND DEVELOPMENT PROGRAMS.

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

"(c) REACTOR CONCEPTS.—

"(1) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application to advance fission power systems as well as technologies to sustain currently 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

progress of the program through international cooperation through such organizations as the Generation IV International Forum, or any other international collaboration the Secretary considers appropriate.

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

SEC. 5. SMALL MODULAR REACTOR PROGRAM.

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

"(d) SMALL MODULAR REACTOR PROGRAM.—

"(1) IN GENERAL.—

"(A) The Secretary shall carry out a small modular reactor program to promote research, development, demonstration, and commercial application of small modular reactors, including through cost-shared projects for commercial application of reactor systems designs.

"(B) The Secretary shall consult with and utilize the expertise of the Secretary of the Navy in establishing and carrying out such program.

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 cluding 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:

"(A) The domestic manufacturing capabilities of the parties to the cooperative agreement and their partners and suppliers.

"(B) The viability of the reactor design and the business plan or plans of the parties to the cooperative agreement.

"(C) The parties to the cooperative agreement's potential to continue the development of small modular reactors without Federal subsidies or loan guarantees.

"(D) The cost share to be provided.

"(E) The degree to which the goals described in paragraph (4)(A) through (G) will be advanced.".

SEC. 6. FUEL CYCLE RESEARCH AND DEVELOPMENT.

(a) AMENDMENTS.—Section 953 of the Energy Policy Act of 2005 (42 U.S.C. 16273) is amended—

(1) in the section heading by striking "**ADVANCED FUEL CYCLE INITIATIVE**" and inserting "**FUEL CYCLE RESEARCH AND DEVELOPMENT**";

(2) by striking subsection (a);

(3) by redesignating subsections (b) through (d) 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 "(3) advanced proliferation and security risk
2 assessment methods;
3 "(4) advanced sensors and instrumentation;
4 "(5) advanced nuclear manufacturing methods;
5 or
6 "(6) any crosscutting technology or trans-
7 formative concept aimed at establishing substantial
8 and revolutionary enhancements in the performance
9 of future nuclear energy systems that the Secretary
10 considers relevant and appropriate to the purpose of
11 this section.
12 "(c) REPORT.—The Secretary shall submit, as part
13 of the annual budget submission of the Department, a re-
14 port on the activities of the program conducted under this
15 section, which shall include a brief evaluation of each ac-
16 tivity's progress.".
17 (b) CONFORMING AMENDMENT.—The table of con-
18 tents of the Energy Policy Act of 2005 is amended by
19 adding at the end of the items for subtitle E of title IX
20 the following new item:

"Sec. 958. Nuclear energy enabling technologies.".

21 **SEC. 8. EMERGENCY RISK ASSESSMENT AND PREPARED-**
22 **NESS REPORT.**

23 Not later than 180 days after the date of enactment
24 of this Act, the Secretary shall transmit to the Congress
25 a report summarizing quantitative risks associated with

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).

COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT
REPORT FROM SUBCOMMITTEE MARKUP
JULY 28, 2010

H.R. 5866, THE NUCLEAR ENERGY RESEARCH AND DEVELOPMENT ACT OF 2010

I. Purpose

The purpose of H.R. 5866, sponsored by Rep. Gordon, is to update the Department of Energy's nuclear energy research and development programs and provide necessary funding to advance nuclear technologies to adequately address the issues of high capital costs and waste management associated with nuclear power.

II. Background and Need for Legislation

Today in the United States there are 104 nuclear reactors producing approximately 20 percent of our nation's electricity supply and 70 percent of our emissions-free energy. However, nuclear power as it exists today relies on a "once-through" fuel cycle that produces high level radioactive waste from enriched uranium. In the United States, there exists a stockpile of approximately 63,000 metric tons of nuclear waste from reactors which generate roughly 2,000 more tons per year. Furthermore, the capital costs of nuclear plants have risen steeply and present a high hurdle to deployment of new reactors. Some have argued that without a fully developed strategy to deal with these challenges, nuclear power will be unable to compete with other fuel sources. Furthermore, in any carbon dioxide restrained regime, nuclear power will play a large role in energy production. To attain the 2030 reduction goals set in the *American Clean Energy and Security Act*, H.R. 2454, the Energy Information Administration estimated that at least 96 gigawatts of new nuclear capacity would be needed.

To address these challenges, the *Nuclear Energy Research & Development Act of 2010* amends the *Energy Policy Act of 2005* to modify and augment existing nuclear research and development programs at the Department of Energy. The primary goals of this bill are to mitigate the problems associated with nuclear waste and reduce the capital costs of nuclear power through a robust and integrated research, development, demonstration and commercial application program.

III. Subcommittee Actions

The Energy and Environment Subcommittee held a hearing on May 19th, 2010 to explore the Administration's strategy for research and development to advance clean and affordable nuclear technology. Amongst the issues considered were how the Federal Government will enhance the safety and economic viability of nuclear power and what programs it recommends for managing nuclear waste, advancing reactor design, sustaining the existing nuclear fleet, and minimizing risk of proliferation of nuclear materials.

Witnesses

Panel I

- **Dr. Warren P. Miller is the Assistant Secretary for the Office of Nuclear Energy at the U.S. Department of Energy**. Dr. Miller testified on the Department of Energy's recently released *Nuclear Energy Research and Development Roadmap* and provided additional guidance on the Office of Nuclear Energy's technology and innovation initiatives.

Panel II

- **Mr. Christofer Mowry is the President and CEO of Babcock & Wilcox Nuclear Energy, Inc**. Mr. Mowry testified on Small Modular Reactors and provided an overview of B&W's reactor operations. He provided information on the role Small Modular Reactors can play in reducing capital costs and improving the safety of nuclear power. Mr. Mowry also commented on DOE's *Nuclear Energy Research and Development Roadmap*.

- **Dr. Charles Ferguson is the President of the Federation of American Scientists**. The Federation of American Scientists (FAS) is a public policy think-tank that was originally founded by scientists from the Manhattan Project. Currently, FAS is conducting a project titled *The Future of Nuclear Energy in the United States* to explore and analyze the direction of nuclear energy technology innovation. Dr. Ferguson provided an overall analysis and critique of the *Nuclear Energy Research and Development Roadmap* and Small Modular Reactor technology.
- **Dr. Mark Peters is the Deputy Director for Programs at Argonne National Lab**. Dr. Peters testified on the *Nuclear Energy Research and Development Roadmap* with particular attention to the Administration's strategy for waste management technology. He also presented a summary of new waste management technologies currently under development at Argonne National Lab.
- **Mr. Gary M. Krellenstein is a Managing Director in JPMorgan's Energy and Environmental Group and is a former nuclear engineer at the Department of Energy and Nuclear Regulatory Commission**. Mr. Krellenstein's areas of focus are municipal utilities, Rural Electric Cooperatives, and alternative energy technologies and project financing. He is also involved in JPMorgan's "carbon" policies. Mr. Krellenstein testified on private capital interest in nuclear power including how Small Modular Reactors and other new technologies may attract private capital investment.
- **Dr. Thomas L. Sanders is the President of American Nuclear Society**. The American Nuclear Society is a nuclear professional society dedicated to promoting the awareness and understanding of the application of nuclear science and technology. Dr. Sanders provided an overall evaluation of the *Nuclear Energy Research and Development Roadmap* and provided recommendations of policy areas to more fully develop or explore.

The Subcommittee on Energy and Environment met to consider H.R. 5866 on July 28, 2010.

Mr. Baird offered a Manager's amendment to make technical corrections and conforming changes and to clarify how the cost share requirement included in the Small Modular Reactor program is to be calculated. *The amendment was agreed to by voice vote.*

Ms. Biggert offered an amendment to include in the list of objectives of the bill researching and developing technologies and processes so as to improve and streamline the process by which nuclear power systems meet Federal and State requirements and standards. *The amendment was agreed to by voice vote.*

Mr. Bartlett offered an amendment to require the Secretary to consult with and utilize the expertise of the Secretary of the Navy in carrying out the Small Modular Reactor program. *The amendment was agreed to by voice vote.*

Mr. Luján offered an amendment to include in the project selection criteria of the Small Modular Reactor program those factors the Secretary must evaluate according to the program's Administration section. *The amendment was agreed to by voice vote.*

Ms. Biggert and Mr. Garamendi offered an amendment to require the Secretary to include additional advanced recycling and crosscutting activities. *The amendment was agreed to by voice vote.*

Mr. Garamendi offered an amendment to require the Secretary to research recycling including integral fast reactors in the Full Recycle Program. *The amendment was withdrawn.*

Mr. Inglis offered an amendment to require the Secretary to transmit a report to the Congress describing any plans to adopt recommendations of the Blue Ribbon Commission and to provide a response to each Blue Ribbon Commission recommendation, including a comparison to data from the Yucca Mountain Project. *The amendment was withdrawn.*

Ms. Johnson offered an amendment to require the Secretary to enter into a contract with the National Academies to conduct an evaluation of workforce and facility upgrades needed for the safe and reliable long-term operation of the Nation's nuclear power infrastructure. *The amendment was agreed to by voice vote.*

Mr. Matheson and Ms. Giffords offered an amendment to include minimization of water usage as a goal to be achieved by new technologies researched under the Small Modular Reactors program. *The amendment was agreed to by voice vote.*

Mr. Inglis moved that the Subcommittee favorably report H.R. 5866, as amended, to the Full Committee. *The motion was agreed to by voice vote.*

The following related hearings were also held in the 110th and 111th Congresses:

On June 17, 2009 a Full Committee hearing titled: *Advancing Technology for Nuclear Fuel Recycling: What Should Our Research, Development and Demonstration Strategy Be?* The purpose of this hearing was to explore the benefits and risks of nuclear waste recycling and address the technical challenges and policy objectives of a waste management strategy.

On April 23, 2008 a Full Committee hearing titled: *Opportunities and Challenges for Nuclear Power*. The purpose of this hearing was to explore the potential for nuclear to increase its share of the U.S. energy mix, [evaluate the capacity of] DOE's programs to support and advance nuclear technologies, and to discuss the challenges of high costs, waste disposal and proliferation concern.

SECTION-BY-SECTION ANALYSIS OF
H.R. 5866
NUCLEAR ENERGY RESEARCH AND DEVELOPMENT ACT OF 2010

Section 1. Short Title

Nuclear Energy Research and Development Act of 2010

Section 2. Objectives

Amends Section 951(a) of the Energy Policy Act of 2005 to include the following objectives:

(1) Reducing the costs of nuclear reactor systems
(2) Reducing used nuclear fuel and nuclear waste products generated by civilian nuclear energy
(3) Supporting technological advances in areas that industry is not likely to undertake because of technical and financial uncertainty

Section 3. Funding

Amends Section 951 of the Energy Policy Act of 2005 to provide the following authorizations for Subtitle E programs:

A. Total Program's Authorization
   (1) $419,000,000 for fiscal year 2011;
   (2) $429,000,000 for fiscal year 2012; and
   (3) $439,000,000 for fiscal year 2013.

B. Breakout of total Authorization for Activities under Section 953 for the Fuel Cycle Research and Development Program:
   (1) $201,000,000 for fiscal year 2011;
   (2) $201,000,000 for fiscal year 2012; and
   (3) $201,000,000 for fiscal year 2013.

C. Breakout of total Authorization for Activities under Section 952 for Nuclear Energy Research and Development Programs other than those described in 952(d):
   (1) $64,000,000 for fiscal year 2011;
   (2) $64,000,000 for fiscal year 2012; and
   (3) $64,000,000 for fiscal year 2013.

D. Breakout of total Authorization for Activities under Section 952(d) for the Small Modular Reactor Program:
   (1) $55,000,000 for fiscal year 2011;
   (2) $65,000,000 for fiscal year 2012; and
   (3) $75,000,000 for fiscal year 2013.

E. Breakout of total Authorization for Activities under Section 958 for the Nuclear Energy Enabling Technologies Program:
   (1) $99,000,000 for fiscal year 2011;
   (2) $99,000,000 for fiscal year 2012; and
   (3) $99,000,000 for fiscal year 2013.

Section 4. Nuclear Energy Research and Development Programs

This section amends Section 952 of the Energy Policy Act of 2005 by striking subsections (c) through (e) and inserting a Reactor Concepts Program that authorizes research into advanced reactor designs and technologies to prolong the life of currently deployed reactor systems. Technologies that may be researched under this section include those that are economically competitive with other electric power generation plants, have higher energy efficiency, lower cost and improved safety compared to current reactors, utilize passive safety systems, minimize proliferation risks, reduce production of high-level waste per unit of output, increase the life and sustainability of deployed reactor systems, use improved instrumentation, or are capable of producing large-scale quantities of hydrogen or process heat. This section also requires the Secretary to seek opportunities for international cooperation.

Section 5. Small Modular Reactor Program

This section amends Section 952 of the Energy Policy Act of 2005 by creating a Small Modular Reactor Program to promote the research, development, demonstration, and commercial application of small modular reactors (SMRs). Under this section, SMRs are defined as reactors with a rated capacity of 300MWe or less and can be constructed and operated in combination with similar reactors at a single site.

In conducting this Program, the Secretary may enter into cooperative agreements to support SMR designs that enable lower capital costs or increased access to private financing, reduced long-term radio-toxicity, mass, or decay heat of waste, increased operating safety of nuclear facilities, reduced dependence of reactor systems on water resources, increased seismic resistance of nuclear generation, reduced proliferation risk, and increased efficiency in reactor manufacturing.

To be eligible to enter into the agreement an applicant must submit a proposal that documents all partners and suppliers involved in the project and a description of anticipated domestic and international activities, the measures to be undertaken to enable cost-effective implementation of the SMR project, an accounting structure approved by the Secretary, and all known assets that shall be contributed to satisfy the non-Federal cost share requirement.

This program will require any applicant to be responsible for at least 50% of the cost of the project and that cost may only be satisfied through the use of non-Federal dollars.

In selecting winners of awards or cooperative agreements, the Secretary shall consider the domestic manufacturing capabilities of the parties and of their partners and suppliers, the viability of the reactor design and business plan of the parties, the potential of the reactor design to be developed without future Federal subsidy, and the non-Federal share to be provided.

Section 6. Fuel Cycle Research and Development

This section amends Section 953 of the Energy Policy Act of 2005 by renaming the program "Fuel Cycle Research and Development." Under this program, the Secretary shall conduct fuel cycle research and development of technologies to improve uranium resource utilization, maximize energy generation, minimize nuclear waste creation, improve safety, and mitigate risk of proliferation in support of a national strategy for spent nuclear fuel.

The fuel management options that may be considered under this program are open fuel cycle, modified open cycle, full recycle, advanced storage, alternative storage, or other appropriate technology areas. Open fuel cycle includes development of fuels for use in reactors that minimize waste creation. Modified open cycle includes development of fuel forms, reactors and limited separations of waste. Full recycle includes development of technologies to repeatedly recycle nuclear waste products to minimize total waste to the greatest extent possible. Advanced storage includes development of innovative storage technologies for both onsite and long-term storage. Alternative storage includes development of innovative long-term storage methods, including deep borehole storage or salt dome storage.

Furthermore, under this section, the Secretary must consider the final Blue Ribbon Commission report. Within 180 days after the release of the Blue Ribbon Commission Report, the Secretary must transmit to Congress a report describing any plans the Department may have to incorporate relevant recommendations from the Commission.

Section 7. Nuclear Energy Enabling Technologies

This section amends the Energy Policy Act of 2005 by adding a new section 958 titled "Nuclear Enabling Technologies." This program is to support integration of activities undertaken in 952(c) and 953 and support crosscutting technology development. Research activities may include those pertaining to advanced reactor materials, catastrophic radiation mitigation methods, proliferation and security risk assessment methods, sensors and instrumentation, manufacturing methods, or any crosscutting technology or transformative concept the Secretary deems relevant.

In conducting this program, the Secretary must submit a report on and evaluation of these activities as part of the annual budget.

Section 8. Emergency Risk Assessment and Preparedness Report

This section requires the Secretary to transmit to the Congress a report summarizing quantitative risks associated with the potential of a severe accident arising from the use of nuclear power and outlining the technologies currently available to mitigate the consequences of such an accident. The report shall include rec-

ommendations of areas of technological development that should be pursued to reduce the public harm arising from such an incident.

Section 9. Next Generation Nuclear Plant

This section amends Section 642(b)(3) of the Energy Policy Act of 2005 to allow the location of the prototype power plant to be constructed in a location chosen by the Consortium through an open and transparent competitive selection process.

This section also requires GAO to undertake a report to provide a status update on the Next Generation Nuclear Plant (NGNP) indicating its progress, how Federal appropriated funds have been distributed and spent, and the current and expected participation by non-Federal entities. The report shall also include an analysis of various challenges facing the NGNP project.

Section 10. Technical Standards Collaboration

This section requires the Director of the National Institute of Standards and Technology (NIST) to establish a nuclear energy standards committee to facilitate and support the development or revision of technical standards for new and existing nuclear power plants and advanced nuclear technologies.

The committee shall include representatives from the Federal Government and the private sector and the committee shall be co-chaired by a representative from NIST and a representative from a private sector standards organization.

The duties of the committee shall include: (1) performing a technical standards needs assessment; (2) formulating, coordinating, and recommending priorities for new technical standards and the revision of existing technical standards; (3) facilitating and supporting collaboration and cooperation among standards developers; (4) coordinating with other national, regional, or international efforts on nuclear energy-related technical standards; and (5) promoting the establishment and maintenance of a database of nuclear energy-related technical standards.

$1 million is authorized to carry out this section for each of FY 2011 through FY 2013.

Section 11. Evaluation of Long-Term Operating Needs

This section requires the Secretary to contract with the National Academies to conduct an evaluation of the long-term operating needs of currently deployed nuclear reactors. This report must be submitted no later than one year after enactment of this act.

COMMITTEE ON SCIENCE AND TECHNOLOGY
FULL COMMITTEE MARKUP
SEPTEMBER 23, 2010

AMENDMENT ROSTER

H. R. 5866, the *Nuclear Energy Research and Development Act of 2010*

No.	Sponsor	Description	Results
1.	Mr. Gordon (051)	Makes several technical and clarifying changes to the bill. Replaces reference in Section 4 ("Nuclear Energy Research Programs") with "fission power systems" with "nuclear power systems". Amends the 'Definition' subsection of Section 5 ("Small Modular Reactor Program") by inserting a new subparagraph (B) which provides that parts for small modular reactors can be factory assembled and shipped as modules to a reactor plant site for assembly. Amends Section 5 to strike "using federally appropriated funds" and insert "using funds received from the Federal Government through appropriation Acts" to the provision calculating the cost sharing amount for a recipient of financial assistance under that section. Amends Section 5 to require the Secretary of Energy to include in the factors considered before entering into a cooperative agreement, the degree which certain listed goals will be advanced. Replaces references in Section 6 ("Fuel Cycle Research and Development") to "a fuel cycle research and development program" with "a fuel cycle research, development, demonstration, and commercial application program".	Agreed to by voice vote.

		Replaces references to "salt dome storage" with "mined repositories in a range of geologic media" in the subsection of Section 6 concerned with "Alternative and Deep Borehole Storage Methods". Modifies the provision of Section 6 permitting the Secretary of Energy to support certain activities to require that supported "development and testing of flow process sheets" be "for advanced nuclear fuel recycling processes".	
2.	Mr. Bilbray (056)	Adds a new section ("Program Objectives Study") to the bill to be inserted after Section 3, requiring a study and report on the scientific and technical merit of major State requirements and standards, including moratoria, that delay or impede the further development and commercialization of nuclear power, and how the Federal Government can assist in overcoming such delays or impediments.	Agreed to by voice vote.
3.	Mr. Tonko (037)	Adds a new section ("Conventional Improvements to Nuclear Power Plants") to the bill, to be inserted after Section 5, allowing the Secretary of Energy to carry out a Nuclear Energy Research Initiative the promote the research, development, demonstration, and commercial application of certain improvements and technologies and limiting the funds used for carrying out the activities permitted by this section to $10,000,000.	Agreed to by voice vote.
4.	Mr. Garamendi/Ms. Biggert (032)	Revises the subparagraph of Section 6 ("Fuel Cycle Research and Development") concerned with the goals of the "Full Recycle" initiative to include Generation IV Reactors.	Agreed to by voice vote.
5.	Mr. Inglis (029)	Amends the "Blue Ribbon Commission Report" subsection of Section 6 ("Fuel Cycle Research and Development") to require that the Secretary of Energy give consideration to the Blue Ribbon	Agreed to by voice vote.

		Commission on America's Nuclear Future final report, and transmit to Congress a report, which includes "any plans the DOE may have to incorporate any relevant recommendations from this report into the program" and includes a description of "how those recommendations for' long-term nuclear waste solutions that will be incorporated into the plan compare with plans for a long-term nuclear waste solution of a repository at Yucca Mountain…" Requires the above analysis to use scientific and technical materials and information used to support policy actions related to the Yucca Mountain project.	
6.	Mr. Wu (058)	Adds a new section to the end of the bill stating that "the Secretary of Energy shall prepare a database of non-Federal user facilities receiving Federal funds that may be used for unclassified nuclear energy research." The section requires that the Secretary of Energy shall make that database accessible on the DOE 's website.	Agreed to by voice vote.
7.	Mr. Sensenbrenner (044)	Adds a new section to the end of the bill stating that, "[c]onsistent with the requirements of current law, the Department of Energy shall be responsible for disposal of high-level radioactive waste or spent nuclear fuel generated by reactors under the programs authorized in this Act, or amendments made by this Act."	Modified by unanimous consent and agreed to by voice vote.
8.	Mr. Lipinski (076)	Adds a new subparagraph to Section 5, requiring that an applicant's proposal must document "the extent to which the proposal will increase domestic manufacturing activity, exports, or employment."	Agreed to by voice vote.

AMENDMENT TO H.R. 5866

OFFERED BY MR. GORDON OF TENNESSEE

Page 3, line 22, strike "fission" and insert "nuclear".

Page 6, line 11, strike "and".

Page 6, line 12, redesignate subparagraph (B) as subparagraph (C).

Page 6, after line 11, insert the following new subparagraph:

1 "(B) with respect to which most parts can
2 be factory assembled and shipped as modules to
3 a reactor plant site for assembly; and

Page 8, lines 20 and 21, strike "using federally appropriated funds" insert "using funds received from the Federal Government through appropriation Acts".

Page 9, lines 12 through 14, amend subparagraph (E) to read as follows:

4 "(E) The degree to which the following
5 goals will be advanced:

1 "(i) Lower capital costs or increased
2 access to private financing in comparison
3 to current large reactor designs.
4 "(ii) Reduced long-term radiotoxicity,
5 mass, or decay heat of the nuclear waste
6 produced by generation.
7 "(iii) Increased operating safety of
8 nuclear facilities.
9 "(iv) Reduced dependence of reactor
10 systems on water resources.
11 "(v) Increased seismic resistance of
12 nuclear generation.
13 "(vi) Reduced proliferation risks
14 through integrated safeguards and security
15 proliferation controls.
16 "(vii) Increased efficiency in reactor
17 manufacturing and construction.".

Page 10, line 5, strike "research and development program" and insert "research, development, demonstration, and commercial application program".

Page 11, line 15, strike "salt dome storage" and insert " "mined repositories in a range of geologic media".

Page 12, line 2, insert "for advanced" after "flow sheets".

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AMENDMENT TO H.R. 5866

OFFERED BY MR. BILBRAY OF CALIFORNIA

Page 3, after line 13, insert the following new section (and redesignate the subsequent sections accordingly):

1 **SEC. 4. PROGRAM OBJECTIVES STUDY.**

2 Section 951 of the Energy Policy Act of 2005 (42
3 U.S.C. 16271) is amended by adding at the end the fol-
4 lowing new subsection:

5 "(f) PROGRAM OBJECTIVES STUDY.—In furtherance
6 of the program objectives listed in subsection (a) of this
7 section, the Secretary shall, within one year after the date
8 of enactment of this subsection, transmit to the Congress
9 a report on the results of a study on the scientific and
10 technical merit of major State requirements and stand-
11 ards, including moratoria, that delay or impede the further
12 development and commercialization of nuclear power, and
13 how the Federal Government can assist in overcoming
14 such delays or impediments.".

AMENDMENT TO H.R. 5866
OFFERED BY MR. TONKO OF NEW YORK

Page 9, after line 14, insert the following new section (and redesignate the subsequent sections accordingly):

1 **SEC. 6. CONVENTIONAL IMPROVEMENTS TO NUCLEAR**
2 **POWER PLANTS.**

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

6 "(e) CONVENTIONAL IMPROVEMENTS TO NUCLEAR
7 POWER PLANTS.—

8 "(1) IN GENERAL.—The Secretary may carry
9 out a Nuclear Energy Research Initiative for re-
10 search and development related to steam-side im-
11 provements to nuclear power plants to promote the
12 research, development, demonstration, and commer-
13 cial application of—

14 "(A) cooling systems;

15 "(B) turbine technologies;

16 "(C) heat exchangers and pump design;

1 "(D) special coatings to improve lifetime of
2 components and performance of heat exchang-
3 ers; and
4 "(E) advanced power conversion systems
5 for advanced reactor technologies.
6 "(2) ADMINISTRATION.—The Secretary may
7 undertake initiatives under this subsection only when
8 the goals are relevant and proper to enhance the
9 performance of technologies developed under sub-
10 section (c). Not more than $10,000,000 of funds au-
11 thorized for this section may be used for carrying
12 out this subsection.".

AMENDMENT TO H.R. 5866

OFFERED BY MR. GARAMENDI OF CALIFORNIA and Mrs. Biggert of Illinois

Page 11, lines 1 through 4, amend paragraph (3) to read as follows:

1 "(3) FULL RECYCLE.—Developing advanced re-
2 cycling technologies, including Generation IV Reac-
3 tors, to reduce the risk of proliferation, radiotoxicity,
4 mass, and decay heat to the greatest extent possible.

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AMENDMENT TO H.R. 5866

OFFERED BY MR. INGLIS OF SOUTH CAROLINA

Page 12, line 19, through page 13, line 3, amend subsection (d) to read as follows:

1 "(d) BLUE RIBBON COMMISSION REPORT.—
2 "(1) In carrying out this section the Secretary
3 shall give consideration to the final report on a long-
4 term nuclear waste solution produced by the Blue
5 Ribbon Commission on America's Nuclear Future.
6 "(2) Not later than 180 days after the release
7 of the Blue Ribbon Commission on America's Nu-
8 clear Future final report, the Secretary shall trans-
9 mit to Congress a report, which shall include—
10 "(A) any plans the Department may have
11 to incorporate any relevant recommendations
12 from this report into the program; and
13 "(B) how those recommendations for long-
14 term nuclear waste solutions that will be incor-
15 porated into the plan compare with plans for a
16 long-term nuclear waste solution of a repository
17 at Yucca Mountain, that may or may not be in-
18 corporated into the plan, with regard to the
19 safety, security, legal, cost, and technological

1 and site readiness factors associated with any
2 recommendations related to final disposition
3 pathways for spent nuclear fuel and high-level
4 radioactive waste to the same factors associated
5 with permanent deep geological disposal at the
6 Yucca Mountain waste repository.
7 "(3) The analysis described in paragraph
8 (2)(B) shall be conducted using scientific and tech-
9 nical materials and information used to support pol-
10 icy actions related to the Yucca Mountain project.".

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AMENDMENT TO H.R. 5866

OFFERED BY MR. WU OF OREGON

At the end of the bill, add the following new section:

1 **SEC. 12. AVAILABLE FACILITIES DATABASE.**

2 The Secretary of Energy shall prepare a database of
3 non-Federal user facilities receiving Federal funds that
4 may be used for unclassified nuclear energy research.
5 The Secretary shall make this database accessible on the
6 Department of Energy's website.

AMENDMENT TO H.R. 5866
OFFERED BY MR. SENSENBRENNER OF WISCONSIN

At the end of the bill, add the following new section:

1 **SEC. 12. NUCLEAR WASTE DISPOSAL.**

2 Consistent with the requirements of current law, the
3 Department of Energy shall be responsible for disposal of
4 high-level radioactive waste or spent nuclear fuel gen-
5 erated by reactors developed under the programs author-
6 ized in this Act, or the amendments made by this Act.

AMENDMENT TO H.R. 5866

OFFERED BY MR. LIPINSKI OF ILLINOIS

Page 8, after line 11, insert the following new subparagraph (and make the necessary conforming changes):

1 "(E) the extent to which the proposal will
2 increase domestic manufacturing activity, ex-
3 ports, or employment.