AMENDMENT NO. ____ Calendar No. ____

Purpose: To establish the Next Generation Nuclear Plant Project.

**IN THE SENATE OF THE UNITED STATES—109th Cong., 1st Sess.**

**S. ____**

To enhance the energy security of the United States, and for other purposes.

Referred to the Committee on _____ and ordered to be printed

Ordered to lie on the table and to be printed

AMENDMENT intended to be proposed by _____ to Title VI—Nuclear Matters (END05442.LC)

Viz:

At the end of the title, add the following:

# Subtitle D—Next Generation Nuclear Plant Project

**SEC. 661. PROJECT ESTABLISHMENT.**

(a) ESTABLISHMENT.—The Secretary shall establish a project to be known as the ''Next Generation Nuclear Plant Project'' (referred to in this subtitle as the ''Project'').

(b) CONTENT.—The Project shall consist of the research, development, design, construction, and operation of a prototype plant, including a nuclear reactor that—

(1) is based on research and development activities supported by the Generation IV Nuclear Energy Systems Initiative under section 942(d); and

(2) shall be used—

(A) to generate electricity;

(B) to produce hydrogen; or

(C) both to generate electricity and to produce hydrogen.

**SEC. 662. PROJECT MANAGEMENT.**

(a) DEPARTMENTAL MANAGEMENT.—

(1) IN GENERAL.—The Project shall be managed in the Department by the Office of Nuclear Energy, Science, and Technology.

(2) GENERATION IV NUCLEAR ENERGY SYSTEMS PROGRAM.—The Secretary may combine the Project with the Generation IV Nuclear Energy Systems Initiative.

(3) EXISTING DOE PROJECT MANAGEMENT EXPERTISE.—The Secretary may utilize capabilities for review of construction projects for advanced scientific facilities within the Office of Science to track the progress of the Project.

(b) LABORATORY MANAGEMENT.—

(1) LEAD LABORATORY.—The Idaho National Laboratory shall be the lead National Laboratory for the Project and shall collaborate with other National Laboratories, institutions of higher education, other research institutes, industrial researchers, and international researchers to carry out the Project.

(2) INDUSTRIAL PARTNERSHIPS.—

(A) IN GENERAL.—The Idaho National Laboratory shall organize a consortium of appropriate industrial partners that will carry out cost-shared research, development, design, and construction activities, and operate research facilities, on behalf of the Project.

(B) COST-SHARING.—Activities of industrial partners funded by the Project shall be cost-shared in accordance with section 1002.

(C) PREFERENCE.—Preference in determining the final structure of the consortium or any partnerships under this subtitle shall be given to a structure (including designating as a lead industrial partner an entity incorporated in the United States) that retains United States technological leadership in the Project while

maximizing cost sharing opportunities and minimizing Federal funding responsibilities.

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

(4) REACTOR TEST CAPABILITIES.—The Project shall use, if appropriate, reactor test capabilities at the Idaho National Laboratory.

(5) OTHER LABORATORY CAPABILITIES.—The Project may use, if appropriate, facilities at other National Laboratories.

**SEC. 663. PROJECT ORGANIZATION.**

(a) MAJOR PROJECT ELEMENTS.—The Project shall consist of the following major program elements:

(1) High-temperature hydrogen production technology development and validation.

(2) Energy conversion technology development and validation.

(3) Nuclear fuel development, characterization, and qualification.

(4) Materials selection, development, testing, and qualification.

(5) Reactor and balance-of-plant design, engineering, safety analysis, and qualification.

(b) PROJECT PHASES.—The Project shall be conducted in the following phases:

(1) FIRST PROJECT PHASE.—A first project phase shall be conducted to—

(A) select and validate the appropriate technology under subsection (a)(1);

(B) carry out enabling research, development, and demonstration activities on technologies and components under paragraphs (2) through (4) of subsection (a);

(C) determine whether it is appropriate to combine electricity generation and hydrogen production in a single prototype nuclear reactor and plant; and

(D) carry out initial design activities for a prototype nuclear reactor and plant, including development of design methods and safety analytical methods and studies under subsection (a)(5)

(2) SECOND PROJECT PHASE.—A second project phase shall be conducted to—

(A) continue appropriate activities under paragraphs (1) though (5) of subsection (a);

(B) develop, through a competitive process, a final design for the prototype nuclear reactor and plant;

(C) apply for licenses to construct and operate the prototype nuclear reactor from the Nuclear Regulatory Commission; and

(D) construct and start up operations of the prototype nuclear reactor and its associated hydrogen or electricity production facilities.

(c) PROJECT REQUIREMENTS.—

(1) IN GENERAL.—The Secretary shall ensure that the Project is structured so as to maximize the technical interchange and transfer of technologies and ideas into the Project from other sources of relevant expertise, including—

(A) the nuclear power industry, including nuclear powerplant construction firms, particularly with respect to issues associated with plant design, construction, and operational and safety issues;

(B) the chemical processing industry, particularly with respect to issues relating to—

(i) the use of process energy for production of hydrogen; and

(ii) the integration of technologies developed by the Project into chemical processing environments; and

(C) international efforts in areas related to the Project, particularly with respect to hydrogen production technologies.

(2) INTERNATIONAL COLLABORATION.—

(A) IN GENERAL.—The Secretary shall seek international cooperation, participation, and financial contributions for the Project.

(B) ASSISTANCE FROM INTERNATIONAL PARTNERS.—The Secretary, through the Idaho National Laboratory, may contract for assistance from specialists or facilities from member countries of the Generation IV International Forum, the Russian Federation, or other international partners if the specialists or facilities provide access to cost-effective and relevant skills or test capabilities.

(C) PARTNER NATIONS.—The Project may involve demonstration of selected project objectives in a partner country.

(D) GENERATION IV INTERNATIONAL FORUM.—The Secretary shall ensure that inter-

national activities of the Project are coordinated with the Generation IV International Forum.

(3) REVIEW BY NUCLEAR ENERGY RESEARCH ADVISORY COMMITTEE.—

(A) IN GENERAL.—The Nuclear Energy Research Advisory Committee of the Department (referred to in this paragraph as the ''NERAC'') shall—

(i) review all program plans for the Project and all progress under the Project on an ongoing basis; and

(ii) ensure that important scientific, technical, safety, and program management issues receive attention in the Project and by the Secretary.

(B) ADDITIONAL EXPERTISE.—The NERAC shall supplement the expertise of NERAC or appoint subpanels to incorporate into the review by NERAC the relevant sources of expertise described under paragraph (1).

(C) INITIAL REVIEW.—Not later than 180 days after the date of enactment of this Act, the NERAC shall—

(i) review existing program plans for the Project in light of the recommenda-

tions of the document entitled ''Design Features and Technology Uncertainties for the Next Generation Nuclear Plant,'' dated June 30, 2004; and

(ii) address any recommendations of the document not incorporated in program plans for the Project.

(D) FIRST PROJECT PHASE REVIEW.—On a determination by the Secretary that the appropriate activities under the first project phase under subsection (b)(1) are nearly complete, the Secretary shall request the NERAC to conduct a comprehensive review of the Project and to report to the Secretary the recommendation of NERAC concerning whether the Project is ready to proceed to the second project phase under subsection (b)(2).

(E) TRANSMITTAL OF REPORTS TO CONGRESS.—Not later than 60 days after receiving any report from the NERAC related to the Project, the Secretary shall submit to the appropriate committees of the Senate and the House of Representatives a copy of the report, along with any additional views of the Secretary that the Secretary may consider appropriate.

**SEC. 664. NUCLEAR REGULATORY COMMISSION.**

(a) IN GENERAL.—In accordance with section 202 of the Energy Reorganization Act of 1974 (42 U.S.C. 5842), the Nuclear Regulatory Commission shall have licensing and regulatory authority for any reactor authorized under this subtitle.

(b) LICENSING STRATEGY.—Not later than 3 years after the date of enactment of this Act, the Secretary and the Chairman of the Nuclear Regulatory Commission shall jointly submit to the appropriate committees of the Senate and the House of Representatives a licensing strategy for the prototype nuclear reactor, including—

(1) a description of ways in which current licensing requirements relating to light-water reactors need to be adapted for the types of prototype nuclear reactor being considered by the Project;

(2) a description of analytical tools that the Nuclear Regulatory Commission will have to develop to independently verify designs and performance characteristics of components, equipment, systems, or structures associated with the prototype nuclear reactor;

(3) other research or development activities that may be required on the part of the Nuclear Regulatory Commission in order to review a license application for the prototype nuclear reactor; and

(4) an estimate of the budgetary requirements associated with the licensing strategy.

(c) ONGOING INTERACTION.—The Secretary shall seek the active participation of the Nuclear Regulatory Commission throughout the duration of the Project to—

(1) avoid design decisions that will compromise adequate safety margins in the design of the reactor or impair the accessibility of nuclear safety-related components of the prototype reactor for inspection and maintenance;

(2) develop tools to facilitate inspection and maintenance needed for safety purposes; and

(3) develop risk-based criteria for any future commercial development of a similar reactor architectures.

**SEC. 665. PROJECT TIMELINES AND AUTHORIZATION OF APPROPRIATIONS.**

(a) TARGET DATE TO COMPLETE THE FIRST PROJECT PHASE.—Not later than September 30, 2011—

(1) the Secretary shall select the technology to be used by the Project for high-temperature hydrogen production and the initial design parameters for the prototype nuclear plant; or

(2) submit to Congress a report establishing an alternative date for making the selection.

(b) DESIGN COMPETITION FOR SECOND PROJECT PHASE.—

(1) IN GENERAL.—The Secretary, acting through the Idaho National Laboratory, shall fund not more than 4 teams for not more than 2 years to develop detailed proposals for competitive evaluation and selection of a single proposal for a final design of the prototype nuclear reactor.

(2) SYSTEMS INTEGRATION.—The Secretary may structure Project activities in the second project phase to use the lead industrial partner of the competitively selected design under paragraph (1) in a systems integration role for final design and construction of the Project.

(c) TARGET DATE TO COMPLETE PROJECT CONSTRUCTION.—Not later than September 30, 2021—

(1) the Secretary shall complete construction and begin operations of the prototype nuclear reactor and associated energy or hydrogen facilities; or

(2) submit to Congress a report establishing an alternative date for completion.

(d) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to the Secretary for research and construction activities under this subtitle (in-

cluding for transfer to the Nuclear Regulatory Commission for activities under section 664 as appropriate)—

(1) $1,250,000,000 for the period of fiscal years 2006 through 2015; and

(2) such sums as are necessary for each of fiscal years 2016 through 2021.