The original documents are located in Box 6, folder "9/3/74 HR14920 Geothermal Energy Research, Development and Demonstration (2)" of the White House Records Office: Legislation Case Files at the Gerald R. Ford Presidential Library.

RUSH

THE WHITE HOUSE

ACTION MEMORANDUM WASHINGTON LOG NO.: 553

Date: August 29, 1974 Time: 3:30 p.m.

FOR ACTION: Michael Duval
NSC/S
Phil Buchen
Bill Timmons

cc (for information): Warren K. Hendriks
Jerry Jones

FROM THE STAFF SECRETARY

DUE: Date: Friday, August 30, 1974 Time: 2:00 p.m.

SUBJECT: Enrolled Bill H.R. 14920 - Geothermal Energy Research Development and Demonstration Act of 1974

ACTION REQUESTED:

____ For Necessary Action
XX For Your Recommendations
____ Prepare Agenda and Brief
____ Draft Reply
____ For Your Comments
____ Draft Remarks

REMARKS: OK Mike Duval

Please return to Kathy Tindle - West Wing

PLEASE ATTACH THIS COPY TO MATERIAL SUBMITTED.

If you have any questions or if you anticipate a delay in submitting the required material, please telephone the Staff Secretary immediately.

Warren K. Hendriks
For the President

EXECUTIVE OFFICE OF THE PRESIDENT

OFFICE OF MANAGEMENT AND BUDGET

WASHINGTON, D.C. 20503

AUG 2 9 1974

MEMORANDUM FOR THE PRESIDENT

Subject: Enrolled Bill H.R. 14920 - Geothermal Energy Research, Development and Demonstration Act of 1974
Sponsor - Rep. McCormack (D) Washington

Last Day for Action

September 3, 1974 - Tuesday

Purpose

Establishes a management project to undertake a comprehensive geothermal energy research and development program, including construction of demonstration plants to produce electricity; establishes a loan guarantee program to stimulate commercial development of geothermal resources; and for other purposes.

Agency Recommendations

Office of Management and Budget	Approval
Federal Energy Administration	Approval
National Aeronautics and Space Administration	Approval (informal)
National Science Foundation	No objection
Department of the Treasury	No objection
Atomic Energy Commission	No objection (informal)
Department of the Interior	Does not recommend Veto

Discussion

Geothermal energy is derived from the internal heat of the Earth. While a small number of plants already produce electricity from one type (dry steam), there are other types

of potentially high-energy geothermal resources, such as hot dry rock and pressurized water, which have not been developed. The full extent and potential of these resources is not known, but they are suspected to offer a large, long-range source of environmentally-acceptable energy. In addition, dissolved materials such as sulfur and minerals can probably be recovered as byproducts.

Recognition of the growing importance of geothermal energy was reflected in enactment of the Geothermal Steam Act of 1970, which authorized the leasing of Federal lands for geothermal development. The enrolled bill was characterized in House floor debate (passed 404-3) as "the next logical step forward" in developing these resources.

H.R. 14920 establishes a temporary interagency geothermal energy management group. The management group -- to be known as the Geothermal Energy Coordination and Management Project -- would be terminated and its functions transferred to the Energy Research and Development Administration within 60 days of the enactment of legislation creating that agency -- legislation for this purpose supported by the Administration is now in conference. The bill also contains a number of new research, development and demonstration authorities in the field of geothermal energy, as discussed below.

The Geothermal Energy Coordination and Management Project (the Project) would be composed of six members -- one at the Assistant Secretary or comparable level from each of the four agencies named below, an Assistant Administrator of the Federal Energy Administration, and a member appointed by the President. The President could designate any member to serve as Chairman. The Project would have authority (until the ERDA legislation is enacted) to establish or approve programs, and its responsibilities would be carried out through the following agencies:

- The Department of the Interior, which would evaluate the resource base and develop technologies associated with exploration;

- The National Aeronautics and Space Administration, which would provide contract management capability, evaluate the resource base, and develop technologies as instructed by the Project;

- The Atomic Energy Commission, which would also be responsible for technology development as the Project would determine; and,

- The National Science Foundation, which would be responsible for basic and applied research.

H.R. 14920 would direct the Project to:

- prepare, through NASA, a comprehensive "program definition" of the effort needed to develop these resources commercially by 1980, which would be transmitted to the Congress by August 31, 1975 ($2.5 million is authorized for this purpose);

- plan the orderly inventorying of geothermal resources throughout the United States, and, through the Geological Survey, carry out regional surveys after developing new drilling techniques and advanced methods of assessing resource value;

- initiate a research and development program to meet eleven goals set out in the bill, which generally concern new or improved drilling, extraction and production technologies;

- initiate a program to design and construct pilot and demonstration plants to produce electricity, and enter into cooperative agreements with utilities or with non-Federal governmental entities to build such plants, or, under specified circumstances, to build such plants without non-Federal participation; and,

- support, through NSF, programs to train the necessary scientific and engineering personnel.

The enrolled bill would also authorize the Project to establish a program to guarantee, under appropriate conditions, loans made by private financial institutions to companies to carry out resource assessment, engage in research and development,

acquire rights to resources, or produce energy or byproducts. An agency designated by the Project would be authorized to guarantee payment of principal and interest on up to 75% of the total value of any one project, not to exceed $25 million for a single project or a total of $50 million for a series of projects by any single company. A Geothermal Resources Development Fund would be established in the Treasury for this purpose. Authority for the loan guarantee program would expire in ten years, and not to exceed $50 million annually would be authorized for appropriation to the Fund to cover losses.

The enrolled bill contains the first energy-related loan guarantee program to be enacted by the 93rd Congress, and so may serve as a prototype for future similar programs. After the bill had reached conference, Treasury and OMB staff met informally with committee staff members in an attempt to remedy sixteen deficiencies in the bill in relation to sound Federal credit management policies. Since the House and Senate versions had almost identical credit provisions, the options were limited. While the number of perfecting provisions accepted by the conferees -- eight -- was better than hoped for under these conditions, a number of important improvements were not adopted.

Treasury has received informal advice from the Senate Interior Committee staff that certain additional perfecting amendments would be considered by the committee if the enrolled bill is signed. On the basis of this understanding, Treasury states in its letter on the enrolled bill that it would have no objection to approval, and that remedial legislation is being prepared by that Department.

Although we do not believe the enrolled bill is essential to the conduct of Federal research and development programs in this area since many of the authorities already exist in Federal agencies, it does offer a feasible interim arrangement for managing research and development programs in several agencies.

It does, however, have some remaining minor problems, since:

- the provisions of the loan guarantee program are still not satisfactory, as discussed above; and,

- while the bill does provide for a transfer of functions, its provisions are vague on whether the actual agency operating programs are to be transferred as well.

However, we recognize that the Congress has moved toward meeting the Administration's major objections by modifying the bill with regard to appointment of a member to the Project and designation of the Chairman by the President, by accepting some of our recommendations concerning the loan guarantee program, and, most importantly, by providing for the Project to be incorporated into ERDA. These improvements were, in fact, suggested by the Executive Branch as a basic means for making the bill acceptable.

On balance, we believe the bill should be approved. We will work with Treasury in developing remedial legislation to correct deficiencies in the loan guarantee authority as well as with Interior, which has advised that it will wish to propose changes in other provisions of the bill. Further, we will be prepared to move expeditiously with appropriate administrative proposals to provide for clarification and an orderly transition of the pertinent authorities in the bill to ERDA when legislation establishing that agency is enacted.

No expenditures are mandated, and the discretionary authority in the bill will not require any increase in funding above the $45 million which has already been appropriated for geothermal energy programs in this fiscal year.

~~We understand that White House staff is preparing a signing statement on the bill for your consideration.~~ per W. Rommel 8/29/74

Wilfred H Rommel

Assistant Director for
Legislative Reference

Enclosures

NATIONAL SCIENCE FOUNDATION
WASHINGTON, D.C. 20550

OFFICE OF THE
DIRECTOR

August 27, 1974

Mr. Wilfred H. Rommel
Assistant Director for
Legislative Reference
Office of Management and Budget
Washington, D. C. 20503

Dear Mr. Rommel:

A copy of the Enrolled Bill, H. R. 14920, the "Geothermal Energy Research, Development, and Demonstration Act of 1974" has not been received. However, we have examined the bill as reported in the Congressional Record for August 19, 1974 at pages H 8600 to H 8603, inclusive.

We have no objection to approval by the President of H. R. 14920 in that form.

Sincerely yours,

Lowell J. Paige
Acting Director

THE GENERAL COUNSEL OF THE TREASURY
WASHINGTON, D.C. 20220

AUG 28 1974

Director, Office of Management and Budget
Executive Office of the President
Washington, D. C. 20503

Attention: Assistant Director for Legislative Reference

Sir:

Reference is made to your request for the views of this Department on the enrolled enactment of H.R. 14920, the "Geothermal Energy Act of 1974."

The enrolled enactment would authorize a Federal program to guarantee lenders against loss of principal or interest on loans made to certain public or private agencies, corporations, or other legal entities for the purpose of acquiring rights in geothermal resources and performing exploration, development, and construction and operation of facilities for the commercial production of energy from geothermal resources.

The financial provisions of the House and Senate versions of the bill were technically deficient in several important respects and not consistent with overall Administration policy with respect to Federal credit programs. Amendments to correct these deficiencies were the subject of Treasury reports dated August 1 to Chairmen Jackson and Teague. However, the conferees did not adopt two amendments of particular importance to the Department.

The first such amendment would have made taxable the interest on any loan guaranteed under the proposal. This provision is necessary to permit guaranteed loans to public bodies but to prevent Federal guarantees of tax-exempt obligations. Federal guarantees of tax-exempts have been clearly recognized by the Administration and the Congress as bad budget, tax, and debt management policy, and the Congress has prohibited such guarantees under a number of Federal credit programs in recent years, including most recently the Indian Financing Act of 1974.

The second such amendment would have authorized the program administrator to borrow from the Treasury in the event that amounts in the fund are insufficient to enable him to discharge his responsibilities under the guarantee program. The guarantee under this program is an obligation fully binding on the United States, whether or not a source of funds for fulfillment of the guarantee obligation has been specified. This amendment would increase the market acceptability of the Federally guaranteed obligations and reduce the cost of financing the program by assuring the ability of the administrator to make timely payments.

We understand that these two amendments were not adopted by the conferees because these specific provisions did not represent an area of disagreement between the House and Senate versions of the bill. We also understand from Senate Interior Committee staff that the Committee may be willing to consider remedial legislation and that there would be a good chance of enactment early next year prior to implementation of the program.

With the understanding that the proposed guarantee program will not be implemented prior to submission of such remedial legislation, the Department would have no objection to a recommendation that the enrolled enactment be approved by the President.

Sincerely yours,

Richard R. Albrecht

General Counsel

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

AUG 28 1974

Mr. Wilfred H. Rommel
Assistant Director for
Legislative Reference
ATTN: Mrs. Louise Garziglia
Legislative Reference Division
Office of Management and Budget

Dear Mr. Rommel:

The Atomic Energy Commission is pleased to respond to your request for our views on Enrolled Bill H.R. 14920, the "Geothermal Energy Research, Development and Demonstration Act of 1974." We have not previously been asked to comment on this bill.

The AEC supports the basic purposes of H.R. 14920. However, while we interpose no objection to its approval, we believe that the bill is of questionable value, as explained below.

Briefly, Title I of the bill would establish a Geothermal Energy Coordination and Management Project, composed of six members, one of whom would be appointed by the President and the remaining five serving by virtue of positions in Government agencies. AEC would be represented by its General Manager.

Of the four main aspects of the geothermal program contemplated by the bill, the Project would look primarily to the Department of the Interior for evaluation and assessment of the resource base; to the National Aeronautics and Space Administration for contract management capability, evaluation and assessment of the resource base and program definition; to the AEC for the development of technologies; and to the National Science Foundation for basic and applied research. The Geological Survey would be utilized in connection with the inventorying of geothermal resources on both Federal and non-Federal lands.

The bill contemplates the carrying out of demonstration projects for each geothermal resource base. These projects could include cooperative projects between Federal agencies and with utilities and non-Federal entities.

Title II of H.R. 14920 would authorize the Project Chairman to designate a Federal agency to carry on a loan guarantee program, in consultation with the Secretary of the Treasury, to encourage the commercial production of energy from geothermal resources. The guaranty for any loan for a project would be limited to $25,000,000, and the guarantees for the loans of a single borrower could not exceed $50,000,000.

Under Title III of the bill, all research, development, and demonstration functions of the Project (including the loan guaranty program) would be transferred to a permanent Federal energy research and development agency, if legislation for such an agency is enacted. In that event, the Project members would provide advice and counsel to the new agency. Finally, the bill would authorize $2.5 million to NASA for program definition in the current fiscal year, and not to exceed $50 million annually for the loan guaranty program.

In her February 6 testimony before the House Committee on Science and Astronautics concerning H.R. 11212, a predecessor bill, Chairman Ray pointed out that the central planning and coordination of all energy research and development efforts in a single independent agency should enable us to make the greatest use of our energy resources such as geothermal. AEC continues to hold this view. While H.R. 14920 would provide a transitional program, its usefulness diminishes markedly with the increasing prospects for passage of the ERDA legislation in the near term. However, we do not oppose approval of H.R. 14920 for two principal reasons. First, the bill does not appear to affect ongoing agency geothermal programs. While under Section 101(e) the Project would have exclusive authority with respect to the establishment or approval of programs initiated under the proposed Act, there is no provision for discontinuing or redirecting existing geothermal programs. It should be noted in this respect that the AEC's present geothermal activities are broader than those contemplated in the bill, and include demonstration power plants in cooperation with industry for the several geothermal resource types. While the AEC would cooperate wholeheartedly in implementing the provisions of H.R. 14920 if approved, we would be able to continue our existing geothermal activities, which are funded for FY 1975 in the amount of $10.7 million in operating funds.

The other reason for our not objecting to the bill's approval is its provision of an orderly procedure for transfer of Project activities to an energy research and development agency, assuming enactment of such legislation.

Sincerely,

William A. Anders
Commissioner

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

AUG 28 1974

Dear Mr. Ash:

This responds to your request for our views concerning H.R. 14920, an enrolled bill "To further the conduct of research, development, and demonstrations in geothermal energy technologies, to establish a Geothermal Energy Coordination and Management Project, to amend the National Science Foundation Act of 1950 to provide for the funding of activities relating to geothermal energy, to amend the National Aeronautics and Space Act of 1958 to provide for the carrying out of research and development in geothermal energy technology, to carry out a program of demonstrations in technologies for the utilization of geothermal resources, and for other purposes", which is before the President for approval.

The bill makes no significant contribution to implementation of present Administration energy policy and includes several objectionable features. However, we do not recommend veto of the bill. In a subsequent letter, we will recommend administrative steps to minimize its objectionable features, should the bill become law.

H.R. 14920 provides for the development of a "Geothermal Energy Coordination and Management Project" composed of six members including representatives of the National Science Foundation, the Interior Department, the National Aeronautics and Space Administration, the Atomic Energy Commission and the Federal Energy Administration together with a member appointed by the President. The Project would carry out certain of its responsibilities through Federal agencies as specified by the bill. Evaluation and assessment of the geothermal resource base, including development of exploration technologies, would be carried out by this Department. The bill requires the Project to prepare a "comprehensive program definition" with interim reports being transmitted to the President and Congress not later than November 30, 1974, and January 31, 1975, and the final definition being prepared not later than August 31, 1975. The Geological Survey would be required to prepare a schedule and objectives for inventorying geothermal resources as part of the comprehensive program definition. The bill also specifies certain research and development programs to be undertaken and contemplates a demonstration plant program.

In addition, H.R. 14920 authorizes a loan guarantee program to be administered by an appropriate agency as determined by the Project Chairman and with an annual authorization of $50 million. Research and development functions provided for by the bill would be transferred to ERDA within 60 days after legislation authorizing that organization is passed.

Establishment of the Geothermal Energy Coordination and Management Project will hamper current Administration efforts to develop and implement a comprehensive energy policy. The Administration's geothermal program can be carried out under existing authorities and the bill adds unnecessary organizational arrangements and substantive requirements. These confuse existing and planned responsibilities relating to geothermal energy. Among other matters, the bill leaves unclear the division of responsibility for evaluation and assessment of the resource base and for the development of technology as contemplated by section 101(d) and would still require Executive Branch determination of responsibility for these functions.

In addition, we object to authorization of loan guarantees for geothermal development as provided by the bill. These provisions are unclear and would arbitrarily favor the development of one energy form over others. The need for loan guarantees has not adequately been demonstrated and the bill fails to distinguish situations where such guarantees may be appropriate from those where they are not.

Sincerely yours,

Jack W Carlson

Assistant Secretary of the Interior

Honorable Roy L. Ash
Director, Office of
Management and Budget
Washington, D.C. 20503

93D CONGRESS } HOUSE OF REPRESENTATIVES { REPORT
2d Session } { No. 93-1301

GEOTHERMAL ENERGY RESEARCH, DEVELOPMENT, AND DEMONSTRATION ACT OF 1974

AUGUST 19, 1974.—Ordered to be printed

Mr. TEAGUE, from the committee of conference, submitted the following

CONFERENCE REPORT

[To accompany H.R. 14920]

The committee of conference on the disagreeing votes of the two Houses on the amendments of the Senate to the bill (H.R. 14920) to further the conduct of research, development, and demonstrations in geothermal energy technologies, to establish a Geothermal Energy Coordination and Management Project, to amend the National Science Foundation Act of 1950 to provide for the funding of activities relating to geothermal energy, to amend the National Aeronautics and Space Act of 1958 to provide for the carrying out of research and development in geothermal energy technology, to carry out a program of demonstrations in technologies for the utilization of geothermal resources, and for other purposes, having met, after full and free conference, have agreed to recommend and do recommend to their respective Houses as follows:

That the House recede from its disagreement to the amendment of the Senate to the text of the bill and agree to the same with an amendment as follows:

In lieu of the matter proposed to be inserted by the Senate amendment insert the following:

SHORT TITLE

SEC. 1. This Act may be cited as the "Geothermal Energy Research, Development, and Demonstration Act of 1974".

FINDINGS

SEC. 2. The Congress hereby finds that—

(1) the Nation is currently suffering a critical shortage of environmentally acceptable forms of energy;

38-006—74——1

(2) the inadequate organizational structures and levels of funding for energy research have limited the Nation's current and future options for meeting energy needs;

(3) electric energy is a clean and convenient form of energy at the location of its use and is the only practicable form of energy in some modern applications, but the demand for electric energy in every region of the United States is taxing all of the alternative energy sources presently available and is projected to increase; some of the sources available for electric power generation are already in short supply, and the development and use of other sources presently involve undesirable environmental impacts;

(4) the Nation's critical energy problems can be solved only if a national commitment is made to dedicate the necessary financial resources, and enlist the cooperation of the private and public sectors, in developing geothermal resources and other nonconventional sources of energy;

(5) the conventional geothermal resources which are presently being used have limited total potential; but geothermal resources which are different from those presently being used, and which have extremely large energy content, are known to exist;

(6) some geothermal resources contain energy in forms other than heat; examples are methane and extremely high pressures available upon release as kinetic energy;

(7) some geothermal resources contain valuable byproducts such as potable water and mineral compounds which should be processed and recovered as national resources;

(8) technologies are not presently available for the development of most of these geothermal resources, but technologies for the generation of electric energy from geothermal resources are potentially economical and environmentally desirable, and the development of geothermal resources offers possibilities of process energy and other nonelectric applications;

(9) much of the known geothermal resources exist on the public lands;

(10) Federal financial assistance is necessary to encourage the extensive exploration, research, and development in geothermal resources which will bring these technologies to the point of commercial application;

(11) the advancement of technology with the cooperation of private industry for the production of useful forms of energy from geothermal resources is important with respect to the Federal responsibility for the general welfare, to facilitate commerce, to encourage productive harmony between man and his environment, and to protect the public interest; and

(12) the Federal Government should encourage and assist private industry through Federal assistance for the development and demonstration of practicable means to produce useful energy from geothermal resources with environmentally acceptable processes.

DEFINITIONS

SEC. 3. For the purposes of this Act—

(1) the term "geothermal resources" means (A) all products of geothermal processes, embracing indigenous steam, hot water,

and brines, (B) steam and other gases, hot water and hot brines resulting from water, gas, or other fluids artificially introduced into geothermal formations, and (C) any byproduct derived from them;

(2) the term "byproduct" means any mineral or minerals which are found in solution or in association with geothermal resources and which have a value of less than 75 percent of the value of the geothermal steam and associated geothermal resources or are not, because of quantity, quality, or technical difficulties in extraction and production, of sufficient value to warrant extraction and production by themselves;

(3) "pilot plant" means an experimental unit of small size used for early evaluation and development of new or improved processes and to obtain technical, engineering, and cost data;

(4) "demonstration plant" means a complete facility which produces electricity, heat energy, or useful byproducts for commercial disposal from geothermal resources and which will make a significant contribution to the knowledge of full-size technology, plant operation, and process economics;

(5) the term "Project" means the Geothermal Energy Coordination and Management Project established by section 101(a);

(6) the term "fund" means the Geothermal Resources Development Fund established by section 204(a); and

(7) the term "Chairman" means the Chairman of the Project.

TITLE I—GEOTHERMAL ENERGY COORDINATION AND MANAGEMENT PROJECT

ESTABLISHMENT

SEC. 101. (a) There is hereby established the Geothermal Energy Coordination and Management Project.

(b) (1) The Project shall be composed of six members as follows:

(A) one appointed by the President;

(B) an Assistant Director of the National Science Foundation;

(C) an Assistant Secretary of the Department of the Interior;

(D) an Associate Administrator of the National Aeronautics and Space Administration;

(E) the General Manager of the Atomic Energy Commission; and

(F) an Assistant Administrator of the Federal Energy Administration.

(2) The President shall designate one member of the Project to serve as Chairman of the Project.

(3) If the individual appointed under paragraph (1)(A) is an officer or employee of the Federal Government, he shall receive no additional pay on account of his service as a member of the Project. If such individual is not an officer or employee of the Federal Government, he shall be entitled to receive the daily equivalent of the annual rate of basic pay in effect for level IV of the Executive Schedule (5 U.S.C. 5315) for each day (including traveltime) during which he is engaged in the actual performance of duties vested in the Project.

(c) The Project shall have overall responsibility for the provision of effective management and coordination with respect to a national geothermal energy research, development, and demonstration program. Such program shall include—

(1) the determination and evaluation of the resource base;

(2) research and development with respect to exploration, extraction, and utilization technologies;

(3) the demonstration of appropriate technologies; and

(4) the loan guaranty program under title II.

(d)(1) The Project shall carry out its responsibilities under this section acting through the following Federal agencies:

(A) the Department of the Interior, the responsibilities of which shall include evaluation and assessment of the resource base, including development of exploration technologies;

(B) the National Aeronautics and Space Administration, the responsibilities of which shall include the provision of contract management capability, evaluation and assessment of the resource base, and the development of technologies pursuant to section 102(b);

(C) the Atomic Energy Commission, the responsibilities of which shall include the development of technologies; and

(D) the National Science Foundation, the responsibilities of which shall include basic and applied research.

(2) Upon request of the Project, the head of any such agency is authorized to detail or assign, on a reimbursable basis or otherwise, any of the personnel of such agency to the Project to assist it in carrying out its responsibilities under this Act.

(e) The Project shall have exclusive authority with respect to the establishment or approval of programs or projects initiated under this Act, except that the agency involved in any particular program or project shall be responsible for the operation and administration of such program or project.

PROGRAM DEFINITION

SEC. 102. (a)(1) The Chairman, acting through the Administrator of the National Aeronautics and Space Administration, is authorized and directed to prepare a comprehensive program definition of an integrated effort and commitment for effectively developing geothermal energy resources. Such Administrator, in preparing such comprehensive program definition, is authorized to consult with other Federal agencies and non-Federal entities.

(2) The Chairman shall transmit such comprehensive program definition to the President and to each House of the Congress. Interim reports shall be transmitted not later than November 30, 1974, and not later than January 31, 1975. Such comprehensive program definition shall be transmitted as soon as possible thereafter, but in any case not later than August 31, 1975.

(3) As part of the comprehensive program definition required by paragraph (1), the Chairman, acting through the Geological Survey, shall transmit to the President and to each House of the Congress a schedule and objectives for the inventorying of geothermal resources.

(b) The National Aeronautics and Space Administration is authorized to undertake and carry out those programs assigned to it by the Project.

RESOURCE INVENTORY AND ASSESSMENT PROGRAM

SEC. 103. (a) The Chairman shall initiate a resource inventory and assessment program with the objective of making regional and national appraisals of all types of geothermal resources, including identification of promising target areas for industrial exploration and development. The specific goals shall include—

(1) the improvement of geophysical, geochemical, geological, and hydrological techniques necessary for locating and evaluating geothermal resources;

(2) the development of better methods for predicting the power potential and longevity of geothermal reservoirs;

(3) the determination and assessment of the nature and power potential of the deeper unexplored parts of high temperature geothermal convection systems; and

(4) the survey and assessment of regional and national geothermal resources of all types.

(b) The Chairman, acting through the Geological Survey and other appropriate agencies, shall—

(1) develop and carry out a general plan for the orderly inventorying of all forms of geothermal resources of the Federal lands and, where consistent with property rights and determined by the Chairman to be in the national interest, of non-Federal lands;

(2) conduct regional surveys, based upon such a general plan, using innovative geological, geophysical, geochemical, and stratagraphic drilling techniques, which will lead to a national inventory of geothermal resources in the United States;

(3) publish and make available maps, reports, and other documents developed from such surveys to encourage and facilitate the commercial development of geothermal resources for beneficial use and consistent with the national interest;

(4) make such recommendations for legislation as may from time to time appear to be necessary to make Federal leasing policy for geothermal resources consistent with known inventories of various resource types, with the current state of technologies for geothermal energy development, and with current evaluations of the environmental impacts of such development; and

(5) participate with appropriate Federal agencies and non-Federal entities in research to develop, improve, and test technologies for the discovery and evaluation of all forms of geothermal resources, and conduct research into the principles controlling the location, occurrence, size, temperature, energy content, producibility, and economic lifetimes of geothermal reservoirs.

RESEARCH AND DEVELOPMENT

SEC. 104. (a) The Chairman, acting through the appropriate Federal agencies and in cooperation with non-Federal entities, shall initiate a research and development program for the purpose of resolving all major technical problems inhibiting the fullest possible commercial utilization of geothermal resources in the United States. The specific goals of such program shall include—

(1) the development of effective and efficient drilling methods to operate at high temperatures in formations of geothermal interest;

(2) the development of reliable predictive methods and control techniques for the production of geothermal resources from reservoirs;

(3) the exploitation of new concepts for fracturing rock to permit recovery of contained heat reserves;

(4) the improvement of equipment and technology for the extraction of geothermal resources from reservoirs;

(5) the development of improved methods for converting geothermal resources and byproducts to useful forms;

(6) the development of improved methods for controlling emissions and wastes from geothermal utilization facilities, including new monitoring methods to any extent necessary;

(7) the development and evaluation of waste disposal control technologies and the evaluation of surface and subsurface environmental effects of geothermal development;

(8) the improvement of the technical capability to predict environmental impacts resulting from the development of geothermal resources, the preparation of environmental impact statements, and the assuring of compliance with applicable standards and criteria;

(9) the identification of social, legal, and economic problems associated with geothermal development (both locally and regionally) for the purpose of developing policy and providing a framework of policy alternatives for the commercial utilization of geothermal resources;

(10) the provision for an adequate supply of scientists to perform required geothermal research and development activities; and

(11) the establishment of a program to encourage States to establish and maintain geothermal resources clearinghouses, which shall serve to (A) provide geothermal resources developers with information with respect to applicable local, State, and Federal laws, rules, and regulations, (B) coordinate the processing of permit applications, impact statements, and other information which geothermal resources developers are required to provide, (C) encourage uniformity with respect to local and State laws, rules, and regulations with respect to geothermal resources development, and (D) encourage establishment of land use plans, which would include zoning for geothermal resources development and which would assure that geothermal resources developers will be able to carry out development programs to the production stage.

(b) The Chairman, acting through the appropriate Federal agencies and in cooperation with non-Federal entities, shall implement a coordinated program of research and development in order to demonstrate the technical means for the extraction and utilization of the resource base, including any byproducts of such base, and in order to accomplish the goals established by subsection (a). Research authorized by this Act having potential applications in matters other than geothermal energy may be pursued to the extent that the findings of such research can be published in a form for utilization by others.

DEMONSTRATION

SEC. 105. (a) The Chairman, acting through the appropriate Federal agencies and in cooperation with non-Federal entities, shall initiate a program to design and construct geothermal demonstration plants. The specific goals of such program shall include—

(1) the development of economical geothermal resources production systems and components which meet environmental standards;

(2) the design of plants to produce electric power and, where appropriate, the large-scale production and utilization of any useful byproducts;

(3) the involvement of engineers, analysts, technicians, and managers from industry field and powerplant development, which shall lead to the early industrial exploitation of advanced geothermal resources;

(4) the provision for an adequate supply of trained geothermal engineers and technicians;

(5) the provision of experimental test beds for component testing and evaluation by laboratories operated by the Federal Government, industry, or institutions of higher education;

(6) the construction and operation of pilot plants; and

(7) the construction and operation of demonstration plants.

(b) In carrying out his responsibilities under this section, the Chairman, acting through the appropriate Federal agencies, and in cooperation with non-Federal entities, may provide for the establishment of one or more demonstration projects utilizing each geothermal resource base involved, which shall include, as appropriate, all of the exploration, siting, drilling, pilot plant construction and operation, demonstration plant construction and operation, and other facilities and activities which may be necessary for the generation of electric energy and the utilization of geothermal resource byproducts.

(c) The Chairman, acting through the appropriate Federal agencies, is authorized to investigate and enter into agreements for the cooperative development of facilities to demonstrate the production of energy from geothermal resources. The responsible Federal agency may consider—

(1) cooperative agreements with utilities and non-Federal governmental entities for construction of facilities to produce energy for commercial disposition; and

(2) cooperative agreements with other Federal agencies for the construction and operation of facilities to produce energy for direct Federal consumption.

(d) The responsible Federal agency is authorized to investigate the feasibility of, construct, and operate, demonstration projects without entering into cooperative agreements with respect to such projects, if the Chairman finds that—

(1) the nature of the resource, the geographical location, the scale and engineering design of the facilities, the techniques of production, or any other significant factor of the proposal offers opportunities to make important contributions to the general knowledge of geothermal resources, the techniques of its development, or public confidence in the technology; and

(2) there is no opportunity for cooperative agreements with any utility or non-Federal governmental entity willing and able to cooperate in the demonstration project under subsection (c)(1), and there is no opportunity for cooperative agreements with other Federal agencies under subsection (c)(2).

(e) Before favorably considering proposals under subsection (c), the responsible Federal agency must find that—

(1) the nature of the resource, the geographical location, the scale and engineering design of the facilities, the techniques of production, or any other significant factor of the proposal offers opportunities to make important contributions to the general knowledge of geothermal resources, the techniques of its development, or public confidence in the technology;

(2) the development of the practical benefits as set forth in paragraph (1) are unlikely to be accomplished without such cooperative development; and

(3) where non-Federal participants are involved, the proposal is not eligible for adequate Federal assistance under the loan guaranty provisions of title II of this Act.

(f) If the estimate of the Federal investment with respect to construction and operation costs of any demonstration project proposed to be established under this section exceeds $10,000,000, no amount may be appropriated for such project except as specifically authorized by legislation hereafter enacted by the Congress.

(g)(1) At the conclusion of the program under this section or as soon thereafter as may be practicable, the responsible Federal agencies shall, by sale, lease, or otherwise, dispose of all Federal property interests which they have acquired pursuant to this section (including mineral rights) in accordance with existing law and the terms of the cooperative agreements involved.

(2) The agency involved shall, under appropriate agreements or other arrangements, provide for the disposition of geothermal resource byproducts of the project administered by such agency.

SCIENTIFIC AND TECHNICAL EDUCATION

SEC. 106. (a) It is the policy of the Congress to encourage the development and maintenance of programs through which there may be provided the necessary trained personnel to perform required geothermal research, development, and demonstration activities under sections 103, 104, and 105.

(b) The National Science Foundation is authorized to support programs of education in the sciences and engineering to carry out the policy of subsection (a). Such support may include fellowships, traineeships, technical training programs, technologist training programs, and summer institute programs.

(c) The National Science Foundation is authorized and directed to coordinate its actions, to the maximum extent practicable, with the Project or any permanent Federal organization or agency having jurisdiction over the energy research and development functions of the United States, in determining the optimal selection of programs of education to carry out the policy of subsection (a).

(d) *The National Science Foundation is authorized to encourage, to the maximum extent practicable, international participation and cooperation in the development and maintenance of programs of education to carry out the policy of subsection (a).*

TITLE II—LOAN GUARANTIES

ESTABLISHMENT OF LOAN GUARANTY PROGRAM

SEC. 201. (a) It is the policy of the Congress to encourage and assist in the commercial development of practicable means to produce useful energy from geothermal resources with environmentally acceptable processes. Accordingly, it is the policy of the Congress to facilitate such commercial development by authorizing the Chairman of the Project to designate an appropriate Federal agency to guarantee loans for such purposes.

(b) In order to encourage the commercial production of energy from geothermal resources, the head of the designated agency is authorized to, in consultation with the Secretary of the Treasury, guarantee, and to enter into commitments to guarantee, lenders against loss of principal or interest on loans made by such lenders to qualified borrowers for the purposes of—

(1) the determination and evaluation of the resource base;

(2) research and development with respect to extraction and utilization technologies;

(3) acquiring rights in geothermal resources; or

(4) development, construction, and operation of facilities for the demonstration or commercial production of energy from geothermal resources.

(c) Any guaranty under this title shall apply only to so much of the principal amount of any loan as does not exceed 75 percent of the aggregate cost of the project with respect to which the loan is made.

(d) Loan guaranties under this title shall be on such terms and conditions as the head of the designated agency determines, except that a guaranty shall be made under this title only if—

(1) the loan bears interest at a rate not to exceed such annual per centum on the principal obligation outstanding as the head of the designated agency determines to be reasonable, taking into account the range of interest rates prevailing in the private sector for similar loans and risks by the United States;

(2) the terms of such loan require full repayment over a period not to exceed thirty years, or the useful life of any physical asset to be financed by such loan, whichever is less (as determined by the head of the designated agency);

(3) in the judgment of the head of the designated agency, the amount of the loan (when combined with amounts available to the qualified borrower from other sources) will be sufficient to carry out the project; and

(4) in the judgment of the head of the designated agency, there is reasonable assurance of repayment of the loan by the qualified borrower of the guaranteed indebtedness.

(e) The amount of the guaranty for any loan for a project shall not exceed $25,000,000, and the amount of the guaranty for any combination of loans for any single qualified borrower shall not exceed $50,000,000.

(f) As used in this title, the term "qualified borrower" means any public or private agency, institution, association, partnership, corporation, political subdivision, or other legal entity which (as determined by the head of the designated agency) has presented satisfactory evidence of an interest in geothermal resources and is capable of performing research or completing the development and production of energy in an acceptable manner.

PAYMENT OF INTEREST

SEC. 202. (a) With respect to any loan guaranteed pursuant to this title, the head of the designated agency is authorized to enter into a contract to pay, and to pay, the lender for and on behalf of the borrower the interest charges which become due and payable on the unpaid balance of any such loan if the head of the designated agency finds—

(1) that the borrower is unable to meet interest charges, and that it is in the public interest to permit the borrower to continue to pursue the purposes of his project, and that the probable net cost to the Federal Government in paying such interest will be less than that which would result in the event of a default; and

(2) the amount of such interest charges which the head of the designated agency is authorized to pay shall be no greater than the amount of interest which the borrower is obligated to pay under the loan agreement.

(b) In the event of any default by a qualified borrower on a guaranteed loan, the head of the designated agency is authorized to make payment in accordance with the guaranty, and the Attorney General shall take such action as may be appropriate to recover the amounts of such payments (including any payment of interest under subsection (a)) from such assets of the defaulting borrower as are associated with the project, or from any other surety included in the terms of the guaranty.

PERIOD OF GUARANTIES AND INTEREST ASSISTANCE

SEC. 203. No loan guaranties shall be made, or interest assistance contract entered into, pursuant to this title, after the expiration of the ten-calendar-year period following the date of enactment of this Act.

GEOTHERMAL RESOURCES DEVELOPMENT FUND

SEC. 204. (a) There is established in the Treasury of the United States a Geothermal Resources Development Fund, which shall be available to the head of the designated agency for carrying out the loan guaranty and interest assistance program authorized by this title, including the payment of administrative expenses incurred in connection therewith. Moneys in the fund not needed for current operations may, with the approval of the Secretary of the Treasury, be invested in bonds or other obligations of, or guaranteed by, the United States.

(b) There shall be paid into the fund the amounts appropriated pursuant to section 304(c) and such amounts as may be returned to

the United States pursuant to section 202(b), and the amounts in the fund shall remain available until expended, except that after the expiration of the ten-year period established by section 203, such amounts in the fund which are not required to secure outstanding guaranty obligations shall be paid into the general fund of the Treasury.

(c) Business-type financial reports covering the operations of the fund shall be submitted to the Congress by the head of the designated agency annually upon the completion of an appropriate accounting period.

TITLE III—GENERAL PROVISIONS

PROTECTION OF ENVIRONMENT

SEC. 301. In the conduct of its activities, the Project and any participating public or private persons or agencies shall place particular emphasis upon the objective of assuring that the environment and the safety of persons or property are effectively protected; and the program under title I shall include such special research and development as may be necessary for the achievement of that objective.

REPORTING REQUIREMENTS

SEC. 302. (a) The Chairman of the Project shall submit to the President and the Congress full and complete annual reports of the activities of the Project, including such projections and estimates as may be necessary to evaluate the progress of the national geothermal energy research, development, and demonstration program and to provide the basis for as accurate a judgment as is possible concerning the extent to which the objectives of this Act will have been achieved by June 30, 1980.

(b) No later than one year after the termination of each demonstration project under section 105, the Chairman of the Project shall submit to the President and the Congress a final report on the activities of the Project related to each project, including his recommendations with respect to any further legislative, administrative, and other actions which should be taken in support of the objectives of this Act.

TRANSFER OF FUNCTIONS

SEC. 303. (a) Within sixty days after the effective date of the law creating a permanent Federal organization or agency having jurisdiction over the energy research and development functions of the United States (or within sixty days after the date of the enactment of this Act if the effective date of such law occurs prior to the date of the enactment of this Act), all of the research, development, and demonstration functions (including the loan guaranty program) vested in the Project under this Act, along with related records, documents, personnel, obligations, and other items to the extent necessary or appropriate, shall, in accordance with regulations prescribed by the Office of Management and Budget, be transferred to and vested in such organization or agency.

(b) Upon the establishment of a permanent Federal organization or agency having jurisdiction over the energy research and development functions of the United States, and when all research and development (and other) functions of the Project are transferred, the members of the Project may provide advice and counsel to the head of such

organization or agency, in accordance with arrangements made at that time.

AUTHORIZATIONS OF APPROPRIATIONS

SEC. 304. (a) For the fiscal years ending June 30, 1976, and September 30, 1977, 1978, 1979, and 1980, only such sums may be appropriated as the Congress may hereafter authorize by law.

(b) There are authorized to be appropriated to the National Aeronautics and Space Administration not to exceed $2,500,000 for the fiscal year ending June 30, 1975, for the purpose of preparing the program definition under section 102(a).

(c) In addition to sums authorized to be appropriated by subsection (b), there are authorized to be appropriated to the fund not to exceed $50,000,000 annually, such sums to carry out the provisions of the loan guaranty program by the Project under title II.

And the Senate agree to the same.

That the House recede from its disagreement to the amendment of the Senate to the title of the House bill and agree to the same with an amendment as follows:

In lieu of the matter proposed to be inserted by the amendment of the Senate to the title of the House bill, insert the following: "An Act to further the conduct of research, development, and demonstrations in geothermal energy technologies, to establish a Geothermal Energy Coordination and Management Project, to provide for the carrying out of research and development in geothermal energy technology, to carry out a program of demonstrations in technologies for the utilization of geothermal resources, to establish a loan guaranty program for the financing of geothermal energy development, and for other purposes.".

And the Senate agree to the same.

OLIN E. TEAGUE,
MIKE MCCORMACK,
DON FUQUA,
JAMES SYMINGTON,
CHARLES A. MOSHER,
BARRY M. GOLDWATER, JR.,
JOHN WYDLER,
Managers on the part of the House.
HENRY M. JACKSON,
ALAN BIBLE,
FRANK CHURCH,
LEE METCALF,
FLOYD K. HASKELL,
PAUL FANNIN,
MARK O. HATFIELD,
JAMES A. MCCLURE,
Managers on the part of the Senate.

JOINT EXPLANATORY STATEMENT OF THE COMMITTEE OF CONFERENCE

The managers on the part of the House and the Senate at the conference on the disagreeing votes of the two Houses on the amendments of the Senate to the bill (H.R. 14920) to further the conduct of research, development, and demonstrations in geothermal energy technologies, to establish a Geothermal Energy Coordination and Management Project, to amend the National Science Foundation Act of 1950 to provide for the funding of activities relating to geothermal energy, to amend the National Aeronautics and Space Act of 1958 to provide for the carrying out of research and development in geothermal energy technology, to carry out a program of demonstrations in technologies for the utilization of geothermal resources, and for other purposes, submit the following joint statement to the House and the Senate in explanation of the effect of the action agreed upon by the managers and recommended in the accompanying conference report:

The Senate amendment to the text of the bill struck out all of the House bill after the enacting clause and inserted a substitute text.

The House recedes from its disagreement to the amendment of the Senate with an amendment which is a substitute for the House bill and the Senate amendment. The differences between the House bill, the Senate amendment, and the substitute agreed to in conference are noted below, except for clerical corrections, conforming changes made necessary by agreements reached by the conferees, and minor drafting and clarifying changes.

SHORT TITLE

House bill

The House bill provided that this legislation shall be cited as the "Geothermal Energy Research, Development, and Demonstration Act of 1974".

Senate amendments

The Senate amendments provided that this legislation shall be cited as the "Geothermal Energy Act of 1974".

Conference substitute

The conference substitute is the same as the House bill.

FINDINGS

House bill

Section 2 of the House bill provided that the Congress finds that (1) there is a national energy shortage; (2) present organizational structures and funding levels are not adequate to meet energy needs; (3) although electric energy is a convenient form of energy, the sources for electric power generation are in short supply; (4) national energy problems can be solved only if there is a commitment to

develop geothermal resources; (5) undeveloped geothermal resources are known to have a large energy content; (6) some geothermal resources contain energy in forms other than heat; (7) some geothermal resources contain valuable byproducts; (8) technologies for the development of most geothermal resources presently are not available, but such technologies are potentially economical and desirable; (9) much of the known geothermal resources exist on public lands; (10) Federal financial assistance is necessary for the development of geothermal resources; and (11) there is a Federal responsibility to encourage private industry in the development of geothermal resources.

Senate amendments

Section 201 of the Senate amendments sets forth that the policy of the Congress to encourage the development of geothermal energy through resource inventory, research, and financial and technical assistance for the construction of pilot and demonstration geothermal developments.

Conference substitute

The conference substitute is the same as the House bill, except that an addition is made to reflect the policy stated in section 201 of the Senate amendments.

DEFINITIONS

House bill

Section 3 of the House bill defined the term "byproduct" as any mineral found in association with geothermal steam and associated geothermal resources which has a value of less than 75 percent of the value of such geothermal steam and associated geothermal resources, or which is not of sufficient value to warrant extraction and production by itself.

Such section provided that the term "geothermal steam and associated geothermal resources" has the meaning given it by section 2(c) of the Geothermal Steam Act of 1970 (30 U.S.C. 1001(c)), except that any amendment of such subsection occurring after the date of the enactment of this legislation shall not affect the meaning of such term for purposes of this legislation.

Such section provided that the term "known geothermal resources area" has the meaning given it by section 2(e) of such Act (30 U.S.C. 1001(e)), except that any amendment of such subsection occurring after the date of the enactment of this legislation shall not affect the meaning of such term for purposes of this legislation.

Such section defined the term "fund" as the Geothermal Resources Development Fund.

Such section defined the term "Project" as the Geothermal Energy Coordination and Management Project.

Senate amendments

Section 210 of the Senate amendments contained definitions of the terms "geothermal resources", "qualified borrower", "pilot plant", and "demonstration development". Section 104 of the Senate amendments defined the term "fund" to mean the Geothermal Resources D evelopment Fund.

Conference substitute

The conference substitute is the same as the House bill, except for the following changes: (1) the definition of "known geothermal resources area" is eliminated; (2) the Senate amendments' definition of "pilot plant" and "demonstration development" are added, with the latter term changed to "development plant"; (3) the definition of "Chairman" is added; and (4) the Senate amendments' definition of "geothermal resources" is substituted for the definition of "geothermal steam and associated geothermal resources". The manner in which the Senate amendments defined such term has the same substantive effect as the definition contained in the House bill.

Coordination of Geothermal Energy Development

Establishment of geothermal energy coordination and management project

House bill

Subsection (a) of section 101 of the House bill provided for the establishment of the Geothermal Energy Coordination and Management Project (hereinafter in this statement referred to as the "Project"). Subsection (b) of section 101 provided that the Project shall have the following members: the Administrator of the Federal Energy Administration; an Assistant Director of the National Science Foundation (hereinafter in this statement referred to as "NSF") an Assistant Secretary of the Department of the Interior; an Associate Administrator of the National Aeronautics and Space Administration (hereinafter in this statement referred to as "NASA"); and the General Manager of the Atomic Energy Commission (hereinafter in this statement referred to as "AEC") Such subsection also provided that the Administrator of the Federal Energy Administration (hereinafter in this statement referred to as "FEA") shall act as Chairman of the Project.

Subsection (c) of section 101 provided that the Project shall be responsible for managing and coordinating national geothermal energy research, development, and demonstration programs, including determination and evaluation of the resource base, research and development with respect to various technologies, demonstration of appropriate technologies, and administration of the loan guaranty program established by this legislation.

Subsection (d) of section 101 provided that the Project shall cooperate with the Department of the Interior, NASA, AEC, and NSF, in carrying out its responsibilities. Such subsection also provided for the responsibilities of each such agency.

Subsection (e) of section 101 provided that the Project shall have overall authority with respect to programs and projects initiated under this legislation. The agencies involved, however, shall be responsible for the operation and administration of each such program or project.

Senate amendments

The Senate amendments required functions to be performed with respect to management and coordination of a national geothermal energy research, development, and demonstration program, which are similar to functions established by section 101(c) of the House bill.

The Senate amendments assigned such functions to Federal agencies in the following manner: (1) section 202 of the Senate amendments assigned the function of determining and evaluating the resource base to the Secretary of the Interior (hereinafter in this statement referred to as the "Secretary"); (2) sections 202(e) and 207 of the Senate amendments assigned the function of research and development with respect to exploration, extraction, and utilization technologies to the Secretary and to AEC; (3) sections 202(e) and 207 of the Senate amendments assigned the function of demonstrating appropriate technologies to the Secretary and AEC; and (4) title I of the Senate amendments required the Secretary to administer a loan guaranty program.

Section 205 of the Senate amendments required NASA to prepare and furnish a proposal for the employment of space technologies for the inventorying and mapping of geothermal resources, and section 202(e) of the Senate amendments required the Secretary to participate with NASA in the development of techniques for the discovery and evaluation of geothermal energy resources.

Section 203 of the Senate amendments required the Secretary to coordinate with the AEC geothermal energy development programs established by the Senate amendments.

Conference substitute

The conference substitute is the same as the House bill, with the following changes: (1) the conference substitute gives the President authority to appoint a member to the Project; (2) the President is given authority to designate one of the members of the Project to serve as Chairman; (3) an Assistant Administrator of FEA is made a member of the Project to replace the Administrator of FEA; and (4) the conference substitute clarifies the intent that NASA shall provide its contract management capabilities to aid other members of the Project in accomplishing the goals of this legislation.

Specific inclusion of the Assistant Administrator of FEA as a member of the Project was agreed to in light of the duty assigned to the Administrator of FEA under section 5(b)(2) of the Federal Energy Administration Act of 1974 (P.L. 93–275; 88 Stat. 99), whereby the Administrator is "to assess the adequacy of energy resources". It is believed that FEA, in its planning capacity, should be aware of the activities and progress of the Project, and this goal would be served by designation of the Assistant Administrator of FEA as a member of the Project.

FUNCTIONS OF NATIONAL SCIENCE FOUNDATION

House bill

Subsection (a) of section 102 of the House bill amended section 3 of the National Science Foundation Act of 1950 (42 U.S.C. 1862) by inserting a new subsection (e) which provides that the Director of NSF shall support geothermal energy research, development, and demonstration programs in accordance with section 102(b) of this legislation.

Subsection (b) of section 102 provided that the Director of NSF shall support and fund geothermal energy research, development, and demonstration programs initiated and approved by the Project. Such subsection further provided that its provisions in no way restrict the

authority of the Director to support and fund basic research, but that such provisions do not authorize the Director to support and fund any demonstration project which is not included in any program initiated and approved by the Project. The Director may, however, support and fund such a project if any other provision of law provides him with authority to do so.

Senate amendments

Section 202(e) of the Senate amendments required the Secretary to participate with NSF, together with other Federal agencies, in the assessment of geothermal energy resources.

Conference substitute

The conference substitute omits section 102 of the House bill and section 202(e) of the Senate amendments. The omission of section 102 is based upon the fact that no amendment to the National Science Foundation Act of 1950 is necessary in order to provide NSF with authority to carry out functions assigned to it by this legislation.

FUNCTIONS OF NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

House bill

Subsection (a) of section 103 of the House bill amended section 203 of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2473) by inserting a new subsection (b) which provides that NASA shall carry out geothermal energy technology research and development in accordance with section 103(b) of this legislation.

Subsection (b) of section 103 provided that NASA may undertake and carry out programs assigned to it by the Project.

Subsection (c) of section 103 required the Administrator of NASA to prepare, in consultation with various public and private agencies and organizations, a comprehensive program definition with respect to the development of geothermal energy resources.

Senate amendments

No provision.

Conference substitute

The conference substitute omits subsection (a) of section 103 of the House bill. Section 103(b) is retained by the conference substitute and subsection 103(c) is retained with the following changes: (1) the interim report filing date is changed from October 31, 1974, to November 30, 1974; (2) the final report filing date with respect to the program definition is changed from June 30, 1975, to August 31, 1975; and (3) a provision is added which establishes a resource inventory and assessment program to be carried out by the Geological Survey as an important part of the program definition. This latter provision is drawn from section 202 of the Senate amendments.

RESOURCE INVENTORY AND ASSESSMENT PROGRAM

House bill

Subsection (a) of section 104 of the House bill required the Project to make regional and national appraisals of geothermal resources. The goals of the appraisal program shall include (1) improving geophysical and other techniques necessary to locate and evaluate

geothermal resources; (2) developing better methods to predict the power potential of geothermal reservoirs; (3) determining and assessing the nature and power potential of high temperature geothermal convection systems; and (4) surveying and assessing regional and national geothermal resources.

Subsection (b) of section 104 required the Project, acting through the Geological Survey and other appropriate agencies, to (1) inventory geothermal resources on Federal land and, with the explicit permission of the owner involved, on non-Federal land; (2) conduct regional surveys, using drilling and other techniques leading to a national inventory of geothermal resources; (3) make available maps and reports developed from such surveys to encourage commercial development of geothermal resources; (4) recommend legislation with respect to Federal leasing policies for geothermal resources; and (5) participate with various public and private agencies and organizations in developing technologies for the discovery and evaluation of geothermal resources.

Senate amendments

Section 203 of the Senate amendments required the Secretary to undertake a resource inventory and assessment program similar to the program established by section 104(a) of the House bill.

Section 202 of the Senate amendments required the Secretary, acting through the Geological Survey, to undertake steps with respect to resource inventory and assessment which are similar to the steps required by section 104(b) of the House bill.

Conference substitute

The conference substitute is the same as the House bill, with the following changes: (1) the heading for section 104 of the House bill is changed to reflect the approach taken by the Senate amendments; and (2) the nature of drilling techniques to be used is modified by the conference substitute, to clarify the intent that this research should be to establish the extent and nature of geothermal resources, and should not involve any exploratory drilling which is and should remain the province of private industry.

RESEARCH AND DEVELOPMENT

House bill

Section 105 of the House bill required the Project to initiate a research and development program to resolve problems with respect to commercial utilization of geothermal resources. The goals of such program shall include (1) development of effective drilling methods; (2) development of reliable predictive and control methods; (3) exploitation of rock fracturing techniques; (4) improvement of extraction equipment and technology; (5) development of geothermal energy conversion methods; (6) development of methods to control emissions and wastes; (7) development of waste disposal control technologies; (8) improvement of the capability to predict the environmental impact of developing geothermal energy resources; (9) identification of social, legal, and economic problems with respect to geothermal resources development; (10) provision for an adequate supply of scientists to perform required geothermal research and development activities; and (11) establishment of a program to encourage States to establish geothermal energy clearinghouses to

facilitate the availability of information with respect to geothermal energy research and development.

Such section also required the Project to implement a coordinated research and development program to demonstrate extraction and utilization technologies and to accomplish such goals.

Senate amendments

Section 207 of the Senate amendments established a research and development program which was similar to the program established by the House bill. The differences between the two programs are as follows:

1. The Senate amendments required the AEC to carry out the research and development program, in cooperation with private industry.

2. The Senate amendments required the AEC to continue research authorized by the Senate amendments having potential applications in fields other than those exclusively related to geothermal energy. The House bill limited the Project to research which is directly related to geothermal energy.

3. The Senate amendments did not include specifically in the research and development program the following goals: (1) identification of social, legal, and economic programs related to geothermal energy research; (2) provision for an adequate supply of scientists; and (3) encouragement of States to establish geothermal energy information clearinghouses.

Conference substitute

The conference substitute is the same as the House bill, except that the conference substitute incorporates the provision of the Senate amendments which requires the Project to continue research authorized by this legislation having potential applications in fields other than those exclusively related to geothermal resources.

It is the intent of the conferees that the term "non-Federal entity" shall include, but shall not be limited to, private industry, academic institutions, municipalities, public utility districts, State and local governments, and private research laboratories.

DEMONSTRATION

House bill

Subsection (a) of section 106 of the House bill provided that the Project shall initiate a program to design and construct geothermal demonstration plants. The goals of such program include (1) developing economical geothermal energy production systems and components; (2) designing and constructing plants to produce electrical power; (3) operating such plants for a period of time; (4) providing experimental test beds; (5) involving engineers and technicians from private industry in developing methods of geothermal energy exploitation; and (6) providing for an adequate supply of trained geothermal engineers and technicians.

Subsection (b) of section 106 permitted the Project to establish a separate demonstration project for each geothermal resource base. The Project was given authority to obtain, through appropriate Federal agencies, plants and other real property used in any demonstration project.

Any agency designated by the Project to conduct a demonstration project shall provide for the disposal of electric energy and other geothermal resource byproducts of such project. Such disposition, to the maximum extent possible, shall be achieved through the sale of such byproducts.

Such subsection also provided that, at the conclusion of the program required under subsection (a), agencies designated by the Project to conduct demonstration projects shall, to the extent possible or appropriate, dispose of such projects or dispose of all electric energy and other geothermal resource byproducts produced by such projects.

Such subsection also provided that preference shall be given to known geothermal resource areas in making site selections for demonstration plants.

Senate amendments

Section 208 of the Senate amendments authorized the AEC to enter into cooperative agreements with non-Federal entities for the construction, operation, and maintenance of demonstration developments for the production of electric or heat energy from geothermal resources. The non-Federal participants would be expected to make some contribution in the form of funds, rights in property, services, or other valuable consideration. The amount of the non-Federal contribution would be left to the discretion of the AEC on a case-by-case basis.

It was anticipated that several such demonstrations would be selected to reflect the development of a variety of geothermal resource types, the application of a variety of energy development and utilization technologies and a variety of conditions of energy and byproduct needs.

The AEC was authorized to proceed with such developments in which the estimated Federal investment will not exceed $10,000,000.

The AEC was authorized to investigate potential agreements for major demonstration facilities (in which the Federal investment will exceed $10,000,000) and to submit proposals to proceed with such agreements to the Congress for authorization.

In preparing proposals for cooperative agreements with non-Federal entities to construct major geothermal energy facilities, it was intended that non-Federal participants shall be selected which have the financial, technical, and management competence to perform the functions required of them pursuant to the agreement.

Conference substitute

The conference substitute is the same as the House bill, with the following changes: (1) the goals of the program established by section 106(a) of the House bill are expanded to include construction and operation of pilot plants and demonstration plants; (2) the provisions of the House bill relating to disposition of electric energy and demonstration projects are replaced by comparable provisions of the Senate amendments; and (3) the conference substitute eliminates the provision that preference shall be given to known geothermal resource areas in making site selections for demonstration plants.

The conference substitute incorporates provisions of section 208 of the Senate amendments which would authorize the Project to enter into cooperative agreements with non-Federal entities for the con-

struction, operation, and maintenance of demonstration plants for the production of electric or heat energy from geothermal resources. The non-Federal participants would be expected to make some contribution in the form of funds, rights in property, services, or other valuable consideration. The amount of the non-Federal contribution would be left to the discretion of the Project on a case-by-case basis.

The conference substitute also adds a provision which is intended to complement the provisions of the Senate amendments which are incorporated and to provide an opportunity for the establishment of demonstration projects without cooperative agreements in the event that there are no possibilities for cooperative agreements with non-Federal entities.

The legislative intent of the Senate amendments was adopted by the conferees regarding the disposal of electric energy produced by demonstrations utilizing geothermal resources. The principal intent is to clearly specify those conditions which must be fully met prior to any consideration of Federal sale and disposition of electric energy resulting from demonstration projects initiated under this legislation. The measure insures that where electric energy is produced by jointly financed demonstration projects the non-Federal participating entity would market the power. In those instances where the criteria for a totally federally financed and operated demonstration project are met, the resultant electric energy is to be consumed only by the Federal Government. In unusual circumstances, where (1) there is no non-Federal entity willing and able to participate, (2) the stringent criteria justifying a federally owned and operated project have been fully met, and (3) there is no opportunity for Federal consumption of the resultant electric energy, only then may the appropriate Federal agency consider direct commercial sale and disposition of the resultant electric energy.

The conference substitute also includes a provision, which is based upon a provision contained in section 208 of the Senate amendments, which requires specific congressional authority for any proposed demonstration project if the estimated Federal investment for such project exceeds $10,000,000.

SCIENTIFIC AND TECHNICAL EDUCATION

House bill

Section 107 of the House bill provided that it is the policy of the Congress to encourage programs to provide trained personnel to carry out geothermal research, development, and demonstration activities. NSF was authorized to support educational programs designed to effectuate such policy. NSF was required to coordinate its activities with various public and private agencies and organizations, and was authorized to encourage international participation and cooperation with respect to such educational programs.

Senate amendments

No provision.

Conference substitute

The conference substitute is the same as the House bill.

Loan Guaranties

ESTABLISHMENT OF LOAN GUARANTY PROGRAM

House bill

Subsection (a) of section 201 of the House bill provided that it is the policy of the Congress to authorize the Chairman of the Project to designate an appropriate Federal agency to guarantee loans to encourage commercial development of geothermal resources.

Subsection (b) of section 201 provided that the head of the designated Federal agency may guarantee any loan made for purposes of (1) determining and evaluating the resource base; (2) extraction and utilization research and development; (3) acquiring rights to geothermal resources; and (4) constructing and operating geothermal resources demonstration facilities.

Subsection (c) of section 201 provided that loan guaranties may not exceed 75 percent of the aggregate cost of the project involved. Subsection (d) of section 201 authorized the head of the designated agency to establish terms and conditions for loan guaranties, and further provided that a guaranty may be made only if (1) the rate of interest for the loan involved does not exceed prevailing interest rates for conventional construction loans; (2) the loan must be fully repaid within 30 years; (3) the amount of the loan, together with amounts otherwise available, is sufficient to carry out the project involved; and (4) there is reasonable assurance of repayment of the loan by the qualified borrower.

Subsection (e) of section 201 prohibited the head of the designated agency from guarantying any loan if such loan is in excess of $25,000,000 for any project, or from guarantying any combination of loans to a single qualified borrower in excess of $50,000,000.

Subsection (f) of section 201 defined the term "qualified borrower" as any public or private agency or organization which, as determined by the head of the designated agency, has an interest in geothermal resources and is capable of carrying out research or development activities with respect to energy production.

Senate amendments

The Senate amendments were the same as the House bill, with the following differences:

1. The Senate amendments authorized the Secretary to administer the loan guaranty program.

2. The Senate amendments did not authorize specifically the making of loan guaranties for the following purposes: (1) determination and evaluation of the resource base; and (2) research and development with respect to extraction and utilization technologies.

3. The committee report with respect to the Senate amendments indicated that section 101(e) of the Senate amendments was designed to permit loan guaranties of no more than $25,000,000 for a single project, and loan guaranties of no more than $50,000,000 for a single borrower. The committee report with respect to the House bill indicated that section 201(e) of the House bill was designed to permit loan guaranties for loans for a single project if the amount of loans did not exceed $25,000,000, and to permit loan guaranties for loans to a single borrower if the amount of such loans did not exceed $50,000,000.

4. The definition of "qualified borrower" contained in section 210(b) of the Senate amendments specifically required that a potential borrower, in order to be considered a qualified borrower, must have the financial responsibility to operate a geothermal energy commercial facility. The definition of "qualified borrower" contained in section 201(f) of the House bill did not make any specific reference to financial responsibility, but did require that a qualified borrower be capable of performing research or completing development and production of geothermal energy in an acceptable manner.

Conference substitute

The conference substitute is the same as the House bill, with the following changes: (1) section 201(e) of the House bill is clarified to indicate that this legislation intends to permit loan guaranties of no more than $25,000,000 for a single project, and loan guaranties of no more than $50,000,000 for a single borrower; and (2) the conference substitute makes technical changes in the provisions relating to the operation of the loan guaranty program to conform with current Federal practices and policies relating to the operation of similar loan guaranty programs.

The conference substitute retains the provision of the House bill which required the Chairman of the Project to designate the head of a Federal agency to administer the loan guaranty program. It is the intent of the conferees that the Federal agency which is designated should have the competence and field organizations necessary to receive and process applications.

The conference substitute also retains the provision of the House bill which authorized the making of loan guaranties for the determination and evaluation of the resource base and for research and development with respect to extraction and utilization technologies. The conference substitute also retains the definition of "qualified borrower" which is contained in the House bill and which is consistent with the establishment of eligibility for research and development loans.

PAYMENT OF INTEREST

House bill

Subsection (a) of section 202 of the House bill provided that the head of the designated agency may pay to the lender any interest charges due on the unpaid balance of a guarantied loan if the head of the designated agency finds that (1) the borrower is unable to pay such interest charges and it is in the public interest to permit the borrower to pursue the project involved; and (2) the amount of such interest charges does not exceed an amount equal to the average prime interest rate for the preceding fiscal year, plus one-half of 1 percent.

Subsection (b) of section 202 provided that if a qualified borrower defaults on a guarantied loan, the head of the designated agency may make payment in accordance with the terms of the guaranty. The Attorney General of the United States was required to take appropriate action to recover the amount of such payments from assets of the qualified borrower which are associated with the project involved.

Senate amendments

Section 102 of the Senate amendments was the same as the House bill, except that section 102 assigned responsibilities to the Secretary, and not to an agency designated by the Chairman of the Project.

Conference substitute

The conference substitute is the same as the House bill, except that the conference substitute provides that the Attorney General also may recover payments from surety contained in the loan guaranty agreement.

PERIOD OF GUARANTIES AND INTEREST ASSISTANCE

House bill

Section 203 of the House bill provided that no loan guaranties or interest assistance contracts shall be made after the 10-calendar-year period following the date of the enactment of this legislation.

Senate amendments

Section 103 of the Senate amendments was the same as the House bill.

Conference substitute

The conference substitute is the same as the House bill.

GEOTHERMAL RESOURCES DEVELOPMENT FUND

House bill

Subsection (a) of section 204 of the House bill established in the Treasury of the United States a Geothermal Resources Development Fund (hereinafter in this statement referred to as the "fund"). The fund shall be available to the head of the designated agency for carrying out the loan guaranty and interest assistance program authorized by this legislation.

Such subsection also provided that moneys in the fund not needed for current operations shall be invested in bonds or other obligations of the United States.

Subsection (b) of section 204 provided that payments into the fund shall be made from amounts appropriated by the Congress pursuant to section 304(c) and from amounts returned to the United States pursuant to section 202(b).

Such subsection also provided that amounts in the fund shall remain available until expended, except that amounts available in the fund after the 10-calendar-year period following the date of the enactment of this legislation shall be paid into the general fund of the Treasury.

Subsection (c) of section 204 required the head of the designated agency to submit annual reports to the Congress with respect to the operation of the fund.

Senate amendments

The Senate amendments were the same as the House bill, except that the Senate amendments required the Secretary (and not the head of a designated agency) to submit annual reports to the Congress with respect to the operation of the fund.

Conference substitute

The conference substitute is the same as the House bill.

General Provisions

PROTECTION OF ENVIRONMENT

House bill

Section 301 of the House bill provided that activities under this legislation shall be designed to protect the environment and to assure the safety of persons and property. Such section also provided that the program developed by the Project under title I of this legislation shall include special research and development to assure environmental protection and the safety of persons and property.

Senate amendments

Section 201 and section 207(a)(5) of the Senate amendments contained provisions similar to those of the House bill with respect to protection of the environment.

Conference substitute

The conference substitute is the same as the House bill.

REPORTING REQUIREMENTS

House bill

Subsection (a) of section 302 of the House bill required the Chairman of the Project to submit biannual reports to the President and to the Congress with respect to the activities of the Project.

Subsection (b) of section 302 required the Chairman of the Project to submit reports to the President and to the Congress with respect to each demonstration project conducted under section 106 of the House bill.

Senate amendments

Section 206 of the Senate amendments required the Secretary to submit the exploration plan and schedule required by section 202 of the Senate amendments, to the President and to the Congress no later than one year after the date of the enactment of this legislation. Annual progress reports would be required thereafter.

Conference substitute

The conference substitute is the same as the House bill, except that the conference substitute requires reports annually, and not semi-annually.

TRANSFER OF FUNCTIONS

House bill

Section 303 of the House bill provided that, upon the establishment of a permanent Federal organization or agency having jurisdiction over energy research and development, the functions of the Project shall be transferred to and vested in such organization or agency. Such section also provided that, after such transfer and vesting, members of the Project shall provide advice and counsel to the head of such organization or agency.

Senate amendments

No provision.

Conference substitute

The conference substitute is the same as the House bill. It is the intent of the conferees that the transfer procedures established by this legislation will not involve the physical transfer of personnel, programs, or agencies which are not otherwise specifically designated for such transfer by legislation such as that creating the Energy Research and Development Administration. Accordingly, it is contemplated that such personnel, programs, or agencies which are engaged in the geothermal programs created by this legislation and which are not transferred to a new agency such as the Energy Research and Development Administration shall continue to engage in such existing programs following the creation of such new agency.

AUTHORIZATION OF APPROPRIATIONS

House bill

Section 304 of the House bill provided that, for fiscal years 1976, 1977, 1978, 1979, and 1980, only such sums may be appropriated to carry out this legislation as the Congress may authorize by law after the date of the enactment of this legislation.

Such section also authorized to be appropriated $2,500,000 for fiscal year 1975 to the Administrator of NASA to prepare program definitions under section 103(c).

Such section also authorized to be appropriated $50,000,000 annually to carry out the loan guaranty program established by this legislation.

Senate amendments

Section 106 of the Senate amendments authorized appropriations to the fund not to exceed $50,000,000 annually.

Section 209 of the Senate amendments authorized appropriations for fiscal years 1974, 1975, and 1976, as follows: (1) $10,000,000 annually to the Secretary; (2) $35,000,000 annually to AEC; and (3) such amounts as may be required to NASA.

Conference substitute

The conference substitute is the same as the House bill.

OLIN E. TEAGUE,
MIKE MCCORMACK,
DON FUQUA,
JAMES SYMINGTON,
CHARLES A. MOSHER,
BARRY M. GOLDWATER, JR.,
HENRY M. JACKSON,
JOHN WYDLER,
Managers on the Part of the House.

ALAN BIBLE,
FRANK CHURCH,
LEE METCALF,
FLOYD K. HASKELL,
PAUL FANNIN,
MARK O. HATFIELD,
JAMES A. MCCLURE,
Managers on the Part of the Senate.

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93D CONGRESS } HOUSE OF REPRESENTATIVES { REPORT
2d Session } { No. 93-1112

GEOTHERMAL ENERGY RESEARCH, DEVELOPMENT, AND DEMONSTRATION ACT OF 1974

JUNE 17, 1974.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. TEAGUE, from the Committee on Science and Astronautics, submitted the following

REPORT

together with

ADDITIONAL VIEWS

[To accompany H.R. 14920]

The Committee on Science and Astronautics, to whom was referred the bill (H.R. 14920) to further the conduct of research, development, and demonstrations in geothermal energy technologies, to establish a Geothermal Energy Coordination and Management Project, to amend the National Science Foundation Act of 1950 to provide for the funding of activities relating to geothermal energy, to amend the National Aeronautics and Space Act of 1958 to provide for the carrying out of research and development in geothermal energy technology, to carry out a program of demonstrations in technologies for the utilization of geothermal resources, and for other purposes, having considered the same, reports favorably thereon without amendment and recommends that the bill do pass.

PURPOSE OF THE BILL

The purpose of the bill is to create an administrative mechanism for Federal coordination and management of research, development, and demonstration activities in geothermal energy, including those presently funded by the Atomic Energy Commission, the Department of the Interior, and the National Science Foundation; to direct the Administrator of the National Aeronautics and Space Administration to undertake in fiscal year 1975 a program definition for an integrated national program to demonstrate the utilization of several geothermal energy resources by the end of fiscal year 1980; and to initiate a loan guaranty program as one means to further research, development, and utilization of geothermal resources by the private sector.

EXPLANATION OF THE BILL

This bill provides for a coordination and management project for geothermal energy research, development and demonstration. This is an interim step, awaiting the establishment of the Energy Research

and Development Administration (ERDA) or some similar agency. The bill also establishes goals for resource exploration and assessment, research and development, and technology demonstration programs. Funds are provided for a comprehensive program definition of the overall national effort required to attain these goals. This program definition is to be carried out by the Administrator of the National Aeronautics and Space Administration (NASA) during fiscal year 1975. This bill also institutes a loan guaranty program to encourage and assist the private sector in programs of resource evaluation, research and development, demonstration, and exploitation of geothermal resources.

Geothermal energy is presently utilized in many parts of the world. Electricity is generated from dry steam resources at The Geysers field, north of San Francisco, and in Lardarello, Italy. Wet steam is used to generate electricity in Wairakei, New Zealand and Cerro Prieto, Mexico.

The dry steam and wet steam resources are being exploited with present technology in an economic manner. They are, however, severely limited in resource size in comparison with other, presently undeveloped sources of geothermal energy. These undeveloped sources include hot dry rock, geopressured water, and high and low salinity convective systems.

There is a need to expand knowledge of these resources and develop new technologies to permit their widespread utilization. This bill seeks to accomplish this goal.

The detailed management and fiscal requirements to accomplish such a goal have not yet been adequately determined. H.R. 14920 provides for the Administrator of NASA to conduct a comprehensive program definition for this purpose during fiscal year 1975. Interim reports on this program definition are to be filed at appropriate times for inclusion in planning for the fiscal year 1976 budget.

Presently, there are three agencies heavily involved in geothermal energy research and development: the National Science Foundation (NSF), the Atomic Energy Commission (AEC), and the Department of the Interior (Interior). The NSF is the lead agency and funds about half of all Federal geothermal energy research and development; AEC and Interior each support about one-fourth. Interior is responsible primarily for the resource assessment conducted by the U.S. Geological Survey.

Federal research and development on potential energy sources is nowhere more fragmented than in the geothermal area. This bill provides a mechanism for coordinating and effectively managing this activity in the immediate future, prior to the creation and implementation of ERDA or an equivalent agency.

The private sector of the national economy has done much of the pioneering work in geothermal energy in this country. The only commercial exploitation of geothermal energy for the generation of electricity in the United States, at The Geysers, has been entirely privately funded. The entrepreneurs responsible for this activity are to be commended for their foresight and determination in meeting this important technological challenge.

In spite of the significant effort by the private sector, however, progress has been admittedly slow. Much of the early technology for

exploiting the geothermal resources at The Geysers was completed in the 1920's. As we view in this decade the overwhelming need for new and environmentally acceptable energy sources, we cannot wait for the normal mechanism of the marketplace to provide incentives for private participation. Government funding, therefore, is rapidly accelerating in the area of geothermal energy. Government support should not, however, supplant private initiative.

In order to provide incentives for private participation, this bill provides a loan guaranty program. This program aims to help eliminate the economic uncertainties associated with research and development, demonstration, and exploration. It provides for Government sharing of the risk associated with the generation of capital and other activities involved in nurturing new technologies for geothermal exploitation.

Findings

The Congress finds that there is a national energy shortage and present organizational structures and funding levels are not adequate to meet energy needs. Although electrical energy is a convenient form of energy, the sources for electric power generation are in short supply. There must be a national commitment to develop geothermal resources. Undeveloped geothermal resources are known to have a large energy content, and some geothermal resources also contain valuable by-products. Technologies for the development of most geothermal resources presently are not available, but such technologies are potentially economical and desirable. Much of the known geothermal resources exist on public lands. Federal financial assistance is necessary for the development of geothermal resources, and the Federal Government has a responsibility to encourage private industry in the development of geothermal resources.

Definitions

This section defines terms used in the body of the legislation, and clarifies specific words or terms of special importance.

The term "byproduct" is defined as any mineral found in association with geothermal steam and associated geothermal resources which has a value of less than 75 percent of the value of such geothermal steam and associated geothermal resources, or which is not of sufficient value to warrant extraction and production by itself.

Byproducts which may be obtained from "geothermal steam and associated geothermal resources" include mineral salts, light metals, and dissolved gases (both condensable and non-condensable). Methane from geopressured water is specifically included, as well as any helium which may be present.

The terms "geothermal steam and associated geothermal resources" and "known geothermal resources area" are noted as having the same meaning as that given in the Geothermal Steam Act of 1970.

"Project" will be synonymous with the Geothermal Energy Coordination and Management Project, and "fund" with the Geothermal Resource Development Fund.

Geothermal Energy Coordination and Management Project

The bill will create a Geothermal Energy Coordination and Management Project composed of—

The Administrator of the Federal Energy Administration;
An Assistant Director of the National Science Foundation;
An Assistant Secretary of the Department of Interior;
An Associate Administrator of the National Aeronautics and Space Administration; and
The General Manager of the Atomic Energy Commission.

The Administrator of the Federal Energy Administration shall serve as Chairman of the Project.

To improve upon the coordination of our present badly splintered Federal effort, the Project will have the administrative authority and responsibility to review and coordinate the diverse efforts of the various participating agencies. The Project shall be responsible for developing, managing and coordinating national geothermal energy research, development, and demonstration programs, including the loan guaranty program.

The Project is not intended to be a separate agency with in-house capabilities. Rather, specific programs approved by the Project will be carried out by existing Federal agencies working in coordination with the Project. Each agency involved shall be responsible for the operation and administration of each specific program it undertakes.

Amendment to National Science Foundation Act of 1950

The bill amends section 3 of the NSF Act to direct NSF to fund and support the programs approved by the Project.[1] This section specifically notes that the new NSF funding responsibility and the Project authority over geothermal technology are in no way a restriction on the basic research authority of NSF.

Amendment to National Aeronautics and Space Act of 1958

The bill amends section 203 of the NASA Act to allow NASA full participation in the Geothermal Energy Program outlined by the legislation. It seeks to assure broad utilization of space and aeronautical technology in identifying resources and exploiting geothermal resources.

Program Definition of a National Geothermal Effort

The Administrator of the National Aeronautics and Space Administration is directed to prepare a comprehensive program definition of an integrated effort for effectively developing the Nation's geothermal energy resources. In preparing this program definition, the Administrator is authorized to consult with other Federal agencies, State and local government agencies, and private organizations. This program definition is to be submitted to the President, each House of the Congress, and the Chairman of the Project (or the head of any permanent Federal organization or agency having jurisdiction over energy research and development) in interim forms by October 31, 1974, and January 31, 1975, in order to be incorporated into the fiscal year 1976 budget cycle. A final program definition is to be transmitted as soon as possible thereafter, but in any case not later than June 30, 1975.

An objective of this program definition is to define more accurately the cost and administrative needs of the five-year Federal effort in geothermal energy research, development, and demonstration. The

[1] This assumes that an Energy Research and Development Administration, or equivalent, is not enacted with authority over geothermal R. & D. NSF is presently the lead agency in geothermal R. & D., and this section is designed to provide an orderly transition from the status quo to an integrated program in the shortest possible time.

Administrator will be expected to receive procedural guidance in carrying out this activity by referring to the five-year energy R. & D. study performed in 1973 by Dr. Dixy Lee Ray, Chairman of the Atomic Energy Commission.

Goals of the Legislation

The goal of H.R. 14920 is to bring to the commercial demonstration stage the presently unused forms of geothermal energy resources. This effort is to culminate in from 6 to 10 electrical powerplants of approximately one to ten megawatt capacity each to be on line by the end of fiscal year 1980, together with appropriate development of technology to utilize byproducts. In attaining this goal, three distinct programmatic efforts will be required and are discussed below.

Exploration and Resource Assessment Program.—The first is a thorough resource exploration and assessment program that will determine the nature and extent of all geothermal resources. Where necessary, an aggressive research and development program to advance the technology needed to discover and quantify geothermal resources will be undertaken. In particular, methods of remote sensing, such as those developed for our satellites, will be refined for application in geothermal resource assessment.

The Project, acting through the USGS and other appropriate agencies, will make a thorough national inventory of geothermal resources on both Federal and non-Federal lands. The results of this inventory are to be made public in order to stimulate commercial interest in and development of new geothermal resource areas. Where appropriate, and based on studies and information developed in conjunction with activities undertaken pursuant to this legislation, the Project shall recommend legislation dealing with Federal leasing of geothermal resources.

Research and Development.— The second major effort will begin concurrently with resource exploration and development and will involve identifying and carrying out the research and development necessary for the economic extraction and utilization of the Nation's geothermal resources and useful byproducts.

To achieve this goal, work is expected to be undertaken on the development of effective drilling methods, rock fracturing techniques, improved extraction equipment and technology, and more effective geothermal energy conversion methods. Other research and development can be expected on emissions and wastes control and disposal, improved capability to predict environmental impacts of developing geothermal energy resources, and identification of social, legal, and economic problems with respect to geothermal resources development. Training an adequate supply of scientists to perform the required geothermal research and development activities will also be necessary.

Demonstration.—The final phase, demonstration, will draw on the results of the first two. It will undertake the design, construction and startup of plants generating electrical power and producing valuable byproducts.

The goals of the demonstrations include (1) developing economical geothermal energy production systems and components; (2) designing and constructing plants to produce electrical power and utilize byproducts and low temperature heat; (3) operating such plants for a period of time; and (4) providing experimental test beds for geothermal systems and components.

When selecting potential sites for use in this demonstration program, preference shall be given to known geothermal resources areas (KGRA's). This should help insure prompt implementation of demonstration projects and later commercial exploitation.

The Project has authority to establish a separate demonstration project for each geothermal resource base, and various Federal agencies will probably be involved in the different demonstrations. The Project may obtain, through appropriate Federal agencies, plants and other real property needed for the demonstration projects.

Even if ERDA or a similar agency is established, it is expected that other agencies will be involved in demonstration projects on a cooperative basis.

Any agency designated by the Project to conduct a demonstration project shall provide for the disposal of electric energy and other geothermal resource byproducts. This disposition, to the maximum extent possible, shall be achieved through the sale of the electrical energy and byproducts.

When each demonstration project is concluded, the agency responsible for that project must dispose of the real property and other assets of the project in a manner consistent with existing law and regulations.

Although there is a specific goal of from 6 to 10 demonstration projects (3 to 5 different resource types with approximately 2 projects each), it should be emphasized that only those projects for which adequate technology has been developed are expected to proceed to the demonstration stage. Successful R. & D. programs as well as attractive economic potential are needed before demonstrations are undertaken.

Scientific and Technical Education

An adequate supply of trained manpower is necessary for the success of this effort. In order to meet this need, the Project is authorized to fund manpower training programs for the duration of the effort—approximately 5 years. NSF is authorized to implement the educational programs designed to assure that scientific manpower will not be the limiting factor in developing geothermal energy. NSF has already taken the lead in its designated traineeship programs, and has demonstrated its competence to initiate and carry out innovative and successful scientific and technical manpower development activities.

Loan Guaranties

Involvement of private industry in all phases of geothermal resources development is essential to the development of geothermal technology and to the full commercial growth of geothermal energy as a useful power source.

It is expected that private industry will be utilized by the Project through contractual arrangements. One means other than direct government support to provide an incentive for industrial participation is the loan guaranty program established by the bill. Activities eligible for such guaranty must be related to one of the following: resource assessment, research, development and demonstration or commercial operation of geothermal facilities.

The Chairman of the Project will designate a Federal agency to manage the loan guaranty program. For each loan, the guaranty will

not exceed 75 percent of the aggregate cost of the specific project.

A loan guaranty may be made if and only if the following conditions are met: (1) the rate of interest for the loan involved does not exceed prevailing interest rates for conventional construction loans; (2) the loan is to be fully repaid within 30 years; (3) the amount of the loan, together with amounts otherwise available, is sufficient to carry out the project involved; and (4) there is reasonable assurance of repayment of the loan by the qualified borrower. The head of the administering agency may establish any additional terms and conditions for the loan guaranty.

No guaranty will be made for a loan in excess of $25,000,000 for one project or loans in excess of $50,000,000 to any single qualified borrower.

In case of a default, the head of the agency may make the remaining payments. The Attorney General of the United States is required to take appropriate action to recover the amount defaulted.

This program will continue for a ten-year period.

Protection of the Environment

The programs developed by the Project shall include relevant research and development to assure environmental protection and the safety of persons and property.

Major concerns will be the environmental impact resulting from commercial development of geothermal resources and provision for adequate control of adverse side effects.

Reporting Requirements

The Chairman of the Project is required to submit biannual reports to the President and to the Congress with respect to the activities of the Project.

Within one year after the completion of each demonstration project, the Chairman of the Project is required to submit a final report on it.

Transfer of Functions

Research, development and other functions of the Management Project will be transferred to any new permanent organization having jurisdiction over energy research and development, such as the proposed Energy Research and Development Administration, should such an organization or agency be established by law. The transfer takes place within 60 days of the effective date of such a law. The members of the Management Project may continue to provide advice to the head of such organization or agency by agreement with the Director of any such entity.

Authorization of Appropriations

There is authorized $2.5 million to NASA for the Administrator to carry out the program definition in fiscal year 1975. Other fiscal year 1975 funds for geothermal energy have already been included in the Special Energy Appropriations Act, which passed the House on April 30, 1974. The bill requires subsequent congressional action for authorization of appropriations for the remaining years. This funding is expected to be based, at least in part, on the results of the program definition.

In addition, $50 million per year is authorized to be appropriated to carry out the loan guaranty program.

BACKGROUND

Funding History of Geothermal Energy Research and Development

Prior to 1970, there was little or no Federal effort in geothermal energy. Work in the United States centered primarily around The Geysers geothermal area in northern California. There, in 1960, dry steam was used to produce commercially available electrical power.

Federal funding of geothermal energy R. & D. was separately identified for the first time in fiscal year 1971 and totalled $200,000. This has grown to a fiscal year 1975 figure of $45.2 million and now involves three Federal departments and agencies: the National Science Foundation, the Department of the Interior and the Atomic Energy Commission. As shown in Table 1, the most significant increase in funding occurred between fiscal years 1974 and 1975.

TABLE 1.—FEDERAL GEOTHERMAL ENERGY R. & D.

	Fiscal year—				
	1971 (actual)	1972 (actual)	1973 (actual)	1974 (actual)	1975 (House appropriation)[1]
NSF	—	0.7	1.1	3.7	22.3
DOI	0.2	.7	3.5	2.8	10.2
AEC	—	—	—	4.7	12.7
Total	.2	1.4	4.6	11.2	45.2

[1] H.R. 14434, Special Energy Research and Development Appropriation Act, 1975, approved by House of Representatives Apr. 30, 1974.

The Geothermal Resources Research Conference

The potentials of geothermal energy and proposals for a major research and development effort over the next 10 years were the subject of the Geothermal Resources Research Conference sponsored by the National Science Foundation in Seattle, Washington, September 18, 19, and 20, 1972. Former Secretary of the Interior Walter J. Hickel was chairman. A report of the conference, *Geothermal Energy, A National Proposal for Geothermal Resources Research*, was published by the University of Alaska, the NSF grantee.

The report emphasized the importance to the Nation of geothermal resources in terms of potential power, electrical energy, oil equivalents, and foreign exchange. It stated that by 1985 geothermal resources could have an enormous impact on the Nation's supply of energy and could also augment the supply of water in regions with insufficient natural water. It also pointed out that the development of geothermal resources could substantially assist efforts to attain national energy self-sufficiency as well as dramatically improving the U.S. balance of payments. The conference report emphasized that a vigorous research and development program is necessary to assure the timely realization of these advantages to the Nation. In order to accomplish this R. & D.,

a budget totalling $684.7 million through fiscal year 1983 was recommended. The report proposed an expenditure of $41.7 million in fiscal year 1974, the first year of the program. The emphasis in fiscal year 1974 would be on resource assessment and utilization technology. The fiscal year 1975 recommendation was $61.0 million.

Energy Task Force Report

The use of geothermal energy received careful consideration in the report of the Task Force on Energy of the Committee on Science and Astronautics. This Task Force was constituted during the 92d Congress specifically for the review of energy matters.

At the conclusion of the 92d Congress, following thorough investigations and study during 1971 and 1972, the Task Force submitted its final report. A major conclusion of the report was that, because the reservoirs of thermal energy located in the Earth's underground water and rocks are large and widespread, geothermal energy should have greatly increased R. & D. emphasis. The Task Force noted that basic and applied research in the field of geothermal energy should be increased many times over the present level of effort. Since little attention has been given to this area in the past, the investment of sums modest compared to many other R. & D. programs has the potential now of opening to development a vast new source of energy.

The Task Force recognized the need for demonstration of geothermal technology, particularly for tapping the energy of hot dry rocks. It noted the great technological effort that will be required for deep drilling and direct experimentation on fracturing hot dry rock in order to produce practical geothermal systems. It also cautioned that this will be a complex, expensive undertaking requiring careful and effective management.

The Task Force recognized that the size of the geothermal resource must be accurately determined and suggested that this could be done by a combination of terrestrial exploration and satellite studies.

The Nation's Energy Future

Dr. Dixy Lee Ray, Chairman of the Atomic Energy Commission, in her recent report to the President on the energy future of the Nation, recommended a Federal expenditure of $40 million in fiscal year 1975 and a total of $185 million over the next five years for geothermal R. & D.

The goal of this program, according to the report, is "to exploit geothermal sources by developing and demonstrating the technology that would allow commercial production of electrical power and other energy uses in environmentally acceptable ways."

The objectives enunciated by Dr. Ray were: to increase knowledge of the location and nature of geothermal resources; to identify and resolve environmental, legal, and institutional barriers to geothermal utilization; to advance geothermal technology; and to accelerate, through demonstration plants, the commercial production of electricity from geothermal resources.

The geothermal program called for in the report is designed to stimulate the commercial production of at least 20,000 megawatts of geothermally produced electricity by 1985 and to realize additional fuel savings through the use of geothermal energy in space heating, air conditioning, extraction of minerals, and desalination of brines.

Field Trips

Between January 1972 and February 1973, Members and staff of the Subcommittee on Energy reviewed work at geothermal energy research and development projects and commercial plants. The sites investigated were: The Geysers, California, a dry steam plant operated by the Pacific Gas and Electric Company; the Atomic Energy Commission Laboratory at Los Alamos, New Mexico, where research on hot dry rock is being performed; Wairakei, New Zealand, a wet steam field operated by the New Zealand Electricity Department; Cerro Prieto, Mexico, a wet steam field operated by Comisión Federal de Electricdad; and various geothermal research sites in the Imperial Valley, California.

Geothermal Energy Legislation

88th–92d Congresses.—Since 1962, Congress has been concerned with formulating leasing procedures to encourage the exploration for, and the development of, geothermal resources. In July and October 1963, the Senate Committee on Interior and Insular Affairs first held hearings on the potential for geothermal steam resources. Following these hearings, the Committee favorably reported S. 883, a bill to aid development of the full potential of geothermal resources underlying public lands (S. Report 88–1508). The Senate passed this measure on August 21, 1964, but the House took no further action.

In the 89th Congress, a geothermal steam leasing bill (S. 1674) passed both Houses. This bill authorized the disposition by the Secretary of the Interior of the geothermal steam and related resources in the public-owned lands of the United States. In the Senate Interior Committee report on this measure, it was maintained that this energy resource had been only slightly explored in the United States, especially on public domain, and the report encouraged its development (S. Report 89–683). The Senate passed this measure on September 7, 1965.

During the second session, the House considered and reported the bill (H. Report 89–2140). The House version omitted a "grandfather clause," contained in the Senate bill, offering preference in leasing to those who had already conducted exploration and/or development of geothermal resources on public lands. The grandfather clause was finally upheld without a conference, and S. 1674 was passed in October 1966.

President Johnson opposed the grandfather clause, among other things, and pocket vetoed the bill. The Senate Committee members contended that this provision was carefully limited. They were dissatisfied with the President's failure to approve the measure.

In the 90th Congress, an identical bill was introduced (S. 23), along with the Administration's version (S. 912). New legislation was introduced in the 91st Congress. The discrepancies were finally resolved when the Committee offered a new bill, S. 386 (S. Report 91–1160). This measure was passed by the Senate on September 16, 1970, and by the House on October 5, 1970 (H. Report 91–1544). The minor differences between the two bills were cleared up in early December, and the Geothermal Steam Act was signed into law on December 24, 1970 (P.L. 91–581; 84 Stat. 1566; 30 U.S.C. 1001–1026).

The Geothermal Steam Act of 1970 authorized the Secretary of the

Interior to issue leases for the development and utilization of geothermal steam and related resources. Such leases are classified into two types: those issued in known geothermal resources areas (KGRA), in which cases the highest responsible qualified bidder receives the lease; and those issued in areas where there is potential for development, in which cases the first qualified person making application is entitled to the lease.

During the 92d Congress, a few bills relating to geothermal resources were introduced. Among these were H.R. 9749 and H.R. 14801, as well as S. 564, S. 1349 and H. Con. Res. 448. One notable measure that emerged during this Congress was S. Res. 45, "The National Fuels and Energy Policy Study." This bill, introduced by Senators Jennings Randolph and Henry M. Jackson on February 4, 1971, was considered, amended and passed by the Senate on May 3, 1971. This resolution authorizes the Senate Interior and Insular Affairs Committee and *ex officio* members of the Committees on Commerce and Public Works and the Joint Committee on Atomic Energy to make a full and complete investigation and study of the national fuels and energy policies.

Pursuant to S. Res. 45, the Senate Interior and Insular Affairs Committee held oversight hearings in June 1972 to examine the progress in implementing the Geothermal Steam Act, to examine the potential of geothermal energy, to review available data concerning this potential, and to assess the status of future plans for the resources.

93d Congress.—The 93d Congress has thus far seen a variety of bills introduced and a mounting interest in the potential of geothermal resources. Among the measures introduced have been S. 1283 and H.R. 6602, which are identical bills; H.R. 8628 and H.R. 9658, identical bills; H.R. 11212, and identical bills; H.R. 4413 and H.R. 4963, identical bills; S. 2465, S. 2636, and H.R. 14172.

The following is a brief summary of the seven specific geothermal bills introduced in the 93d Congress.

H.R. 4413 (Mr. Steiger of Ariz.). Introduced February 20, 1973, to promote the exploration and development of geothermal resources through cooperation between the Federal Government and private enterprise. (Referred to the Committee on Interior and Insular Affairs.)

S. 1283 (Mr. Jackson), the "National Energy Research and Development Policy Act of 1973." Introduced March 19, 1973, to establish a national program for research, development, and demonstration in fuels and energy and for the coordination and financial supplementation of Federal energy research and development; to establish development corporations to demonstrate technologies for shale oil development, coal gasification development, advanced power cycle development, geothermal steam development, and coal liquefaction development; to authorize and direct the Secretary of the Interior to make mineral resources of the public lands available for said development corporations; and for other purposes. This bill was reported from the Senate Committee on Interior and Insular Affairs and amended on December 1, 1973 (S. Report 93–589). The measure was passed unanimously on December 7, 1973, and referred to the House Committee on Interior and Insular Affairs on December 10, 1973, Title II of S. 1283 is similar to S. 2465.

H.R. 8628 (Mr. Brown), the "Geothermal Energy Development Corporation Act." Introduced June 13, 1973, to further energy research and development by establishing a Geothermal Energy Development Corporation, to amend the National Science Foundation Act of 1950, and to authorize the National Science Foundation to fund research related to this resource. (Referred to the Committee on Science and Astronautics.)

S. 2465 (Mr. Bible), the "Geothermal Energy Act of 1973." Introduced September 21, 1973, to authorize the Secretary of the Interior to guaranty loans for the financing of commercial ventures in geothermal energy; to coordinate Federal activities in geothermal energy exploration, research and development; and for other purposes. This bill was reported from the Senate Committee on Interior and Insular Affairs on May 2, 1974.

S. 2636 (Mr. McGovern), the "Solar, Hydrogen and Geothermal Energy Act of 1973." Introduced October 30, 1973, to authorize supplemental appropriations for the National Science Foundation for energy research and development. (Referred to the Committee on Interior and Insular Affairs.)

H.R. 11212 (Mr. McCormack), the "Geothermal Energy Research Development and Commercial Demonstration Act of 1973." Introduced October 31, 1973, to further the conduct of research, development and commercial demonstrations in geothermal energy technologies, to direct the National Science Foundation to fund basic and applied research relating to geothermal energy, and to direct the National Aeronautics and Space Administration to carry out a program of demonstrations in technologies for commercial utilization of geothermal resources including hot dry rock and geopressured fields. (Referred to the Committee on Science and Astronautics.)

H.R. 14172 (Mr. McCormack), the "Geothermal Energy Research, Development, and Demonstration Act of 1974." Introduced April 10, 1974, to further the conduct of research, development and demonstrations in geothermal energy technologies, to establish a Geothermal Energy Coordination and Management Project, to amend the National Science Foundation Act of 1950 to provide for the funding of activities relating to geothermal energy, to amend the National Aeronautics and Space Act of 1958 to provide for the carrying out of research and development in geothermal energy technology, to carry out a program of demonstrations in technologies for the utilization of geothermal resources, and for other purposes. (Referred to the Committee on Science and Astronautics.)

September 1973 Hearings on H.R. 8628 and H.R. 9658

Hearings on H.R. 8628 and H.R. 9658 (Brown *et al.*) were held on September 11, 13, and 18, 1973, by the Subcommittee on Energy of the House Committee on Science and Astronautics. These identical measures, entitled "The Geothermal Energy Development Corporation Act," were introduced to further energy research and development by establishing a Geothermal Energy Development Corporation. The bills were to amend the National Science Foundation Act of 1950 to authorize and direct the National Science Foundation to fund basic and applied research related to energy in support of the objectives of the Geothermal Energy Development Corporation. The bills would also have authorized the Corporation to select sites for demonstration installations, to develop technologies in this field, and to enter into contracts and leases to such end. The Corporation was to be instructed to submit detailed reports of its operations to the President and legislative recommendations to the Congress. The bills would have authorized $8 million per year for 14 years after June 30, 1974, for the use of the Corporation.

The witnesses who advised the subcommittee were:

September 11, 1973:

1. Dr. Joseph Barnea, Office of the Under Secretary General, United Nations.
2. Ralph B. Dewey, Assistant to the Chairman of the Board, Pacific Gas & Electric Co.
3. Dr. Alfred J. Eggers, Jr., Assistant Director for Research Applications, National Science Foundation.

September 13, 1973:

4. William W. Lyons, Deputy Under Secretary, Department of the Interior, accompanied by Dr. Gordon P. Eaton, Deputy Assistant Chief Geologist, Geologic Division, Geological Survey; William L. Miller, Physical Scientist, Division of Metallurgy, Bureau of Mines; Dr. Russell G. Wayland, Chief, Conservation Division, Geological Survey; and Frederick N. Ferguson, Assistant Solicitor for Minerals, Department of the Interior.
5. Dr. Gordon P. Eaton, Deputy Assistant Chief Geologist, Geologic Division, Geological Survey.
6. William L. Miller, Physical Scientist, Division of Metallurgy, Bureau of Mines.

September 18, 1973:

7. Morton C. Smith, Project Manager, Geothermal Energy, Los Alamos Scientific Laboratory, the University of California.
8. Dr. Robert W. Rex, President, Republic Geothermal, Inc.
9. Dr. W. R. McSpadden, Battelle Memorial Institute, Pacific Northwest Laboratories, Richland, Wash.

In addition to the oral testimony, the following individuals and organizations submitted statements for the record:

1. Allen, Donald R., attorney at law, Duncan, Allen & Mitchell.
2. Anderson, J. Hilbert, consulting engineer, York, Pa.
3. Church, Frank, U.S. Senator from Idaho.
4. Comisión Federal de Electricidad, Mexico (Sergio Mercado).
5. Department of Scientific and Industrial Research, New Zealand (F. E. Studt).
6. Geothermal Kinetics Systems Corp. (Mike O'Donnell, executive vice president), Phoenix, Ariz.
7. Hickel, Hon. Walter J., Anchorage, Alaska.
8. Magma Power Co. (B. C. McCabe, president), Los Angeles, Calif.
9. New York, State of, Public Service Commission (Alvin Kaufman, director, Office of Economic Research), Albany, N.Y.
10. Orkustofnun, National Energy Authority (Sveinbjorn Bjornsson, Department of Natural Heat), Reykjavik, Iceland.
11. Rhodes, John J., U.S. Congressman from Arizona.
12. San Diego Gas & Electric Co. (Carthrae M. Laffoon, senior vice president), San Diego, Calif.
13. Sierra Club (Hamilton Hess, California geothermal coordinator), San Francisco, Calif.
14. Standard Oil Co. of California, Western Operations, Inc. (Stanley O. Hutchison, staff engineer, technology development), Bakersfield, Calif.
15. Southern California Edison Co. (L. T. Papay, director, research and development), Rosemead, Calif.

The hearing witnesses strongly endorsed the objective of furthering research in the geothermal area. Dr. Joseph Barnea of the United Nations accused members of the Department of the Interior of "playing down" and "overlooking" the significance of geothermal resources. He claimed that the research performed by these agencies had resulted in unrealistically low predictions of future utilization of geothermal resources for energy production. In response to Dr. Barnea's assertions, the U.S. Geological Survey responded that theirs was not a position of apathy, but rather of "guarded optimism." The Survey pointed out that, in view of the scarcity of highly favorable dry steam deposits like The Geysers and the many unsolved problems with hot water systems, no more than qualified optimism is justified at this time. The Survey feels that, given good prospects for adequate Federal funding and favorable legal decisions on leasing and taxation, there is a good chance that the many remaining problems can be solved or adequately controlled.

The Geological Survey did maintain, however, that geothermal energy development needs optimists such as Dr. Barnea to publicize its potential and encourage adequate assessment.

Introduction of H.R. 11212

In the September hearings, it became apparent that hot dry rock and geopressured water were the geothermal resources in greatest need of technical effort to achieve the breakthroughs needed to bring them to commercial reality. Although these two resources have the greatest potential resource base, almost no R. & D. was underway on either of them in 1973.

Realization of this need for R. & D. programs aimed at hot dry rock and geopressured water led directly to the introduction on October 31, 1973, of H.R. 11212, the Geothermal Energy Research, Development and Commercial Demonstration Act of 1973. There were 90 cosponsors of this and identical bills, which had the objective of bringing to commercial demonstration as quickly as feasible at least two new types of geothermal resources. It was expected that the program envisioned by the legislation would be completed in six years and would focus on the very large but untapped hot dry rock and geopressured water resources.

H.R. 11212 specified that the National Aeronautics and Space Administration should perform the research, development, and related activities, including pilot plant operation and demonstration plant construction. In support of the demonstration program, the National Science Foundation was called on to expand its program of basic research in geothermal energy.

In conjunction with the commercial demonstration of electrical generation, NASA was to develop for commercial use byproducts of the geothermal resources such as methane from geopressured water. Concurrent research and development was to be done on the environmental impacts of each geothermal source and the necessary environmental controls.

The bill authorized $80 million for NASA for the six-year period.

Legislation Identical to H.R. 11212

The widespread support in the Congress for accomplishing the goals of this legislation was demonstrated by 99 Members' sponsorship of legislation identical to H.R. 11212. A list of these Members and the bills they introduced is given below.

Annunzio	H.R. 11436	Fisher	H.R. 11433
Baker	H.R. 11433	Forsythe	H.R. 11436
Bell	H.R. 11212	Fraser	H.R. 11435
Bergland	H.R. 11212	Frey	H.R. 11212
Boland	H.R. 11436	Froelich	H.R. 12437
Bowen	H.R. 11433	Fulton	H.R. 11435
Blackburn	H.R. 11435	Fuqua	H.R. 11212
Brown of Calif.	H.R. 11212	Goldwater	H.R. 11212
Burgener	H.R. 11433	Grasso	H.R. 11435
Biester	H.R. 12029	Gunter	H.R. 11212
Boggs	H.R. 12029	Hamilton	H.R. 11435
Carney	H.R. 11433, H.R. 11435	Hanna	H.R. 11212
Casey	H.R. 11434	Hechler of W. Va.	H.R. 11212
Cleveland	H.R. 11433	Heckler of Mass.	H.R. 11433
Mrs. Collins of Ill.	H.R. 11436	Helstoski	H.R. 11435
Conlan	H.R. 11212	Hicks	H.R. 11436
Conte	H.R. 11435	Hogan	H.R. 11435
Corman	H.R. 11433	Huber	H.R. 11435
Cotter	H.R. 11212	Harvey	H.R. 12029
Cronin	H.R. 11212	Johnson of Colo.	H.R. 11435
Denholm	H.R. 11436	Jones of Okla.	H.R. 11433
Derwinski	H.R. 11436	Kemp	H.R. 11436
Downing	H.R. 11212	Ketchum	H.R. 11435
Duncan	H.R. 11433	Leggett	H.R. 11433
Danielson	H.R. 12029	Lujan	H.R. 11436
Eckhardt	H.R. 11435	McCormack	H.R. 11212
Edwards of Calif.	H.R. 11433	McDade	H.R. 11436
Esch	H.R. 11212	McKay	H.R. 11435
Eshleman	H.R. 11433	Martin of N.C.	H.R. 11212
Fish	H.R. 11436	Matsunaga	H.R. 11435

Mazzoli	H.R. 11433	Ryan	H.R. 11434
Murphy of N.Y.	H.R. 11435	Roy	H.R. 12029
Melcher	H.R. 11436	Rinaldo	H.R. 12029
Milford	H.R. 11212	Schneebeli	H.R. 11436
Mitchell of N.Y.	H.R. 11434	Steiger of Wis.	H.R. 11433
Mosher	H.R. 11212	Shoup	H.R. 11436
Moss	H.R. 11433	Studds	H.R. 11433
Obey	H.R. 11433	Symington	H.R. 11212
Parris	H.R. 11212	Teague	H.R. 11212
Pepper	H.R. 11436	Thomson of Wis.	H.R. 11436
Pickle	H.R. 11212	Thornton	H.R. 11212
Poage	H.R. 11436	Tiernan	H.R. 11436
Podell	H.R. 11436	Towell	H.R. 12029
Preyer	H.R. 11435	Ullman	H.R. 11433
Rees	H.R. 11433	Van Deerlin	H.R. 11436
Rhodes	H.R. 11434	Ware	H.R. 11435
Robinson of Va.	H.R. 11435	Winn	H.R. 11212
Rodino	H.R. 12029	Wright	H.R. 11436
Roe	H.R. 11212	Yatron	H.R. 11435
Roush	H.R. 11433		

February 1974 Hearings on H.R. 11212

Hearings on H.R. 11212 were held on February 5, 6, 7, and 11, 1974. Testimony was offered by 21 witnesses representing universities, Federal and state agencies, and private industry and was supplemented by written statements for the hearing record.

Presenting testimony were:

February 5, 1974:

1. Hon. Al Ullman, a Representative in Congress from the State of Oregon, accompanied by Bernard (Bud) Byers, Oregon State Representative, Lebanon, Oreg.
2. Hon. Victor V. Veysey, a Representative in Congress from the State of California.
3. Dr. H. Guyford Stever, Director, National Science Foundation, accompanied by Dr. Alfred J. Eggers, Jr., Assistant Director for Research Applications; and Richard J. Green, Deputy Assistant Director for Program Management
4. Dr. James C. Fletcher, Administrator, National Aeronautics and Space Administration, accompanied by Charles W. Mathews, Associate Administrator for Applications; and Dr. Harrison H. Schmitt, Special Assistant to the Administrator for Energy R. & D.

February 6, 1974:

5. Hon. Dixy Lee Ray, chairman, U.S. Atomic Energy Commission, accompanied by James C. Bresee, Assistant Director, General Energy Development, U.S. Atomic Energy Commission
6. Dr. William A. Vogely, Acting Assistant Secretary for Energy and Minerals, Department of the Interior
7. Dr. Gordon P. Eaton, Deputy Chief, Office of Geochemistry and Geophysics, U.S. Geological Survey
8. Hon. John N. Nassikas, Chairman, Federal Power Commission, accompanied by Emmett J. Gavin, assistant to the chairman; Lois D. Cashell, staff attorney, Office of General Counsel; Robert B. Boyd, deputy chief, Bureau of Power; Gordon K. Zareski, chief, Planning and Development Division, Bureau of Natural Gas; Richard F. Hill, adviser on Environmental Quality; Daniel Goldstein, assistant gen-

eral counsel, Office of General Counsel and Charles Berg, chief engineer, Federal Power Commission
9. Charles S. Matthews, Shell Oil Co.
10. Robert M. Hallman, Sierra Club
11. A. A. Maasberg and O. Osborn, The Dow Chemical Co.
12. Dr. C. O. Durham, Jr., Louisiana State University

February 7, 1974:

13. Hon. John J. Rhodes, a Representative in Congress from the State of Arizona
14. Dr. John C. Sawhill, Deputy Administrator, Federal Energy Office; accompanied by Robert Shatz and Raymond Zahradnik, Federal Energy Office

February 11, 1974:

15. Ted Livingston, Geology and Earth Resources, State Geologist, Department of Natural Resources, State of Washington
16. Dr. William R. McSpadden, manager, Marysville geothermal project, Battelle-Northwest Laboratories
17. Dr. David D. Blackwell, Department of Geological Sciences, Southern Methodist University
18. Dr. Arthur L. Austin, Lawrence Livermore Laboratories, U.S. Atomic Energy Commission
19. Morton C. Smith, Los Alamos Scientific Laboratories, U.S. Atomic Energy Commission
20. Richard G. Bowen, Department of Geology and Mineral Industries, State of Oregon
21. Howard E. Nelson, Executive Secretary, Washington State Sportsmen's Council

In addition, written testimony was received from:

1. J. Hilbert Anderson, consulting engineer
2. Linwood Holton, Assistant Secretary for Congressional Relations, Department of State
3. Myron Dorfman, Department of Petroleum Engineering, The University of Texas at Austin
4. Dr. Martin Goldsmith, Environmental Quality Laboratory, California Institute of Technology
5. Norman P. Ingraham, executive director, Northern California Power Agency
6. Dudley E. Ott, vice president, The American Society of Mechanical Engineers
7. Jerome A. Lewis, president, Petro-Lewis Corp.
8. Hon. J. J. Pickle, Member of Congress, Texas
9. John C. Reed, College of Engineering, University of Florida
10. L. T. Papay, Director, Research and Development, Southern California Edison Co.

Dr. Gordon P. Eaton of the U.S. Geological Survey stressed that a commitment to exploitation of geopressured brines and hot dry rock resources would be premature without prior or concurrent understanding of the fundamentals of such systems. He indicated that, in his opinion, six years is not an adequate period of time to accomplish the stated objectives. He also asserted that the Geological Survey, the Bureau of Mines, the Atomic Energy Commission and the Advanced Research Project Agency should be centrally involved in any geother-

mal R. & D. program and that their roles and responsibilities should be specified in the bill.

Dr. Dixy Lee Ray, Chairman of the U.S. Atomic Energy Commission, was also concerned that the addition of another major agency (the National Aeronautics and Space Administration) to the other agencies already performing R. & D. work in geothermal energy could cause organizational problems. Dr. Guyford Stever, Director of the National Science Foundation, agreed that further fragmentation of the Federal geothermal program was undesirable.

Dr. John C. Sawhill of the Federal Energy Office indicated that setting an even higher funding level would yield a more rapid solution of the problems currently preventing widespread utilization of geothermal energy and that the six-year time frame of the Act was probably too short.

Dr. James C. Fletcher, Administrator, National Aeronautics and Space Administration, pointed out that taking on responsibilities of coordination and management of new high risk technologies was not new to NASA. It is NASA's view, however, that the major technologies involved in exploiting geothermal energy resources are outside of NASA's existing expertise and have a foundation in other sectors of the Federal Government, such as the Department of the Interior, the Atomic Energy Commission, and the Federal Power Commission.

The hearings did produce agreement on the need for geothermal R. & D. Most witnesses shared the opinion expressed by Mr. John N. Nassikas, Chairman of the Federal Power Commission. "The energy potential of all sources of geothermal energy should be explored to determine the feasibility of commercial application. The Nation cannot afford to neglect the development of these domestic resources, which have the potential to provide a significant amount of environmentally desirable energy."

Four major recommendations were repeatedly advanced during these hearings:

First, the Congress should assume active leadership in developing a comprehensive geothermal energy program for this country, as part of an integrated national energy policy, particularly with respect to research, development, and demonstration of alternate energy sources.

Second, the scope of any geothermal bill should include provisions for—

Research on all forms of geothermal energy and byproducts;

Intensive exploration for and assessment of geothermal resources; and

The necessary institutional changes required to insure the full development of these resources.

Third, the Government agencies involved must have a mechanism for effecting a coordinated effort in geothermal energy research, development and demonstration.

Fourth, the Administration must be willing to cooperate with the Congress in developing legislation to set up these programs and in establishing the agencies to administer them.

Introduction of H.R. 14172

These recommendations led to a reconsideration of the legislation and further review of our Federal effort in geothermal energy by the

Subcommittee. In the Administration's fiscal year 1975 budget, a total of $44.7 million was requested with the following breakdown: $22.3 to NSF, $12.7 to AEC and $9.7 to Department of the Interior. Of the various areas of energy research and development receiving Federal support, only geothermal energy research and development is so heavily splintered among various agencies.

The National Science Foundation has been designated the lead agency, but it does not have the charter to pursue projects to a demonstration stage, nor does it have administrative control over the research programs of the other agencies. In reality there exists no national policy or set of goals to guide our total effort, nor does there exist an effective administrative mechanism to direct or coordinate these various programs. It was this situation that led to the introduction of H.R. 14172, the Geothermal Energy Research, Development and Demonstration Act of 1974, on April 10, 1974. This bill was co-sponsored by all members of the Subcommittee, and an identical bill, H.R. 14633, was co-sponsored by other members of the full Committee.

H.R. 14172 extended the scope of H.R. 11212 to all geothermal resources and authorized the mechanisms for—

A coordinated geothermal R. & D. management;

Resource exploration and assessment;

Research, development, and demonstration of geothermal technologies; and

Government-guarantied loans for these purposes.

It set a goal of producing electricity in demonstration plants (of from 1 to 10 megawatt capacity) from hot dry rock, geopressured water and high and low salinity convective systems by June 30, 1980.

Funds for the program under H.R. 14172 would be authorized to be appropriated to the NSF, the present lead agency. Management of the overall program (including loan guaranty approval) and control of budget priorities, however, would rest with the Geothermal Energy Coordination and Management Project. The Project would be composed of members from NASA, NSF, AEC, Interior, and a Chairman to be appointed by the President. The Energy Research and Development Administration (ERDA) or a similar agency would take over these responsibilities when and if such an agency is created.

A budget of $300 million would be authorized for the fiscal years 1975–79, with an additional $50 million per year for the loan program.

Legislation Identical to H.R. 14172

In addition to H.R. 14172, identical bills were introduced with the Members cosponsoring listed below:

Bell	14633	Hechler of W. Va	14633
Bergland	14172	Ketchum	14172
Brown of Calif	14172	McCormack	14172
Conlan	14172	Martin	14172
Cotter	14633	Milford	14172
Cronin	14172	Mosher	14172
Davis	14633	Parris	14172
Downing	14633	Pickle	14172
Drinan	14632	Roe	14172
Esch	14172	Symington	14172
Frey	14633	Teague	14172
Fuqua	14172	Thornton	14172
Goldwater	14172	Wydler	14172
Gunter	14172	Winn	14633
Hanna	14172		

May 1974 Hearings on H.R. 14172

A hearing on H.R. 14172 was held on Thursday, May 2, 1974. Presenting testimony were Dr. John C. Sawhill, Administrator of the Federal Energy Office, and Mr. Frank G. Zarb, Associate Director, Natural Resources, Energy and Science, Office of Management and Budget. Only policy issues were explored, since the two earlier sets of hearings had adequately developed the technical issues.

In their testimony, both witnesses stressed the need for centralized energy R. & D. management, and they supported the passage of legislation establishing ERDA. Both felt that ERDA should be created before enactment of a geothermal research, development and demonstration bill.

Mr. Zarb stressed, in particular, four elements in H.R. 14172 that should be clarified or reconsidered: (1) the authority of the Project to coordinate resource assessment, now the responsibility of the Geological Survey in the Department of the Interior, (2) the loan guaranty program, (3) the possible amendment of previous mineral Acts by certain definitions contained in H.R. 14172, and (4) the questionable need for a management project at all, since there are indications that the ERDA bill will be passed in the near future.

The Committee carefully considered these objections and amended the legislation to better reflect administration preferences. It has also been advised that H.R. 14920 does not change any existing mineral Acts.

COMMITTEE ACTIONS

Markup in Subcommittee of H.R. 14172

On May 16, 1974, the Subcommittee on Energy marked up the bill H.R. 14172.

During the course of the Subcommittee's deliberations on the bill, a number of amendments were approved. In addition to minor, technical and conforming changes, several substantive amendments were adopted as follows:

Section 3. Definition of Byproduct.—The definition of the term "byproduct" was clarified and modification of the definition contained in the Geothermal Steam Act of 1970 (30 U.S.C. 1001 [C]) was made explicit. For the purpose of resource assessment, research, development and demonstration activities performed pursuant to this bill, the term byproduct includes oil, hydrocarbon gas, or helium.

Section 101. Designation of Administrator of FEA as Project Chairman.—FEA presently has a leadership role in Federal energy policy and Project Independence, and has an overview of the Nation's energy activities and interactions. This change is designed to eliminate the ordinary delay time in the selection and appointment of an outside Chairman by the President. Further, the Chairman of the Project in his FEA role would assure a coordinated phasing of the Management Project programs into ERDA or any other agency which might be created and charged with overall energy R. & D. management responsibility.

Section 103. NASA Amendment.—The phrase "and directed" was stricken from subsection (b) to emphasize that the committee expects NASA and other agencies to perform tasks for the Project as the result of mutual agreement and that unilateral direction of NASA by the Project to perform specific programs is not expected.

Section 103 (c) (1). Program Definition.—This provides for the Administrator of the National Aeronautics and Space Administration to prepare a comprehensive program definition of an integrated effort for effectively developing the Nation's geothermal resources.

In preparing this program definition, the Administrator is authorized to consult with other Federal agencies, State and local government agencies, and private organizations. This program definition is to be submitted to the President, each House of the Congress, and the Chairman of the Project (or head of any permanent Federal organization or agency having jurisdiction over energy research and development) in interim forms by October 31, 1974, and January 31, 1975, in order to be incorporated into the fiscal year 1976 budget cycle. A final program definition

is to be transmitted as soon as possible thereafter, but in any case not later than June 30, 1975.

This program definition is intended to define carefully the cost of this five-year Federal effort in geothermal energy research, development and demonstration. The Administrator will be expected to receive some guidance in carrying out this activity by referring to the energy R. & D. studies performed in 1973 by Dr. Dixy Lee Ray, Chairman of the Atomic Energy Commission.

Section 107. Scientific and Technical Education.—This is a new section concerned with scientific and technical education. A limiting factor in the development of new energy resources such as geothermal energy is the availability of trained scientific and engineering manpower. This section clearly states congressional intent that NSF provide adequate programs to assure training and retraining of needed geothermal energy personnel. Further details of Committee intent are included under Committee Views.

Section 304. Authorization of Funds.—Amendments approved by the Subcommittee delete specific research, development and demonstration funding for the fiscal years 1976–79. Instead, $2.5 million is authorized to NASA for the Administrator to carry out the program definition in fiscal year 1975. Other fiscal year 1975 funds for geothermal energy have already been included in the Special Energy Appropriations Act which passed the House on April 30, 1974. The bill requires subsequent congressional action for the authorization of appropriations for the remaining years. This funding is expected to be based, at least in part, on the results of the program definition.

Full Committee Action on H.R. 14920

Following the Subcommittee actions described above, a clean bill was introduced on May 21, cosponsored by all members of the Subcommittee (including the full Committee Chairman and Ranking Minority Member). The clean bill, H.R. 14920, was considered by the full Committee on May 29, 1974. A quorum being present, the Committee approved H.R. 14920 unanimously with no changes and recommended passage by the full House of Representatives.

COMMITTEE VIEWS

Effective Coordination of Geothermal R. & D.

It is the intent of the Committee that this legislation provide more effective and responsive Federal coordination of geothermal research, development, and demonstration than that which exists today and an orderly transfer of responsibilities if and when an Energy Research and Development Administration or equivalent entity is established.

Presently, the National Science Foundation is the lead agency for geothermal energy R. & D. within the Federal government. NSF chairs an interagency panel on Geothermal Energy Research with the following members:

National Science Foundation
Department of the Interior
Geological Survey
Bureau of Reclamation
Bureau of Mines
Office of Energy R. & D. Policy (NSF)
Defense Advanced Research Projects Agency
Atomic Energy Commission
Council on Environmental Quality

Two difficulties hinder current efforts adequately to coordinate and manage geothermal programs. First, NSF does not have any administrative or fiscal control over the research projects of other agencies belonging to the interagency panel. Second, NSF does not have the authority to take projects through to their logical conclusion as full-fledged demonstrations.

As noted earlier in this report, funding for geothermal activities is also fragmented—much more so than for any other area of research, development, and demonstration on energy sources.

Establishment of an Energy Research and Development Administration, or some similar organization, should help to unify the presently diverse geothermal efforts. It will take time, however, to approve and implement such legislation. Clearly, it is in the national interest to take prompt action so that funds appropriated for fiscal year 1975 will be wisely spent in the context of an effectively coordinated Federal program.

Therefore, the Committee feels strongly that a formal coordination and management group with a chairman who retains administrative and fiscal control is needed. The management role of the Project will be that of providing overall direction to research, development, and demonstration activities in order to maximize the returns from the taxpayers' investment. The Project will not, however, undertake any R. & D. or demonstration tasks by creating its own facilities, but shall utilize existing Federal agencies. The Committee expects that the Project will obtain a broad base of industry participation and will utilize the services of small businesses wherever feasible.

Amendment to the NASA Act

An earlier version of this legislation, H.R. 14172, contains language which would have directed NASA to carry out any geothermal program assigned to it by the Project. This requirement was removed by the Subcommittee on Energy during its markup.

The Committee should like to emphasize, however, its firm intent that NASA assume appropriate responsibility for developing relevant geothermal energy technologies. NASA is also encouraged to adapt existing space technologies, such as the earth resources satellite technology, as much as possible to meeting the challenge of developing geothermal energy sources.

Scientific and Technical Education

The Committee recognizes the necessity of considering scientific and technical manpower requirements in establishing any new program oriented toward development and implementation of new technologies. Research results and scientific education must go hand in hand if the research objectives are to be attained. Suitable emphasis upon the training of geothermal scientists and technicians is necessary to insure the practical success of the research programs and demonstration projects.

It is intended that the educational activities carried out under the bill Act be specifically aimed at educating individuals who will have the capabilities to carry out the objectives of this legislation.

The Committee does not contemplate funding under this legislation of geothermal educational activities beyond the time required to carry out the objectives of the bill. Educational institutions must be aware that long term training programs in geothermal energy will not be indefinitely funded or supported under this legislation. The educational need is current and specific, and should be considered in that manner.

The Committee feels that emphasis should be placed on the interdisciplinary (rather than merely multidisciplinary) nature of the program. Institutions participating in some aspects of the program should have proven ability and experience in conducting interdisciplinary research and training. One activity of a particularly interdisciplinary nature would be special internships or short-term training programs for specialists in such fields as economics and law. The legal implications of alternative technologies in terms of zoning and property rights and relative costs could very well determine the direction that research and development takes. Apparently, there is a dearth of persons in these non-technical fields who are qualified to advise on the legal and economic trade-offs.

It is suggested that these programs will require large-scale experimental facilities and that cooperative programs with industry and with government laboratories would be economical and productive.

Equally important, in the Committee's view, is flexibility. One specific recommendation that has been brought to the Committee's attention is that funds for the training segment of the program should be about 20% of the total amount of funds appropriated. Although large grants cannot be transferred to institutions to dispose of entirely as they wish, the institutions should not be overly restricted in determining how best to design training activities.

These educational programs will be funded by the Project, or its successor agency, through transfer of funds to the National Science Foundation. The NSF is currently supporting a number of such educational programs, and it is expected that this transfer would allow significant augmentation of them. The Committee also expects NSF to initiate retraining programs for scientists who could transfer their expertise into geothermal energy development from other activities.

Program Definition

An integral part of establishing a national effort in geothermal energy technology is proper definition of the program. The Committee has, therefore, included in the legislation a requirement that the Administrator of NASA conduct a thorough and comprehensive program definition during fiscal year 1975. This requirement was inserted in lieu of a section requesting NASA to indicate how it could employ space technology for geothermal energy development. What the Committee has done is to ask a neutral agency with a fine reputation in using a systems approach to the management of technology to look at all aspects of geothermal energy research, development, demonstration and resource assessment—including the economic requirements, the logistic needs, and the manpower which would be utilized.

Interim reports on this program definition are to be prepared for the President, each House of the Congress, and the Chairman of the Project (or the head of any permanent Federal organization or agency having jurisdiction over energy R&D, should such an organization or agency be enacted into law) by October 31, 1974, and January 31, 1975. This schedule will permit the information which such reports contain to be incorporated into the fiscal year 1976 budget review, authorization and appropriation cycle.

Definition of Byproduct

The Committee has clarified the definition of the term byproduct for the purposes of research, development and demonstration activities performed under the bill. The Geothermal Steam Act of 1970, which is the landmark legislation in this area, defines byproducts of geothermal steam and associated resources in such a way that natural gas, helium, and oil are excluded. Such a definition is not compatible with the objectives of the bill, which seeks to utilize non-traditional geothermal resources, as well as geothermal heat, in a systems approach to energy and resource extraction. This is particularly important since the geopressured fields contain large quantities of methane.

The Committee emphasizes that the revised definition is solely for the purpose of activities carried out under this legislation, namely, resource assessment, research, development and demonstration. In no way does this legislation alter or impinge upon present leasing laws, regulations or policies. It is anticipated, however, that recommendations for changes may result from studies and research carried out pursuant to this legislation and funded by the Project, its successor agency, or other entities of the Federal Government.

Title II: Loan Guaranties

The loan guaranty program is to be used not as the only financial incentive, but as one which may be utilized as needed to insure a broader base of participation by the private sector.

According to testimony received by the Committee, NSF is currently conducting reviews of the legal, environmental, and regulatory constraints on geothermal development. It is hoped that the results of these investigations will provide the basis for future legislation that would remove other roadblocks to full geothermal energy development and utilization.

It is the view of this Committee, that, by providing loan guaranties and thereby assuming some of the associated risk, the Government will, in the long run, reduce the Federal cost of a comprehensive, effective geothermal development program.

In addition, the Committee feels that one emphasis of the loan guaranty program should be to give small businesses direct encouragement to participate in geothermal resource assessment, research, development, demonstration and commercial exploitation.

It is expected that emphasis will be placed on loan guaranty requests for activities in each of the four stated categories:

(1) the determination and evaluation of the resource base;

(2) research and development with respect to extraction and utilization technologies;

(3) acquiring rights in geothermal resources;

(4) development, construction, and operation of facilities for the demonstration or commercial production of energy from geothermal resources.

SECTION-BY-SECTION SUMMARY

Following is a summary of the provisions of H.R. 14920 as reported by the Committee on Science and Astronautics, May 29, 1974.

SHORT TITLE

The first section of this legislation provides that it may be cited as the "Geothermal Energy Research, Development, and Demonstration Act of 1974".

FINDINGS

Section 2 provides that the Congress finds that (1) there is a national energy shortage; (2) present organizational structures and funding levels are not adequate to meet energy needs; (3) although electrical energy is a convenient form of energy, the sources for electric power generation are in short supply; (4) national energy problems can be solved only if there is a commitment to develop geothermal resources; (5) undeveloped geothermal resources are known to have a large energy content; (6) some geothermal resources contain energy in forms other than heat; (7) some geothermal resources contain valuable byproducts; (8) technologies for the development of most geothermal resources presently are not available, but such technologies are potentially economical and desirable; (9) much of the known geothermal resources exist on public lands; (10) Federal financial assistance is necessary for the development of geothermal resources; and (11) there is a Federal responsibility to encourage private industry in the development of geothermal resources.

DEFINITIONS

Section 3 defines the term "byproduct" as any mineral found in association with geothermal steam and associated geothermal resources which has a value of less than 75 percent of the value of such geothermal steam and associated geothermal resources, or which is not of sufficient value to warrant extraction and production by itself.

Such section provides that the term "geothermal steam and associated geothermal resources" has the meaning given it by section 2(c) of the Geothermal Steam Act of 1970 (30 U.S.C. 1001(c)), except that any amendment of such subsection occurring after the date of the enactment of this legislation shall not affect the meaning of such term for purposes of this legislation.

Such section provides that the term "known geothermal resources area" has the meaning given it by section 2(e) of such Act (30 U.S.C. 1001(e)), except that any amendment of such subsection occurring after the date of the enactment of this legislation shall not affect the meaning of such term for purposes of this legislation.

Such section defines the term "fund" as the Geothermal Resources Development Fund.

Such section defines the term "Project" as the Geothermal Energy Coordination and Management Project.

GEOTHERMAL ENERGY COORDINATION AND MANAGEMENT PROJECT

ESTABLISHMENT

Establishment; membership

Subsection (a) of section 101 provides for the establishment of the Geothermal Energy Coordination and Management Project (referred to in this explanation as the "Project"). Subsection (b) of section 101 provides that the Project shall have the following members: the Administrator of the Federal Energy Administration; an Assistant Director of the National Science Foundation (referred to in this summary as "NSF"); an Assistant Secretary of the Department of the Interior; an Associate Administrator of the National Aeronautics and Space Administration (referred to in this summary as "NASA"); and the General Manager of the Atomic Energy Commission. Such subsection also provides that the Administrator of the Federal Energy Administration shall act as Chairman of the Project.

Project responsibilities

Subsection (c) of section 101 provides that the Project shall be responsible for managing and coordinating national geothermal energy research, development, and demonstration programs, including determination and evaluation of the resource base, research and development with respect to various technologies, demonstration of appropriate technologies, and administration of the loan guaranty program established by this legislation.

Cooperation with other Federal agencies

Subsection (d) of section 101 provides that the Project shall cooperate with the Department of the Interior, NASA, the Atomic Energy Commission, and NSF, in carrying out its responsibilities. Such subsection also provides for the responsibilities of each such agency.

Program and project authority

Subsection (e) of section 101 provides that the Project shall have overall authority with respect to programs and projects initiated under this legislation. The agencies involved, however, shall be responsible for the operation and administration of each such program or project.

AMENDMENT TO NATIONAL SCIENCE FOUNDATION ACT OF 1950

Subsection (a) of section 102 amends section 3 of the National Science Foundation Act of 1950 (42 U.S.C. 1862) by inserting a new subsection (e) which provides that the Director of NSF shall support geothermal energy research, development, and demonstration programs in accordance with section 102(b) of this legislation.

Subsection (b) of section 102 provides that the Director of NSF shall support and fund geothermal energy research, development, and

demonstration programs initiated and approved by the Project. Such subsection further provides that its provisions in no way restrict the authority of the Director to support and fund basic research, but that such provisions do not authorize the Director to support and fund any demonstration project which is not included in any program initiated and approved by the Project. The Director may, however, support and fund such a project if any other provision of law provides him with authority to do so.

AMENDMENT TO NATIONAL AERONAUTICS AND SPACE ACT OF 1958

NASA program requirements

Subsection (a) of section 103 amends section 203 of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2473) by inserting a new subsection (b) which provides that NASA shall carry out geothermal energy technology research and development in accordance with section 103(b) of this legislation.

Subsection (b) of section 103 provides that NASA may undertake and carry out programs assigned to it by the Project.

Geothermal energy program definition

Subsection (c) of section 103 requires the Administrator of NASA to prepare, in consultation with various public and private agencies and organizations, a comprehensive program definition with respect to the development of geothermal energy resources.

RESOURCE EXPLORATION AND ASSESSMENT PROGRAM

Goals of program

Subsection (a) of section 104 requires the Project to make a regional and national appraisal of geothermal resources. The goals of the appraisal program shall include (1) improving geophysical and other techniques necessary to locate and evaluate geothermal resources; (2) developing better methods to predict the power potential of geothermal reservoirs; (3) determining and assessing the nature and power potential of high temperature geothermal convection systems; and (4) surveying and assessing regional and national geothermal resources.

Other geothermal energy development requirements

Subsection (b) of section 104 requires the Project, acting through the Geological Survey and other appropriate agencies, to (1) inventory geothermal resources on Federal land and, in certain instances, on non-Federal land; (2) conduct regional surveys leading to a national inventory of geothermal resources; (3) make available maps and reports developed from such surveys to encourage commercial development of geothermal resources; (4) recommend legislation with respect to Federal leasing policies for geothermal resources; and (5) participate with various public and private agencies and organizations in developing technologies for the discovery and evaluation of geothermal resources.

RESEARCH AND DEVELOPMENT

Section 105 requires the Project to initiate a research and development program to resolve problems with respect to commercial utiliza-

tion of geothermal resources. The goals of such program shall include (1) development of effective drilling methods; (2) development of reliable predictive and control methods; (3) exploitation of rock fracturing techniques; (4) improvement of extraction equipment and technology; (5) development of geothermal energy conversion methods; (6) development of methods to control emissions and wastes; (7) development of waste disposal control technologies; (8) improvement of the capability to predict the environmental impact of developing geothermal energy resources; (9) identification of social, legal, and economic problems with respect to geothermal resources development; and (10) provision for adequate supply of scientists to perform required geothermal research and development activities.

Such section also requires the Project to implement a coordinated research and development program to demonstrate extraction and utilization technologies and to accomplish such goals.

DEMONSTRATION

Geothermal demonstration plants

Subsection (a) of section 106 provides that the Project shall initiate a program to design and construct geothermal demonstration plants. The goals of such program include (1) developing economical geothermal energy production systems and components; (2) designing and constructing plants to produce electrical power; (3) operating such plants for a period of time; (4) providing experimental test beds; (5) involving engineers and technicians from private industry in developing methods of geothermal energy exploitation; and (6) providing for an adequate supply of trained geothermal engineers and technicians.

Separate demonstration projects

Subsection (b) of section 106 permits the Project to establish a separate demonstration project for each geothermal resource base. The Project is given authority to obtain, through appropriate Federal agencies, plants and other real property used in any demonstration project.

Any agency designated by the Project to conduct a demonstration project shall provide for the disposal of electric energy and other geothermal resource byproducts of such project. Such disposition, to the maximum extent possible, shall be achieved through the sale of such byproducts.

Such subsection also provides that, at the conclusion of the program required under subsection (a), agencies designated by the Project to conduct demonstration projects shall, to the extent possible or appropriate, dispose of such projects or dispose of all electric energy and other geothermal resource byproducts produced by such projects.

Such subsection also provides that preference shall be given to known geothermal resource areas in making site selections for demonstration plants.

SCIENTIFIC AND TECHNICAL EDUCATION

Section 107 provides that it is the policy of the Congress to encourage programs to provide trained personnel to carry out geothermal re-

search, development, and demonstration activities. NSF is authorized to support educational programs designed to effectuate such policy. NSF is required to coordinate its activities with various public and private agencies and organizations, and is authorized to encourage international participation and cooperation with respect to such educational programs.

Loan Guaranties

ESTABLISHMENT OF LOAN GUARANTY PROGRAM

Policy of the Congress

Subsection (a) of section 201 provides that it is the policy of the Congress to authorize the Chairman of the Project to designate an appropriate Federal agency to guarantee loans to encourage commercial development of geothermal resources.

Loan guaranty purposes

Subsection (b) of section 201 provides that the head of the designated Federal agency may guaranty any loan made for purposes of (1) determining and evaluating the resource base; (2) extraction and utilization research and development; (3) acquiring rights to geothermal resources; (4) geothermal resources demonstration facilities.

Loan guaranty terms and requirements

Subsection (c) of section 201 provides that loan guaranties may not exceed 75 percent of the aggregate cost of the project involved. Subsection (d) of section 201 authorizes the head of the designated agency to establish terms and conditions for loan guaranties, and further provides that a guaranty may be made only if (1) the rate of interest for the loan involved does not exceed prevailing interest rates for conventional construction loans; (2) the loan must be fully repaid within 30 years; (3) the amount of the loan, together with amounts otherwise available, is sufficient to carry out the project involved; and (4) there is reasonable assurance of repayment of the loan by the qualified borrower.

Subsection (e) of section 201 prohibits the head of the designated agency from guarantying any loan if such loan is in excess of $25,000,000 for any project, or from guarantying any combination of loans to a single qualified borrower in excess of $50,000,000.

Definition of qualified borrower

Subsection (f) of section 201 defines the term "qualified borrower" as any public or private agency or organization which, as determined by the head of the designated agency, has an interest in geothermal resources and is capable of carrying out research or development activities with respect to energy production.

PAYMENT OF INTEREST

Conditions for payment

Subsection (a) of section 202 provides that the head of the designated agency may pay to the lender any interest charges due on the unpaid balance of a guarantied loan if the head of the designated agency finds that (1) the borrower is unable to pay such interest charges and it is in the public interest to permit the borrower to pur-

sue the project involved; and (2) the amount of such interest charges does not exceed an amount equal to the average prime interest rate for the preceding fiscal year, plus one-half of 1 percent.

Default by qualified borrower

Subsection (b) of section 202 provides that if a qualified borrower defaults on a guarantied loan, the head of the designated agency may make payment in accordance with the terms of the guaranty. The Attorney General of the United States is required to take appropriate action to recover the amount of such payments from assets of the qualified borrower which are associated with the project involved.

PERIOD OF GUARANTIES AND INTEREST ASSISTANCE

Section 203 provides that no loan guaranties or interest assistance contracts shall be made after the 10-year period following the date of the enactment of this legislation.

GEOTHERMAL RESOURCES DEVELOPMENT FUND

Establishment of fund

Subsection (a) of section 204 establishes in the Treasury of the United States a Geothermal Resources Development Fund (referred to in this explanation as the "fund"). The fund shall be available to the head of the designated agency for carrying out the loan guaranty and interest assistance program authorized by this legislation.

Such subsection also provides that moneys in the fund not needed for current operations shall be invested in bonds or other obligations of the United States.

Payments into fund

Subsection (b) of section 204 provides that payments into the fund shall be made from amounts appropriated by the Congress pursuant to section 304(c) and from amounts returned to the United States pursuant to section 202(b).

Such subsection also provides that amounts in the fund shall remain available until expended, except that amounts available in the fund after the 10-year period following the date of the enactment of this legislation shall be paid into the general fund of the Treasury.

Reports

Subsection (c) of section 204 requires the head of the designated agency to submit annual reports to the Congress with respect to the operation of the fund.

GENERAL PROVISIONS

PROTECTION OF ENVIRONMENT

Section 301 provides that activities under this legislation shall be designed to protect the environment and to assure the safety of persons and property. Such section also provides that the program developed by the Project under title I of this legislation shall include special research and development to assure environmental protection and the safety of persons and property.

REPORTING REQUIREMENTS

Biannual reports

Subsection (a) of section 302 requires the Chairman of the Project to submit biannual reports to the President and to the Congress with respect to the activities of the Project.

Demonstration project reports

Subsection (b) of section 302 requires the Chairman of the Project to submit reports to the President and to the Congress with respect to each demonstration project conducted under section 106.

TRANSFER OF FUNCTIONS

Section 303 provides that, upon the establishment of a permanent Federal organization or agency having jurisdiction over energy research and development, the functions of the Project shall be transferred to and vested in such organization or agency. Such section also provides that, after such transfer and vesting, members of the Project shall provide advice and counsel to the head of such organization or agency.

AUTHORIZATION OF APPROPRIATIONS

Section 304 provides that, for fiscal years 1976, 1977, 1978, 1979, and 1980, only such sums may be appropriated to carry out this legislation as the Congress may authorize by law after the date of the enactment of this legislation.

Such section also authorizes to be appropriated $2,500,000 for fiscal year 1975 to the Administrator of NASA to prepare program definitions under section 103(c).

Such section also authorizes to be appropriated $50,000,000 annually to carry out the loan guaranty program established by this legislation.

COST AND BUDGET DATA

In accordance with the requirements of section 252(b) of the Legislative Reorganization Act of 1970, the Committee estimates the costs of the program provided for in the bill are:

(1) $2.5 million for fiscal year 1975 to the Administrator of NASA to conduct the comprehensive program definition.

(2) To be placed in a special fund to insure loans, $50 million annually.

(3) Funds required for implementing the bill for fiscal years 1976–79 have not been precisely determined. Studies of comprehensive 5-year geothermal research, development, and demonstration programs by Federal agencies have resulted in widely varying cost estimates. A more accurate estimate should result from the comprehensive program definition.

COMMITTEE RECOMMENDATIONS

A quorum being present, the Committee, by voice vote, unanimously approved the bill.

DEPARTMENT RECOMMENDATIONS

Formal written reports requested on H.R. 14172 from the National Aeronautics and Space Administration, the National Science Foundation, the Department of the Interior, the Atomic Energy Commission, and the Federal Power Commission have not been received. However, testimony from all these organizations on H.R. 11212 was received and is part of the hearing record. Furthermore, written statements from NSF, AEC, and NASA are included in the hearing record of H.R. 14172.

CHANGES IN EXISTING LAW MADE BY THE BILL, AS REPORTED

In compliance with clause 3 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) :

SECTION 3 OF THE NATIONAL SCIENCE FOUNDATION ACT OF 1950

FUNCTIONS OF THE FOUNDATION

SEC. 3. (a) The Foundation is authorized and directed—

(1) to initiate and support basic scientific research and programs to strengthen scientific research potential in the mathematical, physical, medical, biological, engineering, social, and other sciences, by making contracts or other arrangements (including grants, loans, and other forms of assistance) to support such scientific activities and to appraise the impact of research upon industrial development and upon the general welfare;

(2) to award, as provided in section 10, scholarships and graduate fellowships in the mathematical, physical, medical, biological, engineering, social, and other sciences;

(3) to foster the interchange of scientific information among scientists in the United States and foreign countries;

(4) to foster and support the development and use of computer and other scientific methods and technologies, primarily for research and education in the sciences;

(5) to evaluate the status and needs of the various sciences as evidenced by programs, projects, and studies undertaken by agencies of the Federal Government, by individuals, and by public and private research groups, employing by grant or contract such consulting services as it may deem necessary for the purpose of such evaluations; and to take into consideration the results of such evaluations in correlating the research and educational programs undertaken or supported by the Foundation with programs, projects, and studies undertaken by agencies of the Federal Government, by individuals, and by public and private research groups;

(6) to maintain a current register of scientific and technical personnel, and in other ways to provide a central clearinghouse for the collection, interpretation, and analysis of data on the availability of, and the current and projected need for, scientific and technical resources in the United States, and to provide a source of information for policy formulation by other agencies of the Federal Government; and

(7) to initiate and maintain a program for the determination of the total amount of money for scientific research, including money allocated for the construction of the facilities wherein such research is conducted, received by each educational institution and appropriate nonprofit organization in the United States, by grant, contract, or other arrangement from agencies of the Federal Government, and to report annually thereon to the President and the Congress.

(b) The Foundation is authorized to initiate and support specific scientific activities in connection with matters relating to international cooperation or national security by making contracts or other arrangements (including grants, loans, and other forms of assistance) for the conduct of such scientific activities. Such activities when initiated or supported pursuant to requests made by the Secretary of State or the Secretary of Defense shall be financed solely from funds transferred to the Foundation by the requesting Secretary as provided in section 15(g), and any such activities shall be unclassified and shall be identified by the Foundation as being undertaken at the request of the appropriate Secretary.

(c) In addition to the authority contained in subsections (a) and (b), the Foundation is authorized to initiate and support scientific research, including applied research, at academic and other nonprofit institutions. When so directed by the President, the Foundation is further authorized to support, through other appropriate organizations, applied scientific research relevant to national problems involving the public interest. In exercising the authority contained in this subsection, the Foundation may employ by grant or contract such consulting services as it deems necessary, and shall coordinate and correlate its activities with respect to any such problem with other agencies of the Federal Government undertaking similar programs in that field.

(d) The Board and the Director shall recommend and encourage the pursuit of national policies for the promotion of basic research and education in the sciences.

(e) The Director shall provide support for programs relating to geothermal energy research, development, and demonstration, as provided in section 102(b) of the Geothermal Energy Research, Development, and Demonstration Act of 1974.

[(e)](*f*) In exercising the authority and discharging the functions referred to in the foregoing subsections, it shall be one of the objectives of the Foundation to strengthen research and education in the sciences including independent research by individuals, throughout the United States, and to avoid undue concentration of such research and education.

[(f)](*g*) The Foundation shall render an annual report to the President for submission on or before the 15th day of January of each year to the Congress, summarizing the activities of the Foundation and making such recommendations as it may deem appropriate. Such report shall include information as to the acquisition and disposition by the Foundation of any patents and patent rights.

SECTION 203 OF THE NATIONAL AERONAUTICS AND SPACE ACT OF 1958

FUNCTIONS OF THE ADMINISTRATION

SEC. 203. (a) * * *

* * * * * * *

(b) The Administration shall carry out research, development, and related activities in geothermal energy technology, as provided in section 103(b) of the Geothermal Energy Research, Development, and Demonstration Act of 1974.

[(b)](c) In the performance of its functions the Administration is authorized—

(1) to make, promulgate, issue, rescind, and amend rules and regulations governing the manner of its operations and the exercise of the powers vested in it by law;

(2) to appoint and fix the compensation of such officers and employees as may be necessary to carry out such functions. Such officers and employees shall be appointed in accordance with the civil-service laws and their compensation fixed in accordance with the Classification Act of 1949,[1] except that (A) to the extent the Administrator deems such action necessary to the discharge of his responsibilities, he may appoint not more than four hundred and twenty-five of the scientific, engineering, and administrative personnel of the Administration without regard to such laws, and may fix the compensation of such personnel not in excess of the highest rate of grade 18 of the General Schedule of the Classification Act of 1949, as amended, and [2] (B) to the extent the Administrator deems such action necessary to recruit specially qualified scientific and engineering talent, he may establish the entrance grade for scientific and engineering personnel without previous service in the Federal Government at a level up to two grades higher than the grade provided for such personnel under the General Schedule established by the Classification Act of 1949,[2] and fix their compensation accordingly;

(3) to acquire (by purchase, lease, condemnation, or otherwise), construct, improve, repair, operate, and maintain laboratories, research and testing sites and facilities, aeronautical and space vehicles, quarters and related accommodations for employees and dependents of employees of the Administration, and such other real and personal property (including patents), or any interest therein, as the Administration deems necessary within and outside the continental United States; to acquire by lease or otherwise, through the Administrator of General Services, buildings or parts of buildings in the District of Columbia for the use of the Administration for a period not to exceed ten years without regard to the Act of March 3, 1877 (40 U.S.C. 34); to lease to others such real and personal property; to sell and otherwise dispose of real and personal property (including patents and rights there-

[1] The Classification Act of 1949 was repealed and the reference is now to chapter 51 and subchapter III of chapter 53 of title 5, U.S.C.

[2] The Classification Act of 1949 was repealed and the General Schedule is in section 5332(a) of title 5, U.S.C.

under) in accordance with the provisions of the Federal Property and Administrative Services Act of 1949, as amended (40 U.S.C. 471 et seq.); and to provide by contract or otherwise for cafeterias and other necessary facilities for the welfare of employees of the Administration at its installations and purchase and maintain equipment therefor;

(4) to accept unconditional gifts or donations of services, money, or property, real, personal, or mixed, tangible or intangible;

(5) without regard to section 3648 of the Revised Statutes, as amended (31 U.S.C. 529), to enter into and perform such contracts, leases, cooperative agreements, or other transactions as may be necessary in the conduct of its work and on such terms as it may deem appropriate, with any agency or instrumentality of the United States, or with any State, Territory, or possession, or with any political subdivision thereof, or with any person, firm, association, corporation, or educational institution. To the maximum extent practicable and consistent with the accomplishment of the purpose of this Act, such contracts, leases, agreements, and other transactions shall be allocated by the Administrator in a manner which will enable small-business concerns to participate equitably and proportionately in the conduct of the work of the Administration;

(6) to use, with their consent, the services, equipment, personnel, and facilities of Federal and other agencies with or without reimbursement, and on a similar basis to cooperate with other public and private agencies and instrumentalities in the use of services, equipment, and facilities. Each department and agency of the Federal Government shall cooperate fully with the Administration in making its services, equipment, personnel, and facilities available to the Administration, and any such department or agency is authorized, notwithstanding any other provision of law, to transfer to or to receive from the Administration, without reimbursement, aeronautical and space vehicles, and supplies and equipment other than administrative supplies or equipment;

(7) to appoint such advisory committees as may be appropriate for purposes of consultation and advice to the Administration in the performance of its functions;

(8) to establish within the Administration such offices and procedures as may be appropriate to provide for the greatest possible coordination of its activities under this Act with related scientific and other activities being carried on by other public and private agencies and organizations;

(9) to obtain services as authorized by section 15 of the Act of August 2, 1946 (5 U.S.C. 55a), at rates not to exceed $100 per diem for individuals;

(10) when determined by the Administrator to be necessary, and subject to such security investigations as he may determine to be appropriate, to employ aliens without regard to statutory provisions prohibiting payment of compensation to aliens;

(11) (Repealed by P.L. 88–448, Aug. 19, 1964);

(12) with the approval of the President, to enter into cooperative agreements under which members of the Army, Navy, Air Force, and Marine Corps may be detailed by the appropriate Secretary for services in the performance of functions under this Act to the same extent as that to which they might be lawfully assigned in the Department of Defense;

(13) (A) to consider, ascertain, adjust, determine, settle, and pay, on behalf of the United States, in full satisfaction thereof, any claim for $5,000 or less against the United States for bodily injury, death, or damage to or loss of real or personal property resulting from the conduct of the Administration's functions as specified in subsection (a) of this section, where such claim is presented to the Administration in writing within two years after the accident or incident out of which the claim arises; and

(B) if the Administration considers that a claim in excess of $5,000 is meritorious and would otherwise be covered by this paragraph, to report the facts and circumstances thereof to the Congress for its consideration; and

(14) (Repealed by P.L. 91–646, Jan. 2, 1971.)

ADDITIONAL VIEWS OF MR. HECHLER OF WEST VIRGINIA

I strongly support legislation for research, development, and demonstration in geothermal energy. At a time when our Nation is gravely concerned about energy sources for the short and long term, this legislation promises to get us off to a fast start in developing geothermal energy, a key environmentally sound energy source. However, I do have some serious questions about certain sections of H.R. 14920.

During the full committee markup, I raised a number of questions concerning the adequacy of protection for both consumers and taxpayers who are investing in geothermal development. Since the majority of geothermal resources are located on Federal lands, I feel strongly that the public interest in geothermal development must be protected, not necessarily by Federal ownership and development but by insuring that a giant giveaway does not develop. I am concerned that section 106(b)(4) would require that at the conclusion of the demonstration program, "the agencies designated by the Project to conduct demonstration projects under this section shall, by sale, lease, or otherwise, dispose of all projects which they have undertaken pursuant to this section." This in effect means that the Federal Government will develop the geothermal powerplant, do all the spade work, and then turn it over for private exploitation. I think this may be questionable given the fact that one of the major advantages of geothermal plants over conventional or nuclear plants is that it is economical to begin on a small scale and add generating units as the reservoir is developed or as demand increases. In short, disposing of these projects is not the same as getting rid of surplus Army vehicles—these facilities may be of considerable value to the public as well as to any private owners. Congress must consider whether these facilities should be expanded and developed as a source of power which will clearly benefit the public or be turned over to private industry.

Title II of the bill sets up a system of loan guaranties and a Federal role in covering interest payments on loans to private industries. The rationale here is to encourage small businesses to move into the geothermal energy area. This is certainly a laudable goal. However, title II contains no requirements limiting the size of the corporation or business utilizing the loan guaranty program nor does it require any demonstration of need on the part of the borrower. Given the fact that the huge major energy companies have completely dominated the leasing of geothermal resources under the Geothermal Steam Act of 1970, I would question whether this title would be any more than just another break for the conglomerates. The limitations on the amount any one borrower can borrow are not sufficient to prevent the participation of all of the big energy companies.

KEN HECHLER.

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Calendar No. 820

93D CONGRESS 2d Session } SENATE { REPORT No. 93-849

GEOTHERMAL ENERGY EXPLORATION, RESEARCH AND DEVELOPMENT

MAY 15, 1974.—Ordered to be printed

Mr. BIBLE, from the Committee on Interior and Insular Affairs, submitted the following

REPORT

[To accompany S. 2465]

The Committee on Interior and Insular Affairs, to which was referred the bill (S. 2465) to authorize the Secretary of the Interior to guarantee loans for the financing of commercial ventures in geothermal energy; to coordinate Federal activities in geothermal energy exploration, research, and development; and for other purposes, having considered the same, reports favorably thereon with amendments and recommends that the bill as amended do pass.

The amendments are as follows:

1. On Page 3, strike subsection 101(d) and insert the following:

(d) Loan guaranties under this title shall be on such terms and conditions as the Secretary determines: *Provided, however*, That guaranty shall be made under this title only if—

(1) the loan involved is at a rate which does not exceed the prevailing interest rates for conventional construction loans;

(2) the terms of such loan require full repayment within thirty years after the date thereof;

(3) in the judgment of the Secretary, the amount of the loan (when combined with amounts available to the qualified borrower from other sources) will be sufficient to carry out the project; and

(4) in the judgment of the Secretary, there is reasonable assurance of the repayment by the qualified borrower of the guaranteed indebtedness.

2. On Page 4, lines 16 and 17, delete the phrase: "payments, with interest, from the defaulting borrower." and insert instead the phrase: "payments from such assets of the defaulting borrower as are associated with the project."

3. On page 5, in line 21, after the word "Congress" insert the phrase, "by the Secretary."

4. On page 6, line 16, delete the word "exploration" and insert the phrase "resource inventory."

On page 6, line 24, delete the word "exploration" and insert the word "inventorying."

On page 7, line 9, delete the word "exploration" and insert the word "surveys."

On page 8, line 19, delete the word "exploration" and insert the word "inventorying."

5. On page 7, line 24, delete the word "resources." and insert instead the following language:

> resources, and conduct research into the principles controlling the location, occurrence, size, temperature, energy content, producibility, and economic lifetimes of geothermal reservoirs.

6. On page 8, line 1, delete the phrase "exploration plan" and insert instead the phrase "inventory authorized by subsection 202(a) and the applied research authorized by subsection 202(e)"

7. On page 8, line 24, delete the phrase "exploration of" and insert instead the phrase "inventory of and applied research on"

8. On page 8, line 25, delete the word "202 (a)" and insert instead the word "202."

9. On page 9, line 21 delete the phrase "exploration and development."

10. On page 9, line 22, delete the phrase "discovery and."

11. On page 10, line 21, delete the word "energy" and insert the phrase "energy, water supplies, or minerals."

12. On page 11, lines 8 and 9, delete the phrase "contribute not less than 25 per centum of" and insert instead the phrase "make contributions toward."

13. On page 11, line 22, delete the word "$5,000,000" and insert instead the word "$10,000,000."

14. On page 12, line 25, before the word "provisions" insert the phrase "loan guarantee."

15. On page 13, lines 9 and 10, delete the phrase "NASA to carry out the requirements of section section 205." and insert instead the word "NASA."

I. PURPOSE OF THE MEASURE

The measure, S. 2465, has several purposes which will contribute to improvement of the Federal programs for exploration, research, and development of geothermal energy resources:

Title I—would establish a Federal guarantee program for loans to finance private geothermal development.

Title II—would accelerate and coodinate the Federal exploration program for geothermal resources and expand the Federal program of research, development, and demonstration of geothermal energy technologies.

II. BACKGROUND

The Senate Committee on Interior and Insular Affairs has been concerned with geothermal resources for many years. Under the leadership of Senator Bible, the committee developed legislation which culminated in the Geothermal Steam Act of 1970 (30 U.S.C. 1001–1025).

In June of 1972, as a part of the committee's study of National Fuels and Energy Policy being conducted pursuant to Senate Resolution 45, 92nd Congress, hearings were held on geothermal energy resources and research which provided an overview of the state of technology and the potential of the resource as a new energy source.

On June 13, 1973, the Subcommittee on Water and Power Resources began a detailed investigation of the potential for the production of power from geothermal resources with a hearing in Washington, D.C. At that hearing the following Federal agencies, which have programs related to geothermal energy, were requested to present testimony in response to specific questions posed by the subcommittee:

(1) The Department of the Interior.
(2) The Atomic Energy Commission.
(3) The National Science Foundation.
(4) The National Aeronautics and Space Administration (NASA).
(5) The Department of State.

Subsequent to that hearing, the subcommittee conducted field hearings and inspections of existing and potential geothermal developments. On August 8, an inspection was made of the Geysers Geothermal Power Development of the Pacific Gas & Electric Co. in California which is the only operating geothermal electric facility in the United States.

On August 10, an inspection was made by helicopter of geothermal areas in southern Idaho, which are being considered for early development for power production. On that date, also, the subcommittee held a public hearing in Idaho Falls, Idaho, to take testimony from witnesses including public officials, authorities in geothermal energy, representatives of industrial concerns involved in energy and various citizens groups and individuals.

On August 11, a similar subcommittee hearing was held in Klamath Falls, Oreg. The hearing at Klamath Falls was conducted at the Oregon Technical Institute, in a modern academic building complex which is entirely heated from geothermal wells.

The results of the subcommittee's investigations have been compiled in a report to the Senate which will be available shortly.

S. 2465, a bill introduced on September 24, 1973, by Senators Bible, Fannin, Bartlett, Buckley, Church, Hansen, Haskell, Hatfield, Jackson, Johnston, McClure, and Metcalf, is to a considerable extent based upon the evidence of the investigation concerning the need for definition of the Federal role in geothermal energy.

The Subcommittee on Water and Power Resources held a hearing on S. 2465 on November 7, 1973. The text of S. 2465, with minor amendments, was adopted as a new title II of S. 1283 on November 27, 1973.

S. 1283, the "National Energy Research and Development Policy Act of 1973" was passed by the Senate with a unanimous vote on December 7, 1973 including the substance of S. 2465 as a Title II. Action in the House of Representatives on S. 1283 raises some question as to whether the Geothermal Energy Act can be enacted as Title II of that measure. To insure full consideration of S. 2465 and to facilitate action by the House, the Committee on Interior and Insular Affairs again considered S. 2465 and ordered it reported separately on May 2, 1974.

III. CO-SPONSORS OF S. 2465

The following is a list of co-sponsors of S. 2465:

Mr. Bible
Mr. Fannin
Mr. Bartlett
Mr. Buckley
Mr. Church
Mr. Hansen
Mr. Haskell
Mr. Hatfield
Mr. Jackson
Mr. Johnston
Mr. McClure
Mr. Metcalf
Mr. Goldwater
Mr. Domenici
Mr. Abourezk
Mr. Gurney
Mr. Nelson
Mr. Stevens
Mr. Tunney

IV. NEED FOR THE MEASURE

The Subcommittee on Water and Power Resources of the Committee on Interior and Insular Affairs conducted a detailed study in 1963 of the potential for energy production from geothermal resource. The Subcommittee subsequently adopted a report including findings and recommendations as follows:

I. Findings and Recommendations

A. FINDINGS

1. Electric power production from geothermal resources has been shown to be technically and economically feasible in certain locations and is presently providing 400 megawatts of electricity in the United States.

2. The geothermal resources of the United States hold a potential for the production of substantial amounts of energy in the form of heat and electric power. They hold special promise for making a significant contribution to regional power supplies.

3. Potential geothermal technologies offer the possibility of providing environmentally attractive energy production techniques.

4. The available information about the resource is not adequate to form reliable estimates on the nature and extent of geothermal resources or to support reliable estimates of the probable rate of geothermal energy development. There is a need for increased exploration and classification of geothermal resources.

5. There is a wide margin of uncertainty concerning the potential magnitude of geothermal energy development and the schedule of achievement of technological capabilities.

6. Geothermal resources occur in a variety of types and situations which pose widely different types of technological problems.

a. Dry-steam geothermal systems have been developed successfully but their total potential is believed to be limited.

b. Wet-steam geothermal systems have been harnessed for useful applications, but the ultimate utility of the resource depends upon development of methods to develop energy from low-temperature brines and the successful resolution of engineering and environmental problems.

c. Hot dry-rock systems may offer the greatest power potential over the long run, but significant research and development work (including drilling technology and advanced binary cycle heat exchange work) will be required to develop this resource.

d. Geopressured brines are believed to have potential for energy development, but exploration and research on this form of geothermal resource are especially limited.

7. There is considerable interest on the part of private industry in developing geothermal energy. However, the lack of a Federal leasing program, financing impediments, and the risk involved in advanced technologies are inhibiting development.

8. There is a lack of aggressive governmental leadership in the development of geothermal energy. There is no lead agency and as a result research and development is sporadic and uncoordinated.

9. The Department of the Interior's implementation of the Geothermal Steam Act, which has been law since 1970, has not yet resulted in regulations which will permit orderly development of attractive resources on the public lands.

10. The present Federal geothermal R.&D. program lacks clearly enunciated goals and objectives, coordinated management or adequate funding for the exploration, research, and development activities which are needed.

11. There is a need for small-scale demonstration projects which produce power from geothermal resources to provide experience with and confidence in the resource use.

12. There is a need for more Federal assistance in exploration, research, development, and demonstration of geothermal technology and for financial assistance to non-Federal developments.

B. RECOMMENDATIONS

1. The Department of the Interior should take steps to insure prompt issuance of the final environmental impact

statement on its leasing regulations formulated pursuant to the Geothermal Energy Act of 1970.[1]

2. A lead agency should be designated to take responsibility for advancing geothermal energy resources research and development.

3. Exploration activity for geothermal energy resources should be greatly accelerated.

4. The level of funding for Federal research and development activities in geothermal energy resources should be greatly increased from the present level.[2]

5. In order to facilitate private development of geothermal resources, a financial assistance program should be initiated to overcome some of the uncertainties associated with new technology development.[3]

The provisions of S. 2465 would carry out the legislative action recommended by the Subcommittee. A discussion of the background for the recommendations is included in the subcommittee's report.

V. COMMITTEE AMENDMENTS

The Committee adopted several amendments to S. 2465. The following explanations correspond to the numbered amendments set forth.

1. This is a clarifying amendment which makes only one substantive change. The maximum interest rate permissable for loans guaranteed under the Act was set at the prevailing rate for conventional construction loans instead of being set at the prime rate plus one percent.

2. This amendment limits the liability of a defaulting borrower to the amount of investment in the geothermal project covered by the loan. The Committee believed that the extension of liability to other assets of the borrower would deter investment in high-risk geothermal ventures by industries which are unfamiliar with such investments.

3. This is a clarifying amendment.

4. A number of amendments are required to clarify the intent of the bill concerning the preparation of an inventory of geothermal resources by the Secretary of the Interior. The Committee amended the bill to avoid the use of the word "exploration" which is a term of art in the petroleum industry having connotations beyond those intended in the bill.

5. This amendment was adopted by the Committee to clarify its intent that the Geological Survey should be the lead agency in research activities relating to the improvement of methods of determining the physical properties of geothermal resources.

6. This is a conforming amendment.

7. This is a conforming amendment.

8. This is a technical amendment.

9. This is a conforming amendment.

10. This is a clarifying amendment.

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[1] This action has been taken since the report was prepared.

[2] The fiscal year 1975 budget proposed by the administration reflects a sizable increase in geothermal R. & D. programs.

[3] U.S. Congress, Senate, Subcommittee on Water and Power Resources. *The Potential for Energy Production from Geothermal Resources,* Committee print, 93d Cong., 1st sess., pp. 1–2.

11. This amendment makes clear the intent of the Committee to authorize a research and development program encompassing all applications of geothermal resources.

12. This amendment was adopted to provide greater lattitude to the administrator of the demonstration program to establish cost sharing agreements commensurate with the risk benefits, and other considerations of each potential venture.

13. This amendment was adopted to reflect technical testimony concerning the probable cost of the types of demonstrations intended.

14. This is a clarifying amendment.

15. This is a technical amendment.

VI. SECTION BY SECTION ANALYSIS

Short Title

The short title of this title is the "Geothermal Energy Act of 1973."

Title I—Loan Guarantee Program

Section 101

The Secretary of the Interior is authorized by section 101 to guarantee loans made by financial institutions to qualified borrowers for the purpose of geothermal energy development. Up to 75 percent of the cost of the proposed project could be guaranteed; however, no more than $25 million could be guaranteed for any single project nor more than $50 million for any borrower. The probable major application of geothermal resources in the short-term future will be for the production of electric power. The financial structure of electric utilities and other potential participants in such ventures, however, does not presently facilitate entry into costly, high-risk, geothermal developments. The objective of Federal guarantees is to reduce the financial uncertainties until more extensive experience with the technology exists.

Section 102

The Secretary is authorized pursuant to section 102 to contract with the lender to guarantee such loans and to make payment in accordance with the guarantee in the event of default by the borrower. In the event that a borower becomes unable to pay interest charges and is in danger of default, the Secretary may, if he finds it to be in the public interest, pay the interest in behalf of the borrower and permit the borrower to continue the project.

If a borrower is in default, and the Secretary has made payments to the lender on his behalf, the Attorney General is authorized to take action to recover the amounts of the payments from the assets of the defaulting borrower which are associated with the project. The intent of this limitation is to generally confine the risk taken by the borrower to the amount of his investment in the geothermal venture.

If the borrower has invested other borrowed capital in the venture, however, the Federal rights to the assets of the venture shall take precedent over those of other creditors.

Section 103

Provides for a life of the loan guarantee program limited to 10 calendar years.

Section 104

Provides that a Geothermal Resources Development Fund be established in the Treasury to be available for the purposes of the loan guarantee program.

Section 105

The uses and disposition of the fund are set forth in section 105.

Section 106

Appropriations to the fund not to exceed $50 million annually are authorized in section 106.

Section 107

Requires annual financial reports on the operation of the fund.

TITLE II—COORDINATION OF FEDERAL ACTIVITIES IN GEOTHERMAL ENERGY EXPLORATION, RESEARCH, AND DEVELOPMENT

Section 201

Section 201 sets forth that the policy of the Congress to encourage the development of geothermal energy through resource inventory, research, and financial and technical assistance for the construction of pilot and demonstration geothermal developments.

Section 202

In section 202 the Secretary of the Interior is authorized and directed to carry out a program of resources inventory and research into the geological forms of geothermal resources.

Section 203

Section 203 directs the Secretary to coordinate the geological research program with the technological research program of the Atomic Energy Commission.

Section 204

In section 204 the Secretary is authorized to employ private firms or cooperate with Federal, State, and local agencies to obtain assistance in carrying out the resources inventory.

Section 205

The Administrator of the National Aeronautics and Space Administration is directed in section 205 to prepare and transmit to the Secretary within 6 months a proposal for the employment of space technologies and the capabilities of NASA in inventorying geothermal resources.

Section 206

Section 206 directs the Secretary to submit the exploration plan and schedule to the President and the Congress within 1 year. Annual progress reports would be required thereafter.

Section 207

Section 207 authorizes the Atomic Energy Commission, in cooperation with industry, to undertake a research and development program to develop processes and equipment for the utilization of all forms of geothermal energy.

Section 208

Section 208 authorizes the Commission to enter into cooperative agreements with non-Federal entities for the construction, operation, and maintenance of demonstration developments for the production of electric or heat energy from geothermal resources. The non-Federal participants would be expected to make some contribution in the form of funds, rights in property, services, or other valuable consideration. The amount of the non-Federal contribution would be left to the discretion of the Commission on a case-by-case basis.

It is anticipated that several such demonstrations would be selected to reflect the development of a variety of geothermal resource types, the application of a variety of energy development and utilization technologies and a variety of conditions of energy and by-product needs.

The Commission is authorized to proceed with such developments in which the estimated Federal investment will not exceed $10 million.

The Commission is authorized to investigate potential agreements for major demonstration facilities (in which the Federal investment will exceed $10 million) and to submit proposals to proceed with such agreements to the Congress for authorization.

In preparing proposals for cooperative agreements with non-Federal entities to construct major geothermal energy facilities, the committee expects that non-Federal participants shall be selected which have the financial, technical, and management competence to perform the functions required of them pursuant to the agreement.

Section 209

Appropriations are authorized in section 209 for fiscal years 1974, 1975, and 1976, as follows:

(a) to the Secretary of the Interior, $10 million annually.
(b) to the Atomic Energy Commission, $35 million annually.
(c) to NASA, such amounts as may be required.

Section 210

Section 210 includes definitions which are self-explanatory.

VII. ESTIMATE OF COST

In accordance with section 252(a) of the Legislative Reorganization Act of 1970 (Public Law 91–150, 91st Cong.) the committee provides the following estimate of cost of this measure.

(1) To be placed in a special fund to insure loans, $50 million annually.

(2) To carry out other provisions of this Act, $45 million annually in fiscal years 1974, 1975, and 1976, and such amounts as may be required for the participation of the National Aeronautics and Space Administration in geothermal resources inventories.

VIII. COMMITTEE RECOMMENDATION

The Senate Committee on Interior and Insular Affairs in open markup session on May 2, 1974, by unanimous vote of a quorum pres-

ent, recommends that S. 2465, be enacted with the amendments set forth herein.

IX. EXECUTIVE COMMUNICATIONS

The comments of Executive agencies on S. 2465 are set forth in full below.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,
Washington, D.C., November 6, 1973.

Hon. HENRY M. JACKSON,
Chairman, Committee on Interior and Insular Affairs, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: This is in further reply to your request for the comments of the National Aeronautics and Space Administration on the bill S. 2465, "To authorize the Secretary of the Interior to guarantee loans for the financing of commercial ventures in geothermal energy; to coordinate Federal activities in geothermal energy exploration, research, and development; and for other purposes."

S. 2465 has as its purpose the encouragement of research and development of geothermal energy in order to bring this energy source to the point of practical and commercial application.

Title I establishes a loan guarantee program under the Secretary of the Interior. The Secretary would be authorized to guarantee loans made by financial institutions to qualified borrowers for the purposes of exploration, development, acquisition of rights in geothermal resources, and construction and operation of facilities to bring these resources to use in the commercial production of energy. Loan guarantees would be available for up to 75 percent of the aggregate cost of the project. A geothermal resources development fund would be establishment in the Treasury and be available to the Secretary of the Interior for carrying out this program.

Title II states the policy of the Congress to encourage private industry with Federal assistance and leadership to develop and bring to the point of practical application the production of energy from geothermal sources.

The Secretary of the Interior, through the U.S. Geological Survey, would develop and carry out a plan for the overall exploration of all forms of geothermal resources on Federal and non-Federal lands. He would also conduct surveys leading to a national inventory of geothermal resources and make available maps and other documents to facilitate commercial development. NASA is authorized and directed (section 205) to prepare a proposal for the use of space technologies and the services and facilities of NASA for exploration and mapping of geothermal resources. This report would be due in 6 months from enactment of this legislation.

The Atomic Energy Commission (AEC) is given the lead research and development role in cooperation with private industry to bring geothermal resources to the point of commercial feasibility for the production of useful energy (section 207). AEC is given a broad charter to conduct all the necessary research, development, engineering, laboratory and field experiments and marketing, engineering and economic studies, etc. The Commission is instructed to coordinate its efforts

with those of the Department of the Interior to prevent duplication. The AEC is also given authority to investigate potential interagency agreements and coorperative agreements with non-Federal entities and public utilities for the construction of commercial facilities.

The legislation would require NASA to prepare a proposal, as noted above, for the use of space technologies and/or NASA facilities and services for the exploration and mapping of geothermal resources. In section 209 there is authority to be appropriated to NASA "such amounts as may be required in fiscal years 1974, 1975, 1976 to carry out the requirements of section 205." Thus the only authority granted to NASA is the preparation of a report to be submitted within 6 months from enactment. Since there is no authority to do research and development work, the authorization for appropriations in 3 fiscal years is puzzling. It would seem that if NASA's proposal for the employment of space technologies and NASA services is acceptable to the Secretary of the Interior, he should have the specific authority to ask NASA to perform the necessary work. If this bill is to be considered further, we suggest that it be so amended.

As to the major policy considerations relating to whether S. 2465 should be enacted, the National Aeronautics and Space Administration defers to the Department of the Interior since it would assume the primary role under this legislation.

The Office of Management and Budget has advised that, from the standpoint of the administration's program, there is no objection to the submission of this report to the Congress.

Sincerely,

GERALD D. GRIFFIN,
Assistant Administrator for Legislative Affairs.

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., November 6, 1973.

Hon. HENRY M. JACKSON,
Chairman, Committee on Interior and Insular Affairs,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: This responds to your request for the views of this Department concerning S. 2465, a bill "To authorize the Secretary of the Interior to guarantee loans for the financing of commercial ventures in geothermal energy; to coordinate Federal activities in geothermal energy exploration, research, and development; and for other purposes."

Although we support the general objective of encouraging development of geothermal energy sources, to the extent that the bill provides new authority for loan guarantees in title I, of direct Federal support for geothermal development in title II we recommend that the bill not be enacted at this time.

S. 2465 would establish a 10-year Federal program of guaranteeing loans by financial institutions for certain private geothermal resource developments. Annual appropriations of $50 million plus administrative costs would be authorized, and loan guarantees could

not exceed 75 percent of the cost of the project for which the loan is made. The bill also makes provision for the cooperative exploration, research and development of geothermal resources by Federal agencies. Among these provisions is authority to make direct Federal investments in certain geothermal projects.

Both the loan guarantee and the new exploration, research, and development authority are premature in view of the present Federal activities and policies for the development of geothermal energy. This Department is in the process of issuing regulations under the Geothermal Steam Act of 1970 (30 U.S.C. 1001–1025) with a view to leasing and development of geothermal resources by nongovernmental parties. This accords with our view that the most appropriate initial approach is for private enterprise to bear basic responsibility for such development, supplemented by Federal research and guidance. Adequate statutory authority exists for Federal action carrying out this responsibility. Indeed, we believe that the cooperative exploration, research, and development program provided for by S. 2465 is largely duplicative of existing authority, except to the extent it provides for direct Federal development of geothermal resources. Private industry has already undertaken to harness geothermal energy and we believe it can carry out this function, as energy needs require. Should future events cast doubt on the ability of non-Federal entities to do this, both the loan guarantee program and a program of direct Federal participiation in geothermal development would warrant further consideration.

The Office of Management and Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

JOHN H. KYL,
Assistant Secretary of the Interior.

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., November 26, 1973.

Hon. HENRY M. JACKSON,
Chairman, Committee on Interior and Insular Affairs,
U.S. Senate, Washington, D.C.

DEAR MR. JACKSON: Thank you for the opportunity to comment on S. 2465, a bill "[t]o authorize the Secretary of the Interior to guarantee loans for the financing of commercial ventures in geothermal energy; to coordinate Federal activities in geothermal energy exploration, research, and development; and for other purposes."

The Atomic Energy Commission is sympathetic to the purposes of S. 2465. However, at this time we do not support its enactment.

S. 2465 consists of two titles. Title I, a loan guarantee program, would be administered by the Department of the Interior, to encourage commercial development of energy production from geothermal sources.

Title II of the bill would cover a coordinated effort by the Department of the Interior, the Atomic Energy Commission, the National

Aeronautics and Space Administration, and the National Science Foundation to encourage private industry through Federal assistance for the development and demonstration of practical means to produce useful, environmentally acceptable geothermal energy.

In his testimony prepared for presentation before the November 7 hearing of your Subcommittee on Water and Power Resources, Dr. Gerald Johnson, Director of the AEC's Division of Applied Technology, expressed the AEC's interest in cooperative research and development and demonstration programs in the field of geothermal energy. We are looking toward initiation in this current fiscal year of programs which would both broaden the technology base for geothermal energy utilization and accelerate the commercial development of the resource.

However, as pointed out by Dr. Johnson, S. 2465 is somewhat duplicative of existing authority in part. For example, section 31a(6) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2051a(6)) authorizes the AEC to make arrangements for the conduct of research and development activities relating to "the preservation and enhancement of a viable environment by developing more efficient methods to meet the Nation's energy needs." Dr. Johnson also noted the administration efforts presently underway concerning the planning of and funding for 5-year energy research and development programs, and the related organizational responsibilities for such programs. At this time, therefore, and for the reasons stated, the AEC does not support the enactment of S. 2465.

The Office of Management and Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely,

JOHN A. ERLEWINE,
Deputy General Manager.

X. CHANGES IN EXISTING LAW

Subsection (4) of rule XXIX of the Standing Rules of the Senate requires a statement of any changes in existing law made by the bill ordered reported. S. 2465 as reported makes no amendment to or changes in existing laws.

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H. R. 14920

Ninety-third Congress of the United States of America

AT THE SECOND SESSION

Begun and held at the City of Washington on Monday, the twenty-first day of January, one thousand nine hundred and seventy-four

An Act

To further the conduct of research, development, and demonstrations in geothermal energy technologies, to establish a Geothermal Energy Coordination and Management Project, to provide for the carrying out of research and development in geothermal energy technology, to carry out a program of demonstrations in technologies for the utilization of geothermal resources, to establish a loan guaranty program for the financing of geothermal energy development, and for other purposes.

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

SHORT TITLE

SECTION 1. This Act may be cited as the "Geothermal Energy Research, Development, and Demonstration Act of 1974".

FINDINGS

SEC. 2. The Congress hereby finds that—

(1) the Nation is currently suffering a critical shortage of environmentally acceptable forms of energy;

(2) the inadequate organizational structures and levels of funding for energy research have limited the Nation's current and future options for meeting energy needs;

(3) electric energy is a clean and convenient form of energy at the location of its use and is the only practicable form of energy in some modern applications, but the demand for electric energy in every region of the United States is taxing all of the alternative energy sources presently available and is projected to increase; some of the sources available for electric power generation are already in short supply, and the development and use of other sources presently involve undesirable environmental impacts;

(4) the Nation's critical energy problems can be solved only if a national commitment is made to dedicate the necessary financial resources, and enlist the cooperation of the private and public sectors, in developing geothermal resources and other nonconventional sources of energy;

(5) the conventional geothermal resources which are presently being used have limited total potential; but geothermal resources which are different from those presently being used, and which have extremely large energy content, are known to exist;

(6) some geothermal resources contain energy in forms other than heat; examples are methane and extremely high pressures available upon release as kinetic energy;

(7) some geothermal resources contain valuable byproducts such as potable water and mineral compounds which should be processed and recovered as national resources;

(8) technologies are not presently available for the development of most of these geothermal resources, but technologies for the generation of electric energy from geothermal resources are potentially economical and environmentally desirable, and the development of geothermal resources offers possibilities of process energy and other nonelectric applications;

(9) much of the known geothermal resources exist on the public lands;

(E) the General Manager of the Atomic Energy Commission; and

(F) an Assistant Administrator of the Federal Energy Administration.

(2) The President shall designate one member of the Project to serve as Chairman of the Project.

(3) If the individual appointed under paragraph (1)(A) is an officer or employee of the Federal Government, he shall receive no additional pay on account of his service as a member of the Project. If such individual is not an officer or employee of the Federal Government, he shall be entitled to receive the daily equivalent of the annual rate of basic pay in effect for level IV of the Executive Schedule (5 U.S.C. 5315) for each day (including traveltime) during which he is engaged in the actual performance of duties vested in the Project.

(c) The Project shall have overall responsibility for the provision of effective management and coordination with respect to a national geothermal energy research, development, and demonstration program. Such program shall include—

(1) the determination and evaluation of the resource base;

(2) research and development with respect to exploration, extraction, and utilization technologies;

(3) the demonstration of appropriate technologies; and

(4) the loan guaranty program under title II.

(d)(1) The Project shall carry out its responsibilities under this section acting through the following Federal agencies:

(A) the Department of the Interior, the responsibilities of which shall include evaluation and assessment of the resource base, including development of exploration technologies;

(B) the National Aeronautics and Space Administration, the responsibilities of which shall include the provision of contract management capability, evaluation and assessment of the resource base, and the development of technologies pursuant to section 102(b);

(C) the Atomic Energy Commission, the responsibilities of which shall include the development of technologies; and

(D) the National Science Foundation, the responsibilities of which shall include basic and applied research.

(2) Upon request of the Project, the head of any such agency is authorized to detail or assign, on a reimbursable basis or otherwise, any of the personnel of such agency to the Project to assist it in carrying out its responsibilities under this Act.

(e) The Project shall have exclusive authority with respect to the establishment or approval of programs or projects initiated under this Act, except that the agency involved in any particular program or project shall be responsible for the operation and administration of such program or project.

PROGRAM DEFINITION

SEC. 102. (a)(1) The Chairman, acting through the Administrator of the National Aeronautics and Space Administration, is authorized and directed to prepare a comprehensive program definition of an integrated effort and commitment for effectively developing geothermal energy resources. Such Administrator, in preparing such comprehensive program definition, is authorized to consult with other Federal agencies and non-Federal entities.

(E) the General Manager of the Atomic Energy Commission; and

(F) an Assistant Administrator of the Federal Energy Administration.

(2) The President shall designate one member of the Project to serve as Chairman of the Project.

(3) If the individual appointed under paragraph (1)(A) is an officer or employee of the Federal Government, he shall receive no additional pay on account of his service as a member of the Project. If such individual is not an officer or employee of the Federal Government, he shall be entitled to receive the daily equivalent of the annual rate of basic pay in effect for level IV of the Executive Schedule (5 U.S.C. 5315) for each day (including traveltime) during which he is engaged in the actual performance of duties vested in the Project.

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(2) The Chairman shall transmit such comprehensive program definition to the President and to each House of the Congress. Interim reports shall be transmitted not later than November 30, 1974, and not later than January 31, 1975. Such comprehensive program definition shall be transmitted as soon as possible thereafter, but in any case not later than August 31, 1975.

(3) As part of the comprehensive program definition required by paragraph (1), the Chairman, acting through the Geological Survey, shall transmit to the President and to each House of the Congress a schedule and objectives for the inventorying of geothermal resources.

(b) The National Aeronautics and Space Administration is authorized to undertake and carry out those programs assigned to it by the Project.

RESOURCE INVENTORY AND ASSESSMENT PROGRAM

SEC. 103. (a) The Chairman shall initiate a resource inventory and assessment program with the objective of making regional and national appraisals of all types of geothermal resources, including identification of promising target areas for industrial exploration and development. The specific goals shall include—

(1) the improvement of geophysical, geochemical, geological, and hydrological techniques necessary for locating and evaluating geothermal resources;

(2) the development of better methods for predicting the power potential and longevity of geothermal reservoirs;

(3) the determination and assessment of the nature and power potential of the deeper unexplored parts of high temperature geothermal convection systems; and

(4) the survey and assessment of regional and national geothermal resources of all types.

(b) The Chairman, acting through the Geological Survey and other appropriate agencies, shall—

(1) develop and carry out a general plan for the orderly inventorying of all forms of geothermal resources of the Federal lands and, where consistent with property rights and determined by the Chairman to be in the national interest, of non-Federal lands;

(2) conduct regional surveys, based upon such a general plan, using innovative geological, geophysical, geochemical, and stratagraphic drilling techniques, which will lead to a national inventory of geothermal resources in the United States;

(3) publish and make available maps, reports, and other documents developed from such surveys to encourage and facilitate the commercial development of geothermal resources for beneficial use and consistent with the national interest;

(4) make such recommendations for legislation as may from time to time appear to be necessary to make Federal leasing policy for geothermal resources consistent with known inventories of various resource types, with the current state of technologies for geothermal energy development, and with current evaluations of the environmental impacts of such development; and

(5) participate with appropriate Federal agencies and non-Federal entities in research to develop, improve, and test technologies for the discovery and evaluation of all forms of geothermal resources, and conduct research into the principles controlling the location, occurrence, size, temperature, energy content, producibility, and economic lifetimes of geothermal reservoirs.

RESEARCH AND DEVELOPMENT

SEC. 104. (a) The Chairman, acting through the appropriate Federal agencies and in cooperation with non-Federal entities, shall initiate a research and development program for the purpose of resolving all major technical problems inhibiting the fullest possible commercial utilization of geothermal resources in the United States. The specific goals of such programs shall include—

(1) the development of effective and efficient drilling methods to operate at high temperatures in formations of geothermal interest;

(2) the development of reliable predictive methods and control techniques for the production of geothermal resources from reservoirs;

(3) the exploitation of new concepts for fracturing rock to permit recovery of contained heat reserves;

(4) the improvement of equipment and technology for the extraction of geothermal resources from reservoirs;

(5) the development of improved methods for converting geothermal resources and byproducts to useful forms;

(6) the development of improved methods for controlling emissions and wastes from geothermal utilization facilities, including new monitoring methods to any extent necessary;

(7) the development and evaluation of waste disposal control technologies and the evaluation of surface and subsurface environmental effects of geothermal development;

(8) the improvement of the technical capability to predict environmental impacts resulting from the development of geothermal resources, the preparation of environmental impact statements, and the assuring of compliance with applicable standards and criteria;

(9) the identification of social, legal, and economic problems associated with geothermal development (both locally and regionally) for the purpose of developing policy and providing a framework of policy alternatives for the commercial utilization of geothermal resources;

(10) the provision for an adequate supply of scientists to perform required geothermal research and development activities; and

(11) the establishment of a program to encourage States to establish and maintain geothermal resources clearinghouses, which shall serve to (A) provide geothermal resources developers with information with respect to applicable local, State, and Federal laws, rules, and regulations, (B) coordinate the processing of permit applications, impact statements, and other information which geothermal resources developers are required to provide, (C) encourage uniformity with respect to local and State laws, rules, and regulations with respect to geothermal resources development, and (D) encourage establishment of land use plans, which would include zoning for geothermal resources development and which would assure that geothermal resources developers will be able to carry out development programs to the production stage.

(b) The Chairman, acting through the appropriate Federal agencies and in cooperation with non-Federal entities, shall implement a coordinated program of research and development in order to demonstrate the technical means for the extraction and utilization of the resource base, including any byproducts of such base, and in order to

accomplish the goals established by subsection (a). Research authorized by this Act having potential applications in matters other than geothermal energy may be pursued to the extent that the findings of such research can be published in a form for utilization by others.

DEMONSTRATION

SEC. 105. (a) The Chairman, acting through the appropriate Federal agencies and in cooperation with non-Federal entities, shall initiate a program to design and construct geothermal demonstration plants. The specific goals of such program shall include—

(1) the development of economical geothermal resources production systems and components which meet environmental standards;

(2) the design of plants to produce electric power and, where appropriate, the large-scale production and utilization of any useful byproducts;

(3) the involvement of engineers, analysts, technicians, and managers from industry field and powerplant development, which shall lead to the early industrial exploitation of advanced geothermal resources;

(4) the provision for an adequate supply of trained geothermal engineers and technicians;

(5) the provision of experimental test beds for component testing an evaluation by laboratories operated by the Federal Government, industry, or institutions of higher education;

(6) the construction and operation of pilot plants; and

(7) the construction and operation of demonstration plants.

(b) In carrying out his responsibilities under this section, the Chairman, acting through the appropriate Federal agencies, and in cooperation with non-Federal entities, may provide for the establishment of one or more demonstration projects utilizing each geothermal resource base involved, which shall include, as appropriate, all of the exploration, siting, drilling, pilot plant construction and operation, demonstration plant construction and operation, and other facilities and activities which may be necessary for the generation of electric energy and the utilization of geothermal resource byproducts.

(c) The Chairman, acting through the appropriate Federal agencies, is authorized to investigate and enter into agreements for the cooperative development of facilities to demonstrate the production of energy from geothermal resources. The responsible Federal agency may consider—

(1) cooperative agreements with utilities and non-Federal governmental entities for construction of facilities to produce energy for commercial disposition; and

(2) cooperative agreements with other Federal agencies for the construction and operation of facilities to produce energy for direct Federal consumption.

(d) The responsible Federal agency is authorized to investigate the feasibility of, construct, and operate, demonstration projects without entering into cooperative agreements with respect to such projects, if the Chairman finds that—

(1) the nature of the resource, the geographical location, the scale and engineering design of the facilities, the techniques of production, or any other significant factor of the proposal offers opportunities to make important contributions to the general

knowledge of geothermal resources, the techniques of its development, or public confidence in the technology; and

(2) there is no opportunity for cooperative agreements with any utility or non-Federal governmental entity willing and able to cooperate in the demonstration project under subsection (c) (1), and there is no opportunity for cooperative agreements with other Federal agencies under subsection (c) (2).

(e) Before favorably considering proposals under subsection (c), the responsible Federal agency must find that—

(1) the nature of the resource, the geographical location, the scale and engineering design of the facilities, the techniques of production, or any other significant factor of the proposal offers opportunities to make important contributions to the general knowledge of geothermal resources, the techniques of its development, or public confidence in the technology;

(2) the development of the practical benefits as set forth in paragraph (1) are unlikely to be accomplished without such cooperative development; and

(3) where non-Federal participants are involved, the proposal is not eligible for adequate Federal assistance under the loan guaranty provisions of title II of this Act.

(f) If the estimate of the Federal investment with respect to construction and operation costs of any demonstration project proposed to be established under this section exceeds $10,000,000, no amount may be appropriated for such project except as specifically authorized by legislation hereafter enacted by the Congress.

(g) (1) At the conclusion of the program under this section or as soon thereafter as may be practicable, the responsible Federal agencies shall, by sale, lease, or otherwise, dispose of all Federal property interests which they have acquired pursuant to this section (including mineral rights) in accordance with existing law and the terms of the cooperative agreements involved.

(2) The agency involved shall, under appropriate agreements or other arrangements, provide for the disposition of geothermal resource byproducts of the project administered by such agency.

SCIENTIFIC AND TECHNICAL EDUCATION

SEC. 106. (a) It is the policy of the Congress to encourage the development and maintenance of programs through which there may be provided the necessary trained personnel to perform required geothermal research, development, and demonstration activities under sections 103, 104, and 105.

(b) The National Science Foundation is authorized to support programs of education in the sciences and engineering to carry out the policy of subsection (a). Such support may include fellowships, traineeships, technical training programs, technologist training programs, and summer institute programs.

(c) The National Science Foundation is authorized and directed to coordinate its actions, to the maximum extent practicable, with the Project or any permanent Federal organization or agency having jurisdiction over the energy research and development functions of the United States, in determining the optimal selection of programs of education to carry out the policy of subsection (a).

(d) The National Science Foundation is authorized to encourage, to the maximum extent practicable international participation and cooperation in the development and maintenance of programs of education to carrying out the policy of subsection (a).

TITLE II—LOAN GUARANTIES

ESTABLISHMENT OF LOAN GUARANTY PROGRAM

SEC. 201. (a) It is the policy of the Congress to encourage and assist in the commercial development of practicable means to produce useful energy from geothermal resources with environmentally acceptable processes. Accordingly, it is the policy of the Congress to facilitate such commercial development by authorizing the Chairman of the Project to designate an appropriate Federal agency to guarantee loans for such purposes.

(b) In order to encourage the commercial production of energy from geothermal resources, the head of the designated agency is authorized to, in consultation with the Secretary of the Treasury, guarantee, and to enter into commitments to guarantee, lenders against loss of principal or interest on loans made by such lenders to qualified borrowers for the purposes of—

(1) the determination and evaluation of the resource base;

(2) research and development with respect to extraction and utilization technologies;

(3) acquiring rights in geothermal resources; or

(4) development, construction, and operation of facilities for the demonstration or commercial production of energy from geothermal resources.

(c) Any guaranty under this title shall apply only to so much of the principal amount of any loan as does not exceed 75 percent of the aggregate cost of the project with respect to which the loan is made.

(d) Loan guaranties under this title shall be on such terms and conditions as the head of the designated agency determines, except that a guaranty shall be made under this title only if—

(1) the loan bears interest at a rate not to exceed such annual per centum on the principal obligation outstanding as the head of the designated agency determines to be reasonable, taking into account the range of interest rates prevailing in the private sector for similar loans and risks by the United States;

(2) the terms of such loan require full repayment over a period not to exceed thirty years, or the useful life of any physical asset to be financed by such loan, whichever is less (as determined by the head of the designated agency);

(3) in the judgment of the head of the designated agency, the amount of the loan (when combined with amounts available to the qualified borrower from other sources) will be sufficient to carry out the project; and

(4) in the judgment of the head of the designated agency, there is reasonable assurance of repayment of the loan by the qualified borrower of the guaranteed indebtedness.

(e) The amount of the guaranty for any loan for a project shall not exceed $25,000,000, and the amount of the guaranty for any combination of loans for any single qualified borrower shall not exceed $50,000,000.

(f) As used in this title, the term "qualified borrower" means any public or private agency, institution, association, partnership,

corporation, political subdivision, or other legal entity which (as determined by the head of the designated agency) has presented satisfactory evidence of an interest in geothermal resources and is capable of performing research or completing the development and production of energy in an acceptable manner.

PAYMENT OF INTEREST

SEC. 202. (a) With respect to any loan guaranteed pursuant to this title, the head of the designated agency is authorized to enter into a contract to pay, and to pay, the lender for and on behalf of the borrower the interest charges which become due and payable on the unpaid balance of any such loan if the head of the designated agency finds—

(1) that the borrower is unable to meet interest charges, and that it is in the public interest to permit the borrower to continue to pursue the purposes of his project, and that the probable net cost to the Federal Government in paying such interest will be less than that which would result in the event of a default; and

(2) the amount of such interest charges which the head of the designated agency is authorized to pay shall be no greater than the amount of interest which the borrower is obligated to pay under the loan agreement.

(b) In the event of any default by a qualified borrower on a guaranteed loan, the head of the designated agency is authorized to make payment in accordance with the guaranty, and the Attorney General shall take such action as may be appropriate to recover the amounts of such payments (including any payment of interest under subsection (a)) from such assets of the defaulting borrower as are associated with the project, or from any other surety included in the terms of the guaranty.

PERIOD OF GUARANTIES AND INTEREST ASSISTANCE

SEC. 203. No loan guaranties shall be made, or interest assistance contract entered into, pursuant to this title, after the expiration of the ten-calendar-year period following the date of enactment of this Act.

GEOTHERMAL RESOURCES DEVELOPMENT FUND

SEC. 204. (a) There is established in the Treasury of the United States a Geothermal Resources Development Fund, which shall be available to the head of the designated agency for carrying out the loan guaranty and interest assistance program authorized by this title, including the payment of administrative expenses incurred in connection therewith. Moneys in the fund not needed for current operations may, with the approval of the Secretary of the Treasury, be invested in bonds or other obligations of, or guaranteed by, the United States.

(b) There shall be paid into the fund the amounts appropriated pursuant to section 304(c) and such amounts as may be returned to the United States pursuant to section 202(b), and the amounts in the fund shall remain available until expended, except that after the expiration of the ten-year period established by section 203, such amounts in the fund which are not required to secure outstanding

guaranty obligations shall be paid into the general fund of the Treasury.

(c) Business-type financial reports covering the operations of the fund shall be submitted to the Congress by the head of the designated agency annually upon the completion of an appropriate accounting period.

TITLE III—GENERAL PROVISIONS

PROTECTION OF ENVIRONMENT

SEC. 301. In the conduct of its activities, the Project and any participating public or private persons or agencies shall place particular emphasis upon the objective of assuring that the environment and the safety of persons or property are effectively protected; and the program under title I shall include such special research and development as may be necessary for the achievement of that objective.

REPORTING REQUIREMENTS

SEC. 302. (a) The Chairman of the Project shall submit to the President and the Congress full and complete annual reports of the activities of the Project, including such projections and estimates as may be necessary to evaluate the progress of the national geothermal energy research, development, and demonstration program and to provide the basis for as accurate a judgment as is possible concerning the extent to which the objectives of this Act will have been achieved by June 30, 1980.

(b) No later than one year after the termination of each demonstration project under section 105, the Chairman of the Project shall submit to the President and the Congress a final report on the activities of the Project related to each project, including his recommendations with respect to any further legislative, administrative, and other actions which should be taken in support of the objectives of this Act.

TRANSFER OF FUNCTIONS

SEC. 303. (a) Within sixty days after the effective date of the law creating a permanent Federal organization or agency having jurisdiction over the energy research and development functions of the United States (or within sixty days after the date of the enactment of this Act if the effective date of such law occurs prior to the date of the enactment of this Act), all of the research, development, and demonstration functions (including the loan guaranty program) vested in the Project under this Act, along with related records, documents, personnel, obligations, and other items to the extent necessary or appropriate, shall, in accordance with regulations prescribed by the Office of Management and Budget, be transferred to and vested in such organization or agency.

(b) Upon the establishment of a permanent Federal organization or agency having jurisdiction over the energy research and development functions of the United States, and when all research and development (and other) functions of the Project are transferred, the members of the Project may provide advice and counsel to the head of such organization or agency, in accordance with arrangements made at that time.

AUTHORIZATIONS OF APPROPRIATIONS

SEC. 304. (a) For the fiscal years ending June 30, 1976, and September 30, 1977, 1978, 1979, and 1980, only such sums may be appropriated as the Congress may hereafter authorize by law.

(b) There are authorized to be appropriated to the National Aeronautics and Space Administration not to exceed $2,500,000 for the fiscal year ending June 30, 1975, for the purpose of preparing the program definition under section 102(a).

(c) In addition to sums authorized to be appropriated by subsection (b), there are authorized to be appropriated to the fund not to exceed $50,000,000 annually, such sums to carry out the provisions of the loan guaranty program by the Project under title II.

Speaker of the House of Representatives.

Vice President of the United States and
President of the Senate.

August 22, 1974

Dear Mr. Director:

The following bills were received at the White House on August 22nd:

S. 1871	H.R. 14402
S. 3703	H.R. 14920
H.R. 6485	H.R. 15205
H.R. 11864	H.R. 15842

Please let the President have reports and recommendations as to the approval of these bills as soon as possible.

Sincerely,

Robert D. Linder
Chief Executive Clerk

The Honorable Roy L. Ash
Director
Office of Management and Budget
Washington, D. C.