Report of the
Fiftieth American Assembly
April 22-25, 1976
Arden House
Harriman, New York

Nuclear Energy

The American Assembly
Columbia University

The volume *The Nuclear Power Controversy* (ed. Murphy), containing the chapters described on the next page, will appear in public print in Fall 1976, and may be ordered from the publisher, Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.

PREFACE

On April 25, 1976, the participants in the Fiftieth American Assembly—at peak sixty-two Americans from eighteen states and the District of Columbia—met as a group to consider a draft of conclusions prepared after three days of discussing national and international policies and programs in nuclear energy. After deliberation and modification in that final plenary session the draft became the final report, which is presented on these pages.

The participants based their deliberations on a single agenda formed from a series of background papers with authors and chapters as follow:

David Bodansky and Fred H. Schmidt	*Safety Aspects of Nuclear Energy*
R. Michael Murray, Jr.	*The Economics of Electric Power Generation: 1975-2000*
Fritz F. Heimann	*How Can We Get the Nuclear Job Done?*
Arthur W. Murphy	*Nuclear Power Plant Regulation*
John G. Palfrey	*Nuclear Exports and Nonproliferation Strategy*
George B. Kistiakowsky	*Nuclear Power: How Much Is Too Much?*

The papers were prepared under the editorial supervision of Professor Arthur W. Murphy of Columbia University School of Law.

During the Assembly participants heard formal addresses by U.S. Senator John Pastore of Rhode Island, by U.S. Ambassador to the International Atomic Energy Agency, Gerald Tape, and by U.S. Congressman Mike McCormack of Washington.

The opinions embodied on the following pages are those of the participants collectively. No individual is committed to any particular portion. And The American Assembly, a nonpartisan forum, takes no official position on any matter it presents for discussion.

Clifford C. Nelson
President
The American Assembly

FINAL REPORT

of the

FIFTIETH AMERICAN ASSEMBLY

At the close of their discussions the participants in the Fiftieth American Assembly, on *Nuclear Energy,* at Arden House, Harriman, New York, reviewed as a group the following statement. The statement represents general agreement; however no one was asked to sign it. Furthermore it should not be assumed that every participant subscribes to every recommendation.

Introduction

As early as 1954, it became an important national objective to develop nuclear power as a source of electricity. Although our need was not seen as imminent, nuclear power was viewed as a viable and cheap supplement to, and ultimately as a replacement for, fossil fuels (oil, gas, and coal). For other parts of the world—without our rich fossil fuel supplies—the day of dependence on fission was expected to come much sooner.

Our own pressing needs for additional energy sources became broadly recognized in 1973, with the oil embargo, and there has been intense concern over our subsequent increased dependence on imported oil. Despite the need for new sources of energy, and despite a spurt of nuclear power plant orders in the early 1970s, today the future of nuclear power in the United States is very much in doubt. Although support at the federal level continues to be firm, there are strong efforts in a number of states to roll back nuclear power.

The opposition to nuclear power is based on a number of objections. The crux of the opposition—at least of the articulated reasons—is concern about safety—particularly the possibility of a catastrophic reactor accident; the possibility of future accidents in the long-term storage of nuclear wastes; and, finally, the fear of sabotage, or the diversion of nuclear materials to the making of bombs.

The proponents of nuclear power, on the other hand, see its development as essential if we are to avoid serious energy shortages, which could have severe social consequences, and if we are to avoid unacceptable dependence on foreign countries for petroleum. Most proponents admit that there are dangers but argue that the chances of a serious reactor accident are extremely small, and, in any event, the risks from them compare favorably with other risks accepted by society; that wastes can be handled safely; and that the answer to threats of diversion is increased safeguards and not in abandoning this highly necessary energy form.

In the United States there is an alternative to nuclear power—coal. Coal is not without its serious environmental and health problems. And both coal and nuclear power pose serious economic problems. In much of the rest of the world there is no present alternative to nuclear power. Therefore, whatever we decide, Western Europe and Japan will continue to go rapidly forward with the use of fission. As they and other countries do so, the possibility of proliferation of nuclear weapons—the prevention (or delay) of which has been a major objective of United States foreign policy since World War II—will increase.

It was against this background that the Fiftieth American Assembly met to consider what the United States' position on nuclear power should be. Our focus was primarily on the next twenty-five years—to about the year 2000.

Conclusions and Recommendations

1. It is essential to provide for the expected growth rate in electric power consumption. The failure to keep up with our energy needs could have serious social effects including increased unemployment. Although some beginnings have been made, there is an urgent need for a comprehensive federal energy policy which will establish firm guidelines for the development of our power resources and will coordinate government regulation.

2. Although there was considerable sentiment that overall energy growth rate should be cut down through more efficient use and conservation of energy, it was felt that some growth, possibly as low as 1.5 percent, annually, but probably higher, would occur. For electric power demand, it was felt that although the growth rate would probably be less than the "historic" growth rate of 7 percent, it was unlikely to be less than 5 to 5.5 percent, in view of the need to substitute electrical energy for some present uses of oil and gas.

3. Substantial savings can and should be made through energy efficiency improvements and a strong conservation program. Savings through voluntary action alone, although important, are likely to be limited. Some mandatory controls are essential, despite undoubted difficulties in administering such controls effectively and fairly. Market factors will have some impact, especially on commercial and industrial consumption, but they should be supplemented by tax and other incentives. In the case of individual consumption evidence to date suggests energy demands in the United States may not be strongly dependent on price in the short-run.

4. The need to meet demand will require installation of a large amount of new electric plant capacity by the end of the century. Although we should vigorously pursue research in solar power, fusion, and other "future" technologies, we will have to rely on existing technologies. Moreover, given the scarce resources of oil and natural gas, the fuel for new base load plants must be coal or nuclear, and even some existing gas and oil-fired plants should be converted to coal.

5. Although at least in theory the United States could meet its needs entirely through coal, it should not (as some have recommended) abandon the nuclear option. The future economics of both nuclear and coal are hard to predict, but it seems fair to assume that in many parts of the country nuclear will have a significant economic advantage and that the advantage will be larger if the time for design, licensing, and construction of nuclear plants can be reduced, and, assuming the continued implementation of rigorous environmental and safety controls, the hazards of nuclear operation to health are less than those of coal. In any case, rigorous environmental controls for the use of coal will also be necessary.

In any event it is unrealistic to assume that either coal or nuclear alone can meet projected energy demands, and it is clear that if these demands are to be met both must be pursued.

6. On the question of reactor safety, discharges of radioactive effluence from a reactor during normal operations are not a significant factor, given current standards and practices. Further, the chances of a reactor accident causing significant damage offsite are extremely small. Should such an unlikely accident occur, there could be serious loss of life and property damage in the vicinity of the reactor, but the risk to an individual from nuclear accidents is far less than that from risks commonly accepted, including those from other forms of energy generation.

7. Nevertheless, the actual situation may be less important than the public perception of it. Apparently, the public sees nuclear risks as qualitatively different from other risks—for example, although the risk from the failure of a large dam may be significantly higher than that from a nuclear plant accident, the former risk is easier for the public to accept. Thus, comparison of risks in terms of predicted probabilities may not alone achieve public reassurance.

8. One obstacle to nuclear power is public acceptability. Since in the last analysis, major decisions on nuclear power will be political, a significant effort is required to secure greater confidence in the agencies and industries involved in the nuclear program. One step toward securing such greater confidence is full and prompt dissemination of information on abnormal (even insignificant) releases of radioactivity. In addition, it is important that information about the risks and benefits involved in the use of nuclear power and alternative energy sources and in other complex technological industries be made generally available.

9. There are risks associated with waste storage but they appear to be manageable with existing technology. The long delay in adopting a plan to deal with commercial waste storage has been regrettable and further delay would be deplorable. We should demonstrate one or more alternative methods of waste storage as soon as possible.

10. The time to license construction and operation of a reactor is too long and efforts should be made to shorten the process. In particular, the time spent in hearings can and should be significantly abbreviated.

However, public participation in hearings is important to public acceptance. Safety issues common to more than one licensing proceeding should be resolved in generic hearings.

11. The primary responsibility for developing and carrying out the nuclear power program must continue to be that of the federal government. Control over nuclear radiation hazards and safety must remain an exclusive federal responsibility. While the states should have control over matters of siting, they should not bar particular classes of power plants.

The current proposals in a number of states for moratoria on nuclear construction pose a serious threat to a national energy policy, and if passed, would seriously jeopardize the future of nuclear power. They should be opposed.

12. Although mining, uranium fuel fabrication, and power plant construction should continue to be the responsibility of the private sector, any new enrichment facilities should be government owned, nationally or internationally, as should waste storage facilities. Problems of security should be the dominant consideration in deciding where responsibility for plutonium reprocessing facilities and mixed oxide fuel fabrication, as necessary, should be allocated.

13. Addition of new electric generating capacity will be expensive, and the utilities are having considerable difficulty raising the capital needed for such facilities. It is expected that the capital needs can be satisfied out of the traditional markets. However, the utilities must be allowed rates sufficiently high to compete for capital, and utility rate structures should be altered to provide strong incentives for the efficient utilization of energy resources.

14. For many foreign countries the need to pursue the nuclear option is imperative. At the present time a number of industrialized countries are embarked on major nuclear power programs of their own. The United States is not in a position to control unilaterally the development of nuclear power in the world, but we are in a position to substantially influence what the rest of the world does. There is no realistic way in which even a moderately industrialized country can be kept from making nuclear weapons if it decides to do so. But further efforts must be made to dissuade additions to the number of nuclear weapons powers. The greatest imminent danger lies in the export to third world countries of nationally owned pilot reprocessing plants for the extraction from spent reactor fuel rods of plutonium suitable for nuclear explosives. Such exports and the sale abroad of uranium enrichment technology have been avoided by the nuclear supplier nations for thirty years. A more vigorous effort must be made at the highest levels to persuade governments that have recently departed from the policy to return to it. Multinational nuclear fuel cycle centers could assure all countries of equal access to future economic advantages without spreading nuclear weapons capabilities.

15. The export of reactors should be limited to countries that accept International Atomic Energy Agency (IAEA) safeguards, and the United States should do everything it possibly can to encourage supplier nations to cooperate in following this policy.

16. The export of enrichment or reprocessing facilities to individual countries increases the threat of nuclear weapons proliferation. The interest in national development of such facilities arises in part from the desire for an independent supply of fuel. The acquisition of indigenous enrichment and reprocessing facilities, however, places a nuclear weapons option in the hands of individual nations. This inherent conflict can best be resolved by assuring countries of an adequate fuel supply for their power needs under effective safeguards.

17. The assurance of an adequate fuel supply is dependent both on the expansion of current enrichment capacity and on the development of a mechanism, perhaps internationally operated enrichment plants, which would provide all countries with confidence in their access to power reactor fuel.

18. The best prospect for an effective safeguards program is in the IAEA. The United States should redouble its efforts to strengthen IAEA both in funding and other resources; at the same time it must continue efforts through bilateral and multilateral negotiations to reach other countries. As one specific step, the IAEA might undertake the role of regulating the stockpiling of fissile material and the safeguarding of spent fuel under the now dormant Article XII of the IAEA Charter.

19. There is a need for additional international mechanisms for energy development. All such efforts should be broadly based to encourage progress not only in nuclear energy utilization but also of other energy sources, including both fossil fuels and nonconventional sources.

20. There is an urgent need to educate the public now on the costs and benefits of nuclear power. Because of the time required to plan, design, construct, and license nuclear plants, a substantial additional commitment to nuclear energy must be made within the next several years. It is unrealistic to expect that commitment to be made in the face of the present uncertainty regarding public acceptability. Accordingly, unless such acceptability is demonstrated quickly, the benefits of the nuclear option will, as a practical matter, be substantially diminished merely by the passage of time.

21. Nuclear power is a victim of the disenchantment with science and technology, and the distrust of institutions characteristic of our age. Nuclear power was expanded rapidly and the government and the nuclear community did not recognize promptly nor respond adequately to public concerns. But whatever the mistakes of the past, they should not be allowed to control the present and future. The use of rapidly dwindling oil and natural gas for power production is in most cases a wasteful act.

The peaceful uses of nuclear power offer us at this time a significant possibility of moving in the direction of a world with an improved quality of life for all people. The cost to mankind of not pursuing the nuclear option could be tragic.

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ABOUT THE AMERICAN ASSEMBLY

The American Assembly was established by Dwight D. Eisenhower at Columbia University in 1950. It holds nonpartisan meetings and publishes authoritative books to illuminate issues of United States policy.

An affiliate of Columbia, with offices in the Graduate School of Business, the Assembly is a national, educational institution incorporated in the State of New York.

The Assembly seeks to provide information, stimulate discussion, and evoke independent conclusions in matters of vital public interest.

American Assembly Sessions

At least two national programs are initiated each year. Authorities are retained to write background papers presenting essential data and defining the main issues in each subject.

A group of men and women representing a broad range of experience, competence, and American leadership meet for several days to discuss the Assembly topic and consider alternatives for national policy.

All Assemblies follow the same procedure. The background papers are sent to participants in advance of the Assembly. The Assembly meets in small groups for four or five lengthy periods. All groups use the same agenda. At the close of these informal sessions participants adopt in plenary session a final report of findings and recommendations.

Regional, state, and local Assemblies are held following the national session at Arden House. Assemblies have also been held in England, Switzerland, Malaysia, Canada, the Caribbean, South America, Central America, the Philippines, and Japan. Over one hundred institutions have cosponsored one or more Assemblies.

Arden House

Home of The American Assembly and scene of the national sessions is Arden House, which was given to Columbia University in 1950 by W. Averell Harriman. E. Roland Harriman joined his brother in contributing toward adaptation of the property for conference purposes. The buildings and surrounding land, known as the Harriman Campus of Columbia University, are 50 miles north of New York City.

Arden House is a distinguished conference center. It is self-supporting and operates throughout the year for use by organizations with educational objectives. The American Assembly is a tenant of this Columbia University facility only during Assembly sessions.

American Assembly Books

The background papers for each Assembly program are published in cloth and paperbound editions for general readership. In this way the deliberations of Assembly sessions are continued and extended. Subjects to date are:

1951-1952 — United States-Western Europe. Inflation
1953 — Economic Security for Americans
1954 — The United States' Stake in the United Nations
— The Federal Government Service
1955 — United States Agriculture. The Forty-eight States
1956 — The Representation of the United States Abroad
— The United States and the Far East
1957 — International Stability and Progress. Atoms for Power
1958 — The United States and Africa. United States Monetary Policy
1959 — Wages, Prices, Profits, and Productivity
— The United States and Latin America
1960 — The Federal Government and Higher Education
— The Secretary of State
— Goals for Americans
1961 — Arms Control: Issues for the Public
— Outer Space: Prospects for Man and Society
1962 — Automation and Technological Change
— Cultural Affairs and Foreign Relations
1963 — The Population Dilemma
— The United States and the Middle East
1964 — The United States and Canada
— The Congress and America's Future
1965 — The Courts, the Public, and the Law Explosion
— The United States and Japan
1966 — State Legislatures in American Politics
— A World of Nuclear Powers?
— The United States and the Philippines
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— Choosing the President
1974 — The Good Earth of America
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