

# **A Technology Assessment System for the Executive Branch**

**Report of the  
National Academy of  
Public Administration**

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**COMMITTEE ON SCIENCE AND ASTRONAUTICS  
U.S. HOUSE OF REPRESENTATIVES**

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PREFACE

Late in 1969 the Committee on Science and Astronautics inaugurated discussions with the National Academy of Public Administration with regard to a special study of the administrative and organizational facets of technology assessment in the Executive Branch. Subsequently, an agreement was reached between the Committee and the Academy for undertaking the study.

The report here presented, *A Technology Assessment System for the Executive Branch*, is the result. It addresses itself to a problem with which Members of this Committee have been working extensively since 1965 and it will, I believe, be of marked significance in leading to effective assessment organization in the future. It should be pointed out and emphasized that the task performed by the Academy has not been an easy one to undertake, for it deals with highly complex, delicate, and elusive relationships existing within the Executive Branch. Some of these relationships are formal and others are mere *de facto* arrangements. All had to be considered and weighed.

In carrying out the terms of the agreement and in developing the sum and substance of the study we are indebted to Representative Emilio Q. Daddario, who, as Chairman of the Subcommittee on Science, Research, and Development, served as the Congressional agent and focal point, and to Dr. George A. Graham, Executive Director of the National Academy of Public Administration, who served in similar fashion on behalf of the Academy.

GEORGE P. MILLER, *Chairman,*  
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HONORABLE GEORGE P. MILLER

Chairman, Committee on Science and Astronautics  
U.S. House of Representatives  
Washington, D.C. 20515

June 30, 1970

DEAR MR. MILLER:

I take pleasure in submitting to you the attached report, *A Technology Assessment System for the Executive Branch*, prepared by the *ad hoc* Panel on Technology Assessment of the National Academy of Public Administration. The Panel was constituted at the request of Representative Emilio Q. Daddario, Chairman of the Subcommittee on Science, Research, and Development of your Committee.

Mr. Daddario asked that the Academy examine technology assessment from the standpoint of public administration, with particular reference to possible organizational and administrative formats in the Executive branch. In its report the Panel describes what it considers feasible alternative systems of technology assessment, their pros and cons, and recommends specific choices. The report and the recommendations represent the consensus of the Panel. The most important conclusion of the Panel probably is that to be effective technology assessment must permeate the decision-making processes of the Executive Departments and Agencies. Although the question of where in the Executive Office of the President to vest central responsibility for Government-wide policy, coordination, and review of technology assessment was perplexing, the Panel, after lengthy consideration, came to the firm conclusion that both the Office of Management and Budget and the Council on Environmental Quality have essential and complementary functions to perform in technology assessment.

On behalf of the Panel, and the National Academy of Public Administration, I want to express our appreciation for the opportunity to assist your Committee in its constructive efforts to expand and improve program evaluation in the Federal Government.

Sincerely,

JOHN D. MILLETT  
*Chairman*

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## **SUMMARY OF PANEL RECOMMENDATIONS**

1. Technology assessment should be made a continuing responsibility of each Executive Department and Agency, and should be integrated into program formulation, review, decision, and execution through the planning-programming-budgeting system.
2. Central responsibility for Government-wide policy, coordination, and review of technology assessment should be vested in the Council on Environmental Quality. However, the Council can discharge this responsibility only by working closely with, and receiving the full support of, the Office of Science and Technology and the Office of Management and Budget.
3. Each Executive Department and Agency should assign clear responsibility for monitoring and evaluating technology assessment to the most senior level within the central planning-programming-budgeting organizations in departments, agencies, and bureaus.
4. Each Executive Department and Agency should work closely with interested agencies on assessments with implications beyond its own areas of responsibility. Agency technical staff should be involved fully in all assessments via the chief official responsible for scientific and technological activities.
5. Technology assessments should utilize the broadest and most diverse kinds of data from the widest array of relevant disciplines, techniques, and interests. Public contributions should be welcomed and solicited, and assessments should be available to the public under the terms of the Freedom of Information Act.
6. Agencies should seek independent assessments from qualified groups at universities, Federal laboratories, private research institutes, or industry to supplement their own capabilities. Federal laboratories with special competences should be assigned special assessment responsibilities and provided with some discretionary funds to undertake unsolicited assessments.

## I. INTRODUCTION

This Panel, in this report, is searching for a constructive beginning for an effective technology assessment system in the Executive branch. The report outlines a system that we believe represents an improvement over present arrangements. It also has weaknesses which reflect the conflicting goals of society and the complex, often conflicting, Governmental organizations that have evolved to serve them. Whatever assessment system finally is introduced should be reviewed three to five years later and modified in the light of actual administrative experience.

Simply stated, technology assessment is the evaluation of the impacts of new, developing, or established technologies, including, but not limited to, those which the Federal Government may support or regulate. The Panel was requested to examine technology assessment from the standpoint of public administration and with particular reference to possible organizational and administrative formats in the Executive branch.

As its point of departure the Panel examined the three reports made in 1969 to the Committee on Science and Astronautics: "Technology: Processes of Assessment and Choice," National Academy of Sciences; "A Study of Technology Assessment," National Academy of Engineering; and "Technical Information for Congress," Legislative Reference Service. The 1969 hearings on technology assessment before Congressman Daddario's Subcommittee on Science, Research, and Development provided a valuable collection of views and data on the problems and opportunities of technology assessment.<sup>1</sup>

No attempt was made to collect new data about assessment. Rather, the Panel concentrated upon organizational and administrative problems that must be overcome if an effective assessment system is to be created.

## II. INADEQUACIES OF CURRENT EXECUTIVE BRANCH TECHNOLOGY ASSESSMENT

Technology assessment in the Executive branch now suffers from two major drawbacks: (1) the assessments usually are incomplete or promotionally biased, and (2) their conclusions are not consistently conveyed to officials who can and should act upon them. The reports of the National Academy of Sciences, the National Academy of Engineering, and the Legislative Reference Service, the hearings on technology assessment before Congressman Daddario's Subcommittee on Science, Research, and Development, and the growing technology assessment literature all underscore these problems and their many causes.

Most assessments of the consequences of introducing a technology are incomplete, if not superficial. Commonly, they include few first-order consequences outside the assessing agency's program interests or statutory responsibility, and only technical and economic analyses of second-order consequences. Good assessments should consider the interactions of population, environment, technology, society, and the economy.

The resultant information is not consistently used in relevant Federal program and policy decisions because technology assessment is not recognized as a continuing responsibility of most agencies. There are no recognized channels for the flow of information about technological assessments or actions within the Government or to the public. And there are no recognized seats of responsibility for assessment in most Executive Departments and Agencies.

Prevailing assessments are often inadequate because they are conducted by agencies committed to a particular technology or industry; they are vehicles of advocacy rather than of impartial analysis. Negative or undesirable effects tend to be discounted, overlooked, or dismissed without the same intense examination devoted to the favored course of action. The inhibition of com-

plete or "full impact" assessment resulting from the promotional biases of Executive Departments and Agencies is reinforced by the limits of agency statutory responsibility and authority. In a strict sense, no agency has any responsibility, nor is appropriated any money, to deal with problems outside of its legislative charter. Therefore, present Governmental arrangements discourage assessments of the broadest public interest and importance.

What exists today is a conglomeration of *ad hoc* efforts to assess the effects of technology on special interests, programs, and goals. What is lacking is attention to a broader national purpose, clearly enunciated and systematically pursued.

### **III. CHARACTERISTICS OF A BETTER TECHNOLOGY ASSESSMENT SYSTEM**

An improved system of technology assessment should:

- (1) Be designed to operate within a pluralistic Government where responsibility for assessing the effects of technology is widely dispersed. Most data collection and analysis are near the base of the vast Governmental pyramid, while interagency coordination transpires closer to the peak.
- (2) Provide the administrative and procedural framework for *continuing* assessment in the everyday process of program formulation, review, decision, and implementation.
- (3) Clearly identify who is responsible for technology assessment throughout the Executive branch.
- (4) Provide a frame of reference tied to societal goals, viewing technology as one means among many to achieve specific goals. The frame of reference should be as broad as possible at all organizational levels, and should broaden from programmatic to societal goals as the assessment moves hierarchically upward. (However, as assessment moves upward, political considerations also come into play which may or may not advance societal goals.) Although an assessment can illuminate and modify established goals, rarely, if ever, can it provide a "final" answer. "Final" solutions belong to doctrinaire or totalitarian, not democratic, societies in which social goals frequently are contradictory and difficult to reconcile. Therefore, Government assessments are subject to a constant "pulling and hauling" of the administrative and political processes for accommodating conflicting goals.

- (5) Provide balance, without a consistent bias for or against technology, program or societal goals, producers or consumers. Although any one component of the system may be so biased, the overall system should be balanced.
- (6) Provide access to information necessary for the adequate conduct or review of assessments.
- (7) Enable interested parties to be represented and to challenge procedures, analyses, facts, and decisions.
- (8) Be tied to those elements of Government administration with the power to act and to assure that assessment will be neither overlooked nor bypassed in the press of program activities.
- (9) Be able to interpose new data and arguments in the program decision process (without having the authority unilaterally to make or change a decision).

An effective technology assessment system for the Executive branch should have four features.

It should permeate the Executive branch, observing common standards while permitting variations which render assessments more useful and attractive to individual agencies. One of the most pervasive such administrative processes in the Government is budgeting, now variously combined with planning and programming to form a planning-programming-budgeting (PPB) "system." A good deal of technology assessment already occurs in the course of planning and programming, though such assessment has not yet been designated as a formal part of PPB. Such an enlargement of PPB into a PPAB—planning, programming, assessing, and budgeting—system would relate technological programs to their social and economic consequences while anchoring social programs to technical realities.

An alternative course would be to establish an independent assessment process running from the base of the pyramid in Executive Departments and Agencies through points of assigned responsibility in the office of the Department Secretary or Agency Head to the apex of the President. This would require establish-

ing a completely new system, and orienting agencies to its use, much as the President's order of August 25, 1965, establishing the PPB system, was implemented in some departments and agencies by a new, separate programming system parallel to the budget process.<sup>2</sup> However, we doubt the feasibility or wisdom of setting up a parallel system for technology assessment.

The second feature of an effective assessment system should be a high level organization to initiate, coordinate, review, and monitor Government-wide assessment policies and procedures. It should stimulate and improve assessments, ensuring that they receive adequate attention at the highest levels of Government. The Panel agrees that the only logical place for this organization is in the Executive Office of the President. It should be a permanent body with professional staff, a strong charter, access to the President, and authority to deal effectively with other Presidential-level offices and with Executive Departments and Agencies.

The third feature is the operational function of departments and agencies, which necessarily will initiate and conduct the vast majority of assessments.

The fourth feature is a source of independent analytical and technical expertise. Agencies should have the authority and the funds to finance independent assessments at universities, research institutes, industry, or at government laboratories such as the National Bureau of Standards or the proposed National Environmental Laboratories (Baker-Muskie bill, S. 3410).<sup>3</sup>

#### IV. A TECHNOLOGY ASSESSMENT SYSTEM FOR THE EXECUTIVE BRANCH

##### THE PLANNING-PROGRAMMING-ASSESSING-BUDGETING SYSTEM

Integrating technology assessment into the on-going process of planning, programming, and budgeting would enhance its impact upon agency program decisions and actions.

The budget process is continuous and is updated twice yearly. The Bureau of the Budget conducts a Spring Planning Review with all agencies, emphasizing program content and major policy. Later, the Bureau holds its Fall Review, matching program decisions to updated resource allocations. The resulting budget is presented to the Congress the following January. Both the Spring and Fall Reviews incorporate updated five-year projections, with the Spring Review emphasizing the longer range considerations. This same process "backs down" the Executive branch hierarchy through the departments and agencies to the bureaus where analogous reviews occur.

Integrated or parallel planning, programming, and budget staffs pull major program and financial considerations together at the department and bureau levels. As the Comptroller General reported in a study of the system, "In general, the agencies have responded to the Bureau instructions by setting up PPB staffs at two levels—one staff at the departmental level to report to department-level officials and the other staffs at the bureau level reporting to bureau-level officials."<sup>4</sup>

Technology assessments of one kind or another frequently enter into this planning-programming-budgeting process. For example, the Program Evaluation and Planning Staff of the Department of Agriculture examines the budget request for agricultural research and development with an eye to the economic and social consequences of the products that research may yield.

The Department's study of mechanization in the flue-cured tobacco industry, cited in the Daddario Subcommittee hearings, is a case of an assessment integrated into the program decision process.<sup>5</sup>

Incorporating assessment into the programming and budgeting process would not shift the actual locus of many assessments, which would continue to be performed by technically qualified persons wherever they may be located. However, the scope of their assessments should be broadened under the influence of the broader programming-budgeting process.

One panelist described ideal technology assessment as "PPB, properly done." His description pinpoints a weakness of tying assessment to the budgeting system: PPB is still highly imperfect. It is strongest at the Presidential and departmental levels with marked unevenness in quality from one agency to another. However, PPB has improved substantially since 1965. To make assessment a fruitful part of PPB the competence of PPB staff would have to be enlarged. At present, most PPB staff are economists, and their analyses naturally are economic. A more ecumenical staffing is needed for political, social and technical analyses. Unless such additional staff are involved in PPB at all levels, the Panel's hopes for PPAB cannot be realized.

In spite of these shortcomings, the PPB process remains the most practical and effective way to bring technology assessment regularly to bear upon Government program decisions. Such assessment should be made an integral part of the PPB system in all agencies.

#### THE EXECUTIVE OFFICE OF THE PRESIDENT

Among existing units in the Executive Office of the President, the Council on Environmental Quality offers the most hospitable locale for Government-wide policy, coordination, and review of technology assessment. Although new and untried, it has strong statutory authority for oversight of technology assessment related to the environment, broadly defined. One panelist described technology assessment as the *raison d'être* of the Council.

Public Law 91-190, the "National Environmental Policy Act of 1969,"<sup>6</sup> established the Council after proclaiming the continu-

ing responsibility of the Federal Government to . . . use all practicable means . . .

to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may—

(1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;

(2) assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;

(3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;

(4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice;

(5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and

(6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Section 202 of the Act prescribes the qualifications (and thereby implicitly the responsibilities) of the Council members as being:

. . . to analyze and interpret environmental trends and information of all kinds; to appraise programs and activities of the Federal Government in the light of the policy set forth in title I of this Act; to be conscious of and responsive to the scientific, economic, social, esthetic, and cultural needs and interests of the Nation; and to formulate and recommend national policies to promote the improvement of the quality of the environment.

President Nixon's Executive Order 11514, March 5, 1970, implemented and supplemented the Act.<sup>7</sup> Among the specific responsibilities charged to the Council were:

Sec. 3. (c) Determine the need for new policies and programs for dealing with environmental problems not being adequately addressed.

(e) Promote the development and use of indices and monitoring systems (1) to assess environmental conditions and trends, (2) to predict the environmental impact of proposed public and private actions, and (3) to determine the effectiveness of programs for protecting environmental quality.

(f) Coordinate Federal programs related to environmental quality.

(h) Issue guidelines to Federal agencies for the preparation of detailed statements on proposals for legislation and other Federal actions affecting the environment, as required by section 102(2)(C) of the Act.

(i) Issue such other instructions to agencies, and request such reports and other information from them, as may be required to carry out the Council's responsibilities under the Act.

(k) Foster investigations, studies, surveys, research, and analyses relating to (i) ecological systems and environmental quality, (ii) the impact of new and changing technologies thereon, and (iii) means of preventing or reducing adverse effects from such technologies.

The combination of the National Environmental Policy Act and Executive Order 11514 gives the Council broader formal authority for technology assessment than any other unit in the Executive Office of the President. In addition, both the Act and the implementing Executive Order emphasize responsibility for developing means by which the public can be kept informed, and by which interested parties may have the opportunity to present their views. This function of public access and advice is further strengthened by the Citizens' Advisory Committee on Environmental Quality, which advises the President and the Council on "matters assigned to the Council..."<sup>8</sup>

Vesting technology assessment responsibilities in the Council presents certain problems. Most important is the Council's youth. As a junior member of the Executive Office, it is just building its staff, is untried, has meager funding, and has yet to define its role vis-a-vis other Executive Office units. Since it was established to protect and enhance the environment, some may regard it as skeptical, if not hostile, to many kinds of technology.

The breadth of the Council's responsibility for the environment should be interpreted to include more than just the physical environment. The Council's jurisdiction should encompass assessment of technology which affects society as individuals or as a whole, whether or not the environment, however defined, is directly affected. For instance, assessment of the use of computer data banks upon individual privacy, food additives, drugs, and new medical procedures (e.g., organ transplants or genetic manipulation) should fall within the Council's responsibility. In due course, its charter probably should be broadened.

To succeed in the technology assessment role this Panel envisions, the Council must pursue that assignment vigorously, and develop a system that reaches down into the agencies.

The Panel considered, but eventually discarded, alternative sites of assessment responsibility such as the Office of Management and Budget, the Office of Science and Technology, a new Office of Technology Assessment, or some other reorganization of the Executive Office.

For 30 years the Bureau of the Budget (now the Office of Management and Budget) has acted as the President's surrogate in all but a fraction of those program issues that reached the Presidential level. The Bureau's history of successful performance is a strong argument for placing overall responsibility for the assessment function there. But the pressures and complexity of the budget operation are so demanding that the Bureau would be unable to handle more than a few *ad hoc* assessment issues. It would be most unlikely to provide a continuous monitoring and coordination of assessment throughout the Government. And the Bureau's proximity to the President has removed it from public purview more than most other Executive Office bodies. The importance of maintaining the maximum possible openness and public access in the assessment process argues against assigning the principal assessment responsibility to the Bureau.

Nonetheless, no Government-wide assessment system can succeed without the enthusiastic support of the Office of Management and Budget (OMB). The cooperation of this Office is essential to converting PPB into a PPAB system, enforcing the use of assessments in the Bureau's regular review of budget and program decisions. To perform this function adequately, OMB will have to broaden its staff and give explicit administrative recognition to the importance of technology assessment.

The Office of Science and Technology (OST) is the principal alternative considered by the Panel. Since its creation in 1962, OST has worked closely with the Bureau of the Budget, providing advice and analyses on questions involving scientific and technological issues. The Office's mandate to advise and assist the President on Federal programs in science and technology and their impact on national policy affords a rationale for broad technology assessment activities. The President's message trans-

mitting Reorganization Plan No. 2 of 1962, which established the Office of Science and Technology, emphasized OST's role in evaluating the implications of science and technology for national security and foreign policy matters, and for promoting science and technology generally.<sup>9</sup>

Considering the rapid growth and far-reaching scope of Federal activities in science and technology, it is imperative that the President have adequate staff support in developing policies and evaluating programs in order to assure that science and technology are used most effectively in the interests of national security and general welfare.

To this end it is contemplated that the Director will assist the President in discharging the responsibility of the President for the proper coordination of Federal science and technology functions. More particularly, it is expected that he will advise and assist the President as the President may request with respect to—

(1) Major policies, plans, and programs of science and technology of the various agencies of the Federal Government, giving appropriate emphasis to the relationship of science and technology to national security and foreign policy, and measures for furthering science and technology in the Nation.

The emphasis here is upon *technical* factors. But effective technology assessment must also include social, economic, and political factors which OST has not been staffed to consider on a regular basis. And the President's Science Advisory Committee is too narrowly constituted to provide the industrial and citizen participation that is needed for the central assessment body. However, the Panel believes that, at least at the outset, OST should remain responsible for the overview of technology assessment on national security programs.

A third alternative would be to create a new Office of Technology Assessment (OTA) in the Executive Office. However, most scholars and administrators who know the Executive Office believe that there are already too many agencies at the Presidential level. Additional agencies, which are constantly proposed by every special interest group, would only serve to reduce the President's flexibility, magnify the problems of management and coordination at the Presidential level and further dilute the responsibility and authority of Department Secretaries and Agency Directors. And an OTA would either have to obtain legislative

authority to absorb the Council on Environmental Quality or be left with only residual assessment responsibilities. The Panel agreed with Charles Kidd's judgment that "The establishment of the new Council will certainly postpone for a long time if not forever the proposal that a major unit devoted to technology assessment as such be set up in the Executive Office of the President."

Finally, the Panel dismissed the alternative of reorganizing present Executive Office agencies. Until the nature and consequences of the recent reorganization establishing OMB and the Domestic Council become clear, further reorganization is ill-timed and unrealistic.

The Council on Environmental Quality will have to work closely and informally with the Office of Science and Technology, the Office of Management and Budget, and the Council of Economic Advisers. The effectiveness of technology assessment depends upon positive cooperation among this family of agencies. The Council on Environmental Quality must monitor the *process* of assessment in the departments and agencies, periodically reviewing the organization, procedures, techniques, and substantive assessments. It should encourage assessment in the early stages of an emergent technology by enforcing adequate assessment criteria in each department and reviewing the department's supervision of assessment at the bureau level.

The Council should review *program* issues involving technology assessment and give its views to the Office of Management and Budget. To facilitate the Council's work, OMB should assign to an Assistant Director responsibility for the incorporation of assessment into the PPB system. OMB should also augment its staff competence for evaluating and using assessments.

The Council should work closely with OST to assure that no gaps occur in the assessment of either domestic or national security programs.

#### THE EXECUTIVE DEPARTMENTS AND AGENCIES

The Executive Departments and Agencies will remain the heart of most Government technology assessment. The function of coordination is not confined to the Executive Office of the

President. Agencies with special competence in a particular technological domain should be assigned special responsibility for interagency assessments aimed at determining the total impact of a major national program in that area. For example, such an assessment of the supersonic transport might be assigned to the Department of Transportation. The Council would monitor the assessment, ensuring that Transportation obtained the views of other departments and agencies such as Housing and Urban Development, Interior, Commerce, Labor, the National Aeronautics and Space Administration, Defense, State, and Health, Education and Welfare. The lead agency and the Council might also seek the assistance of industry, universities, and other institutions.

Specific provision should be made to ensure close cooperation between the Assistant Secretary for science and technology or comparable agency officials and those responsible for PPB operations. If the action to establish an Environmental Protection Agency by a Presidential Reorganization Plan should be taken, and if it should be effective, it would tend to enhance the vigor and effectiveness of technology assessment by bringing together the pollution control programs. It would also somewhat simplify the oversight task of the Council on Environmental Quality.

Except in rule-making or regulatory agencies, public hearings and other forms of public participation are rarely employed by Executive Departments and Agencies as part of their normal process of program planning and policy formation. One notable exception is the hearing process used by the U.S. Army Corps of Engineers (Civil Works) when undertaking preliminary studies for a Corps' initiated project.<sup>10</sup> When collecting data for these studies, the District Engineer gives formal notice to the public in the affected geographic area. He chairs a public meeting designed to inform the interested public about the project and to receive whatever information and opinion anyone wishes to present. A similar meeting usually is held at the conclusion of the study, *before* the District Engineer makes his final recommendations on the project. These hearings avoid any adversary process. They do permit public testimony which becomes part of the project record.

Both public access to information and the opportunity to be heard are provided under the National Environmental Policy Act of 1969 and its implementing Executive Order (11514). The Act states in Section 102:

- "(2) all agencies of the Federal Government shall—  
\* \* \* \* \* \* \*  
(B) identify and develop methods and procedures, in consultation with the Council on Environmental Quality established by title II of the Act, which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decisionmaking along with economic and technical considerations;  
(C) include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on—  
(i) the environmental impact of the proposed action,  
(ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,  
(iii) alternatives to the proposed action,  
(iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and  
(v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

Prior to making any detailed statement, the responsible Federal official shall consult with and obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved. Copies of such statement and the comments and views of the appropriate Federal, State, and local agencies, which are authorized to develop and enforce environmental standards, shall be made available to the President, the Council on Environmental Quality and to the public as provided by section 552 of title 5, United States Code, and shall accompany the proposal through the existing agency review processes;"

The Executive Order goes further, requiring that (Section 2)  
". . . , the heads of Federal agencies shall:  
\* \* \* \* \* \* \*

- (b) Develop procedures to ensure the fullest practicable provision of timely public information and understanding of Federal plans and programs with environmental impact in order to obtain the views of interested parties. These procedures shall include, whenever appropriate, provision for public hearings, and shall provide the public with relevant information, including information on alternative courses of action. Federal agencies shall also encourage State and

local agencies to adopt similar procedures for informing the public concerning their activities affecting the quality of the environment."

The Panel believes that full implementation of the Environmental Quality Act and Executive Order 11514 should help the Government to learn the full range of private interests and opinions, and should help the public to become aware of, and to participate in, major technology assessments. Agencies should be encouraged to experiment with a variety of processes for obtaining views and information from interested citizens. However, rigid formal procedures, a contentious adversary climate, and other aspects of a semi-judicial process should be avoided. "Judicialization" would detract from the principal purpose of such public meetings, which is to acquire and exchange information—not to determine legal rights, obligations, or binding allocations.

Rule-making or regulatory agencies are required by the Administrative Procedures Act to provide an opportunity for interested or affected parties to make their views known. On major assessments affecting the private sector, it may be desirable for the department or agency head to have the power of subpoena (with appropriate protection for proprietary information), as provided in the Technology Assessment Act introduced by Congressman Daddario.<sup>11</sup> The Council on Environmental Quality should have the authority to require an agency to hold a public hearing if it considers that desirable.

#### INDEPENDENT CENTERS

Most observers agree upon the desirability for independent centers of competence to provide qualified analyses and to serve as checks upon agency program biases.

One source of independent analyses are Government laboratories and analytical organizations such as the laboratories of the Atomic Energy Commission, the National Institutes of Health, the National Bureau of Standards, and the National Aeronautics and Space Administration. Since the Economy Act of 1932, it has been the policy of the Federal Government to encourage the full utilization of each agency's laboratories, including work for other agencies.<sup>12</sup> Particularly when doing assessments for other agencies, these laboratories could be as free

from programmatic or political pressures as any private institution. The Technical Analysis Division of the National Bureau of Standards, a group of approximately 50 operations research and system analysts, already performs similar functions for a variety of Federal agencies. The primary limiting factor in most Government laboratories is a lack of staff qualified to undertake social, economic, and political analyses. This can be overcome by recruitment, temporary assignments, the use of consultants, and supplementary contracts.

Another source of independent analysis is the establishment of *ad hoc* assessment teams or panels, as suggested in the report of the National Academy of Engineering. A group of recognized experts and staff could be collected under the auspices of the Council, the National Science Foundation, one of the Academies, or another professional organization to conduct an assessment and then be disbanded. Such a procedure would be valuable when fresh insight, free of institutional habits and commitments, is sought. Agencies should have the authority and the funds to obtain such assessments.

Another potential source of independent assessment would be the establishment of new, redirected, or reinvigorated national laboratories, such as the proposed National Environmental Laboratories or National Institutes of Research and Advanced Studies.<sup>13</sup> Although the Panel did not examine either proposal closely, we find two points in the proposed National Environmental Laboratories especially commendable: (1) the idea of designating regional laboratories to focus upon environmental problems peculiar to the region, and (2) the provision to laboratory directors of some discretionary funds to pursue research of their choice on technology assessment and environmental problems. One weakness of the proposed National Environmental Laboratories is their nearly total independence of either the Executive or Congress. This probably would weaken the laboratories politically and financially, and no publicly-financed activity should be immune from public scrutiny. Making the laboratories responsible to the Council on Environmental Quality or to a new environmental protection administration (if it should be established) could strengthen their purpose and public accountability.

## THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation has been concerned for some time about correcting deficiencies in the techniques, data, methodology, criteria, and manpower for the conduct of assessments. Regardless of how well new organizational arrangements work, such shortcomings will limit the quality and effectiveness of assessments. The National Science Foundation should be encouraged to continue and to expand its efforts in cooperation with Executive Office organizations, interested departments and agencies, State and local governments, and private institutions.

## V. HOW THE SYSTEM WOULD OPERATE

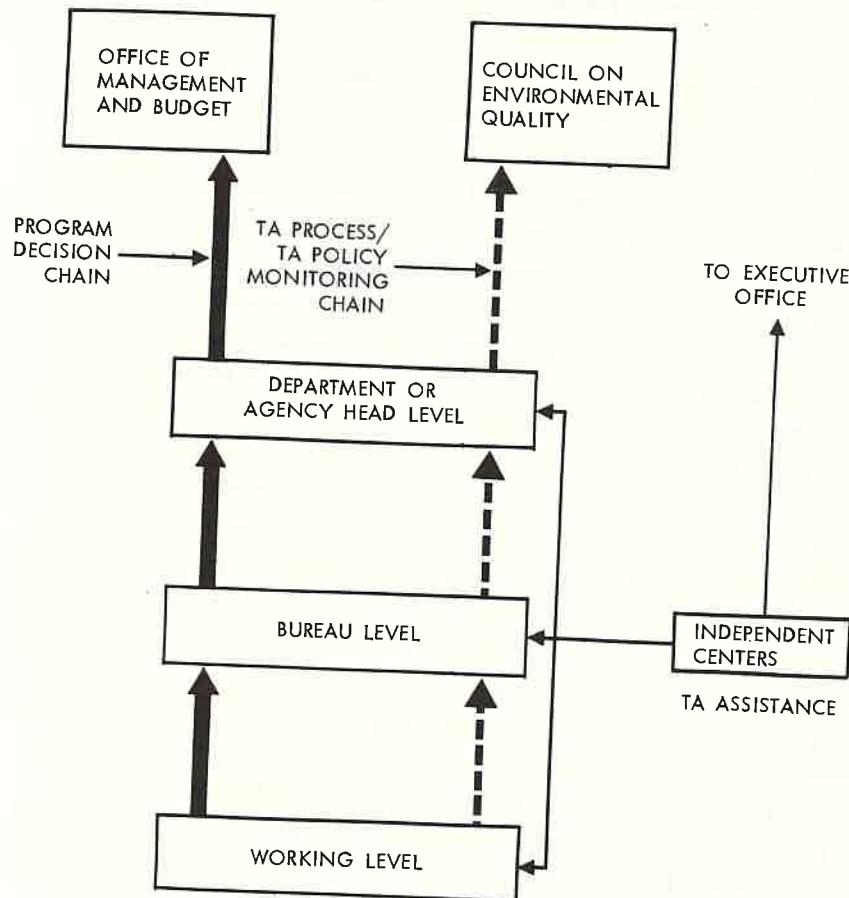
A working technology assessment system must evolve in stages. *Initially the fledgling system should focus upon policy assessments and interventions.* This will emphasize assessment activities where the greatest analytical skill and experience already exist—in the Executive Office of the President and at the departmental level. As experience is gained and staff competence bolstered within the agencies, more reliance can be placed upon assessment functions at the agency and bureau levels. Two critical factors are involved: (1) the competence to perform assessments of the requisite scope and quality; and (2) the competence to evaluate and use these assessments in the PPB process. Both will take time and considerable experience to develop.

Like budgeting, technology assessment should have its roots at the working level of each agency, where programs are implemented. The first formal review of assessments should be undertaken by the bureau PPB office. The assessment itself would usually be conducted elsewhere—by bureau staff responsible for the program under examination, or perhaps by an external organization. Such an assessment might be program-biased, but the staff should be wary of overly parochial analyses.

The department secretary or agency head would provide the second major level of review. Interdepartmental factors would certainly be weighed here; agencies would be expected to coordinate assessments and program decisions, as required by the Environmental Policy Act.

Above the department or agency level, responsibility for monitoring assessments would be divorced from that for programs and budgets, the former being discharged by the Council on Environmental Quality and the latter by the Office of Management and Budget. (See figure 1.) Any level—bureau, departmental, or Presidential—might call upon the “independent” centers for assistance.

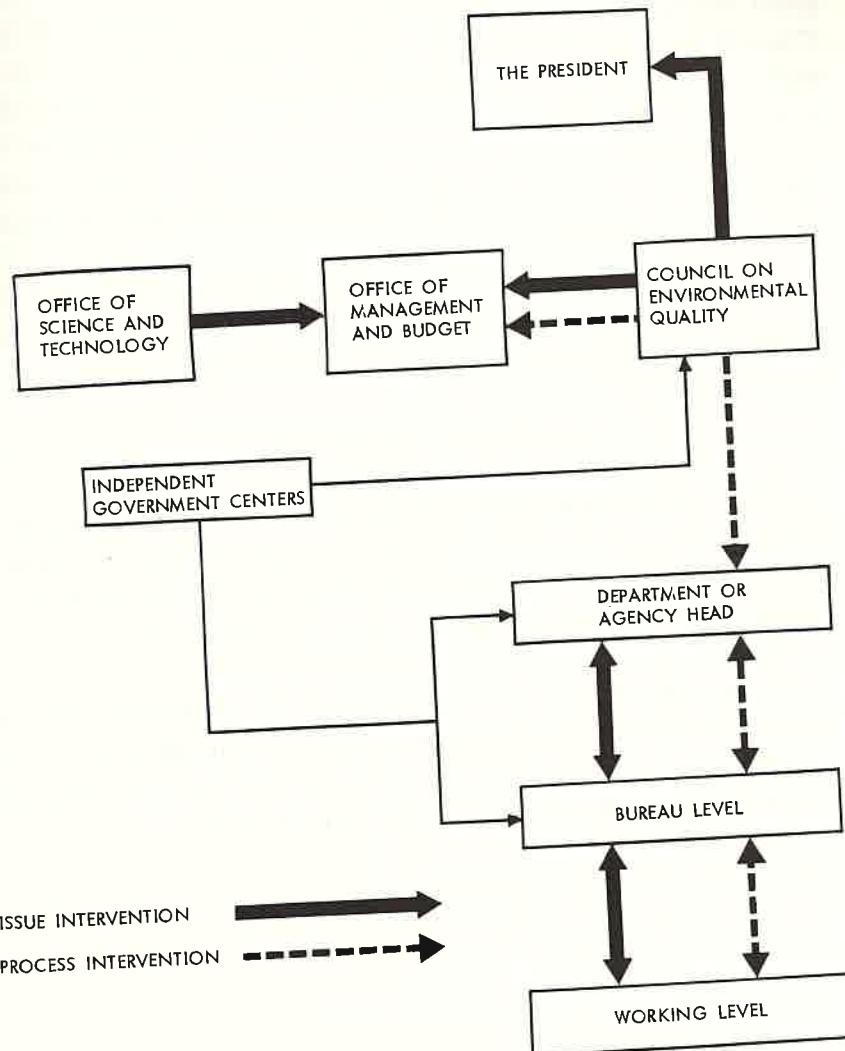
FIGURE 1  
THE TECHNOLOGY ASSESSMENT PROCESS



On most matters, Council and OMB staff would act in concert, much as the staff of OST and the Budget Bureau have done in the past. But should they disagree upon an important issue, it normally would be resolved by the head of the Domestic Policy Council staff or, in exceptional cases, by the President. (See figure 2, The Technology Assessment Intervention Structure.) OST would intervene especially in national security and other programs not assigned to the Council. Ideally, independent Government centers should be able to bring assessment shortcomings

to the attention of the Department Secretary and/or the Council. But, in practice, they probably would bring such problems to the attention of their bureau contacts before proceeding upward.

FIGURE 2  
THE TECHNOLOGY ASSESSMENT INTERVENTION STRUCTURE



NOTE: AGENCY HEADS WOULD BE RESPONSIBLE FOR COORDINATING  
TOTAL IMPACT ASSESSMENTS WITH OTHER AFFECTED AGENCIES.

The Council would intervene with the Office of Management and Budget wherever: (1) it believed that assessments had been given either excessive or insufficient weight at the department level in the PPAB process (i.e., the assessment was sound, but the program decision was not); or, (2) it believed that the assessment was faulty (e.g., it neglected critical data, failed to meet specified criteria, or was otherwise unsound). In the former case, the Council could present its rationale for a change in the program decision to OMB, appealing up to the Domestic Policy Council and the President if necessary. Since the Council does not, like OMB, have any general program decision authority, it would not intervene in program issues at the department or bureau levels. It could require the correction of a poor assessment at the department level, but could not change the resulting program decision.

The Council cannot meet its assessment responsibilities fully without the active support and cooperation of the Office of Management and Budget.

#### AREAS OF UNCERTAINTY

The proposed technology assessment system should represent a substantial improvement over current arrangements if two problems are frankly faced and resolved. First, the Council must enlarge its staff and pursue its responsibilities with vigor and realism.

Second, the Office of Management and Budget must actively support assessment by enlarging its staff, encouraging a similar augmentation of agency PPB staff, and enforcing greater emphasis upon assessment throughout the PPB system.

## VI. OTHER REQUIREMENTS

The Panel did not presume to address all aspects of a technology assessment system in the Executive branch. We have proposed the general outline and inception of a system which later should be reevaluated and, doubtless, modified. Several final points should be noted here.

### THE ROLE OF THE CONGRESS

The establishment of a focal point in the Congress, such as the Office of Technology Assessment proposed in H.R. 17046, would benefit assessment in the Executive branch. It would encourage the strengthening of a similar focal point in the Executive Office, and a clear point of liaison through which Executive assessments could be transmitted to the Congress. This objective has already been advanced by General Accounting Office-Executive branch efforts to make certain PPB data available to the Congress. Similar working arrangements could presumably be developed to avoid the unnecessary duplication of assessments by Congress and the Executive.

### THE STATE AND LOCAL GOVERNMENTS

The Council on Environmental Quality should seek to support and strengthen technology assessment at all levels of Government. The developing role and capability of the State and local governments in technology assessment should be reexamined periodically.

### FEDERAL REGULATORY AGENCIES

The regulatory agencies tend to be relatively independent of Executive Office leadership. As a technology assessment system

becomes more firmly rooted, the Council should consider ways to monitor and strengthen assessment responsibilities in the regulatory agencies.

### THE PRIVATE SECTOR

It is too early to suggest systematic procedures for assessing technology in the private sector. In developing the environmental monitoring system required by Executive Order 11514, the Council will take an important step toward such assessment. Nearly all Executive Departments and Agencies serve, regulate, or otherwise monitor elements of the private sector. For example, the Food and Drug Administration (FDA) is one of the oldest Government agencies with the principal responsibility for conducting assessments to protect the health of the public from harmful effects of privately produced foods, drugs and cosmetics. The Council should support and strengthen the assessment capabilities of the FDA and other agencies similarly charged with regulating private sector technology, such as the Division of Biologics Standards, National Institutes of Health. In carrying out their assessment responsibilities, agencies should explore ways of assessing private technology. Ultimately, the Council should incorporate such assessment into the general assessment system.

### REFERENCES AND NOTES

- 1 United States Congress, House of Representatives, Committee on Science and Astronautics, *Technology Assessment*. Hearings before the Subcommittee on Science, Research, and Development, November 18, 24; December 2, 3, 4, 8, and 12, 1969; 91st Congress, 1st Session.
- 2 United States Congress, Joint Economic Committee, Joint Committee Print, *The Analysis and Evaluation of Public Expenditures: The PPB System*, Subcommittee on Economy in Government, 1969; Volumes 1, 2, and 3.
- 3 S. 3410, "National Environment Laboratory Act of 1970," February 6, 1970; 91st Congress, 2d Session.
- 4 Comptroller General, *Survey of Progress in Implementing the Planning-Programming-Budgeting System in Executive Agencies*, B-115398, July 29, 1969, p. 45.
- 5 William A. Carlson, "Planning, Programming, and Budgeting in U.S.D.A.," paper presented December 9, 1969, to Civil Service Commission PPB Seminar.
- 6 Public Law 91-190, "National Environmental Policy Act of 1969," 91st Congress (S. 1075), January 1, 1970.
- 7 Executive Order 11514, "Protection and Enhancement of Environmental Quality," March 5, 1970.
- 8 Executive Order 11472, "Environmental Quality Council and Citizens' Advisory Committee on Environmental Quality, May 29, 1969.
- 9 United States Congress, House of Representatives, *Message of the President of the United States Transmitting Reorganization Plan No. 2 of 1962*, Document No. 372, 87th Congress, 2d Session, March 29, 1962.
- 10 Department of the Army, Office of the Chief of Engineers, ER 1135-2-5, "Public Hearings, Civil Works Activities," April 14, 1967; also, see 33 C.F.R. 209-120.
- 11 H.R. 17046, "Technology Assessment Act of 1970," April 16, 1970, 91st Congress, 2d Session, Section 6.(d).

<sup>12</sup> 31 U.S.C. 686 (47 Stat. 417) Public Law 72-212. The Act permits any department or agency to place orders with other agencies for materials, supplies, equipment, work, or services of any kind that the requisitioned agency can supply if funds are available, and it is determined by the head of the requesting agency to be in the interest of the Government. However, Comptroller General's decision 33 C.G. 565 prohibits adding new plant and equipment for the purpose of meeting such requests.

<sup>13</sup> See Appendix D, S. 3410. Also, United States Congress, House of Representatives, Committee on Science and Astronautics, *The National Institutes of Research and Advanced Studies, A Recommendation for Centralization of Federal Science Responsibilities*, Report of the Subcommittee on Science, Research, and Development, April 15, 1970; 91st Congress, 2d Session: Serial N.

## APPENDIXES

### APPENDIX A



Public Law 91-190  
91st Congress, S. 1075  
January 1, 1970

### An Act

83 STAT. 852

To establish a national policy for the environment, to provide for the establishment of a Council on Environmental Quality, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "National Environmental Policy Act of 1969".

National Environmental Policy Act of 1969.

#### PURPOSE

SEC. 2. The purposes of this Act are: To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality.

#### TITLE I

##### DECLARATION OF NATIONAL ENVIRONMENTAL POLICY

SEC. 101. (a) The Congress, recognizing the profound impact of Policies and man's activity on the interrelations of all components of the natural environment, particularly the profound influences of population growth, high-density urbanization, industrial expansion, resource exploitation, and new and expanding technological advances and recognizing further the critical importance of restoring and maintaining environmental quality to the overall welfare and development of man, declares that it is the continuing policy of the Federal Government, in cooperation with State and local governments, and other concerned public and private organizations, to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.

(b) In order to carry out the policy set forth in this Act, it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may—

(1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;

(2) assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;

(3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;

(4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice;

(5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and

Administration.

- (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.
- (c) The Congress recognizes that each person should enjoy a healthful environment and that each person has a responsibility to contribute to the preservation and enhancement of the environment.

SEC. 102. The Congress authorizes and directs that, to the fullest extent possible: (1) the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in this Act, and (2) all agencies of the Federal Government shall—

(A) utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decisionmaking which may have an impact on man's environment;

(B) identify and develop methods and procedures, in consultation with the Council on Environmental Quality established by title II of this Act, which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decisionmaking along with economic and technical considerations;

(C) include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on—

- (i) the environmental impact of the proposed action,
- (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,
- (iii) alternatives to the proposed action,
- (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
- (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

Prior to making any detailed statement, the responsible Federal official shall consult with and obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved. Copies of such statement and the comments and views of the appropriate Federal, State, and local agencies, which are authorized to develop and enforce environmental standards, shall be made available to the President, the Council on Environmental Quality and to the public as provided by section 552 of title 5, United States Code, and shall accompany the proposal through the existing agency review processes;

(D) study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources;

(E) recognize the worldwide and long-range character of environmental problems and, where consistent with the foreign policy of the United States, lend appropriate support to initiatives, resolutions, and programs designed to maximize international cooperation in anticipating and preventing a decline in the quality of mankind's world environment;

(F) make available to States, counties, municipalities, institutions, and individuals, advice and information useful in restoring, maintaining, and enhancing the quality of the environment;

Copies of statements, etc.; availability.

81 Stat. 54.

(G) initiate and utilize ecological information in the planning and development of resource-oriented projects; and

(H) assist the Council on Environmental Quality established by title II of this Act.

SEC. 103. All agencies of the Federal Government shall review their present statutory authority, administrative regulations, and current policies and procedures for the purpose of determining whether there are any deficiencies or inconsistencies therein which prohibit full compliance with the purposes and provisions of this Act and shall propose to the President not later than July 1, 1971, such measures as may be necessary to bring their authority and policies into conformity with the intent, purposes, and procedures set forth in this Act.

SEC. 104. Nothing in Section 102 or 103 shall in any way affect the specific statutory obligations of any Federal agency (1) to comply with criteria or standards of environmental quality, (2) to coordinate or consult with any other Federal or State agency, or (3) to act, or refrain from acting contingent upon the recommendations or certification of any other Federal or State agency.

SEC. 105. The policies and goals set forth in this Act are supplementary to those set forth in existing authorizations of Federal agencies.

## TITLE II

### COUNCIL ON ENVIRONMENTAL QUALITY

SEC. 201. The President shall transmit to the Congress annually beginning July 1, 1970, an Environmental Quality Report (hereinafter referred to as the "report") which shall set forth (1) the status and condition of the major natural, manmade, or altered environmental classes of the Nation, including, but not limited to, the air, the aquatic, including marine, estuarine, and fresh water, and the terrestrial environment, including, but not limited to, the forest, dryland, wetland, range, urban, suburban, and rural environment; (2) current and foreseeable trends in the quality, management and utilization of such environments and the effects of those trends on the social, economic, and other requirements of the Nation; (3) the adequacy of available natural resources for fulfilling human and economic requirements of the Nation in the light of expected population pressures; (4) a review of the programs and activities (including regulatory activities) of the Federal Government, the State and local governments, and nongovernmental entities or individuals, with particular reference to their effect on the environment and on the conservation, development and utilization of natural resources; and (5) a program for remedying the deficiencies of existing programs and activities, together with recommendations for legislation.

SEC. 202. There is created in the Executive Office of the President a Council on Environmental Quality (hereinafter referred to as the "Council"). The Council shall be composed of three members who shall be appointed by the President to serve at his pleasure, by and with the advice and consent of the Senate. The President shall designate one of the members of the Council to serve as Chairman. Each member shall be a person who, as a result of his training, experience, and attainments, is exceptionally well qualified to analyze and interpret environmental trends and information of all kinds; to appraise programs and activities of the Federal Government in the light of the policy set forth in title I of this Act; to be conscious of and responsive to the scientific, economic, social, esthetic, and cultural needs and interests of the Nation; and to formulate and recommend national policies to promote the improvement of the quality of the environment.

80 Stat. 416.  
Duties and  
functions.

SEC. 203. The Council may employ such officers and employees as may be necessary to carry out its functions under this Act. In addition, the Council may employ and fix the compensation of such experts and consultants as may be necessary for the carrying out of its functions under this Act, in accordance with section 3109 of title 5, United States Code (but without regard to the last sentence thereof).

SEC. 204. It shall be the duty and function of the Council—

- (1) to assist and advise the President in the preparation of the Environmental Quality Report required by section 201;
- (2) to gather timely and authoritative information concerning the conditions and trends in the quality of the environment both current and prospective, to analyze and interpret such information for the purpose of determining whether such conditions and trends are interfering, or are likely to interfere, with the achievement of the policy set forth in title I of this Act, and to compile and submit to the President studies relating to such conditions and trends;
- (3) to review and appraise the various programs and activities of the Federal Government in the light of the policy set forth in title I of this Act for the purpose of determining the extent to which such programs and activities are contributing to the achievement of such policy, and to make recommendations to the President with respect thereto;
- (4) to develop and recommend to the President national policies to foster and promote the improvement of environmental quality to meet the conservation, social, economic, health, and other requirements and goals of the Nation;
- (5) to conduct investigations, studies, surveys, research, and analyses relating to ecological systems and environmental quality;
- (6) to document and define changes in the natural environment, including the plant and animal systems, and to accumulate necessary data and other information for a continuing analysis of these changes or trends and an interpretation of their underlying causes;
- (7) to report at least once each year to the President on the state and condition of the environment; and
- (8) to make and furnish such studies, reports thereon, and recommendations with respect to matters of policy and legislation as the President may request.

SEC. 205. In exercising its powers, functions, and duties under this Act, the Council shall—

- (1) consult with the Citizens' Advisory Committee on Environmental Quality established by Executive Order numbered 11472, dated May 29, 1969, and with such representatives of science, industry, agriculture, labor, conservation organizations, State and local governments and other groups, as it deems advisable; and
- (2) utilize, to the fullest extent possible, the services, facilities, and information (including statistical information) of public and private agencies and organizations, and individuals, in order that duplication of effort and expense may be avoided, thus assuring that the Council's activities will not unnecessarily overlap or conflict with similar activities authorized by law and performed by established agencies.

Sec. 206. Members of the Council shall serve full time and the Chairman of the Council shall be compensated at the rate provided for Level II of the Executive Schedule Pay Rates (5 U.S.C. 5313). The other members of the Council shall be compensated at the rate provided for Level IV or the Executive Schedule Pay Rates (5 U.S.C. 5315).

Sec. 207. There are authorized to be appropriated to carry out the provisions of this Act not to exceed \$300,000 for fiscal year 1970, \$700,000 for fiscal year 1971, and \$1,000,000 for each fiscal year thereafter.

Approved January 1, 1970.

Tenure and  
compensation.  
80 Stat. 460,  
461.  
61 Stat. 638.  
Appropriations.

#### LEGISLATIVE HISTORY:

HOUSE REPORTS: No. 91-378, 91-378, pt. 2, accompanying H. R. 12549 (Comm. on Merchant Marine & Fisheries) and 91-765 (Comm. of Conference).

SENATE REPORT No. 91-296 (Comm. on Interior & Insular Affairs).

CONGRESSIONAL RECORD, Vol. 115 (1969):

July 10: Considered and passed Senate.

Sept. 23: Considered and passed House, amended, in lieu of H. R. 12549.

Oct. 8: Senate disagreed to House amendments; agreed to conference.

Dec. 20: Senate agreed to conference report.

Dec. 22: House agreed to conference report.

## APPENDIX B

Pub. Law 91-224

- 24 -

April 3, 1970

### TITLE II—ENVIRONMENTAL QUALITY

#### SHORT TITLE

SEC. 201. This title may be cited as the "Environmental Quality Improvement Act of 1970."

#### FINDINGS, DECLARATIONS, AND PURPOSES

SEC. 202. (a) The Congress finds—

- (1) that man has caused changes in the environment;
- (2) that many of these changes may affect the relationship between man and his environment; and
- (3) that population increases and urban concentration contribute directly to pollution and the degradation of our environment.

(b) (1) The Congress declares that there is a national policy for the environment which provides for the enhancement of environmental quality. This policy is evidenced by statutes heretofore enacted relating to the prevention, abatement, and control of environmental pollution, water and land resources, transportation, and economic and regional development.

(2) The primary responsibility for implementing this policy rests with State and local governments.

(3) The Federal Government encourages and supports implementation of this policy through appropriate regional organizations established under existing law.

(c) The purposes of this title are—

(1) to assure that each Federal department and agency conducting or supporting public works activities which affect the environment shall implement the policies established under existing law; and

(2) to authorize an Office of Environmental Quality, which, notwithstanding any other provision of law, shall provide the professional and administrative staff for the Council on Environmental Quality established by Public Law 91-190.

#### OFFICE OF ENVIRONMENTAL QUALITY

SEC. 203. (a) There is established in the Executive Office of the President an office to be known as the Office of Environmental Quality (hereafter in this title referred to as the "Office"). The Chairman of

Office of  
Environmental  
Quality.  
Authorization.  
83 Stat. 852.

Establishment.

April 3, 1970 - 25 - Pub. Law 91-224

the Council on Environmental Quality established by Public Law 91-190 shall be the Director of the Office. There shall be in the Office a Deputy Director who shall be appointed by the President, by and with the advice and consent of the Senate.

83 Stat. 852.

(b) The compensation of the Deputy Director shall be fixed by the President at a rate not in excess of the annual rate of compensation payable to the Deputy Director of the Bureau of the Budget.

Pay.

(c) The Director is authorized to employ such officers and employees (including experts and consultants) as may be necessary to enable the Office to carry out its functions under this title and Public Law 91-190, except that he may employ no more than ten specialists and other experts without regard to the provisions of title 5, United States Code, governing appointments in the competitive service, and pay such specialists and experts without regard to the provisions of chapter 51 and subchapter III of chapter 53 of such title relating to classification and General Schedule pay rates, but no such specialist or expert shall be paid at a rate in excess of the maximum rate for GS-18 of the General Schedule under section 5332 of title 5.

Duties.  
84 STAT. 114  
84 STAT. 115

(d) In carrying out his functions the Director shall assist and advise the President on policies and programs of the Federal Government affecting environmental quality by—

5 USC 5101-  
5115; 5331-  
5338.

(1) providing the professional and administrative staff and support for the Council on Environmental Quality established by Public Law 91-190;

(2) assisting the Federal agencies and departments in appraising the effectiveness of existing and proposed facilities, programs, policies, and activities of the Federal Government, and those specific major projects designated by the President which do not require individual project authorization by Congress, which affect environmental quality;

(3) reviewing the adequacy of existing systems for monitoring and predicting environmental changes in order to achieve effective coverage and efficient use of research facilities and other resources;

(4) promoting the advancement of scientific knowledge of the effects of actions and technology on the environment and encourage the development of the means to prevent or reduce adverse effects that endanger the health and well-being of man;

(5) assisting in coordinating among the Federal departments and agencies those programs and activities which affect, protect, and improve environmental quality;

(6) assisting the Federal departments and agencies in the development and interrelationship of environmental quality criteria and standards established through the Federal Government;

(7) collecting, collating, analyzing, and interpreting data and information on environmental quality, ecological research, and evaluation.

Contract au-  
thority.

(e) The Director is authorized to contract with public or private agencies, institutions, and organizations and with individuals without regard to sections 3648 and 3709 of the Revised Statutes (31 U.S.C. 529; 41 U.S.C. 5) in carrying out his functions.

#### REPORT

SEC. 204. Each Environmental Quality Report required by Public Law 91-190 shall, upon transmittal to Congress, be referred to each standing committee having jurisdiction over any part of the subject matter of the Report.

Referral to  
congressional  
committees.

AUTHORIZATION

Appropriations. SEC. 205. There are hereby authorized to be appropriated not to exceed \$500,000 for the fiscal year ending June 30, 1970, not to exceed \$750,000 for the fiscal year ending June 30, 1971, not to exceed \$1,250,000 for the fiscal year ending June 30, 1972, and not to exceed \$1,500,000 for the fiscal year ending June 30, 1973. These authorizations are in addition to those contained in Public Law 91-190.  
83 Stat. 852.

Approved April 3, 1970.

LEGISLATIVE HISTORY:

HOUSE REPORTS: No. 91-127 (Comm. on Public Works) and No. 91-940 (Comm. of Conference).

SENATE REPORT No. 91-351 accompanying S. 7 (Comm. on Public Works).

CONGRESSIONAL RECORD:

Vol. 115 (1969): Apr. 15, 16, considered and passed House.  
Oct. 7, 8, considered and passed Senate, amended,  
in lieu of S. 7.

Vol. 116 (1970): Mar. 24, Senate agreed to conference report.  
Mar. 25, House agreed to conference report.



APPENDIX C

PROTECTION AND ENHANCEMENT OF ENVIRONMENTAL  
QUALITY

*Executive Order 11514. March 5, 1970*

By virtue of the authority vested in me as President of the United States and in furtherance of the purpose and policy of the National Environmental Policy Act of 1969 (Public Law No. 91-190, approved January 1, 1970), it is ordered as follows:

SECTION 1. *Policy.* The Federal Government shall provide leadership in protecting and enhancing the quality of the Nation's environment to sustain and enrich human life. Federal agencies shall initiate measures needed to direct their policies, plans and programs so as to meet national environmental goals. The Council on Environmental Quality, through the Chairman, shall advise and assist the President in leading this national effort.

SEC. 2. *Responsibilities of Federal agencies.* Consonant with Title I of the National Environmental Policy Act of 1969, hereafter referred to as the "Act", the heads of Federal agencies shall:

(a) Monitor, evaluate, and control on a continuing basis their agencies' activities so as to protect and enhance the quality of the environment. Such activities shall include those directed to controlling pollution and enhancing the environment and those designed to accomplish other program objectives which may affect the quality of the environment. Agencies shall develop programs and measures to protect and enhance environmental quality and shall assess progress in meeting the specific objectives of such activities. Heads of agencies shall consult with appropriate Federal, State and local agencies in carrying out their activities as they affect the quality of the environment.

(b) Develop procedures to ensure the fullest practicable provision of timely public information and understanding of Federal plans and programs with environmental impact in order to obtain the views of interested parties. These procedures shall include, whenever appropriate, provision for public hearings, and shall provide the public with relevant information, including information on alternative courses of action. Federal agencies shall also encourage State and local agencies to adopt similar procedures for informing the public concerning their activities affecting the quality of the environment.

(c) Insure that information regarding existing or potential environmental problems and control methods developed as part of research, development, demonstration, test, or evaluation activities is made available to Federal agencies, States, counties, municipalities, institutions, and other entities, as appropriate.

(d) Review their agencies' statutory authority, administrative regulations, policies, and procedures, including those relating to loans, grants, contracts, leases, licenses, or permits, in order to identify any deficiencies or inconsistencies therein which prohibit or limit full compliance with the purposes and provisions of the Act. A report on this review and the corrective actions taken or planned, including such measures to be proposed to the President as may be necessary to bring their authority and policies into conformance with the intent, purposes, and procedures of the Act, shall be provided to the Council on Environmental Quality not later than September 1, 1970.

(e) Engage in exchange of data and research results, and cooperate with agencies of other governments to foster the purposes of the Act.

(f) Proceed, in coordination with other agencies, with actions required by section 102 of the Act.

*SEC. 3. Responsibilities of Council on Environmental Quality.*  
The Council on Environmental Quality shall:

(a) Evaluate existing and proposed policies and activities of the Federal Government directed to the control of pollution and the enhancement of the environment and to the accomplishment of other objectives which affect the quality of the environment. This shall include continuing review of procedures employed in the development and enforcement of Federal standards affecting

environmental quality. Based upon such evaluations the Council shall, where appropriate, recommend to the President policies and programs to achieve more effective protection and enhancement of environmental quality and shall, where appropriate, seek resolution of significant environmental issues.

(b) Recommend to the President and to the agencies priorities among programs designed for the control of pollution and for enhancement of the environment.

(c) Determine the need for new policies and programs for dealing with environmental problems not being adequately addressed.

(d) Conduct, as it determines to be appropriate, public hearings or conferences on issues of environmental significance.

(e) Promote the development and use of indices and monitoring systems (1) to assess environmental conditions and trends, (2) to predict the environmental impact of proposed public and private actions, and (3) to determine the effectiveness of programs for protecting and enhancing environmental quality.

(f) Coordinate Federal programs related to environmental quality.

(g) Advise and assist the President and the agencies in achieving international cooperation for dealing with environmental problems, under the foreign policy guidance of the Secretary of State.

(h) Issue guidelines to Federal agencies for the preparation of detailed statements on proposals for legislation and other Federal actions affecting the environment, as required by section 102(2)(C) of the Act.

(i) Issue such other instructions to agencies, and request such reports and other information from them, as may be required to carry out the Council's responsibilities under the Act.

(j) Assist the President in preparing the annual Environmental Quality Report provided for in section 201 of the Act.

(k) Foster investigations, studies, surveys, research, and analyses relating to (i) ecological systems and environmental quality, (ii) the impact of new and changing technologies thereon, and (iii) means of preventing or reducing adverse effects from such technologies.

SEC. 4. *Amendments of E.O. 11472.* Executive Order No. 11472 of May 29, 1969, including the heading thereof, is hereby amended:

(1) By substituting for the term "the Environmental Quality Council", wherever it occurs, the following: "the Cabinet Committee on the Environment".

(2) By substituting for the term "the Council", wherever it occurs, the following: "the Cabinet Committee".

(3) By inserting in subsection (f) of section 101, after "Budget," the following: "the Director of the Office of Science and Technology,".

(4) By substituting for subsection (g) of section 101 the following:

"(g) The Chairman of the Council on Environmental Quality (established by Public Law 91-190) shall assist the President in directing the affairs of the Cabinet Committee."

(5) By deleting subsection (c) of section 102.

(6) By substituting for "the Office of Science and Technology", in section 104, the following: "the Council on Environmental Quality (established by Public Law 91-190)".

(7) By substituting for "(hereinafter referred to as the 'Committee')", in section 201, the following: "(hereinafter referred to as the 'Citizens' Committee')".

(8) By substituting for the term "the Committee", wherever it occurs, the following: "the Citizens' Committee".

RICHARD NIXON.

THE WHITE HOUSE, March 5, 1970.

[Filed with the Office of the Federal Register, 2:29 p.m., March 5, 1970]

## APPENDIX D

91<sup>ST</sup> CONGRESS  
2D SESSION

# S. 3410

## IN THE SENATE OF THE UNITED STATES

FEBRUARY 6, 1970

Mr. BAKER (for himself and Mr. MUSKIE) introduced the following bill; which was read twice and referred to the Committee on Public Works

## A BILL

To establish a structure that will provide integrated knowledge and understanding of the ecological, social, and technological problems associated with air pollution, water pollution, solid waste disposal, general pollution, and degradation of the environment, and other related problems.

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

2       *That this Act may be cited as the "National Environmental*  
3       *Laboratory Act of 1970."*

4       *SEC. 2. (a) The Congress finds—*

5           *"(1) that the Nation is presently experiencing a*  
6           *rapid deterioration of environmental quality;*

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1       “(2) that the environmental resources of the Na-  
2       tion are finite;

3       “(3) that the demands of a growing population and  
4       an increasing material standard of living will place an ad-  
5       ditional burden upon the capacity of the environment;

6       “(4) that the optimum allocation and use of our  
7       limited environmental resources will require the maxi-  
8       mum use of scientific principles if the Nation is to re-  
9       store and enhance the health, diversity, beauty, and  
10      capacity of the environment for perpetuity;

11      “(5) that the development of technologies has often  
12      created unintended ecological, economic, and social ef-  
13      fects which have a profound impact on the environment;

14      “(6) that technologies must be assessed on a timely  
15      basis in order to detect and predict the detrimental effects  
16      these may have on the ecosystem, which includes man,  
17      and that existing technologies must continually be re-  
18      appraised to detect latent detrimental effects;

19      “(7) that the amelioration and prevention of en-  
20      vironmental problems depend on a thorough understand-  
21      ing of the complex interactions among the human, nat-  
22      ural, and technological components of the ecosystem,  
23      thereby requiring multidisciplinary research and anal-  
24      ysis of the total environment;

25      “(8) that while the established departments and

1       mission-oriented agencies make valuable contributions  
2       in specialized research and development, they lack au-  
3       thority and organization to deal comprehensively with  
4       the interconnected problems of the environment; and

5       “(9) that a complete and thorough understanding  
6       of the ecosystem cannot be accomplished through frag-  
7       mented application of specialized research and develop-  
8       ment efforts, but rather requires a unity of effort and  
9       emphasis which is focused on the restoration and en-  
10      hancement of the total environment.

11      “(b) The Congress declares—

12      “(1) that in the interest of restoring and enhanc-  
13      ing environmental quality it is necessary to establish an  
14      organization with sufficient professional breadth and  
15      scope to provide a unified and systematic approach to  
16      its area of concern; such organization to complement  
17      those agencies presently dealing with various aspects of  
18      the environment; and

19      “(2) that the organization will conduct research,  
20      development, and analysis of environmental problems,  
21      which will include (A) data collection, information  
22      storage and dissemination, data analysis and synthesis,  
23      development of methods and devices, education and  
24      training, and environmental policy analysis; (B) the  
25      formulation, development, testing, and demonstration of

1 alternative solutions to environmental problems for con-  
 2 sideration by policymakers; and (C) the performance of  
 3 any other functions necessary to provide for the restora-  
 4 tion and enhancement of the environment.

5 “SEC. 3. There is established at the seat of government a  
 6 National Environmental Laboratory and a Board of Trustees  
 7 of the Laboratory (hereinafter referred to as the ‘Laboratory’  
 8 and the ‘Board’) whose duty it shall be to maintain and ad-  
 9 minister the Laboratory and site or sites thereof, and to exe-  
 10 cute other functions as are vested in the Board by section 4.

11 “SEC. 4. (a) The Board shall be composed of nine mem-  
 12 bers as follows: (1) the Vice President; (2) the Chairman  
 13 of the Council on Environmental Quality established by  
 14 Public Law 91-190; (3) the Director of the Office of Sci-  
 15 ence and Technology; (4) the Director of the National Sci-  
 16 ence Foundation; and (5) five members appointed by the  
 17 President from the public, by and with the advice and con-  
 18 sent of the Senate. Not more than three of the public mem-  
 19 bers of the Board may be members of the same political  
 20 party.

21 “(b) Each Member of the Board specified in clauses 1  
 22 through 4 of subsection (a) of this section may designate  
 23 another official to serve on the Board in his stead.

24 “(c) Each member of the Board appointed under clause  
 25 5 of subsection (a) of this section shall serve for a term

1 of six years from the expiration of his predecessor’s term  
 2 except that (1) any such member appointed to fill a va-  
 3 cancy occurring prior to the expiration of the term for which  
 4 his predecessor was appointed shall be appointed for the  
 5 remainder of such term, and (2) the terms of office of such  
 6 members first taking office shall begin on April 24, 1970,  
 7 shall expire, as designated by the President at the time of  
 8 appointment, one at the end of two years, two at the end  
 9 of four years, and two at the end of six years. No member  
 10 of the Board chosen from private life shall be eligible to  
 11 serve in excess of two terms, except that the member whose  
 12 term has expired may serve until his successor has qualified.

13 “(d) The President shall designate a Chairman and  
 14 a Vice Chairman from among the members of the Board  
 15 chosen from the public.

16 “SEC. 5. In administering the Laboratory, the Board  
 17 shall have all necessary and proper powers which shall  
 18 include, but not be limited to, the power to—

19 “(a) establish regional national environmental lab-  
 20 oratories not to exceed six in number with the geo-  
 21 graphical distribution of any such regional laboratories  
 22 determined by environmental criteria, and if the Board  
 23 determines it is feasible to initiate any regional Na-  
 24 tional Environmental Laboratory through the transfer

1 of certain research functions and facilities of existing  
 2 national laboratories of the Atomic Energy Commission  
 3 or any other Federal agency, the Board shall recom-  
 4 mend to the President that such functions and facili-  
 5 ties be transferred to the Laboratory;

6        "(b) establish broad policy directions for the Lab-  
 7 oratory as determined from an analysis of the social  
 8 and environmental priorities established by the Congress,  
 9 the executive branch, and the private sector;

10      "(c) solicit, accept, and dispose of gifts, bequests,  
 11 and devices of money, securities, and other property of  
 12 whatsoever character for the benefit of the Labora-  
 13 tory, and any such money, securities, or other property  
 14 shall, upon receipt, be deposited into a special fund ad-  
 15 ministered by the Board for the purposes of the Labora-  
 16 tory, and the source, amount, and restrictions of any  
 17 gift, bequest, or device of money, securities, or other  
 18 property in excess of \$5,000 fair market value shall be  
 19 included in the annual report required under section 10;

20      "(d) obtain grants from, and make contracts with,  
 21 State, Federal, local, and private agencies, organiza-  
 22 tions, institutions, and individuals;

23      "(e) acquire such site or sites as a location for the  
 24 Laboratory or regional laboratories;

25      "(f) acquire, hold, maintain, use, operate, and dis-

1 pose of any physical facilities, including equipment, nec-  
 2 essary for the operation of the Laboratory;

3        "(g) appoint and fix the compensation and duties  
 4 of a General Manager and such other officers of the  
 5 Laboratory as may be required. The compensation of the  
 6 General Manager and other such officers shall be fixed  
 7 without regard to the provisions of title 5 of the United  
 8 States Code governing appointments in the competitive  
 9 service and chapter 51 and subchapter III of chapter  
 10 53 of such title 5; and

11       "(h) appoint and fix the compensation and duties  
 12 of a Director, or Directors and such other officers of the  
 13 Laboratory to administer any regional laboratory, or  
 14 laboratories, established pursuant to subsection (a) of  
 15 this section; and such Director or Directors may be ap-  
 16 pointed and compensated without regard to such pro-  
 17 visions of title 5.

18       "SEC. 6. Any Director appointed under clause (h) of  
 19 section 4 shall be responsible for the management and devel-  
 20 opment of the regional laboratory for which he is appointed  
 21 and for the research program that such laboratory conducts,  
 22 subject only to the broad policy directions provided by the  
 23 Board pursuant to subsection (b) of section 4.

24       "SEC. 7. The Board shall, in connection with acquisi-  
 25 tion of any site or sites, as provided for in clause (e) of

1 section 4, provide to businesses and residents displaced from  
 2 any such site or sites relocation assistance, including pay-  
 3 ments and other benefits, equivalent to that authorized to  
 4 displaced businesses and residents under the Housing Act  
 5 of 1949, as amended. In providing such relocation assistance  
 6 and developing such relocation program the Board shall  
 7 utilize to the maximum extent the services and facilities of  
 8 the appropriate Federal and local agencies.

9       “SEC. 8. The Board is authorized to adopt an official  
 10 seal which shall be judicially noticed and to make such  
 11 bylaws, rules, and regulations as it deems necessary for the  
 12 administration of its functions under this Act, including,  
 13 among other matters, bylaws, rules, and regulations relating  
 14 to the administration of its trust funds and the organization  
 15 and procedures of the Board. A majority of the members  
 16 of the Board shall constitute a quorum for the transaction of  
 17 business.

18       “SEC. 9. (a) There is hereby authorized to be appro-  
 19 priated to the Board \$50,000,000 for each of five consecutive  
 20 fiscal years beginning with the fiscal year ending June 30,  
 21 1971, to be deposited in a fund (hereinafter referred to as  
 22 the “Special Trust Fund”) for the perpetual maintenance  
 23 and support of the long-term research activities of the Labora-  
 24 tory. It shall be the duty of the Board to invest such fund  
 25 only in interest-bearing obligations of the United States or

1 in obligations guaranteed as to both principal and interest by  
 2 the United States. For such purpose such obligations may be  
 3 acquired (1) on original issue at the issue price, or (2) by  
 4 purchase of the outstanding obligations at the market price.  
 5 The purposes for which obligations of the United States may  
 6 be issued under the Second Liberty Bond Act, as amended,  
 7 are extended to authorize the issuance at par of public-debt  
 8 obligation for purchase by the Special Trust Fund. Such ob-  
 9 ligations issued for purchase by the Special Trust Fund shall  
 10 have maturities fixed with due regard for the needs of the  
 11 Special Trust Fund and shall bear interest at a rate equal to  
 12 the average market yield (computed by the Secretary of the  
 13 Treasury on the basis of market quotations as of the end of  
 14 the calendar month next preceding the date of such issue) on  
 15 all marketable interest-bearing obligations of the United  
 16 States then forming a part of the public debt which are not  
 17 due or callable until after the expiration of four years from  
 18 the end of such calendar month; except that where such aver-  
 19 age market yield is not a multiple of one-eighth of 1 per  
 20 centum, the rate of interest of such obligations shall be the  
 21 multiple of one-eighth of 1 per centum nearest such market  
 22 yield. The Board may purchase other interest-bearing obli-  
 23 gations of the United States or obligations guaranteed as to  
 24 both principal and interest by the United States, on original  
 25 issue or at the market price only where it determines that the

1 purchase of such other obligations is in the public interest.  
 2 Any obligations acquired by the Special Trust Fund (except  
 3 public-debt obligations issued exclusively to the Special Trust  
 4 Fund) may be sold by the Board at the market price, and  
 5 such public-debt obligations may be redeemed at par plus ac-  
 6 crued interest.

7       (b) In addition to amounts appropriated pursuant to  
 8 subsection (a) there are authorized to be appropriated such  
 9 sums as may be necessary to carry out the purposes of this  
 10 Act: *Provided*, That not to exceed \$200,000,000 may be  
 11 appropriated for the use of any one regional laboratory estab-  
 12 lished pursuant to subsection (a) of section 5. Such sums  
 13 appropriated under authority of this subsection shall remain  
 14 available until expended.

15       “SEC. 10. The General Manager of the Laboratory shall  
 16 transmit annually to the President and to Congress a report  
 17 which shall set forth, but not be limited to, (1) the audit  
 18 reports required under subsection (a) of section 10 of this  
 19 Act, (2) bibliographies, with annotations, of research per-  
 20 formed, and (3) a description of ongoing research programs.”

**A BILL**

To establish a structure that will provide inte-  
 grated knowledge and understanding of the  
 ecological, social, and technological prob-  
 lems associated with air pollution, water pol-  
 lution, solid waste disposal, general pollu-  
 tion, and degradation of the environment,  
 and other related problems.

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By Mr. BAKER and Mr. MUSKIE

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FEBRUARY 6, 1970  
 Read twice and referred to the Committee on Public  
 Works

**H. R. 17046**

IN THE HOUSE OF REPRESENTATIVES

APRIL 16, 1970

Mr. DADDARIO (for himself and Mr. MOSHER) introduced the following bill;  
which was referred to the Committee on Science and Astronautics

**A BILL**

To establish an Office of Technology Assessment for the Congress as an aid in the identification and consideration of existing and probable impacts of technological application; to amend the National Science Foundation Act of 1950; and for other purposes.

1     *Be it enacted by the Senate and House of Representa-*  
 2     *tives of the United States of America in Congress assembled,*  
 3     That this Act may be cited as the "Technology Assessment  
 4     Act of 1970".

## 5                 DECLARATION OF PURPOSE

6     SEC. 2. The Congress hereby finds and declares that:  
 7         (a) Emergent national problems, physical, biological,  
 8     and social, are of such a nature and are developing at such

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 1     an unprecedented rate as to constitute a major threat to the  
 2     security and general welfare of the United States.  
 3         (b) Such problems are largely the result of and are allied  
 4     to—  
 5                 (1) the increasing pressures of population;  
 6                 (2) the rapid consumption of natural resources;  
 7                 and  
 8                 (3) the deterioration of the human environment,  
 9     natural and social,  
 10   though not necessarily limited to or by these factors.  
 11         (c) The growth in scale and extent of technological  
 12   application is a crucial element in such problems and either  
 13   is or can be a pivotal influence with respect both to their  
 14   cause and to their solution.  
 15         (d) The present mechanisms of the Congress do not  
 16   provide the legislative branch with adequate independent  
 17   and timely information concerning the potential applica-  
 18   tion or impact of such technology, particularly in those in-  
 19   stances where the Federal Government may be called upon  
 20   to consider support, management, or regulation of tech-  
 21   nological applications.  
 22         (e) It is therefore, imperative that the Congress equip  
 23   itself with new and effective means for securing competent,  
 24   unbiased information concerning the effects, physical, eco-  
 25   nomic, social, and political, of the applications of technology,

1 and that such information be utilized whenever appropriate  
 2 as one element in the legislative assessment of matters  
 3 pending before the Congress.

4 ESTABLISHMENT OF THE OFFICE OF TECHNOLOGY

5 ASSESSMENT

6 SEC. 3. (a) In accordance with the rationale enunciated  
 7 in section 2, there is hereby created the Office of Technology  
 8 Assessment (hereinafter referred to as the "Office") which  
 9 shall be within and responsible to the legislative branch of the  
 10 Government.

11 (b) The Office shall consist of a Technology Assessment  
 12 Board (hereinafter referred to as the "Board") which shall  
 13 formulate and promulgate the policies of the Office, and a  
 14 Director who shall carry out such policies and administer  
 15 the operations of the Office.

16 (c) The basic responsibilities and duties of the Office  
 17 shall be to provide an early warning of the probable im-  
 18 pacts, positive and negative, of the applications of technology  
 19 and to develop other coordinate information which may  
 20 assist the Congress in determining the relative priorities of  
 21 programs before it. In carrying out such function, the Office  
 22 shall—

23 (1) identify existing or probable impacts of tech-  
 24 nology or technological programs;

1 (2) where possible establish cause and effect rela-  
 2 tionships;

3 (3) determine alternative technological methods of  
 4 implementing specific programs;

5 (4) determine alternative programs for achieving  
 6 requisite goals;

7 (5) make estimates and comparisons of the impacts  
 8 of alternative methods and programs;

9 (6) present findings of completed analyses to the  
 10 appropriate legislative authorities;

11 (7) identify areas where additional research or data  
 12 collection is required to provide adequate support for the  
 13 assessments and estimates described in paragraphs (1)  
 14 through (5); and

15 (8) undertake such additional associated tasks as  
 16 the appropriate authorities specified under subsection (d)  
 17 may direct.

18 (d) Activities undertaken by the Office may be initi-  
 19 ated by—

20 (1) the chairman of any standing, special, select,  
 21 or joint committee of the Congress;

22 (2) the Board; or

23 (3) the Director.

24 (e) Information, surveys, studies, reports, and findings  
 25 produced by the Office shall be made freely available to the

1 public except where (1) to do so would violate security  
 2 statutes, or (2) the information or other matter involved  
 3 could be withheld from the public, notwithstanding subsection  
 4 (a) of section 552 of title 5, United States Code, under  
 5 one or more of the numbered paragraphs in subsection (b)  
 6 of such section.

7 (f) In undertaking the duties set out in subsection (c),  
 8 full use shall be made of competent personnel and organizations  
 9 outside the Office, public or private; and special ad hoc  
 10 task forces or other arrangements may be formed by the  
 11 Director when appropriate.

#### TECHNOLOGY ASSESSMENT BOARD

13 SEC. 4. (a) The Board shall consist of thirteen members  
 14 as follows:

15 (1) two Members of the Senate who shall not be  
 16 members of the same political party, to be appointed  
 17 by the President of the Senate;

18 (2) two Members of the House of Representatives  
 19 who shall not be members of the same political party,  
 20 to be appointed by the Speaker of the House of Representatives;

22 (3) the Comptroller General of the United States;

23 (4) the Director of the Legislative Reference Service  
 24 of the Library of Congress; and

25 (5) seven members from the public, appointed by

1 the President, by and with the advice and consent of  
 2 the Senate, who shall be persons eminent in one or  
 3 more fields of science or engineering or experienced in  
 4 the administration of technological activities, or who may  
 5 be judged qualified on the basis of contributions made  
 6 to educational or public affairs.

7 (b) In addition, the Director shall be a member of the  
 8 Board ex officio.

9 (c) The Board, by majority vote, shall elect from among  
 10 its members appointed under subsection (a) (5) a Chairman  
 11 and a Vice Chairman, who shall serve for such time  
 12 and under such conditions as the Board may prescribe. In  
 13 the absence of the Chairman, or in the event of his incapacity,  
 14 the Vice Chairman shall fulfill the duties and functions of  
 15 the Chairman.

16 (d) The Board shall meet upon the call of the Chairman  
 17 or upon the petition of five or more of its members,  
 18 but it shall meet not less than twice each year.

19 (e) Seven members of the Board shall constitute a  
 20 quorum.

21 (f) Any vacancy in the Board shall not affect its powers,  
 22 but shall be filled in the manner in which the vacant position  
 23 was originally filled.

24 (g) Any appointed member of the Board may be removed  
 25 at any time by the official who appointed him.

1       (b) (1) The members of the Board who are Members  
 2 of Congress, the Comptroller General, and the Director of  
 3 the Legislative Reference Service shall receive no compen-  
 4 sation for their services as members of the Board, but shall  
 5 be allowed necessary travel expenses (or, in the alternative,  
 6 mileage for use of privately owned vehicles and a per diem  
 7 in lieu of subsistence not to exceed the rates prescribed in  
 8 sections 5702 and 5704 of title 5, United States Code), and  
 9 other necessary expenses incurred by them in the perform-  
 10 ance of duties vested in the Board, without regard to the  
 11 provisions of subchapter I of chapter 57 of title 5, United  
 12 States Code, the Standardized Government Travel Regula-  
 13 tions, or section 5731 of title 5, United States Code.

14       (2) The members of the Board appointed under sub-  
 15 section (a) (5) shall each receive compensation at the rate  
 16 of \$100 for each day engaged in the actual performance of  
 17 duties vested in the Board, and in addition shall be reim-  
 18 bursed for travel, subsistence, and other necessary expenses  
 19 in the manner provided in paragraph (1) of this subsection.

20                   DIRECTOR AND DEPUTY DIRECTOR

21       SEC. 5. (a) The Director of the Office of Technology  
 22 Assessment shall be appointed by the Board and shall serve  
 23 for a term of six years unless sooner removed by the Board.  
 24 He shall receive basic pay at the rate provided for level II

1 of the Executive Schedule under section 5313 of title 5,  
 2 United States Code.

3       (b) In addition to the powers and duties vested in him  
 4 by this Act, the Director shall exercise such powers and  
 5 duties as may be delegated to him by the Board.

6       (c) The Director may appoint, with the approval of the  
 7 Board, a Deputy Director who shall perform such functions  
 8 as the Director may prescribe and who shall be Acting Direc-  
 9 tor during the absence or incapacity of the Director or in the  
 10 event of a vacancy in the office of Director. The Deputy  
 11 Director shall receive basic pay at the rate provided for  
 12 level III of the Executive Schedule under section 5314 of  
 13 title 5, United States Code.

14       (d) Neither the Director nor the Deputy Director shall  
 15 engage in any other business, vocation, or employment than  
 16 that of serving as such Director or Deputy Director, as the  
 17 case may be; nor shall the Director or Deputy Director, ex-  
 18 cept with the approval of the Board, hold any office in, or  
 19 act in any capacity for, any organization, agency, or institu-  
 20 tion with which the Office makes any contract or other  
 21 arrangement under this Act.

22                   AUTHORITY OF THE OFFICE

23       SEC. 6. (a) The Office shall have the authority, within  
 24 the limits of available appropriations, to do all things neces-  
 25 sary to carry out the provisions of this Act, including, but  
 26 without being limited to, the authority to—

1       (1) prescribe such rules and regulations as it deems  
 2 necessary governing the manner of its operation and its  
 3 organization and personnel;

4       (2) make such expenditures as may be necessary  
 5 for administering the provisions of this Act;

6       (3) enter into contracts or other arrangements, or  
 7 modifications thereof, for the carrying on, by orga-  
 8 nizations or individuals in the United States and foreign  
 9 countries, including other Government agencies of the  
 10 United States and of foreign countries and international  
 11 agencies, of such technology assessment activities as the  
 12 Office deems necessary to carry out the purposes of this  
 13 Act; and when deemed appropriate by the Office such  
 14 contracts or other arrangements, or modifications thereof,  
 15 may be entered into without legal consideration, with-  
 16 out performance or other bonds, and without regard to  
 17 section 3709 of the Revised Statutes (41 U.S.C. 5);

18       (4) make advance, progress, and other payments  
 19 which relate to technology assessment without regard  
 20 to the provisions of section 3648 of the Revised Statutes  
 21 (31 U.S.C. 529);

22       (5) acquire by purchase, lease, loan, or gift, and  
 23 hold and dispose of by sale, lease, or loan, real and per-  
 24 sonal property of all kinds necessary for, or resulting  
 25 from, the exercise of authority granted by this Act; and

1       (6) accept and utilize the services of voluntary and  
 2 uncompensated personnel and provide transportation and  
 3 subsistence as authorized by section 5703 of title 5,  
 4 United States Code, for persons serving without  
 5 compensation.

6       (b) The Director shall, in accordance with such policies  
 7 as the Board shall prescribe, appoint and fix the compensa-  
 8 tions of such personnel as may be necessary to carry out the  
 9 provisions of this Act. Such appointments shall be made and  
 10 such compensation shall be fixed in accordance with the pro-  
 11 visions of title 5, United States Code, governing appoint-  
 12 ments in the competitive service, and the provisions of chap-  
 13 ter 51 and subchapter III of chapter 53 of such title relating  
 14 to classification and General Schedule pay rates; except that  
 15 the Director may, in accordance with such policies as the  
 16 Board shall prescribe, employ such technical and professional  
 17 personnel and fix their compensation without regard to such  
 18 provisions as he may deem necessary for the discharge of the  
 19 responsibilities of the Office under this Act.

20       (c) The Office shall not, itself, operate any laboratories,  
 21 pilot plants, or test facilities in the pursuit of its mission.

22       (d) The Office or (on the authorization of the Office)  
 23 any of its duly constituted officers may, for the purpose of  
 24 carrying out the provisions of this Act, hold such hearings,  
 25 take such testimony, and sit and act at such times and places

1 as the Office deems advisable. For this purpose the Office is  
 2 authorized to require the attendance of such persons and the  
 3 production of such books, records, documents, or data, by  
 4 subpoena or otherwise, and to take such testimony and rec-  
 5 ords, as it deems necessary. Subpenas may be issued by the  
 6 Director or by any person designated by him. If compliance  
 7 with such a subpoena by the person to whom it is issued or  
 8 upon whom it is served would (in such person's judgment)  
 9 require the disclosure of trade secrets or other commercial,  
 10 financial, or proprietary information which is privileged or  
 11 confidential, or constitute a clearly unwarranted invasion of  
 12 privacy, such person may petition the United States district  
 13 court for the district in which he resides or has his principal  
 14 place of business, or in which the books, records, documents,  
 15 or data involved are situated, and such court (after inspect-  
 16 ing such books, records, documents, or data *in camera*) may  
 17 excise and release from the subpoena any portion thereof  
 18 which it determines would require such disclosure or con-  
 19 stitute such invasion.

20       (e) Each department, agency, or instrumentality of  
 21 the executive branch of the Government, including independ-  
 22 ent agencies, is authorized and directed to furnish to the  
 23 Office, upon request by the Director, such information as  
 24 the Office deems necessary to carry out its functions under  
 25 this Act.

1           UTILIZATION OF THE LIBRARY OF CONGRESS

2       SEC. 7. (a) Pursuant to the objectives of this Act or  
 3 upon the request of the chairman of any standing, special,  
 4 select, or joint committee of the Congress, or of the Director,  
 5 the Librarian of Congress is authorized to make available to  
 6 the appropriate committee or to the Office such services and  
 7 assistance by the Legislative Reference Service as may be  
 8 appropriate and feasible.

9       (b) The foregoing services and assistance shall include  
 10 all of the services and assistance which the Legislative Ref-  
 11 erence Service is presently authorized to provide, and shall  
 12 particularly include—

13           (1) maintenance of a monitoring indicator system  
 14 with respect to the natural and social environments  
 15 which might reveal early impacts of technological  
 16 change, but any such system shall be coordinated with  
 17 other assessment activities which may exist in the de-  
 18 partments and agencies of the executive branch of the  
 19 Government;

20           (2) surveys of ongoing and proposed programs of  
 21 government with a high or novel technology content,  
 22 together with timetables of applied science showing  
 23 promising developments;

24           (3) publishing, from time to time, anticipatory  
 25 reports and forecasts;

- 1           (4) recording the activities and responsibilities of  
 2       Federal agencies in affecting or being affected by tech-  
 3       nological change;
- 4           (5) when warranted, recommending full-scale as-  
 5       sessments to the proper legislative committees;
- 6           (6) preparation of background reports to aid the  
 7       congressional committees in receiving and using the  
 8       assessments;
- 9           (7) assisting committee staffs in preparing for  
 10      hearings to consider the findings of the assessments;
- 11          (8) review of the findings of any assessment made  
 12      by or for the Office;
- 13          (9) assistance in public hearings held by commit-  
 14      tees; and
- 15          (10) maintenance of liaison with executive agencies  
 16      involved in technology assessments.
- 17          (c) Nothing in this section shall alter or modify any  
 18      services or responsibilities (other than those specifically  
 19      enumerated in subsection (b)) which the Legislative Refer-  
 20      ence Service under law performs for or on behalf of the Con-  
 21      gress. The Librarian is, however, authorized to establish  
 22      within the Legislative Reference Service such additional  
 23      divisions, groups, or other organizational entities as may be  
 24      necessary to perform the functions enumerated in this section.

- 1       COORDINATION WITH THE NATIONAL SCIENCE FOUNDATION
- 2       SEC. 8. (a) The Office shall maintain a continuing liaison  
 3       with the Office of Interdisciplinary Research of the National  
 4       Science Foundation with respect to—
- 5           (1) grants and contracts formulated or activated  
 6       by the Foundation which are for purposes of technology  
 7       assessment, and
- 8           (2) the promotion of coordination in areas of tech-  
 9       nology assessment, and the avoidance of unnecessary  
 10      duplication or overlapping of research activities in the  
 11      development of technology assessment techniques and  
 12      programs.
- 13          (b) Section 3 (b) of the National Science Foundation  
 14      Act of 1950, as amended, is hereby amended to read as  
 15      follows:
- 16          “(b) The Foundation is authorized to initiate and sup-  
 17      port specific scientific activities in connection with matters  
 18      relating to international cooperation, national security, and  
 19      the effects of scientific applications upon society by making  
 20      contracts or other arrangements (including grants, loans, and  
 21      other forms of assistance) for the conduct of such activities.  
 22      When initiated or supported pursuant to requests made by  
 23      the Secretary of State, the Secretary of Defense, or the Di-  
 24      rector of the Office of Technology Assessment, such activities  
 25      shall be financed from funds transferred to the Foundation

1 by the requesting official as provided in section 14 (g), and  
 2 any such activities shall be unclassified and shall be identified  
 3 by the Foundation as being undertaken at the request of the  
 4 appropriate official."

5                   ANNUAL REPORT

6       SEC. 9. The Office shall submit to the Congress an annual  
 7 report which shall, among other things, evaluate the existing  
 8 state of the art with regard to technology assessment tech-  
 9 niques and forecast, insofar as may be feasible, technological  
 10 areas requiring future attention. The report shall be sub-  
 11 mitted not later than March 15 each year.

12                   FINANCIAL AND ADMINISTRATIVE SERVICES

13       SEC. 10. Financial and administrative services (includ-  
 14 ing those related to budgeting, accounting, financial report-  
 15 ing, personnel, and procurement) shall be provided the  
 16 Office by the General Accounting Office, with or without  
 17 reimbursement from funds of the Office, as may be agreed  
 18 upon by the Chairman of the Board and the Comptroller  
 19 General of the United States. The regulations of the General  
 20 Accounting Office for the collection of indebtedness of per-  
 21 sonnel resulting from erroneous payments (under section 5514  
 22 (b) of title 5, United States Code) shall apply to the col-  
 23 lection of erroneous payments made to or on behalf of an  
 24 Office employee, and the regulations of the Comptroller  
 25 General for the administrative control of funds (under sec-

1 tion 3679 (g) of the Revised Statutes (31 U.S.C. 665 (g))  
 2 shall apply to appropriations of the Office; and the Office  
 3 shall not be required to prescribe such regulations.

4                   APPROPRIATIONS

5       SEC. 11. (a) To enable the Office to carry out its  
 6 powers and duties, there is hereby authorized to be appro-  
 7 priated to the Office, out of any money in the Treasury not  
 8 otherwise appropriated, not to exceed \$5,000,000 for the  
 9 fiscal year ending June 30, 1971, and thereafter such sums as  
 10 may be necessary.

11       (b) Appropriations made pursuant to the authority pro-  
 12 vided in subsection (a) shall remain available for obligation,  
 13 for expenditure, or for obligation and expenditure for such  
 14 period or periods as may be specified in the Act making such  
 15 appropriations.

APRIL 21, 1970

91ST CONGRESS  
2D SESSION

H. R. 17046

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## A BILL

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To establish an Office of Technology Assessment for the Congress as an aid in the identification and consideration of existing and probable impacts of technological application; to amend the National Science Foundation Act of 1950; and for other purposes.

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By Mr. DADDARIO and Mr. MOSHER

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APRIL 16, 1970

Referred to the Committee on Science and Astronautics

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## APPENDIX F

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### TECHNOLOGY ASSESSMENT IN THE EXECUTIVE OFFICE OF THE PRESIDENT<sup>1</sup>

"The common problem, yours, mine, every one's,  
Is—not to fancy what were fair in life  
Provided it could be,—but, finding first  
What may be, then finding how to make it fair  
Up to our means."

ROBERT BROWNING. *Men and Women*. Bishop Blougrams Apology

#### I Introduction

Technological change involves the Executive branch of government in many ways. The Executive agencies generate and use technology. They influence the development of technology in industry in many powerful ways. The President shares responsibility for promoting the general welfare, and hence for the protection of the citizenry against the adverse effects of technological change. He must be involved with technology directly and indirectly, and conscious attention has to be paid to how his responsibilities in this field can best be discharged. This paper explores some of the aspects of this question. I shall use the term "Executive Office" as shorthand to cover the President and his immediate staff as well as the Executive Office as such. A distinction will be made between the immediate staff and the Executive Office at appropriate points. The "Executive agencies" will refer to the departments and agencies comprising the great bulk of the Executive branch of government.

Such a pervasive and important problem can not be realistically "placed" either in the Congress or the Executive branch. If

<sup>1</sup> Paper presented at a George Washington University Seminar, December 11, 1969, by: Charles V. Kidd, Director, Council on Federal Relations, Association of American Universities.

such a misguided effort were made it would not succeed because both branches of government have constitutional responsibilities and all kinds of effective pressures which put them in, and keep them in, the business of technology assessment. Therefore, the real problems include not who has exclusive jurisdiction, but what each should do, how each should be organized to perform its function, and how the activities of the two branches should be related.

## II Technology Assessment Defined for the Purpose of This Paper

For the purpose of this paper, I shall define technology assessment as the process of evaluating the effects of technological change on human beings and human institutions. This broad definition encompasses consideration of the beneficial and harmful effects of technological change. It does not assume that the overriding problem on which attention should be riveted is the harmful or potentially catastrophic effects of technological change. The definition encompasses concern with the preservation and enhancement of environmental quality, but is not confined to this important question. This definition also encompasses both of the useful categories identified in the report of the National Academy of Engineering—problem oriented and technology oriented assessment.

## III More Effective Assessment at Various Levels is Required

As is true of many functions of government different kinds of activities relating to technology assessment are needed at different levels of government. Each agency that uses, promotes, evaluates, controls, or is influenced by technological developments should be responsible for monitoring the full effects of the technological area with which it is concerned. This includes the assessment of and advice or action on adverse effects as part of its total responsibility.

There is in government no substitute for a conscious effort to evaluate in advance the full efforts—bad and good—in all major Executive agencies of government. These agencies have the responsibility, talent and resources to use and to control tech-

nology. Without this base, no effort at technology assessment in the Executive Office can be successful. The case for widespread responsibility for technology assessment is based on the logic that leads to our firmly fixed policy of embedding science and technology within all major operating agencies.

The Committee on Public Engineering Policy of the National Academy of Engineering in its July 1969 report, *A Study of Technology Assessment*, takes another view of the utility of technology assessment by Executive agencies:

In general, existing groups in the Executive branch of the government are unlikely to be suited to the performance of technology assessments for Congress because such organizations have other primary missions, have a spectrum of skills weighted toward their specialized disciplines, may be committed to existing programs of the executive branch, and would have to be provided with special budgets and temporary staff to carry out the new function of technology assessment.

This statement is directed towards technology assessment *for Congress*, but the limitations which the Committee ascribes to the Executive agencies would apparently apply to any technology assessment which they might undertake. It seems to me, to reiterate the point, that the Executive agencies are necessarily in the technology assessment business, and that efforts should be directed to making their assessments better and to assessing their assessments more critically. Even so far as technology assessment for Congress is concerned, the Executive agencies will continue to provide a large part of the technology assessment available to Congress. They should not be the sole sources.

It is true that the Executive agencies have weaknesses as far as technology assessment is concerned. They may pay insufficient attention to technology because of powerful traditions, budgetary limitations or other reasons. The regulatory agencies, for example, have been notably deficient in both using and assessing technology. (This, incidentally, is an area within which the independence of the regulatory agencies decreases the effectiveness of any Executive effort at technology assessment. Other forms of influence and control will have to be exerted if the extensive and expanding responsibilities of the independent regulatory agencies for technology assessment are to be effectively exercised.

This seems, in fact, to be an aspect of technology assessment which needs further organized exploration.)

In addition, any assessment of the effects of technological development done by any agency is likely to be both biased and limited. The bias derives largely from the constituency of the various agencies. The Department of Agriculture cannot be expected to give as much weight to the general environmental hazards generated by use of pesticides as it does to the immediate increase in costs of producing agricultural products that would result from banning their use. Agencies represent interests, and this is a fact more to be recognized than deplored.

Agencies are also limited. They have specified jobs to do, and they tend to give less weight to matters that are not their central concern. This is probably a good rather than a bad thing, since the processes and actions of government would come to a complete stop if everybody did everything.

Finally, agencies tend to be set in their ways, and this trait contributes to a widespread inability and unwillingness to generate ideas, and to foresee and prescribe for things which may result in radical change—particularly changes which may reduce the power of the agency, tend to keep its budget down, force a change in the bureaucratic structure or bring different kinds of people into positions of power in the bureaucracy.

In short, the Executive agencies have inescapable and important responsibilities for technology assessment, but their capacity for assessment is limited by many factors and must be supplemented within the Executive branch.

#### IV Why Complete Centralization of Technological Assessment Would Be Either Ineffective or Harmful

One way that has been suggested as a means of augmenting the capacity of the Executive branch for assessment of technology is to establish a central agency which would assess all aspects of technology in a comprehensive logical manner, and publicize the findings. Such an agency might also have regulatory powers. One proposal for such a group would involve the creation of an analogue to the Council of Economic Advisers. However, the case against such a comprehensive centralized institutionalization of the function seems to me to be strong at this time.

Perhaps the most fundamental consideration is that all parts of the government are affected by technology, generate technology, or both. This country has followed the wise course of encouraging every major branch of government to consider how technological advances can improve the operation of government, how technology relevant to the missions of agencies can be improved outside the government and how problems generated by technology can be dealt with. This general policy has been by and large, successful and it should continue to be a central guide to the manner in which science and technology are organized in government. This is true of every aspect of the assessment of technology—how to encourage technological developments, how to set the conditions which will lead to the effective use of technology and how to foresee and guard against the untoward effects of technological change. Complete centralization of technology assessment could be as unwise and as impractical as centralization of technology.

The losses from centralized technology assessment would include degrading the quality of the performance of agencies, a decrease in legislative support for all aspects of science and technology, and a decoupling of technology assessment from the matrix of technical, economic and political realities in which it is most productively imbedded. Other untoward results would include unproductive duplication of effort, diffusion of authority, and a reduction in sense of responsibility of agencies for technology assessment.

One variation of centralized technology assessment—an agency with formal responsibility for a comprehensive examination of the future—is repugnant to me. It is in my judgment impossible to sustain a continuing, effective governmental organization that is completely future oriented. The leadership would be weak because the intellectual center for such speculation is not in government. The staff would be weak because of the weak leadership. The organization would have little influence on decisions because it would not be in the streams through which decisions flow. This would tend to frustrate the staff and, over the long run, to reduce the quality of the staff and of their product. Because of attention to the future, a degree of prophecy would be involved, and the President cannot give an exclusive franchise on the future to any single group. Assessment of the

future involves choices of values and goals and how to achieve them as well as technological forecasting. Choosing values and goals is the heart of the political process, and the widest possible participation is needed. Accordingly, a governmental agency concerned solely with the future would find a substantial part of its recommendations ignored or overridden.

## V What Are the Technology Assessment Functions of the Executive Office?

Some functions of the President relating to technology assessment can be performed effectively only if his Executive Office takes an active role. In some cases, as in stating the position of the President to Congress, the role may be almost an exclusive one. In others, as in stimulating research, the function may be widely shared. Precisely how active the Executive Office will be with respect to any function depends upon so many unpredictable circumstances that the relative importance of the various functions cannot be ranked.

### 1. *Initiate Proposals for Presidential Action*

Proposals arising from assessments of technology will come from the Congress, from organized groups, from individuals and from agencies of government. However, it is reasonable to assume that there will be needs for governmental action that will be met only through Presidential action. This action can be of various kinds: (a) formal or informal direction to Executive agencies; (b) proposals for legislation and steps intended to assure enactment; (c) allocation of resources—money and people—through the budget; (d) allocation and reallocation of responsibilities within the Executive agencies; (e) the power of appointment, and, (f) the use of the Presidency as a platform for education and persuasion.

Such things do not just happen. If they are to be done effectively there must be a mandate to someone or some organization in the Executive Office and enough people and money to do the jobs at hand.

## 2. *Surveillance of Problems and Opportunities Involving More Than One Agency*

Many technological problems and opportunities do not arise within single agencies. This is inherent in the relationship between technology and government. Science and technology develop rapidly and unpredictably. These developments often do not coincide with the functional governmental packages put together for other purposes and in response to other pressures. The fact that the impact of technology is often felt across rather than within governmental jurisdictions is inherent in relationship and will continue. The continuing exposure of new problems and opportunities that do not fit neatly into the bureaucratic structure means that devices for coping with the problem must be considered as a continuing problem of government.

The capacity of peer organizations in the U.S. Government to resolve conflicts or to solve problems by cooperative efforts which they initiate and carry out without external influence is strictly limited, and in inverse proportion to the significance of the problem. For example, HEW and the Department of Agriculture might cooperatively study and agree among themselves on the toxicity of DDT to various forms of life, but they could not be expected to agree on their own initiative on rules governing the use of DDT. Executive Office intervention was required.

Not only will agencies tend to disagree on many issues involving jurisdictional issues, philosophical views, political matters such as relationships with constituents and Congressional committees, but they will at times tacitly ignore such problems or fail to attack them vigorously. This may be because no single agency feels completely responsible for a given problem, or because agencies may feel that they have more to lose than they have to gain by acting aggressively in an area where other agencies may have an equal or greater claim to jurisdiction. A Secretary often has more than enough problems in his own bailiwick, and does not have to search out causes which can generate difficulties with fellow cabinet members and perhaps for the President. Therefore, there exists a continuing need not only for resolving conflicts among agencies arising out of zeal to claim

jurisdiction but also for identifying important problems to which the agencies are paying too little attention.

Surveillance of issues crossing departmental lines is most effective from the Executive Office.

### 3. *The Long Look*

Executive departments find it difficult to look ahead in any systematic manner that affects action at the top. The present tends to crowd out the future. Secretaries typically have more immediate problems than they can deal with without borrowing trouble from the future. Long term studies are done in departments, and they are sometimes influential. But the departments can not be depended upon as a mechanism to ensure that the major problems that seem to be developing are adequately studied and acted upon by the separate agencies. Not only is the future more remote than the present, but the long view generally results in a statement of problems and consideration of solutions that transcend agency lines. This decreases the incentives of individual agencies to look intensively and effectively into the future. Thus, the time element tends to degrade further the capacity of individual agencies to assess the future, and to emphasize the significance of a long look ahead as a central function.

### 4. *Initiation of Studies*

The Executive Office must depend primarily on other sources for the facts, analyses and judgments which enter into any aspect of technology assessment carried on by the Office. The problems are so numerous and complicated that any attempt to carry out a substantial part of the evaluation by or in the Executive Office is to me unthinkable. The problem is rather one of establishing the expectation that assessments will be carried out, and of using the power of the Executive branch to see that they are carried out. This includes the educational function of the President and his staff, establishment of Presidential task forces, mobilization of talent through such groups as PSAC and ad hoc presidential task forces, influence over legislation, the budget, and influence or control over the policies and actions of the Executive agencies. Taken together, these can constitute a powerful arsenal.

The National Science Foundation should have a particularly important role in supporting basic research relevant to the assessment of technology. The National Academy of Sciences Report, "Technology: Processes of Assessment and Choice" (July 1969) proposes (p. 97) that NSF have a Technology Assessment Division which would "by prior agreement with OST, commission specifically defined assessments under contract," and administer a grant program which would identify new problems and issues and stimulate research on them. The Director of the NSF testified effectively before Congress (November 18, 1969) as to the urgent need for basic research relating to technology assessment. NSF should also conduct, or commission, studies of the nature and effectiveness of technologies for assessment both within and outside government. In addition, NSF could sponsor conferences and symposia on assessment matters and prepare in-house position papers and policy recommendations. Indeed, the Director of OST has made these recommendations.<sup>1</sup> This relationship between OST and NSF indicates one of the major ways in which essential tasks relating to assessment can be done without involving OST in their administration.

The National Academy of Engineering report "A Study of Technology Assessment" (July 1969) said (p. 3) that "technology assessments should be produced in an environment free from political influence or predetermined bias." This is no doubt true of the particular kind of technology assessment advocated by the Academy. This kind of objective assessment flavored by the intuitive judgments of experienced people is needed by the Executive Office. However, more than such studies are required for effective performance of the Executive Office functions relating to technology assessment. The Executive Office is an arm of the President and the Presidency, and it must be useful to the President by posing problems and solutions in terms that help him. The question is always, "What should the President do?" and not "What does a technical assessment demonstrate?" In the wise words of William Carey, "The presidency is weak in policy analysis. It stands perched on a bottom-heavy administra-

<sup>1</sup> Statement on *Technology Assessment*, by Dr. Lee A. DuBridge before the Subcommittee on Science, Research, and Development of the House Committee on Science and Astronautics. December 11, 1969.

tive and operational system consisting of departments and agencies equipped with resources, clienteles, and historical baggage which continually threaten to out-think and outrun the tenuous policy management capabilities of the White House.”<sup>2</sup> Ultimately, studies of technology assessment should be woven into the broader process of policy assessment.

While this approach is the central one in the Executive Office, there will no doubt always be specific problems that have not for one reason or another been adequately explored. In this circumstance, some part of the Executive Office may find it useful to stimulate a study. This can be done through the PSAC mode of operation, by asking an Executive agency to conduct or finance a study, or by asking some individual or group, for example an industrial group, an academic scholar, a think tank, to undertake a study. What cannot be done is to depend as a mode of operation on Executive Office personnel to conduct studies themselves.

### *5. Provision of a Receptor for Ideas*

The effectiveness of technology assessment in the Executive branch depends heavily on the free flow of facts, ideas and judgments into government from outside. This is true at all levels of government, including the Executive Office. The problem arises not only in terms of whether there is someone to listen. There almost always is a person who will give a decent hearing to a position to propagate the facts or proposals, to get a serious hearing for them at the points where parts of decisions are made and actions are taken, or both.

The effectiveness of the listener—his influence or power, in effect—as well as his politeness and receptivity are in question. Effectiveness on such matter in the Executive Office depends upon such factors as proximity to the President, relations with the array of presidential advisors, relations with the Executive agencies and Congressional committees, persuasiveness with non-governmental groups and ease of access to their expertise and influence, and, least important, personal technical competence.

<sup>2</sup> William D. Carey. Presidential Staffing in the Sixties and Seventies. *Public Administration Review*. September–October, 1969.

When a problem becomes highly important to the President, the demands on the staff are such that some kind of organized effort, as contrasted with the work of an individual, is called for. As a generalization, the more important the problem (to the President, and not abstractly) the greater the degree of formality of the organization.

### *6. Sustain Effective Links with Congress*

Congress needs an improved technology assessment capability of its own, and this subject has been extensively discussed. However, Congress will always need a means of dealing with the President's office on matters involving technology assessment. The Executive branch will continue to carry out the laws passed by Congress, and this will continue to give the Executive branch larger areas of discretion in dealing with technology assessment. Congress will be increasingly interested in how this discretion is used. The President will continue to take the initiative in many areas of legislation. He has extensive discretionary powers to organize the Executive branch. His office is the point at which much administration policy is determined and he is always in form and often in fact ultimately responsible for the policies and actions of the departments. All of these things are obvious, but their reiteration in the context of technology assessment reinforces the point that the President must be involved, and that Congress must have an effective link to the Presidency.

In all probability, the need for this link would increase in proportion to the capacity of Congress to assess technology. The broader, more fundamental and long range the Congressional perspective, the more penetrating will be the questions directed to the Executive branch, and the more will they be answerable only in terms of the totality of the involvement of the Executive department and in terms of the policies of the President. The better informed and better organized Congress becomes, the greater the pressure to equip the Executive Office to deal competently with technology assessment.

In summary, as a problem becomes important on the National agenda, it is to the advantage of both the President and

the Congress to have an instrument specifically designed to deal with the problem both in the Executive Office and the Congress. The President needs the capacity to formulate and present an administration position to Congress and to respond to Congressional inquiries directed specifically to him or to his office.

Capacity to deal effectively with technology assessment in the Executive Office should be viewed not as competition with Congress in this area, but rather as a prerequisite to the Presidential responsiveness to the will of the people, as expressed through Congress, and to the exercise of the Constitutional powers and responsibilities of the President.

## VI. How Well Equipped Is the Executive Office for Technology Assessment?

Many parts of the Executive Office are and will continue to be concerned with technology assessment. The National Security Council, the Arms Control and Disarmament Agency, the Urban Affairs Council, the Office of Emergency Planning, and the Council of Economic Advisors must assess various technologies from various points of view. This will, of course, continue. These organizations should be no more inhibited in assessing technology than they are in using technology or in promoting the use of technology. However, jointly and severally they do not constitute an apparatus competent to deal with the pressures for technology assessment which now exist.

The Bureau of the Budget has a hand in practically everything that goes on in the Executive Office, primarily because of its budgetary functions. Accordingly, it is involved with technology assessment in various ways. However, BOB is not the appropriate place for technology assessment functions as such. The Bureau wisely tends to keep itself in the position of asking questions rather than proposing administrative actions subject to questioning. The recent PPBS fad would encompass aspects of technology assessment, but this is not a sufficient reason to suppose that BOB will or should assume significant technology assessment functions. In any event, the Bureau is already overextended. Moreover, it does not have and does not want either the staff expertise or the access to expertise required for effective performance in this area.

The Office of Science and Technology has several characteristics which make it a logical place to assess some aspects of technology:

1. It has the basic staff required for the assessment of technology.
2. It has the network of relationships in the academic, governmental and industrial world essential to identification of emerging problems, securing of advice and help from varied sources.
3. It has had substantial experience with technology assessment.

However, OST has weaknesses as an instrument for technology assessment:

1. OST does not have a large enough staff even to identify an adequate sample of emerging problems.
2. OST has no specific mandate to work on technology assessment, except in connection with the environment.
3. Many Committees of Congress, including the Subcommittee of the House Committee on Appropriations which controls the funds available to OST, do not recognize OST as the central point in the White House for technology assessment. (A specific, wide Presidential mandate to OST to work on technology assessment is more important as a means of legitimatizing efforts in this area in the eyes of Congress than it is to provide OST the necessary power to work within the Executive branch.) The primary consequences of this are to hold the OST budget below the level required if the necessary staff is to be added, and to leave too many committees of Congress with the impression that there is no place in the Executive Office that is concerned with technology assessment.
4. OST has been given so many assignments within and outside the fields of science and technology that major technology assessment responsibilities would unduly diffuse its mission.
5. Finally, and most important, the fact that OST is oriented toward science and technology is a deficiency as well as an asset in dealing with technology assessment. Economic, social and political factors are centrally important to many aspects of technology assessment. The process of dealing with the adverse effects of many technological changes is more a matter of deal-

ing with economic, political and sociological factors than of finding a technological remedy. OST is widely considered as overstressing the technological aspects of technological assessment, of being overly influenced by the scientific and technological establishment and of lacking the staff skills required for a comprehensive approach to technological assessment.

In summary, the Executive Office is not well enough equipped to deal with the assessment of technology. By "not well enough" I mean that there is a clear and present danger that a number of responsibilities of the President in this area will be poorly handled because his office is inadequately staffed and organized.

## VII. Environmental Quality and Technology Assessment

The degradation of the quality of the environment, largely as a consequence of undesirable and unanticipated effects of technological "advances," is clearly the area of technology assessment most significant on the national scene generally and in the Executive Office in particular. Other consequences of technological change may later become of equal or greater significance, but the environment will be the most important area of technological assessment for some time to come. Accordingly, the adjustments to deal with this problem, which can be only briefly sketched, are significant.

The rapidity with which the structural changes noted below followed the emergence of acute popular and Congressional concern over air and water pollution, and other forms of deterioration of the environment is significant. These changes lend further credence to the old axiom that changes generally follow rather than precede the emergence of a crisis.

### (a) *The Environmental Quality Council*

In connection with the evolution of the Executive Office structure for technology assessment, the establishment of the Environmental Quality Council in May 1969 was an important event. The salient facts are these:

(1) The Council was established by Executive Order (No. 11472, May 29, 1969), thus giving it direct Presidential sanction.

(2) The Council is a cabinet level group over which the President presides. (The members are the Vice President and the Secretaries of Agriculture, Commerce, HEW, HUD, Interior and Transportation, and the Director of the Bureau of the Budget, the Chairman of the Council of Economic Advisers, and the Executive Secretary of the Council for Urban Affairs are observers.)

(3) The Science Adviser to the President is the Executive Secretary of the Council and assists the President in directing the Council. OST provides staff and administrative support for the Council.

(4) The Council has broadly defined responsibilities. It "shall advise and assist the President with respect to environmental quality matters and shall perform such other related duties as the President may from time to time prescribe. In addition thereto, the Council is directed to:

- (a) Recommend measures to ensure that Federal policies and programs, including those for development and conservation of natural resources, take adequate account of environmental effects.
- (b) Review the adequacy of existing systems for monitoring and predicting environmental changes so as to achieve effective coverage and efficient use of facilities and other resources.
- (c) Foster cooperation between the Federal Government, State and local governments, and private organizations in environmental programs.
- (d) Seek advancement of scientific knowledge of changes in the environment and encourage the development of technology to prevent or minimize adverse effects that endanger man's health and well-being.
- (e) Stimulate public and private participation in programs and activities to protect against pollution of the Nation's air, water, and land and its living resources.
- (f) Encourage timely public disclosure by all levels of government and by private parties of plans that would affect the quality of environment.
- (g) Assure assessment of new and changing technologies for their potential effects on the environment.
- (h) Facilitate coordination among departments and agencies of the Federal Government in protecting and improving the environment.

In addition, the Council is responsible for the plans and actions of Federal agencies affecting outdoor recreation and natural beauty.

Finally, the Council is directed to assist the President in preparing periodic reports to the Congress on the matters covered by the Order.

These powers and responsibilities are quoted at length because they constituted the first specific, broad, concrete, continuing recognition of the significance of technology assessment in the Executive Office. Without unduly stretching the concept of the environment, certainly most of the areas of technology assessment that have been identified as most urgent could come under the purview of this Council.

However, there are other views of the motives for establishing the Council and of its effectiveness. In Congress there was a widespread impression that the Council was established to create the impression without the substance of Executive branch action, to keep initiative in the hands of the President and away from Congress, and to emphasize coordination rather than action and the resulting large expenditure. Certainly there was protracted jockeying for political position by the White House and Congress—notably Senators Jackson (D., Washington) and Muskie (D., Maine). Both of them introduced bills dealing with the protection of the quality of the environment.

#### (b) *The Statutory Council on Environmental Quality*<sup>1</sup>

On January 1, 1970, President Nixon signed the National Environmental Policy Act which created a three member Council of Environmental Advisers. This law had its origins in Congress, and particularly with Senator Jackson and Congressman Dingell (D., Michigan). Enactment of the measure over opposition from his office and from several Cabinet members, based on the view that the Environmental Quality Council was an adequate arrangement, bears witness to the rapidly rising political potency of the issue of deterioration of the environment and to the tendency of Congress to take the initiative on the issue. In terms of the President's office, the legislation indicates that he does not in fact have a completely free hand to organize his own staff, and that the structure of his Executive Office has important symbolic

<sup>1</sup> This section was added after the seminar.

political significance. Just what the relationship between the President's Cabinet committee and the new statutory Council will be—and whether the Cabinet committee will survive—remains to be seen.

The complicated minuet has not yet been played out. The President's statement on signing the bill said:

The environmental advisers will be assisted by a compact staff in keeping me thoroughly posted on current problems and advising me on how the Federal Government can act to solve them.

#### *Opposes Second Group*

In the near future I will forward to the Senate names of highly qualified individuals to help both the Cabinet and me in the critical decisions that will affect the quality of life in the United States for years to come. I will then take the necessary Executive action to reconstitute the Cabinet committee and its staff to avoid duplication of function.

On the latter point, I know that the Congress has before it a proposal to establish yet another staff organization to deal with environmental problems in the Executive Office of the President. I believe this would be a mistake.

No matter how pressing the problem, to overorganize, to over-staff or to compound the levels of review and advice seldom brings earlier or better results.

The last sentence of the statement was directed at Senator Muskie's proposal, embodied in the Water Quality Improvement Act of 1969 which has been passed by both houses of Congress, to set up an Office of Environmental Quality in the Executive Office. The sentiment of Congress on this specific issue, as contrasted with the traditional Congressional reluctance to provide adequately and directly for Presidential staff, is to ensure that the President's office is amply staffed, and compactly staffed. Moreover, it is reasonable to assume that Senator Muskie has a stake in seeing his name attached to a law designed to protect the quality of the environment.

## VIII. The Future

It now seems clear that restoration and protection of the quality of the environment will be a major national priority for the decade of the '70's and that numerous important political is-

sues will center around this problem. Just how broadly "the environment" will be interpreted by the new Council remains to be seen, but the probability is that the term will be widely rather than narrowly construed. If so, most of the technology assessment functions of the Executive Office will be carried on by the Council and its staff.

The precedent set by the establishment of the Council of Environmental Advisers suggests that in the Executive Office over the long run it may be more effective to set up a separate organization and also to define the task in terms of what is to be protected—the environment, the consumer, etc.—than in terms of technology. There are plausible reasons for thinking that this approach may be preferable:

(1) It is useful politically to have a symbol of action against a concrete danger. This is provided better by defining at least some parts of the task in terms such as "protection of the environment."

(2) Social, economic and political factors influence the development of hazards and they can promote or frustrate efforts to mitigate hazards. It may be more effective to organize in terms of problems to be attacked—threats to the environment, for example—than in terms of the technology involved. The former approach can facilitate an attack that encompasses but is not limited to technological factors.

(3) The range of tasks assigned to the Office of Science and Technology is so broad that assumption of responsibility for a set of problems requiring expertise in many areas not closely linked to technology—the legal and administrative framework within which the Federal, State and local governments approach problems of environmental protection and balancing the legitimate and incompatible claims of various interest groups—may unduly diffuse the efforts of OST and do less than full justice to the problems of the environment.

(4) Organization in terms of problems preserves flexibility. Organizational adjustments can be major or minor, depending on the problem, and the adjustments need not be irrevocable.

(5) A problem approach is "convergent." That is, existing knowledge and the contributions of existing organizations can be brought to bear sharply on the solution of a defined problem. This focusing of effort can be done well by the Executive Office. In contrast, an approach which stresses the assessment of technology initiated problems tends to be divergent and open ended.

The establishment of the new Council will certainly postpone for a long time, if not forever, the proposal that a major unit devoted to technology assessment as such be set up in the Executive Office of the President.

The fact that one cannot be clear and unequivocal in foretelling the structure of the Executive Office reflects its nature. It is designed to help the President, and the changing, unpredictable pattern of forces and pressures that assail the President are for the most part the same forces that make it impossible to be dogmatic about the structure of his office. Only one thing is clear to me. That is, any effective organization must be in the stream of power. If functions relating to technology assessment in the Executive Office are not linked to the power system in both the Executive and Legislative branches, they will be ineffectively performed. The new Council is linked to that system.

A Technology Assessment  
System for the  
Executive Branch

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