



*Annual Report
to the Congress*

20th Anniversary Edition

OFFICE OF TECHNOLOGY ASSESSMENT
FISCAL YEAR 1992

About the Report

The Office of Technology Assessment is an analytical support agency of the United States Congress. OTA works directly with and for the Committees of Congress, providing them with objective, thorough analysis of technological issues. This report to Congress is required under Sec. 11 of the Technology Assessment Act of 1972, Public Law 92-484. It describes the activities of the Office in Fiscal Year 1992 within the context of the legislative agenda of the 102d Congress and the events in the United States and the world during 1992.

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Chairman's Statement

As OTA approaches its 20th anniversary, it is appropriate to take some time to reflect on its progress. Having been associated with the agency since its founding, I have watched its steady progress from a tiny operation known only to Congress to an internationally known source of wisdom on technology and its use in society. I am also struck at how prescient, or lucky, we were to have established OTA in time to address the many technological questions that face society today.

It has been rewarding to see the breadth of OTA's involvement in congressional debates. The agency has tuned its work to better fit the needs of legislative deliberations. It has improved the quality of its work to the point where it has become a policy advisor to a wide range of Members of Congress and congressional committees. And, if sales of its publications and cites in the press and academic papers are any guide, OTA has also become a presence across our society.

It has been a pleasure to have been a part of this successful experiment in evaluating technological, social, and political issues. In the coming decade this work will be needed even more and I expect that OTA's successes will continue. Congress has the benefit and advantage of an organization that hires good people, solicits good advice, and distills technology to a form that most of us in Congress can understand.

I am honored to have chaired OTA's governing board for the past Congress, and I look forward to a continuing warm association.

CONGRESSMAN GEORGE E. BROWN, JR.

Vice Chairman's Statement

It has been my pleasure and privilege, once again, to serve as Vice Chairman of the Office of Technology Assessment's Board.

It is hard to believe, but OTA is 20 years old. Over this time period, OTA has matured. It is more efficient, better managed, and OTA researchers provide members of Congress with very good technical analysis and accurate facts critical to making good law based on sound policy. OTA has emerged as a key source of objective data in my judgment.

OTA is also an economical means for Congress to get objective data and analysis. OTA is a shared resource where multiple committees can request a single study to cut duplication and save the taxpayers money. I have said this before, but the cost-saving nature of OTA needs to be understood.

Of the many studies OTA has completed during the 102d Congress, the organization's work on U.S. oil import vulnerability was particularly valuable. I might add that report was done in conjunction with consideration of the national energy bill. All committees in the House and Senate benefited from working with facts from the same document. This is just one of many examples of highly useful information from OTA that congressmen and senators had at hand while contemplating various bills during the past Congress.

I believe that OTA is an important asset to the Congress and look forward to working with the board members and staff researchers at OTA in the future.

SENATOR TED STEVENS

TAAC Chairman's Statement

It has been a pleasure to serve as Chairman of OTA's Advisory Council for the past two years. I wish to give particular thanks to Josh Lederberg, who ably served as Vice Chairman and who now has been elected Chairman, and the other members of the council for a rewarding two years.

As OTA is ending its second decade, it has been fulfilling to see it develop into an internationally recognized analytical organization. The council's review of OTA has demonstrated that this is an entity that puts out quality work at a highly productive rate. The staff is top notch, beginning with the Director, Jack Gibbons.

I personally support the Congress' continued support of OTA, for it gets vastly more than its money's worth. OTA needs to maintain its current capability if the Congress is to have the best possible advice on complex technological and public policy issues. The coming decade will require that of Congress. Support of OTA is an essential first step.

CHASE N. PETERSON

Director's Statement

When OTA was founded by Congress 20 years ago, we had not yet experienced the first oil embargo, our nation was deeply embroiled in the Cold War, and we dominated world markets for technology. Times have changed and new concerns have emerged, but science and technology still compose the mother lode of new options for society. OTA's 20th anniversary seems an appropriate time to acknowledge the foresight of OTA's founders and the essential role of the Technology Assessment Board (TAB). In creating OTA, Congress secured that asset so highly prized by James Madison—the power that knowledge gives. The continuity of TAB's membership and their leadership positions in the Congress lend an unparalleled credibility to OTA. Accumulating wisdom about the substance and process of technology assessment has left OTA's staff well prepared to help Congress and the Nation face the issues of the next 20 years, from health to education, from economic competitiveness to environmental quality, and from national security to global sustainability.

A review of OTA's 20 years of service to the Congress reveals two hallmarks of success: (1) flexibility of response in meeting the clients' needs, and (2) unwavering commitment to sound, nonpartisan analysis. OTA works hard to adapt to rapid changes in congressional priorities and in the scientific and technological issues we address for Congress. Our methods—assessment of issues in their broadest context of impacts, involvement of experts and stakeholders in all stages—are the foundation. As a result, I believe the agency can remain on the cutting edge of science and technology, addressing new issues while constantly adding to its valuable storehouse of basic information for future congressional needs.

OTA's work reflects Congress's pursuit of broad, national goals, such as a strong economy, a healthy and educated population, international security, and environmental quality. OTA neither promotes nor disparages technologies, but strives to evaluate their impacts, for better or worse, expertly and without prejudice. In advising Congress on the potential effects of legislative action or inaction on technological developments, OTA seeks to sustain a reputation for accuracy, impartiality, and staunch objectivity.

Despite budgetary pressures that have kept OTA's staff and budget (in real dollars) unchanged for seven years, the Office has managed an increased workload through higher productivity. This can be explained in part by the determination, dedication, and growing experience of OTA staff; they continue to do more with less. The increasing sophistication of electronic tools such as computers and telecommunication devices has been invaluable in our efforts to stay ahead despite declining resources.

OTA's productivity also benefits from the openness of its process. Through advisory panels for each study and numerous other outreach mechanisms that encourage those outside the agency to review and critique its products and its process, OTA receives rapid feedback that helps insure that its limited funds are not frittered away on unproductive paths of research. Moreover, broad participation from the outset makes the process and the products more credible, and thus less susceptible to second guessing by individuals and organizations that may be affected by OTA's reports. This last factor increases OTA's accountability and credibility outside as well as within Congress. For instance, Executive Branch confidence in OTA's ability

to conduct a thorough evaluation of the issues surrounding DNA patenting recently led to their use of OTA's ongoing analysis to fulfill an international commitment of the U.S. Government. Our studies of post-Cold War economic conversion were not only used by Congress but also adopted in part by the Department of Defense. In addition, OTA's work on the potential impacts of telecommunications and information technologies on rural America has received widespread attention in other nations.

What of the next 20 years? Many issues now before Congress will profoundly affect the nation's future in the next two decades. Thus, in addressing issues for the 103d Congress, OTA will spend significant time in elucidating long-term impacts—such as transitional effects in energy systems and impacts of demographic and environmental change—especially in terms of how current and emerging technologies create policy choices.

What of the present? Robert Louis Stevenson observed that "the obscurest epoch is today," noting that humans see the distant past and future more clearly than the present. No sure formula calculates the post-Cold War trajectory for the U.S. The now anachronistic role for the U.S. of global peacekeeper against the "forces of darkness" must swiftly evolve to a new order, adapt to new opportunities. The spread of advanced technology has globalized the marketplace and revolutionized economies. These technologies, more than weapons, helped disintegrate the centrally planned economies and are forcing major changes in the U.S. and elsewhere. OTA can help Congress better understand many of the choices that are arising in this transition.

What should be done about nuclear weapons? Many nations now view them as a less than effective investment. Countries like South Africa, Brazil, and Argentina have abandoned nuclear weapons development in favor of investments in improved economic strength. Yet proliferation of nuclear and other weapons of mass destruction remains a deeply troubling problem. Discoveries about Iraq's capabilities give us pause, and questions about who really controls weapons located in the former Soviet states (and intentions regarding their use or sale) add to our concerns. Technology—for verification and monitoring, or for disposal—will play a critical role in addressing these problems.

How can the U.S. maintain and regain economic competitiveness? Some critical civilian technologies now lag behind those of other countries. Our physical infrastructure suffers from lack of investment, and our people are less functionally literate than they were a half century ago. Rising health care, defense, and debt have consumed so much public capital that little is left for innovation. Yet, development and application of innovative technologies will largely determine the economic success needed to deal with these problems.

Can high-quality health care be delivered at affordable cost? The U.S. now spends about 12 percent of GNP on health care. The average for other industrial countries runs about 8 percent for comparable health outcomes. Yet, this Nation leads in new technology for health care, and OTA can help Congress devise ways to direct technology toward reducing the cost of staying or becoming healthy.

Are environmental quality and economic security compatible goals? Environmental challenges and opportunities abound and all are deeply connected to technology—as cause, cure, and preventative. The U.S. has addressed environmental problems more aggressively than any other nation, but still has a long way to go. For example, the U.S. releases a fourth of all CO₂ emitted around the planet. OTA has helped Congress recognize that energy efficiency,

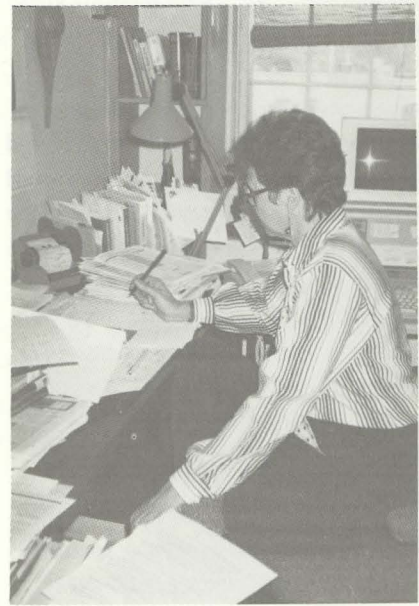
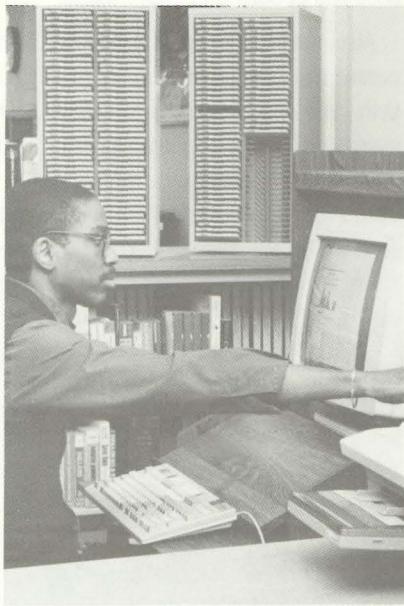
new energy sources, green manufacturing, and a variety of other advanced technologies hold much promise for a bright environmental and economic future. However, progress will require a productive public/private partnership as well as new levels of cooperation, including technology transfer, between the industrialized nations and the developing nations.

Will our children and grandchildren inherit a healthy planet? As understanding increases about the importance of intergenerational equity, and the implications of continued exponential growth of population and consumption, people around the planet are asking more and more about sustainable futures and how to achieve them. This question will likely be addressed with much greater seriousness in the decade ahead. Sustainability is sensitively dependent upon the status and use of technology, so any sound policy or plan—and indeed even a clear understanding of the question—will have to rest upon technically sophisticated analysis.

At OTA, on its 20th Anniversary, we see burgeoning and complex issues coming before the Congress and the American people—issues which will need thoughtful, careful analysis. It would seem that if OTA hadn't been created in 1972, the case for its existence would be even greater in 1992! We look forward to continuing to serve as a shared resource for the Senate and the House, the Majority and the Minority to help *frame* issues, to help *inform* the debate, and to provide helpful options for *resolution* of the issues.

JOHN H. GIBBONS

Organization and Operations



Created by the Technology Assessment Act of 1972 [86 Stat. 797], OTA is an agency of the legislative branch of the Federal Government (a copy of the Act is found on p. 42). OTA's primary function is to provide congressional committees with studies that identify the positive and negative consequences of policy alternatives affecting the uses of technology.

OTA assists Congress by identifying existing or probable impacts of technology; alternative technological methods and management programs for implementing specific actions (estimating and comparing the impacts of alternatives); and areas where additional research or data collection is required to provide support for assessments. OTA presents its completed analyses to the appropriate legislative authorities and, whenever possible, undertakes whatever additional related activities are necessary.

The Act provides for a bipartisan Technology Assessment Board, a director, and other employees and consultants necessary for the Office to conduct its work. The congressional board is made up of six Senators, appointed by the President pro tempore of the Senate, and six Representatives, appointed by the Speaker of the House, evenly divided by party. In 1992, Rep. George E. Brown, Jr. (D-California) and Sen. Ted Stevens (R-Alaska) served as the Chairman and Vice Chairman, respectively, of the board. The two posts alternate between the Senate and the House with each Congress. The board members from each Chamber select their respective officer.

The congressional board sets the policies of the Office and is the sole and exclusive body governing OTA. The board appoints the director, who is OTA's chief executive officer and a nonvoting member of the board.

The Act also calls for a Technology Assessment Advisory Council composed of 10 public members eminent in scientific and technological fields, the Comptroller General of the United States, and the Director of the Congressional Research Service of the Library of Congress. The advisory council advises the board and the director on such matters as the balance, comprehensiveness, and quality of OTA's work, and OTA's non-governmental resources.

Requests for OTA assessments may be initiated by:

- the chairman of any standing, special, select or joint committee of Congress, acting alone, at the request of the ranking minority member, or at the request of a majority of the committee members;
- the OTA board; or
- the OTA director, in consultation with the board.

The authorization of specific assessment projects and the allocation of funds for their performance are the responsibilities of the OTA board.

The analytical work of the Office is organized into three divisions, each headed by an assistant director. They encompass assessments grouped in the areas of energy and materials; international security and commerce; industry, technology, and employment; biological applications; food and renewable resources; health; oceans and environment; science, education, and transportation; and telecommunication and computing technologies.

Staff of the Operations Division support the analytical work of the Office. The Operations Division is divided into three main sections. Contracts and Building Services and the Budget and Finance Office provides

administrative support. Information Management and Publishing Services includes Telecommunication and Information Systems, the Information Center, Publishing, and Information Marketing. Personnel Services includes the Personnel Office. The Division provides the research staff and management with a variety of services and technologies vital to successful functioning of the Office. The Information Center also provides public access to the full collection of OTA publications, including an online index, and the Publications Unit within Information Marketing handles public dissemination of OTA publications.

The Congressional and Public Affairs Office assists in coordinating OTA's work with various committees of the House and Senate, by initiating communications between OTA management and staff, and the Technology Assessment Board and the Technology Assessment Advisory Council. OTA publications are widely disseminated on Capitol Hill and are publicly available. (General Information on OTA and availability of OTA publications is listed on the inside back cover.)

FY1992 ACTIVITIES

Technological capabilities will determine, in large part, whether America leads or follows other economically and scientifically powerful nations in the decades following the end of the Cold War. Now 20 years old, OTA has proven its ability to assist Congress' deliberations on the Nation's vision of the future and to help link the science and technology enterprise to achieve national goals.

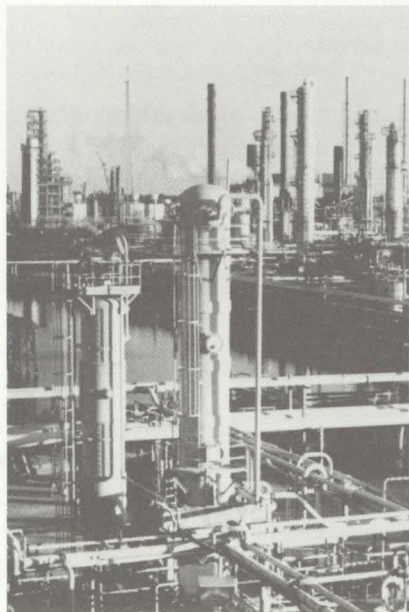
The accurately ever-arching priority of citizens and elected officials is to restore the resilience and competitiveness of the U.S. economy. OTA studies such as *Competing Economies: America, Europe, and the Pacific Rim*, *U.S.-Mexico Trade: Pulling Together or Pulling Apart?*, and *After the Cold War: Living*

with Lower Defense Spending help put the Nation's economic problems in perspective and provide important technological guidance and options for policy makers.

Also, the 103d Congress undoubtedly will pursue legislation to ensure improvements in the quality of life and human health. OTA's assessments on education, e.g., *Technologies for Adult Literacy*, and health, e.g., *Cystic Fibrosis and DNA Tests* and *Special Care Units for People with Alzheimer's and Other Dementias*, establish a sound basis for the debates.

As Congress addresses the critical goals of personal, national, and international security, OTA's studies ranging from *Police Body Armor Standards and Testing to Building Future Security: Strategies for Restructuring the Defense Technology and Industrial Base* will provide essential grounding in basic technical knowledge and opportunities. Improved environmental quality and sustainable use of natural resources likely will remain high on Congress' agenda, and the breadth and depth of OTA's publications in this area—*Green Products By Design: Choices for a Cleaner Environment*, *Trade and Environment: Conflicts and Opportunities*, *Building Energy Efficiency*, *Forest Service Planning: Accommodating Uses, Producing Outputs, and Sustaining Ecosystems*, and *A New Technological Era for American Agriculture*, to name just a few—should serve members and committees well.

Energy, Materials, and International Security Division



The Energy Program was formed at OTA in 1974, and the Materials Program started up in 1975. During an agency restructuring in 1978, Director Russell Peterson formed three divisions out of the nine programs then existing at OTA. The Energy Program and the Materials Program were joined by a third program—International Security and Commerce—to form one of the divisions.

Annual strategic planning was first undertaken in the division in the late '70s and continued to the present. Such planning is used to determine the work congressional committees, in consultation with OTA analysts, believe will be needed in the 12 to 24 months ahead. In the early '80s it became apparent that the shift in priorities of the Congress and the Nation placed greater attention on trade and competitiveness and less on energy issues than in the late '70s.

To reflect the changes in the Nation's needs, the division reorganized in 1983. It is comprised of the Energy and Materials (E&M) Program, the International Security and Commerce (ISC) Program, and the Industry, Technology and Employment (ITE) Program. ITE, formed from the Materials Program, built on the industry knowledge already developed there, and concentrated its analysis on technology and competitiveness, trade, and the quality of the workforce.

In its 18-year history, the E&M program has analyzed many aspects of energy issues and the potential of new materials development, ranging from ceramics and composites to superconductors. In recent years the program has considered more of the international dimensions of those issues which affect this country—e.g., Energy in Developing Countries, completed in 1992.

ISC has concentrated on arms control, strategic defense, weapons trade and proliferation, and space research and development. Most recently, work on defense conversion has helped redefine the defense industrial base required to support future force structure needs.

ITE has analyzed numerous industries and their competitive posture in a global economy. The training and retraining needs of the U.S. workforce also has been studied at length. In addition, the program has analyzed the technology and trade policies of the United States' global competitor nations. Most recent work has concentrated on the need to address the conversion of assets in the U.S. dedicated to defense, which must now be productively refocused to the peacetime economy of the U.S.

This division will continue to address some of the most difficult technology-driven issues facing the U.S. Congress, the Nation and the global community of nations.

Monitoring Limits on Sea-Launched Cruise Missiles, September 1992

Requested by:
Senate Foreign Relations Committee
House Foreign Affairs Committee

U.S.-Mexico Trade: Pulling Together or Pulling Apart?, September 1992

Requested by:
House Committee on Education and Labor

Green Products by Design: Choices for a Cleaner Environment, September 1992

Requested by:
House Committee on Science, Space, and Technology
House Committee on Energy and Commerce

Police Body Armor Standards and Testing: Volume I, August 1992

Requested by:
Senate Committee on the Judiciary
House Committee on the Judiciary
House Committee on Rules

Police Body Armor Standards and Testing: Volume II Appendixes, August 1992

Requested by:
Senate Committee on the Judiciary
House Committee on the Judiciary
House Committee on Rules

Building Future Security: Strategies for Restructuring the Defense Technology and Industrial Base, July 1992

Requested by:
House Committee on Government Operations
Senate Committee on Labor and Human Resources
Senate Committee on Commerce, Science, and Transportation
Senate Committee on Armed Services

Retiring Old Cars: Programs to Save Gasoline and Reduce Emissions, July 1992

Requested by:
House Committee on Energy and Commerce

Lessons in Restructuring Defense Industry: The French Experience—Background Paper, June 1992

Requested by:
House Committee on Government Operations
Senate Committee on Labor and Human Resources
Senate Committee on Commerce, Science, and Transportation
Senate Committee on Armed Services

Fueling Development: Providing Energy Services for Developing Countries, May 1992

Requested by:
House Committee on Energy and Commerce
House Committee on Foreign Affairs
House Committee on Banking, Finance and Urban Affairs
House Select Committee on Hunger
Congressional Competitiveness Caucus
Senate Committee on Governmental Affairs
Senate Committee on Environment and Public Works

Trade and Environment: Conflicts and Opportunities—Background Paper, May 1992

Requested by:
House Committee on Foreign Affairs
House Committee on Energy and Commerce
Senate Committee on Finance

Building Energy Efficiency, May 1992

Requested by:
House Committee on Energy and Commerce
House Committee on Science, Space, and Technology
Senate Committee on Governmental Affairs
Senate Committee on Energy and Natural Resources

After the Cold War: Living with Lower Defense Spending, February 1992

Requested by:
House Committee on Interior and Insular Affairs
House Committee on Government Operations
Senate Committee on Labor and Human Resources
Senate Committee on Commerce, Science, and Transportation
Senate Committee on Foreign Relations
Senate Committee on Armed Services

Performance Standards for the Food Stamp Employment and Training Program, February 1992

Mandated Study

Technology Against Terrorism: Structuring Security, January 1992

Requested by:
Senate Committee on Governmental Affairs
Senate Committee on Commerce, Science, and Transportation

Competing Economies: America, Europe, and the Pacific Rim, November 1991

Requested by:
Senate Committee on Finance

American Military Power: Future Needs, Future Choices—Background Paper, October 1991

Requested by:
House Committee on Government Operations
Senate Committee on Commerce, Science, and Transportation
Senate Committee on Foreign Relations
Senate Committee on Armed Services

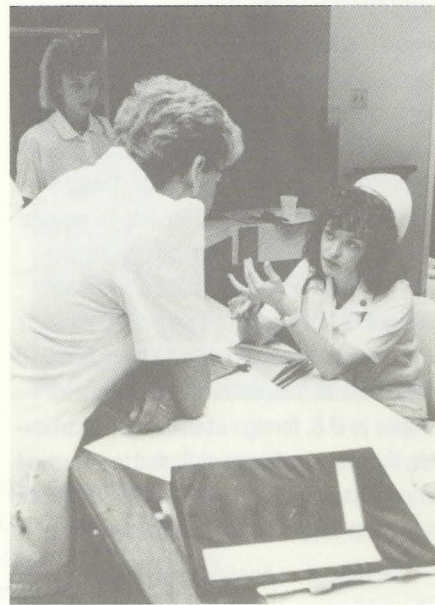
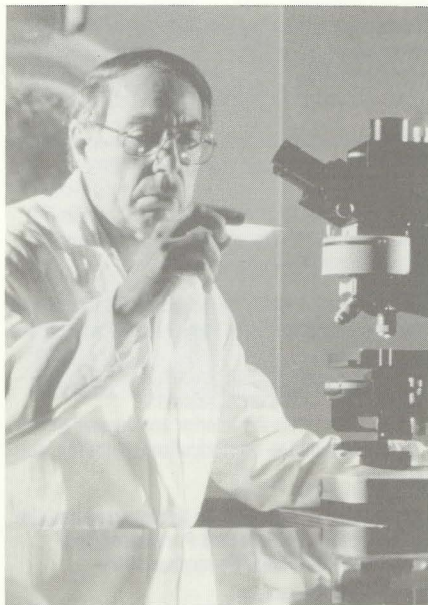
Improving Automobile Fuel Economy: New Standards, New Approaches, October 1991

Requested by:
Senate Committee on Energy and Natural Resources

U.S. Oil Import Vulnerability: The Technical Replacement Capability, October 1991

Requested by:
House Committee on Energy and Commerce
Senate Committee on Energy and Natural Resources

Health and Life Sciences Division



OTA's first assessment was in the field of health. This subject matter, together with food, has formed the initial and continuing core of work for the Health and Life Sciences Division. Like OTA itself, however, the division has, over the 20-year life of the institution, evolved and reflected in a dynamic way the changing times in the U.S. and the changing interests and needs of the Congress. It is the result of sensitivity not just to the Congress and congressional committees as a whole, but to OTA's Technology Assessment Board and to the input of the Technology Assessment Advisory Council and the many public and private institutions and persons who form the wide network of advisors to and participants in the OTA process.

The Health Program was the first of the division's three programs to be formed. As noted above, it issued OTA's first report, on the subject of bioequivalency of drugs. The program soon began a series of efforts which defined the state of the art of health technology assessment. They remain valuable and valid documents even today. A long series of case studies of specific health technologies was issued during the time the program turned to more health policy oriented work on the structure and functions of the health system, keeping the focus on technology. More recently, the program has explored timely issues in AIDS, among other things, and most recently has undertaken a series of efforts to provide the Congress with help in resolving the problems associated with health care and long-term health care reform.

The Food and Renewable Resources Program has developed and pursued, from its initial work on food, several major subject areas. The program has had a continuing interest in basic agriculture and has explored the farm structure and function and technologies important to understanding American agriculture and to congressional consideration of successive Farm Bills. Integral to this work, moreover, and leading to reports on related subjects, is the program's emphasis on sustainability and on renewable resources. The expertise generated through study of these issues has also been required for review of international problems and issues in U.S. foreign assistance. In particular, the program has contributed to improved understanding of agricultural resource problems and support opportunities in Africa.

The Biological Applications Program, only about 10 years old, was formed to examine the important new fields of biotechnology, genetics, and molecular biology, as they present important policy issues in science, health care, and commerce. An important and lengthy series of reports has comprehensively defined the issues in biotechnology for policy makers from 10 years ago to the present. The program also turned to important impacts of modern biology, from the latest advances in neuroscience to DNA fingerprinting to timely women's issues such as hormone replacement therapy for menopause. Most recently, the program has begun to identify and respond to congressional concerns about occupational and environmental risk analyses and the biology underlying such activities.

We cannot predict with certainty what Congress and the Nation will require from our programs in the future, but if history is any guide, we can rely on the need to be ready to change and evolve to meet the new, and exciting challenges ahead.

Special Care Units for People with Alzheimer's and Other Dementias, September 1992

Requested by:
Senate Special Committee on Aging
House Select Committee on Aging

The Biology of Mental Disorders, September 1992

Requested by:
House Committee on Energy and Commerce
House Committee on Veterans Affairs
House Committee on Science, Space, and Technology
House Committee on Appropriations
Senate Committee on Commerce, Science, and Transportation

Endorsed by: Senate Committee on Labor and Human Resources

Difficult-to-Reuse Needles for the Prevention of HIV Infection Among Injecting Drug Users, September 1992

Requested by:
House Committee on Small Business

Does Health Insurance Make a Difference?, September 1992

Requested by:
Senate Committee on Labor and Human Resources

Cystic Fibrosis and DNA Tests: Implications of Carrier Screening, August 1992

Requested by:
House Committee on Science, Space, and Technology
House Committee on Energy and Commerce

A New Technological Era for American Agriculture, August 1992

Requested by:
Senate Committee on Agriculture, Nutrition, and Forestry
House Committee on Agriculture

CDC's Case Definition of AIDS: Implications of Proposed Revisions, June 1992

Requested by:
House Committee on Government Operations

Identifying and Controlling Pulmonary Toxicants—Background Paper, June 1992

Requested by:
Senate Committee on Environment and Public Works

Combined Summaries: Technologies to Sustain Tropical Forest Resources and Biological Diversity, May 1992 (Reprint)

Requested by:
House Committee on Foreign Affairs
House Committee on Interior and Insular Affairs
Senate Committee on Environment and Public Works
Senate Committee on Energy and Natural Resources

Home Drug Infusion Therapy Under Medicare, May 1992

Requested by:
Senate Committee on Finance

Evaluation of the Oregon Medicaid Proposal, May 1992

Requested by:
House Committee on Energy and Commerce

The Menopause, Hormone Therapy and Women's Health—Background Paper, May 1992

Requested by:
Congressional Caucus for Women's Issues
Senators Brock Adams and Barbara Mikulski
Representative Henry Waxman

Forest Service Planning: Accommodating Uses, Producing Outputs, and Sustaining Ecosystems, March 1992

Requested by:
House Committee on Agriculture
House Committee on Interior and Insular Affairs
Senate Committee on Agriculture, Nutrition, and Forestry

Adolescent Health, Vol. II: Background and the Effectiveness of Selected Prevention and Treatment Services, November 1991

Requested by:
House Committee on Interior and Insular Affairs
Senate Committee on Appropriations
Senate Select Committee on Indian Affairs
Senate Committee on Commerce, Science, and Transportation
Senate Committee on Finance
Senate Committee on Small Business
Senate Committee on Labor and Human Resources
Senate Committee on Veterans Affairs

HIV in the Health Care Workplace, November 1991

Requested by:
Senate Committee on Labor and Human Resources

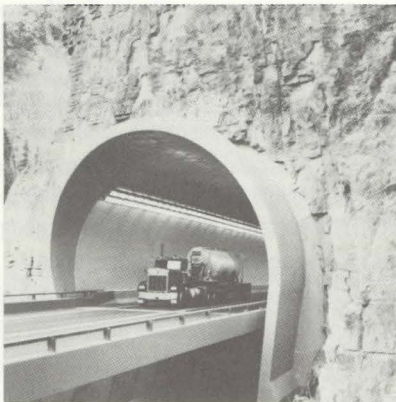
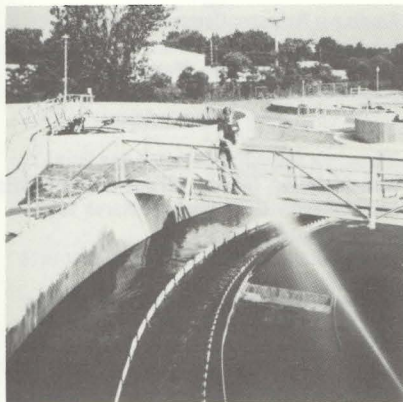
Medical Monitoring and Screening in the Workplace: Results of a Survey—Background Paper, October 1991

Requested by:
House Committee on Energy and Commerce
House Committee on Science, Space, and Technology
Senate Committee on Commerce, Science, and Transportation
Senate Committee on Labor and Human Resources

Biotechnology in a Global Economy, October 1991

Requested by:
House Committee on Science, Space, and Technology
Senate Committee on Agriculture, Nutrition, and Forestry
Senate Committee on Governmental Affairs
Senate Committee on the Budget

Science, Information, and Natural Resources Division



As Congress' analytical needs have evolved, so has OTA's Division of Science, Information, and Natural Resources: broad expertise in environmental, educational, and computing technologies and policy was developed to complement the division's original and continuing responsibilities of oceans, transportation, science policy, and communications. Specialized expertise was acquired in areas as diverse as space, information privacy and security, illegal drug trafficking, intellectual property, and some aspects of economic development, mineral resources, and weapons dismantlement.

The program now called Oceans and Environment was established in 1974 when the Senate's National Ocean Policy Study spearheaded a number of ocean-related initiatives.

Its November 1976 study on offshore energy systems was one of the early models for technology assessments done by OTA. From this and other early studies, OTA learned that heavy reliance on large outside contractors was inappropriate for the kinds of studies expected by the Congress. OTA's work style quickly adjusted, with the integration task falling mainly on inhouse staff, who, in turn, used workshops, small contracts, and panels to gather the needed data for the assessments. OTA's fellowship program, started in 1977, provided the environmental talent that enabled the program to support Congress in such new and important areas as acid rain, urban ozone, global warming, solid waste, medical waste, and marine pollution. Two of the six fellows who helped in this effort continue as permanent employees today.

In March 1989, when the Exxon Valdez tanker accident resulted in the largest oil spill in U.S. history, several Congressional committees asked for OTA assistance. Findings from an assessment on oil transportation by tankers produced by the Oceans Program in 1975 were still valid and pertinent. The approaches outlined for reducing pollution and improving tanker safety in this report were essentially those adopted in new tanker safety legislation passed by the Congress.

The Telecommunication and Computing Technologies Program (TCT) has focused on three general areas: (1) Improving government communication and information services; (2) preserving individual rights of privacy, security, intellectual property, freedom of expression, and equitable access; and (3) enhancing the competitive position of America through the deployment of communication and information technologies. TCT's reports balance the perspectives of the user community with those of the industry. This insistence that users' views are as important as those of manufacturers, vendors, and technology promoters is what sets these reports apart.

Regarding government services, TCT has assisted the Congress in trying to improve the performance of the Internal Revenue Service, the Postal Service, Veterans Administration hospitals, and the National Crime Information Center. TCT is currently assessing the potential of future technology to deliver government services to the public more efficiently at less cost. From the emergence of the personal computer and networking as major forces in the information revolution in the early 1980s, TCT has dealt with the threat of modern communication technologies to privacy, security, and human dignity: the prospect of electronic surveillance by the government and private employers has been considered from several perspectives; security has become more important as business and personal transactions are increasingly carried out electronically, and has weighed heavily in several studies; and the sanctity of personal electronic medical records and the value of such information to those who would abuse it has become a major concern that is under study.

Telecommunication and computing technologies are changing the global economic structure. OTA has tracked the evolution of this development from the early years of computers through the structural changes of the telecommunication industry resulting from the AT&T divestiture and deregulation. TCT has assessed the impact of this evolution on several areas of business and commerce, e.g., global and domestic stock markets, financial services, and health services. Wireless telecommunications—e.g., cellular telephone and personal communication devices—are the wave of the future. TCT has evaluated these technologies in the context of service delivery and global economic development as a function of technology, public policy, and international commerce. Supercomputers have become an integral part of research, design, and engineering, and are the database servers of the future in a networked society. Computing technolo-

gies, especially high-performance computers and computing, have been the subject of studies that considered their role in economic competitiveness. Electronic information systems present major challenges to the constitutional protection of intellectual property, which have been the focus of several studies by TCT.

OTA's program on Science, Education, and Transportation (SET), with roots going back to the agency's origins, has done pioneering work in recognizing the roles of state and local governments in carrying out federally defined policy. SET has integrated transportation/infrastructure policy work into single documents that encompass all modes and all levels of governance. Its 1986 study on transportation of hazardous materials was the first study to cover all hazardous materials and all modes of transport, including nuclear. This was thought to be an impossible analytical task, but SET's perseverance changed the way the policy community thinks about the issue. Similarly, its 1991 study on infrastructure combined both transportation and environmental components in terms of technology, finance, and management.

By 1980, OTA had recognized the importance of education as a critical aspect of our national needs, and the value of technology to enhance education for all learners, and began to explore these issues. Added to the SET agenda in 1985, education quickly became a prime focus for study. The education documents have been the most widely distributed category of OTA studies.

SET's 1991 report on federally funded research is a seminal document for a new approach to science policy. The framework established in this study has affected congressional and Executive thinking on the funding and management of basic research.

Disposal of Chemical Weapons: Alternative Technologies, June 1992
Requested by:
Senator Wendell Ford

Finding a Balance: Computer Software, Intellectual Property and the Challenge of Technological Change, May 1992
Requested by:
House Committee on the Judiciary

Managing Industrial Solid Wastes from Manufacturing, Mining, Oil and Gas Production, and Utility Coal Combustion, March 1992
Requested by:
House Committee on Energy and Commerce

Alaskan Water for California?: The Subsea Pipeline Option, March 1992
Requested by:
Representative George Brown
Representative Edward Roybal
Representative Don Young

Global Standards: Building Blocks for the Future, March 1992
Requested by:
House Committee on Science, Space, and Technology

Testing in American Schools: Asking the Right Questions, February 1992
Requested by:
House Committee on Education and Labor
Senate Committee on Labor and Human Resources

The 1992 World Administrative Radio Conference: The U.S. International Spectrum Policy, November 1991
Requested by:
House Committee on Energy and Commerce
Senate Committee on Commerce, Science, and Transportation

The FBI Fingerprint Identification Automation Program: Issues & Options, November 1991
Requested by:
House Committee on the Judiciary

Miniaturization Technologies, November 1991
Requested by:
House Committee on Science, Space, and Technology

Dioxin Treatment Technologies, November 1991
Requested by:
Representative Richard Gephardt

New Ways: Tiltrotor Aircraft and Magnetically Levitated Vehicles, October 1991
Requested by:
House Committee on Appropriations

Technology Assessment Abroad

The concept of technology assessment was developed in Congress two decades ago, and for many years OTA was the only significant practitioner of the discipline. In recent years, however, there has been growing interest abroad, particularly in Europe. Offices have been created in France (1983), the Netherlands (1986), Denmark (1986), the European Community (1987), the United Kingdom (1988), and Germany (1989). Related activities are taking place in Sweden and Austria, and interest has been expressed in Russia, China, Japan, Taiwan, Switzerland, Hungary, and Mexico.

OTA has been a model for these groups. All six operating offices do the same kind of objective, societal impact analysis and policy analysis that characterizes OTA's work. All have been designed to serve parliaments, not ministries. Many delegations have visited OTA, and OTA reports serve as guidelines for methodology and databases.

There also are some differences. All European offices are quite small. Collectively, they have less than half the staff and budget of OTA. In France, the members of parliament themselves serve as analysts and authors of reports, and the office has a staff of only three. The parliamentary form of government also imposes different operating conditions because parliament and ministries generally are more integrated than are Congress and the executive departments. In several countries, including Denmark and the Netherlands, the offices serve a broader constituency than just Parliament, seeing themselves as conduits for communication among political leaders, technology proponents, and society as a whole.

Until very recently, the relationship between OTA and the European offices was largely one-sided; the Europeans would visit here and use our reports. This has started to evolve into a more equal partnership, a change which should prove very valuable for OTA. Our counterparts are sources of information and contacts. Eventually, joint projects may be envisioned. Such cooperation will be of increasing importance as the international component of OTA studies grows along with the increase of international trade and the recognition of common problems. In addition, cooperation on methodology may provide new techniques and perspectives. One difficulty is that while most of our colleagues abroad speak English, they write their reports in their native language. Until more are translated, report exchange will continue to be largely one-sided.

Recent international interactions have promoted cooperation in technology assessment. The European offices have established a network for the exchange of information and have held three conferences, the latest in November 1992 on "Technology & Democracy" in Copenhagen. The United Nations organized a workshop on "Technology Assessment for Developing Countries," hosted by OTA in November 1991. The Organization for Economic Co-operation and Development and the Austrian Academy of Sciences organized a "Symposium on Technology Assessment" in 1989. OTA has participated in most of these activities.

OTA welcomes the development of peer agencies and new technology assessment initiatives abroad. A growing international trend toward thoughtful policy analysis of science and technology issues will benefit everyone and provide stimulating new opportunities for cooperation.

Work in Progress at Year-End

More than 40 projects were in progress during fiscal year 1992. In addition, 18 new studies were undertaken.

This section lists the titles of assessments underway or in press, as of September 30, 1992. For a full description of these projects, please refer to the current "Assessment Activities," OTA-PC-105. This pamphlet is available from OTA by calling the Publication's Request Line (202) 224-8996.

ENERGY, MATERIALS, AND INTERNATIONAL SECURITY DIVISION

Energy and Materials Program

- U.S. energy efficiency: past trends and future opportunities
- Renewable energy technology: research development and commercial prospects
- Aging nuclear powerplants: life attainment, license extension and decommissioning
- Energy and environmental technology transfer to Central and Eastern Europe

Industry, Technology, and Employment Program

- Technology opportunities for economic conversion
- American industry and the environment: implications for trade and U.S. competitiveness
- Multinational corporations and U.S. technology base

International Security and Commerce Program

- Proliferation of weapons of mass destruction
- Earth observation systems
- Assessing the potential integration of defense and civilian technology and manufacturing

HEALTH AND LIFE SCIENCES DIVISION

Biological Applications Program

- Research on health risk assessment
- Technologies for understanding the root causes of substance abuse and addiction
- OSHA's selection of control technologies and assessments of their impacts and costs
- The human genome project and patenting human DNA sequences

Food and Renewable Resources Program

- Alternative coca reduction strategies in the Andean region
- Non-indigenous species in the United States
- Science and technology, renewable resources and international development

Health Program

- Monitoring of mandated veteran studies
- Drug labeling in developing countries
- Government policies and pharmaceutical research and development
- Technology, insurance and the health care system
- Federal response to AIDS: congressional issues
- Defensive medicine and the use of medical technology
- International differences in health technology, services and economics
- Tuberculosis: research, technological and policy issues
- Policy issues in the prevention and treatment of osteoporosis
- Prospects for health technology assessment
- Appointment and monitoring of the Prospective Payment Assessment Commission and the Physician Payment Review Commission

SCIENCE, INFORMATION, AND NATURAL RESOURCES DIVISION

Oceans and Environment Program

- Systems at risk from climate change
- Managing nuclear materials from warheads

Science, Education, and Transportation Program

- Technologies for adult literacy
 - Intercity bus access for individuals with disabilities
 - Federal aviation research and technology
 - Vocational education assessment instruments
- #### *Telecommunication and Computing Technologies Program*
- Federal telecommunications for the 21st century: transforming the delivery of government services
 - 1992 World Administrative Radio Conference outcomes and implications
 - International telecommunications networks and U.S.-European trade in services
 - Privacy rights in computerized medical information
 - The electronic enterprise: opportunities for American business and industry

Technology Assessment Advisory Council

The Technology Assessment Advisory Council (TAAC) was established by OTA's statute, and members are appointed by OTA's Congressional Technology Assessment Board (TAB). The Council advises TAB and the Director on issues and other matters related to science, technology, and technology assessment.

MEMBERS

CHASE N. PETERSON, *Chairman*

Dr. Peterson was President of the University of Utah. He practiced medicine at the Salt Lake Clinic and taught at the LDS Hospital and University of Utah Medical School until his appointment as Dean of Admissions and Financial Aid at Harvard College. There he also served as Vice President for Alumni Affairs and Development. Dr. Peterson returned to the University of Utah in 1978 as Vice President for Health Sciences, and has served as University President since 1983.

JOSHUA LEDERBERG, *Vice Chairman*

Dr. Lederberg was President of Rockefeller University, New York. He is the former Chairman of the Department of Genetics at Stanford University School of Medicine. He is a member of the National Academy of Sciences and is a Nobel Laureate in Physiology and Medicine.

LEWIS M. BRANSCOMB

Dr. Branscomb is the Albert Pratt Public Service Professor at Harvard's John F. Kennedy School of Government. He is a former executive of International Business Machines. Prior to joining IBM, he was the Director of the National Bureau of Standards.

MICHEL T. HALBOUTY

Mr. Halbouty is Chairman of the Board of Michel T. Halbouty Energy Co. in Houston, Texas. Prior to establishing his company, he was a chief geologist and petroleum engineer with Glenn H. McCarthy and also with Yount-Lee Oil Co.

NEIL E. HARL

Dr. Harl is the Charles F. Curtiss Distinguished Professor of Economics at Iowa State University, where he has served on the faculty since 1964.

JAMES HUNT

Dr. Hunt is the Chancellor of the University of Tennessee Health Science Center in Memphis. He previously served as the Dean of Medicine for the University and as Chairman of the Department of Medicine at the Mayo Clinic.

HENRY KOFFLER

Dr. Koffler is President and Professor of Biochemistry and Microbiology at the University of Arizona. He previously served on the faculties of the University of Massachusetts, University of Minnesota, and Purdue University.

MAX LENNON

Dr. Lennon is President of Clemson University. He previously served on the faculties of Ohio State University (Vice-President for Agricultural Administration and Executive Dean for Agriculture, Home Economics and Natural Resources), University of Missouri, and Texas Tech University.

JOHN F.M. SIMS

Dr. Sims is Vice President for Marketing for Usibelli Coal Mine, Inc. He previously served as Director of the Office of Mineral Development with the Alaska Department of Commerce and Economic Development. Dr. Sims also taught Geological Engineering at the University of Alaska-Fairbanks.

MARINA v.N. WHITMAN

Dr. Whitman is Vice President and Group Executive for Public Affairs Staffs Group at General Motors Corporation. She also served as Vice President and Chief Economist at General Motors. Prior to joining General Motors she taught at the University of Pittsburgh.

STATUTORY MEMBERS

CHARLES A. BOWSHER

Mr. Bowsher is Comptroller General of the United States and Director of the U. S. General Accounting Office.

JOSEPH E. ROSS

Mr. Ross is Director of the Congressional Research Service, U. S. Library of Congress.

OTA Staff

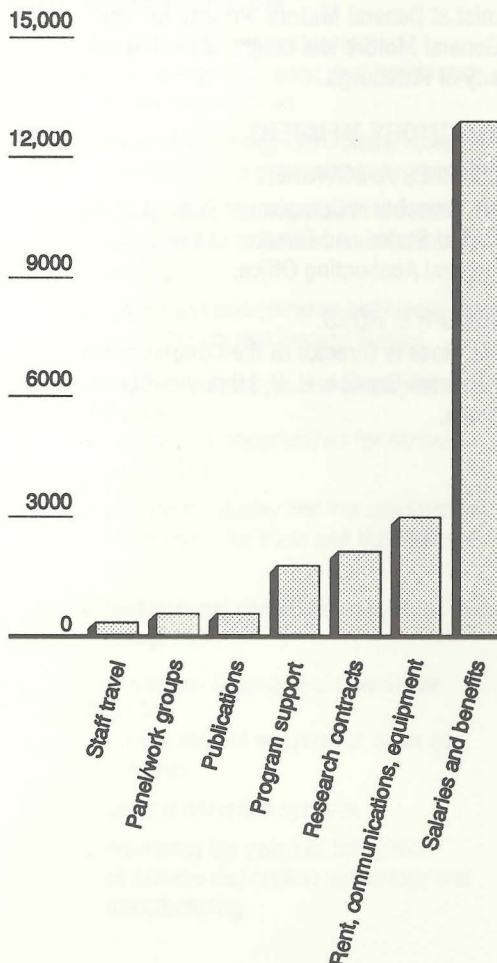
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 Holly Gwin, *General Counsel*
 Barbara Murphy, *Division Assistant*
 Gilda Squire, *Secretary*

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 Jean McDonald, *Director, Press Affairs*
 Barbara Ketchum, *Administrative Secretary*
 Karen Piccione, *Administrative Assistant*
 Eugenia Ufholz, *Congressional Affairs Officer*

Fiscal year '92 breakdown (in thousands)



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 Henry Kelly, *Senior Associate*

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 Paul Komor, *Senior Analyst*
 Karen Larsen, *Senior Analyst*
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 Steven Plotkin, *Senior Associate*
 Robin Roy, *Senior Analyst*

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 Carol Guntow, *Office Administrator*
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 Gerald Epstein, *Senior Analyst*
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 Ray Williamson, *Senior Associate*

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 Kerry Kemp, *Analyst*

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 Eileen Murphy, *PC Specialist*
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 Leah Wolfe, *Analyst*

SCIENCE, INFORMATION, AND NATURAL RESOURCES DIVISION

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Christopher Clary, *Division Assistant*

Oceans and Environment Program

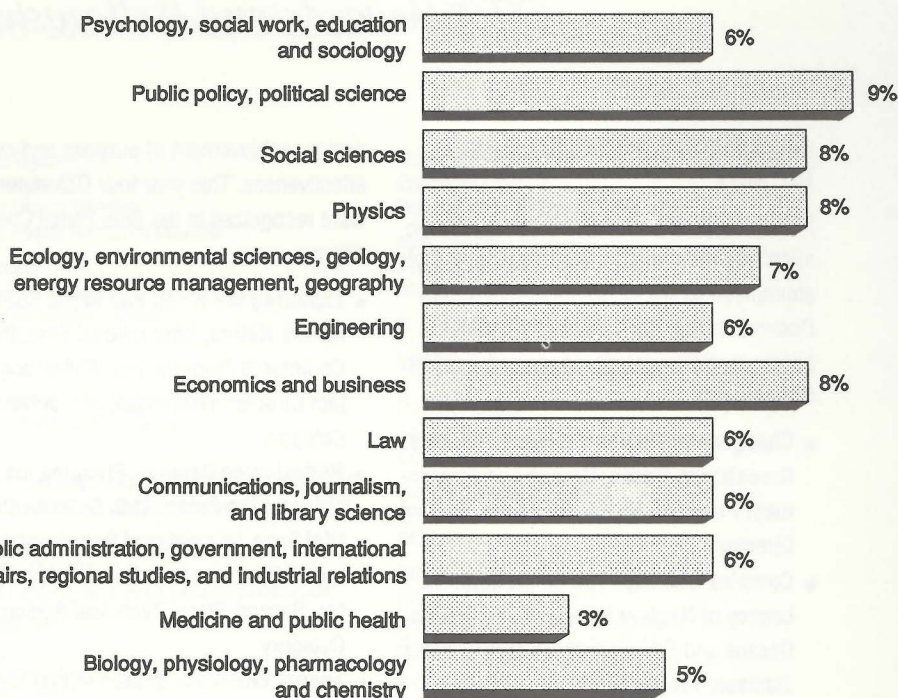
Robert Niblock, *Program Manager*
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Robert Friedman, *Senior Associate*
Emilia Govan, *Senior Analyst*
Joan Harn, *Senior Analyst*
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German Reyes, *Analyst*
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David Wye, *Analyst*
Jo Anne Young, *Secretary*



OTA is composed of 143 permanent staff members, of which 75 percent are analytical and 25 percent are administrative.

OPERATIONS DIVISION

Bart McGarry, *Operations Manager*

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Carolyn Datcher, *Senior Accounting Technician*
Frances Hemingway, *Senior Finance Analyst*
Carrie Miller, *Accounting Technician*

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Karen Cox, *Contracts Officer*

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Martha Dexter, *Director, Information
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Sylvester Boyd, *Manager, Telecommunications
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Larry Bond, *Senior Systems Analyst*
Mary Beth Breitbach, *Systems Support Analyst*
Brenda Hahn, *Systems Support Analyst*
Philip Jackson, *Senior Systems Integrator*

Information Center

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Debra McCurry, *Assistant Manager, Information
Services*
Linda Trout, *Librarian*
Keith West, *Information Technician*

Personnel Services

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Lola Crow, *Payroll/Benefits Officer*
Laura Ellinger, *Administrative Assistant*
Gail Turner, *Personnel Specialist*

Medical Services

Janet Hammond

OTA Awards and Fellowship Programs

OTA REPORTS RECOGNIZED AS NOTABLE

In May 1992, the American Library Association's Government Documents Round Table announced its list of Notable Government Documents for 1991. Of the 21 Federal government documents recognized, five were OTA reports:

- **Changing by Degrees: Steps to Reduce Greenhouse Gases**, Oceans and Environment Program, Rosina Bierbaum, Project Director
- **Complex Cleanup: The Environmental Legacy of Nuclear Weapons Production**, Oceans and Environment Program, Peter Johnson, Project Director
- **Genetic Monitoring and Screening in the Workplace**, Biological Applications Program, Margaret Anderson, Project Director
- **Global Arms Trade**, International Security and Commerce Program, Bill Keller, Project Director
- **Health Care in Rural America**, Health Program, Elaine Power, Project Director

The Government Documents Round Table selects those documents considered to be the best of the government information sources produced in the previous year. These documents "expand our knowledge, enhance the quality of life, and/or contribute to an understanding of government."

BLUE PENCIL AWARDS

The National Association of Government Communicators conducts the Blue Pencil Competition as an annual recognition of outstanding government communications projects and producers. Entries are judged on writing, editorial content, layout and

design, achievement of purpose and cost effectiveness. This year four OTA reports were recognized in the Blue Pencil Competition:

- **Exploring the Moon and Mars: Choices for the Nation**, International Security and Commerce Program, Ray Williamson, Project Director, First Place, Monographs Category
- **Redesigning Defense: Planning the Transition to the Future U.S. Defense Industrial Base**, International Security and Commerce Program, Jack Nunn, Project Director, Second Place, Technical Audience Category
- **Energy Efficiency in the Federal Government: Government by Good Example?**, Energy and Materials Program, Robin Roy, Project Director, Third Place, Monographs Category
- **HIV in the Health Care Workplace**, Health Program, Maria Hewitt/Michael Gluck, Project Directors, Honorable Mention, Monographs Category

THE MORRIS K. UDALL FELLOWSHIP PROGRAM

The Udall Fellowship Program is awarded to up to six individuals each year for a one-year appointment at OTA. It was established in 1991 by the Technology Assessment Board in honor of Morris K. Udall, retired congressman from Arizona who served 30 years in the House of Representatives and 18 years on the Technology Assessment Board. Qualified candidates must demonstrate exceptional ability in areas needed in OTA's work, such as the physical or biological sciences, engineering, law, economics, environmental and social sciences, and public policy. Candidates must have significant experience in technical fields or management or have completed research at the doctoral level.

FELLOW, 1991-92

Carol Edwards, Science, Education, and Transportation Program

FELLOWS, 1992-93

Lucian Hughes, Industry, Technology and Employment Program

Thomas Vischi, Biological Applications Program

CONGRESSIONAL FELLOWSHIP IN HEALTH POLICY

The Milbank Memorial Fund and the Office of Technology Assessment established the Congressional Fellowship in Health Policy in 1992 to be served at OTA beginning in September 1992. The program seeks candidates with substantial training and experience in research and strong interest in health policy. The fellowship provides an opportunity for an individual of proven ability and considerable promise to work with OTA researchers to assist Congress in its deliberations of science and technology issues affecting our Nation's health policy and to gain a better understanding of the ways in which Congress establishes national policy related to these issues.

The Fund and OTA invited applications from individuals who have demonstrated ability in research on issues of health policy. Applicants should have doctorates in the social sciences or related areas or have terminal scientific or professional degrees and considerable training in research using the policy sciences.

FELLOW, 1992-93

Sean Tunis, Health Program

*Advisors and Panel Members**

Energy and Materials Program

AGING NUCLEAR POWER PLANTS ADVISORY PANEL

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School of Civil and Environmental Engineering
Cornell University

Peter Bradford
Commissioner
New York Public Service Commission

Richard W. Devane
President
Framatome USA, Inc.

William Dornsife
Acting Director
Bureau of Radiation Protection
Pennsylvania Department of Environmental
Resources

S. David Freeman
General Manager
Sacramento Municipal Utility District

Michael W. Golay
Professor
Department of Nuclear Engineering
Massachusetts Institute of Technology

Jerome Goldberg
President
Nuclear Division
Florida Power and Light Company

Howard Hiller
Vice President
Salomon Brothers

Leonard Hyman
First Vice President
Merrill Lynch Capital Markets

James Joosten
Principal Administrator
OECD/Nuclear Energy Agency

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Senior Research Engineer
Waste Systems Department
Battelle, Pacific Northwest Lab

Martin J. Pasqualetti
Professor
Department of Geography
Arizona State University

Robert Pollard
Senior Nuclear Safety Engineer
Union of Concerned Scientists

Daniel W. Reicher
Senior Attorney
Natural Resources Defense Council

Cas Robinson
Commissioner
Georgia Public Service Commission

John J. Taylor
Vice President
Nuclear Power Division
Electric Power Research Institute

H.B. Tucker
Senior Vice President
Nuclear Generation Group
Duke Power Co.

Nat Woodson
Vice President and General Manager
Westinghouse Electric Corp.

ENERGY, TECHNOLOGY AND THE ENVIRONMENT IN DEVELOPING COUNTRIES ADVISORY PANEL

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Executive Director
Critical Languages & Area Studies Consortium

Irma Adelman
Professor
Department of Agriculture and Resource
Economics
University of California, Berkeley

Jeffrey Anderson
Director
Comparative Country Analysis
Institute of International Finance

Edward S. Ayensu
President
Pan-African Union for Science & Technology

Gerald Barnes
Manager
International Regulations Department
General Motors

Mohamed T. El-Ashry
Director of Environment
World Bank

Erik Helland-Hansen
Principal Technical Advisor
Bureau of Program Policy & Evaluation
United Nations Development Programme

Carl N. Hodges
Director
Environmental Research Laboratory
University of Arizona

Donald Jost
Manager
Technology Department
Sun Refining and Marketing

Amory Lovins
Director
Research Department
Rocky Mountain Institute

Mohan Munasinghe
Chief
Environment Department
World Bank

Henry Norman
Executive Director
Volunteers in Technical Assistance

Mrs. Waafas Oforu-Amaah
Project Director
World Wide Network

R.K. Pachauri
Director
TATA Energy Research Institute

D. Lou Peoples
Senior Vice President
RCG/Hagler, Bailly, Inc.

Gabriel Sanchez-Sierra
Executive Director
OLADE

Kirk R. Smith
Program Coordinator
Risk, Resources, & Development
Environment & Policy Institute

Irving Snyder
Director
Research and Development
Dow Chemical Co.

Thomas B. Stoel, Jr.
Private Consultant

Jack W. Wilkinson
Chief Economist & Director
International Economics
Sun Refining & Marketing Co.

Robert H. Williams
Senior Research Scientist
Center for Energy and Environmental Studies
Princeton University

Lu Yingzhong
Professor
Professional Analysis Inc.

Montague Yudelman
Senior Fellow
World Wildlife Fund and
The Conservation Foundation

Eugene Zeltmann
Manager
Trade & Industry Associations
General Electric Co.

GREEN PRODUCTS BY DESIGN: CHOICES FOR A CLEANER ENVIRONMENT ADVISORY PANEL

Indira Nair, *Chairman*
Associate Head
Department of Engineering and Public Policy
Carnegie Mellon University

*Affiliations are at time of appointment to panel or workshop.

Frank van den Akker
Head
Department of Environmental Technology
Ministry of Housing, Physical Planning,
and the Environment
The Netherlands

Harvey Alter
Manager
Resources Policy Department
U.S. Chamber of Commerce

David Chittick
Vice President
Environment and Safety Engineering
AT&T

Michael G. DeCata
Manager
Materials Management
GE Plastics

Michael A. Gallo
Professor
Environmental and Community Medicine
University of Medicine & Dentistry of
New Jersey

Robert Garino
Director
Commodities
Institute of Scrap Recycling Industries

Gil Gavlin
President
Gavlin Associates, Inc.

Denis Hayes
Chair and CEO
(member Energy Foundation)
Green Seal

Kenneth Hunnibell
Professor and Head
Industrial Design Department
Rhode Island School of Design

Richard L. Klimisch
Executive Director
Environmental Activities Staff
General Motors Corporation

Michael H. Levin
Counsel
Nixon, Hargrave, Devans & Doyle

Stewart Mosberg
Senior Director of Client Services
Walter Dorwin Teague Associates, Inc.

Thomas Rattray
Associate Director
Product Packaging Development
Procter & Gamble Co.

Clifford S. Russell
Director
Vanderbilt Institute for Public Policy Studies
Vanderbilt University

Mary T. Sheil
Senior Policy Analyst
Office of Policy Planning
New Jersey Department of Environmental
Protection and Energy

T.S. Sudarshan
Technical Director
Materials Modifications, Inc.

Don Theissen
Director
Corporate Product Responsibility
3M Co.

Jeanne Wirka
Private Consultant

Dennis A. Yao
Commissioner
Federal Trade Commission

**RENEWABLE ENERGY TECHNOLOGY: RESEARCH,
DEVELOPMENT AND COMMERCIAL PROSPECTS
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President
Resources for the Future

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**WORKSHOP ON CYSTIC FIBROSIS, GENETIC
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**WORKSHOP ON BIOLOGICAL CONTROL OF COCA
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**HIV TRANSMISSION IN THE HEALTH CARE
WORKPLACE WORKSHOP**

**HOME DRUG INFUSION THERAPY UNDER
MEDICARE WORKSHOP**

DEFINITION OF AIDS WORKSHOP

DRUG LABELING WORKSHOP

**RELATIONSHIPS AMONG INSURANCE
COVERAGE, ACCESS TO SERVICES AND HEALTH
OUTCOMES: CRITICAL REVIEW AND SYNTHESIS
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WORKSHOP ON AGRICULTURE: COPING WITH A CLIMATE CHANGE

WORKSHOP ON ALASKA TO CALIFORNIA SUBSEA WATER PIPELINE

WORKSHOP ON DEVELOPMENT OF ALTERNATIVE TECHNOLOGIES FOR CHEMICAL WEAPONS DISPOSAL

WORKSHOP ON DIOXIN TREATMENT TECHNOLOGIES

WORKSHOP ON LONG-TERM STORAGE AND DISPOSITION OF PLUTONIUM FROM WARHEADS

WORKSHOP ON MANAGING FORESTS UNDER A CHANGING CLIMATE

WORKSHOP ON MANAGING WESTERN LANDS IN A CHANGING CLIMATE

WORKSHOP ON MANAGING WETLANDS IN A CHANGING CLIMATE

WORKSHOP ON WATER RESOURCES AND CLIMATE CHANGE



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**WORKSHOP ON BUILDING AN ACCESSIBLE
SYSTEM FOR INTERCITY BUS ACCESS FOR
INDIVIDUALS WITH DISABILITIES**

**WORKSHOP ON COOPERATION AND
COORDINATION FOR FEDERAL AVIATION
RESEARCH AND TECHNOLOGY**

**WORKSHOP ON FEDERAL SAFETY
REQUIREMENTS AND TECHNOLOGY IN A GLOBAL
AVIATION SYSTEM**

**WORKSHOP ON INTERCITY BUS ACCESS FOR
INDIVIDUALS WITH DISABILITIES**

**WORKSHOP ON NEW VISION FOR VIDEO USE OF
CABLE, SATELLITE, BROADCAST, AND
INTERACTIVE SYSTEMS FOR LITERACY AND
LEARNING**

**WORKSHOP ON RESEARCH, TECHNOLOGY AND
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**WORKSHOP ON MINIATURIZATION
TECHNOLOGIES FOR THE FUTURE**

OTA Act

Public Law 92-484
92d Congress, H.R. 10243
October 13, 1972
An Act

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.

Technology
Assessment Act
of 1972.

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 "Technology Assessment Act of 1972."

FINDINGS AND DECLARATION OF PURPOSE

SEC. 2. The Congress hereby finds and declares that:

(a) As technology continues to change and expand rapidly, its applications are—

- (1) large and growing in scale; and
- (2) increasingly extensive, pervasive, and critical in their impact, beneficial and adverse, on the natural and social environment.

(b) Therefore, it is essential that, to the fullest extent possible, the consequences of technological applications be anticipated, understood, and considered in determination of public policy on existing and emerging national problems.

(c) The Congress further finds that:

- (1) the Federal agencies presently responsible directly to the Congress are not designed to provide the legislative branch with adequate and timely information, independently developed, relating to the potential impact of technological applications, and
- (2) the present mechanisms of the Congress do not and are not designed to provide the legislative branch with such information.

(d) Accordingly, it is necessary for the Congress to—

- (1) equip itself with new and effective means for securing competent, unbiased information concerning the physical, biological, economic, social, and political effects of such applications; and
- (2) utilize this information, whenever appropriate, as one factor in the legislative assessment of matters pending before the Congress, particularly in those instances where the Federal Government may be called upon to consider support for, or management or regulation of, technological applications.

ESTABLISHMENT OF THE OFFICE OF TECHNOLOGY ASSESSMENT

SEC. 3. (a) In accordance with the findings and declaration of purpose in section 2, there is hereby created the Office of Technology Assessment (hereinafter referred to as the "Office") which shall be within and responsible to the legislative branch of the Government.

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

Technology
Assessment
Board.

(c) The basic function of the Office shall be to provide early indications of the probable beneficial and adverse impacts of the applications of technology and to develop other coordinate information which may assist the Congress. In carrying out such function, the Office shall:

Duties.

- (1) identify existing or probable impacts of technology or technological programs;
- (2) where possible, ascertain cause-and-effect relationships;
- (3) identify alternative technological methods of implementing specific programs;
- (4) identify alternative programs for achieving requisite goals;
- (5) make estimates and comparisons of the impacts of alternative methods and programs;
- (6) present findings of completed analyses to the appropriate legislative authorities;
- (7) identify areas where additional research or data collection is required to provide adequate support for the assessments and estimates described in paragraph (1) through (5) of this subsection; and
- (8) undertake such additional associated activities as the appropriate authorities specified under subsection (d) may direct.

(d) Assessment activities undertaken by the Office may be initiated upon the request of:

- (1) the chairman of any standing, special, or select committee of either House of the Congress, or of any joint committee of the Congress, acting for himself or at the request of the ranking minority member or a majority of the committee members;
- (2) the Board; or
- (3) the Director, in consultation with the Board.

(e) Assessments made by the Office, including information, surveys, studies, reports, and findings related thereto, shall be made available to the initiating committee or other appropriate committees of the Congress. In addition, any such information, surveys, studies, reports, and findings produced by the Office may be made available to the public except where—

Information,
availability.

- (1) to do so would violate security statutes; or
- (2) the Board considers it necessary or advisable to withhold such information in accordance with one or more of the numbered paragraphs in section 552(b) of title 5, United States Code.

81 Stat. 54.

TECHNOLOGY ASSESSMENT BOARD

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

Membership.

- (1) six Members of the Senate, appointed by the President pro tempore of the Senate, three from the majority party and three from the minority party;
- (2) six Members of the House of Representatives appointed by the Speaker of the House of Representatives, three from the majority party and three from the minority party; and

(3) the Director, who shall not be a voting member.

Vacancies.

(b) Vacancies in the membership of the Board shall not affect the power of the remaining members to execute the functions of the Board and shall be filled in the same manner as in the case of the original appointment.

Chairman and vice chairman.

(c) The Board shall select a chairman and a vice chairman from among its members at the beginning of each Congress. The vice chairman shall act in the place and stead of the chairman in the absence of the chairman. The chairmanship and the vice chairmanship shall alternate between the Senate and the House of Representatives with each Congress. The chairman during each even-numbered Congress shall be selected by the Members of the House of Representatives on the Board from among their number. The vice chairman during each Congress shall be chosen in the same manner from that House of Congress other than the House of Congress of which the chairman is a Member.

Meetings.

(d) The Board is authorized to sit and act at such places and times during the sessions, recesses, and adjourned periods of Congress, and upon a vote of a majority of its

Subpoena.

members, to require by subpoena or otherwise the attendance of such witnesses and the production of such books, papers, and documents, to administer such oaths and affirmations, to take such testimony, to procure such printing and binding, and to make such expenditures, as it deems advisable. The Board may make such rules respecting its organization and procedures as it deems necessary, except that no recommendation shall be reported from the Board unless a majority of the Board assent. Subpoenas may be issued over the signature of the chairman of the Board or of any voting member designated by him or by the Board, and may be served by such person or persons as may be designated by such chairman or member. The chairman of the Board or any voting member thereof may administer oaths or affirmations to witnesses.

DIRECTOR AND DEPUTY DIRECTOR

Appointment.

SEC. 5. (a) The Director of the Office of Technology Assessment shall be appointed by the Board and shall serve for a term of six years unless sooner removed by the Board. He shall receive basic pay at the rate provided for level III of the Executive Schedule under section 5314 of title 5, United States Code.

Compensation.

83 Stat. 863.

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

(c) The Director may appoint with the approval of the Board, a Deputy Director who shall perform such functions as the Director may prescribe and who shall be Acting Director during the absence or incapacity of the Director or in the event of a vacancy in the office of Director. The Deputy Director shall receive basic pay at the rate provided for level IV of the Executive Schedule under section 5315 of title 5, United States Code.

Employment restriction.

(d) Neither the Director nor the Deputy Director shall engage in any other business, vocation, or employment than that of serving as such Director or Deputy Director, as the case may be; nor shall the Director or Deputy Director, except with the approval of the Board, hold any office in, or act in any capacity for, any organization, agency, or institution with which the Office makes any contract or other arrangement under this Act.

AUTHORITY OF THE OFFICE

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

(1) make full use of competent personnel and organizations outside the Office, public or private, and form special ad hoc task forces or make other arrangements when appropriate;

(2) enter into contracts or other arrangements as may be necessary for the conduct of the work of the Office with any agency or instrumentality of the United States, with any State, territory, or possession or any political subdivision thereof, or with any person, firm, association, corporation, or educational institution, with or without reimbursement, without performance or other bonds, and without regard to section 3709 of the Revised Statutes (41 U.S.C. 5);

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

(4) accept and utilize the services of voluntary and uncompensated personnel necessary for the conduct of the work of the Office and provide transportation and subsistence as authorized by section 5703 of title 5, United States Code, for persons serving without compensation;

(5) acquire by purchase, lease, loan, or gift, and hold and dispose of by sale, lease, or loan, real and personal property of all kinds necessary for or resulting from the exercise of authority granted by this Act; and

(6) prescribe such rules and regulations as it deems necessary governing the operation and organization of the Office.

(b) Contractors and other parties entering into contracts and other arrangements under this section which involve costs to the Government shall maintain such books and related records as will facilitate an effective audit in such detail and in such manner as shall be prescribed by the Office, and such books and records (and related documents and papers) shall be available to the Office and the Comptroller General of the United States, or any of their duly authorized representatives, for the purpose of audit and examination.

(c) The Office, in carrying out the provisions of this Act, shall not, itself, operate any laboratories, pilot plants, or test facilities.

(d) The Office is authorized to secure directly from any executive department or agency information, suggestions, estimates, statistics, and technical assistance for the purpose of carrying out its functions under this Act. Each such executive department or agency shall furnish the information, suggestions, estimates, statistics, and technical assistance directly to the Office upon its request.

(e) On request of the Office, the head of any executive department or agency may detail, with or without reimbursement, any of its personnel to assist the Office in carrying out its functions under this Act.

(f) The Director shall, in accordance with such policies as the Board shall prescribe, appoint and fix the compensation of such personnel as may be necessary to carry out the provisions of this Act.

Contracts.

80 Stat. 499;
83 Stat. 190.

Recordkeeping.

Agency
cooperation.

Personnel
detail.

**ESTABLISHMENT OF THE TECHNOLOGY ASSESSMENT
ADVISORY COUNCIL**

Membership.

SEC. 7. (a) The Office shall establish a Technology Assessment Advisory Council (hereinafter referred to as the "Council"). The Council shall be composed of the following twelve members:

- (1) ten members from the public, to be appointed by the Board, who shall be persons eminent in one or more fields of the physical, biological, or social sciences or engineering or experienced in the administration of technological activities, or who may be judged qualified on the basis of contributions made to educational or public activities;
- (2) the Comptroller General; and
- (3) the Director of the Congressional Research Service of the Library of Congress.

Duties.

(b) The Council, upon request by the Board, shall—

- (1) review and make recommendations to the Board on activities undertaken by the Office or on the initiation thereof in accordance with section 3(d);
- (2) review and make recommendations to the Board on the findings of any assessment made by or for the Office; and
- (3) undertake such additional related tasks as the Board may direct.

**Chairman and
Vice Chairman**

(c) The Council, by majority vote, shall elect from its members appointed under subsection (a)(1) of this section a Chairman and a Vice Chairman, who shall serve for such time and under such conditions as the Council may prescribe. In the absence of the Chairman, or in the event of his incapacity, the Vice Chairman shall act as Chairman.

**Term of
office.**

(d) The term of office of each member of the Council appointed under subsection (a)(1) shall be four years except that any such member appointed to fill a vacancy occurring prior to the expiration of the term for which his predecessor was appointed shall be appointed for the remainder of such term. No person shall be appointed a member of the Council under subsection (a)(1) more than twice. Terms of the members appointed under subsection (a)(1) shall be staggered so as to establish a rotating membership according to such method as the Board may devise.

Travel expenses.

(e)(1) The members of the Council other than those appointed under subsection (a)(1) shall receive no pay for their services as members of the Council, but shall be allowed necessary travel expenses (or, in the alternative, mileage for use of privately owned vehicles and per diem in lieu of subsistence at not to exceed the rate prescribed in sections 5702 and 5704 of title 5, United States Code), and other necessary expenses incurred by them in the performance of duties vested in the Council, without regard to the provisions of subchapter 1 of chapter 57 and section 5731 of title 5, United States Code, and regulations promulgated thereunder.

80 Stat. 498;
83 Stat. 190.
5 USC 5701.

Compensation.

(2) The members of the Council appointed under subsection (a)(1) shall receive compensation for each day engaged in the actual performance of duties vested in the Council at rates of pay not in excess of the daily equivalent of the highest rate of basic pay set forth in the General Schedule of section 5332(a) of title 5, United States Code, and in addition shall be reimbursed for travel, subsistence, and other necessary expenses in the manner provided for other members of the Council under paragraph (1) of this subsection.

UTILIZATION OF THE LIBRARY OF CONGRESS

SEC. 8. (a) To carry out the objectives of this Act, the Librarian of Congress is authorized to make available to the Office such services and assistance of the Congressional Research Service as may be appropriate and feasible.

(b) Such services and assistance made available to the Office shall include, but not be limited to, all of the services and assistance which the Congressional Research Service is otherwise authorized to provide to the Congress.

(c) Nothing in this section shall alter or modify any services or responsibilities, other than those performed for the Office, which the Congressional Research Service under law performs for or on behalf of the Congress. The Librarian is, however, authorized to establish within the Congressional Research Service such additional divisions, groups, or other organizational entities as may be necessary to carry out the purpose of this Act.

(d) Services and assistance made available to the Office by the Congressional Research Service in accordance with this section may be provided with or without reimbursement from funds of the Office, as agreed upon by the Board and the Librarian of Congress.

UTILIZATION OF THE GENERAL ACCOUNTING OFFICE

SEC. 9. (a) Financial and administrative services (including those related to budgeting, accounting, financial reporting, personnel, and procurement) and such other services as may be appropriate shall be provided the Office by the General Accounting Office.

(b) Such services and assistance to the Office shall include, but not be limited to, all of the services and assistance which the General Accounting Office is otherwise authorized to provide to the Congress.

(c) Nothing in this section shall alter or modify any services or responsibilities, other than those performed for the Office, which the General Accounting Office under law performs for or on behalf of the Congress.

(d) Services and assistance made available to the Office by the General Accounting Office in accordance with this section may be provided with or without reimbursement from funds of the Office, as agreed upon by the Board and the Comptroller General.

COORDINATION WITH THE NATIONAL SCIENCE FOUNDATION

SEC. 10. (a) The Office shall maintain a continuing liaison with the National Science Foundation with respect to—

(1) grants and contracts formulated or activated by the Foundation which are for purposes of technology assessment; and

(2) the promotion of coordination in areas of technology assessment, and the avoidance of unnecessary duplication or overlapping of research activities in the development of technology assessment techniques and programs.

(b) Section 3(b) of the National Science Foundation Act of 1950, as amended (42 U.S.C. 1862(b)), is amended to read as follows:

“(b) The Foundation is authorized to initiate and support specific scientific activities in connection with matters relating to international cooperation, national security, and the effects of scientific applications upon society by making contracts or other arrangements (including grants, loans, and other forms of assistance) for the conduct of such activities. When initiated or supported pursuant to requests made by any other Federal department

Scientific
programs,
financing.
82 Stat. 360.

64 Stat. 156;
82 Stat. 365.
42 USC 1873.

or agency, including the Office of Technology Assessment, such activities shall be financed whenever feasible from funds transferred to the Foundation by the requesting official as provided in section 14(g), and any such activities shall be unclassified and shall be identified by the Foundation as being undertaken at the request of the appropriate official."

ANNUAL REPORT

SEC. 11. The Office shall submit to the Congress an annual report which shall include, but not be limited to, an evaluation of technology assessment techniques and identification, insofar as may be feasible, of technological areas and programs requiring future analysis. Such report shall be submitted not later than March 15 of each year.

APPROPRIATIONS

SEC. 12. (a) To enable the Office to carry out its powers and duties, there is hereby authorized to be appropriated to the Office, out of any money in the Treasury not otherwise appropriated, not to exceed \$5,000,000 in the aggregate for the two fiscal years ending June 30, 1973, and June 30, 1974, and thereafter such sums as may be necessary.

(b) Appropriations made pursuant to the authority provided in subsection (a) shall remain available for obligation, for expenditure, or for obligation and expenditure for such period or periods as may be specified in the Act making such appropriations.

Approved October 13, 1972.

LEGISLATIVE HISTORY:

HOUSE REPORTS: No. 92-469 (Comm. on Science and Astronautics) and
No. 92-1436 (Comm. of Conference).

SENATE REPORT No. 92-1123 (Comm. on Rules and Administration).

CONGRESSIONAL RECORD, Vol. 118 (1972):

Feb. 8, considered and passed House.

Sept. 14, considered and passed Senate, amended.

Sept. 22, Senate agreed to conference report.

Oct. 4, House agreed to conference report.