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TYPE: ACTION DOCUMENT NUMBER: 9124759
ORIGINATOR: 02 STATUS I DIRECTORATE STATUS

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FROM: IVERSON, J. Richard: AMERICAN ELECTRONICS ASSOCIATION

TO: DR. D.A. BROMLEY

DATE OF CORRESPONDENCE: 11/12/91

SUBJECT: A THANK YOU TO DR. BROMLEY FOR MEETING WITH THEM ON 10/23/91, AND A RESTATEMENT OF THEIR POSITION REGARDING THE ADMINISTRATIONS ROLE IN TECHNOLOGY DEVELOPMENT. THEY REQUEST DR. BROMLEY'S VIEWS ON THEIR RECOMMENDATIONS.

****

DIRECTORATE ASSIGNED: INDUSTRIAL STAFF ASSIGNED:

Gene Iverson Jmeeting DBR

ACTION REQUIRED: DIRECT REPLY STAFF ACTION:

****

SENDER'S DUE DATE:

OSTP DUE DATE: 11/27/91 STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

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COPIES TO: D. Allan Bromley

****

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REMARKS:

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FILE: P-INDUSTRIAL-CRITICAL TECHNOLOGIES

CENTRAL FILES:

AEA

Denise Michel
SENIOR MANAGER
EDUCATION, SCIENCE, TECHNOLOGY POLICY

American Electronics Association

1225 Eye Street, N.W., Suite 950, Washington 20005
Telephone: (202) 682-9110 Telefax: (202) 682-9111

FYI

Document Originally
Attached to
Following Page

American Electronics Association AEA

5201 Great America Parkway, Santa Clara, California 95054. Telephone: (408) 987-4200
1225 Eye Street, N.W., Suite 950, Washington, D.C. 20005. Telephone: (202) 682-9110

November 12, 1991

The Honorable John H. Sununu
Chief of Staff to the President
The White House
West Wing - First Floor
Washington, DC

Dear Governor Sununu:

On behalf of the Advanced Technology Coalition we want to thank you for meeting with us on October 23, 1991 to discuss the problems facing U.S. manufacturers of critical technologies. We appreciate receiving the Administration's views on this issue, but would like to re-state our priorities.

The United States is facing intense competition in the development of microelectronics, computer systems and software, flat panel displays, machine tools, and a range of other vital technologies which will influence our future manufacturing prowess and economic welfare. Already this competition has eroded U.S. leadership severely in a number of critical high technology sectors. Nonetheless, U.S. manufacturers of these products are striving to meet these challenges through increasing expenditures on research and development, improving their management and commercialization of technology, expanding their businesses to overseas markets, and initiating programs to improve productivity and overall quality.

These efforts alone cannot succeed, however, unless a number of steps are taken by the federal government to stimulate long term economic growth and investment in critical, high risk technologies.

The Bush Administration must demonstrate leadership in responding to the formidable challenges the U.S. faces in technology development. Employment in the American electronics industry has decreased by more than 150,000 workers since November, 1989. In the 1980's, 1.2 million U.S. manufacturing jobs were lost. A decreasing defense budget, increasing pressures from a slow U.S. economy, and strong foreign competition supported by their governments, have discouraged private investment in high technology. It will be difficult for some of our companies to remain viable, much less to support long-term R&D in key technologies which are the building blocks for our future industrial base.

Thus far, industry, Congress, and the Administration have responded to these issues in a fragmented, ad-hoc manner, which has left the U.S. unable to focus resources most effectively and to establish long term national goals. If we had taken such an approach to the challenges posed by the Russian space program thirty years ago we would not have reached the moon -- which spurred investment in science and technology -- nor pioneered the revolution in electronics -- which has fueled our economic growth and protected our national security. As we once addressed these challenges to our economic welfare, the President now needs to draw national attention to these issues and to make technology and productivity growth a top priority of the Administration.

We urge you to incorporate the following technology competitiveness recommendations, which enjoy broad-based support among private sector organizations, in the Administration's Economic Growth Initiative and FY 1993 budget proposal:

o Technology Administration -- A severe lack of funds and personnel has hampered the Department of Commerce Technology Administration's ability to fulfill its critical role of helping industry strengthen the U.S. manufacturing base, improve commercialization of federal R&D, promote technology transfer and international technology and manufacturing cooperation, and expand U.S. access to Japanese scientific and technological information. We recommend that the President include $10 million for the Technology Administration in his FY 1992 budget proposal. This funding level was authorized by the Senate Commerce Committee in S. 1034, the American Technology Preeminence Act, which was unanimously reported by the Committee.

o National Institute of Standards and Technology -- We applaud the President's commitment to double NIST's internal budget in five years to $349 million in FY 1996. In keeping with this pledge, we support the President's stated intention of providing $231.5 million for NIST's vital measurements, standards and R&D programs in his FY 1993 budget proposal.

o Advanced Technology Program -- To have a meaningful, sustained effort in supporting industry-led efforts to develop pre-competitive generic technologies with significant economic potential, we urge the President to include $100 million for ATP in his FY 1993 budget proposal.

o National Science Foundation -- We commend the President's commitment to double the NSF budget, culminating with a total of $3.2 billion in FY 1994. We support an FY 1993 budget that will place the Foundation on this doubling track. We also urge the President to provide additional resources for NSF's joint industry/university research programs, such as the Engineering Research and Science and Technology Centers.

o Industry-Led Research Consortia -- We recommend the President's continued support for industry-led research consortia, such as SEMATECH and NCMS, that are effectively promoting collaborative R&D that leads to commercial innovation.

o Long-Term Federal Research Initiatives -- Coordinated, long-term federal research initiatives, such as the High Performance Computing and Communications Initiative, should be supported and duplicated. The defining characteristics of a successful initiative that should guide initiatives in advanced materials, manufacturing, and other areas are: national goal-setting, coordination of federal efforts, and industry input.

o Defense Advanced Research Projects Agency -- DARPA has successfully fostered cutting-edge technology needed for superior defense systems of the future. DARPA's efforts also have strengthened industry competitiveness in many critical technology areas. We urge the President to support Congress' FY 1990 goal of two percent real growth each year for five years for DARPA. We also urge you to encourage interagency initiatives on critical technologies.

o Technology Development and Transfer -- Support for commercially relevant, pre-competitive generic technology R&D and the transfer of federal R&D to the private sector should be a priority of all federal research agencies. DOD's MANTECH and NASA's Technology Utilization Program are examples of initiatives that should be encouraged and much more needs to be done.

o Workforce -- In implementing the President's "America 2000" education plan, we urge you to keep in mind our industries' need for technically skilled workers.

o Private Sector Input -- To improve the overall utility of federal R&D investment, work with us to establish formal mechanisms for private sector involvement in setting federal R&D priorities.

As our letter indicates, there is growing consensus among a variety of private sector groups on what should be done to ensure America's industrial and technological leadership. The above list of critical actions represents the foundation of a consensus, private sector technology competitiveness strategy. We will provide you with additional recommendations that are advocated by a variety of private sector organizations. We also are eager to develop an active working relationship with the relevant executive branch staff in order to flesh out specific initiatives to refocus national R&D priorities. Over the course of the next few weeks our organizations will contact you and your staff directly to develop these relationships.

We look forward to your response on these recommendations and to working with you on making U.S. technology competitiveness and long-term productivity growth a reality.

Sincerely,

J. Richard Iverson
President and CEO
American Electronics Association

Leo Reddy
President
National Coalition for Advanced Manufacturing

William H. Reed
President
Semiconductor Equipment and Materials International

Edward A. Miller
President
National Center for Manufacturing Sciences

A. A. Procassini
President
Semiconductor Industry Association

Kent Hughes
President
Council on Competitiveness

Arvid Larson
Chairman
IEEE-USA Technology Policy Council

11/12/91 - Identical letters were sent by messenger to the addressees listed below:

Robert E. Grady
Associate Director, Natural Resources, Energy & Science
Office of Management and Budget
Old Executive Office Building - Room 260
17th & Pennsylvania Avenue, NW
Washington, DC

The Honorable Roger B. Porter
Assistant to the President for Economic and Domestic Policy
The White House
1600 Pennsylvania Avenue, NW
Washington, DC

The Honorable Allan D. Bromley
Assistant to the President for Science & Technology
Office of Science and Technology Policy
Old Executive Office Building, Room 358
17th St. & Pennsylvania Avenue, NW
Washington, DC

The Honorable John H. Sununu
Chief of Staff to the President
The White House
West Wing - First Floor
Washington, DC

The Honorable Michael J. Boskin
Chairman, President's Council of Economic Advisers
Executive Office of the President
Old Executive Office Building, Room 314
17th St. & Pennsylvania Avenue, NW
Washington, DC

The Honorable Clayton Yeutter
Chairman, Republican National Committee
4th Floor, Chairman's Office
310 First Street, SE
Washington, DC

"Document Control"

TYPE: INFORMATION DOCUMENT NUMBER: 9124370
ORIGINATOR: 02 STATUS C DIRECTORATE STATUS

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FROM: LARSON, Charles F.: EXECUTIVE DIRECTOR, INDUSTRIAL RESEARCH INSTITUTE

TO: DR. D.A. BROMLEY

DATE OF CORRESPONDENCE: 10/02/91

SUBJECT: MR. LARSON IS FORWARDING COPIES OF LETTERS HE SOLICTED TO OBTAIN OPINIONS AND SUGGESTIONS REGARDING THE NATIONAL CRITICAL TECHNOLOGIES REPORT.

****

DIRECTORATE ASSIGNED: STAFF ASSIGNED:

ACTION REQUIRED: STAFF ACTION:

****

SENDER'S DUE DATE:

OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

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COPIES TO: D. Allan Bromley
INDUSTRIAL

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4370

Industrial Research Institute, Inc.

October 2, 1991

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CHARLES F. LARSON

The Honorable D. Allan Bromley
Assistant to the President for
Office of Science & Technology
Old Executive Office Building
17th Street & Pennsylvania Avenue, NW
Suite 358
Washington, DC 20506

Dear Dr. Bromley:

In August we sent copies of the Report of the National Critical Technologies Panel and the White House Fact Sheet to our member company representatives, with the suggestion that they may wish to comment on the report in regard to the following points:

1) Are the sectors listed under each area of technology the most critical, or are there others more important?

2) Is the description of the U.S. competitive position relative to that of other countries accurate?

3) What can industry do to help resolve the problem areas?

Enclosed for your information are several responses received to date, from Aluminum Company of America, Bell South Enterprises, Coors Porcelain Company, Exide Electronics, GTE Laboratories, Nynex, Pfizer, Phillips Petroleum, Proctor & Gamble, Sherwin-Williams, and 3M. Other responses will be forwarded as they are received.

You will find in these responses a good deal of support for the effort, a good deal of interest in the process, some opinions on the accuracy of the analyses, and some advice on where we should go from here.

We trust that you will find the responses useful. We stand ready to assist in any way possible on the next edition of the Panel Report.

Sincerely,

Chuck

Charles F. Larson
Executive Director

CFL:pt
Enclosures

1550 M Street, NW, Washington, D.C. 20005 • (202) 872-6350 • Fax (202) 872-6356

Industrial Research Institute, Inc.

August 8, 1991

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EXECUTIVE DIRECTOR
CHARLES F. LARSON

To: Member Company Representatives and Alternates

Subject: **OPPORTUNITY TO COMMENT ON REPORT OF THE NATIONAL CRITICAL TECHNOLOGIES PANEL**

Enclosed for your review is a copy of the subject report, issued in March 1991, with a White House Fact Sheet. Two I.R.I. Reps, Dick Messinger (Cincinnati Milacron) and Past President Bert Westwood (Martin Marietta), were members of the Critical Technologies Panel. You will note in the Acknowledgements that Jules Blake, I.R.I. Fellow in OSTP at that time, provided input to the report, but that I.R.I. was not listed as a contributor from the private sector. Now is your chance!

It would be appreciated if you would review the write-ups on the critical technologies in which you and your company have expertise and send me your comments in regard to the following points:

1) Are the sectors listed under each area of technology the most critical, or are there others more important?

2) Is the description of the U.S. competitive position relative to that of other countries accurate?

3) What can industry do to help resolve the problem areas?

Your comments, ideas, and suggestions will be compiled and combined as a brief report to OSTP. Plans will also be developed by our F.S.T. Committee for I.R.I. to provide input on the next edition of the Panel's report, due in 1993. That report will be facilitated by the Critical Technologies Institute, which is now being formed by OSTP. I look forward to your response.

Chuck

Charles F. Larson
Executive Director

CFL/ddq
Enclosure

1550 M Street, NW, Washington, D.C. 20005 • (202) 872-6350 • Fax (202) 872-6356

ACTION!

Industrial Research Institute, Inc.

August 9, 1991

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THE BABCOCK & WILCOX COMPANY

EXECUTIVE DIRECTOR
CHARLES F. LARSON

To: IRI Member Company Representatives

Subject: **1992 RESEARCH TRENDS SURVEY**

WE NEED A FEW MINUTES OF YOUR TIME TO ASSIST...

the Research-on-Research Committee with its Trends Survey. A brief questionnaire on trends expected for 1992 is enclosed. Please fill it in and return it to IRI headquarters by September 5. Your best guess on trends for next year is all that the Committee requests (and your best estimates for questions 19-23). We urge you to respond for your entire company.

Responses need not be identified other than by major industrial classification. All data will be kept confidential and will be used only for statistical tabulations to determine industry-wide averages. Responses will be aggregated and published by major industrial classification.

Results will be circulated within IRI this fall and published in RESEARCH·TECHNOLOGY MANAGEMENT next January. The purpose, of course, is to assist member companies and others in R&D forecasting, planning, and budgeting activities.

Your cooperation in responding to this survey will be greatly appreciated. To have your company's data included in the survey results, we must receive your form by the **September 5** deadline. Thank you.

Margaret R. Grucza
Director, Member Services

MRG/cb
Enclosure

IRI SURVEY QUESTIONNAIRE
FORECAST OF 1992 TRENDS

Indicate your best estimate of the relative change in the following areas of your R&D activities anticipated for 1992 compared with 1991. Use the following scale.

NA. Not available.
1. Indicates significantly less in 1992 compared with 1991 (-5% or less).
2. Indicates slightly less (0 to -5%).
3. Indicates approximately the same (1 to 5% more).
4. Indicates somewhat more (6% to 10% more).
5. Indicates significantly more expected in 1992 as compared with 1991 (more than 10%).

NR. Indicates that a forecast of trends in this area is not relevant to your company.

Expected changes in 1992 compared with 1991 experience (check appropriate column):	Relative Change						
	NA	1	2	3	4	5	NR
Expenditures							
1. Capital spending for R&D operations	___	___	___	___	___	___	___
2. Subcontracting R&D to outside commercial	___	___	___	___	___	___	___
3. Grants, contracts, etc., for university R&D	___	___	___	___	___	___	___
4. Ratio of direct salaries and wages to other direct R&D costs	___	___	___	___	___	___	___
Effort Allocation							
5. Relative distribution of R&D costs:							
a. Support of existing business	___	___	___	___	___	___	___
b. Directed basic research*	___	___	___	___	___	___	___
c. New-business projects	___	___	___	___	___	___	___
6. Ratio of non-centralized (e.g., divisional) to centralized corporate R&D efforts	___	___	___	___	___	___	___
7. Outside-customer, technical-service efforts relative to total R&D (in time or dollars)	___	___	___	___	___	___	___
8. R&D efforts in response to existing or proposed legislation, standards, or other governmental rules (in time or dollars)	___	___	___	___	___	___	___
Other Trends							
9. Hiring new graduates	___	___	___	___	___	___	___
10. Top management attention to Research on longer term or strategic issues	___	___	___	___	___	___	___
11. Top management attention to Development	___	___	___	___	___	___	___

*Research whose outcome may be unknown at the time the work is undertaken but where there is a reasonable expectation that findings will be valuable to the supporting organization.

Other Trends (cont.)	Relative Change NA	1	2	3	4	5	NR
12. Participation in consortia for pre-competitive university research	___	___	___	___	___	___	___
13. Participation in alliances and joint ventures for R&D	___	___	___	___	___	___	___
14. Licensing technology from others (dollar volume)	___	___	___	___	___	___	___
15. Licensing technology to others (dollar volume)	___	___	___	___	___	___	___
16. Extent of government financial support of R&D	___	___	___	___	___	___	___
17. Contacts with Federal Laboratories	___	___	___	___	___	___	___
18. Overhead costs	___	___	___	___	___	___	___

Quantitative Data (Estimated)	1991	Percent Change 1991-1992
19. What is your total company-wide R&D expense?	M$_____;	_____ %
20. What are your total company-wide sales?	M$_____;	_____ %
21. What is your company-wide capital expenditure for R&D?	M$_____;	_____ %
22. What is the total number of: (a) All R&D personnel in the U.S.?	_____;	_____ %
(b) R&D professionals** in the U.S.?	_____;	_____ %
23. For your largest laboratory in the U.S.: (a) What are your operational costs for R&D?***	M$_____;	_____ %
(b) What is the number of R&D professionals?**	_____;	_____ %

** Total number of degreed full-time equivalent technical and managerial professionals, excluding technical secretaries and non-project administrative personnel.

*** Refers to the actual cost of performing project-related, in-house R&D, including salaries and benefits for all full-time equivalent professionals and non-professionals; travel; training; supplies; information services; secretarial, management, and administrative support; in-house & outside testing services; utilities; taxes; building and grounds; depreciation; etc.

Industry Classification (Check predominate classification or indicate percentage of sales for up to 3 major business segments.)

_____ Food, Tobacco, & Kindred Products
_____ Paper & Allied Products
_____ Chemicals & Plastics
_____ Petroleum & Related Industries
_____ Primary Metal Industries
_____ Machinery, Except Electrical
_____ Electrical Machinery, Equipment, & Supplies
_____ Pharmaceuticals & Personal Care Products
_____ Fabricated Metal Products
_____ Stone, Clay, & Glass
_____ Other_____

PLEASE RETURN BY
September 5, 1991 to:

Margaret R. Grucza
Industrial Research Institute
1550 M Street, NW
Washington, DC 20005
FAX 202-872-6356

ALUMINUM COMPANY OF AMERICA
ALCOA TECHNICAL CENTER
ALCOA CENTER, PA 15069
(412) 339-6651

ALCOA

August 20, 1991

Mr. Charles F. Larson
Executive Director
Industrial Research Institute, Inc.
1550 M Street
Washington, D. C. 20005

Dear Mr. Larson

Thank you for the invitation! It is a pleasure to comment on the Report of the National Critical Technologies Panel. This, like companion papers that have been generated in DOD and others, is reasoned and insightful. Unlike some similar works, it does not appear to give in to special pleadings. It should therefore be a serious contribution to the national dialog on technology priorities.

No single observer has sufficient breadth to keep this broad agenda in perspective and we, certainly, do not presume to compare the relative worth and importance of systems management, aeronautics, and medical technology. Nor do we think that the panel has promoted trivial pursuits at the expense of critical areas.

In the amplifying text if not in the headings, we would have paid greater attention to two rapidly expanding disciplines. First, non-destructive examination. As components and products are designed to function closer to their ultimate capabilities, smaller and smaller defects of manufacture become life-threatening. Even when satisfactorily built, service reliability is compromised by corrosion, fatigue, and varieties of stochastic damage and, again, functional life is threatened. Conversely, techniques for characterising structural and functional reliability are more sophisticated than ever before and are increasing the scope and shrinking in relative cost dramatically. From integrated multiple-signal computerized tomography to "smart skins" to *in situ* active and passive sensors, this is an area of technology that impacts all of Materials and almost all of Manufacturing and Transportation.

Second, nano-scale structures. Both theoretically and experimentally this is an area of ferment, at least in part because extrapolations of properties from conventional microstructures into the nanostructure regime fail dramatically to agree with experiment. Superplastic ceramics, unique crystallography, extraordinary electromagnetic properties, are observed. This scale of structure is difficult to model because it is too structured for continuum extrapolations and too extensive for atomic modeling (though that will not remain true for long).

Regarding the US competitive position relative to the rest of the world, we would distinguish more sharply than the Report between Science and Application. Scientifically, in most areas of critical technology we are very competitive indeed. At the point of Application, there is a clear, strong, inverse correlation between the capital investment required to implement and the degree to which we are threatened. In software, no problem. In energy technologies and structural ceramics and leading-edge microelectronics, real and growing problems.

In passing, some comment on the President's Council on Competitiveness Fact Sheet is irresistable. It is succint, pointed, intelligent and remarkably free of bureaucratic "waffling" -- in short, a pleasure to read. I do see some internal conflict between paragraph 8 and paragraph 12: the Superconducting Supercollider, Star Wars, Agriculture, and Space research do not obviously "offer large benefits to the economy as a whole but do not offer the prospect of adequate profit to any private..." -- rather the opposite, it seems. In the final Section (THE FINANCIAL CLIMATE: ..), I would have welcomed 1-2 paragraphs on the extreme negative impact on innovation of the present liability morass. Something along the lines of Mr. Quayle's address to the ABA recently would capture the thinking of a lot of people in the manufacturing sector, I think.

Thank you again for the opportunity to "observe" a very worthwhile effort.

Gordon R Lovell

Technical Director

SEP 12 1991

BELLSOUTH ENTERPRISES, INC.

Roy E. Moore
Assistant Vice President
Strategic Technical Planning & Development

Room 11D02
1100 Peachtree Street, N.E.
Atlanta, GA 30309-4599
404 249-4500

September 3, 1991

Mr. Charles F. Larsen
Executive Director
Industrial Research Institute, Inc.
1550 M Street, NW
Washington, D.C 20005

Dear Mr. Larsen:

Your letter of August 8, 1991 requested some comments regarding the Report of the National Critical Technologies Panel. Listed below are my thoughts relevant to the U. S. Department of Commerce's Critical Technologies list:

1. The following technologies are listed as critical by both the Department of Commerce and BellSouth Enterprises:

- Materials
  - Electronic and photonic materials
  - Ceramics
  - Composites
- Manufacturing
  - Flexible computer integrated manufacturing
  - Intelligent processing equipment
  - micro- and nanofabrication
- Information and Communications
  - Software
  - Microelectronics and optoelectronics
  - High-performance computing and networking
  - High-definition imaging and displays
  - Sensors and signal processing
  - Data storage and peripherals
- Energy and Environment
  - Energy technologies
  - Pollution minimization, remediation and waste mgt.

2. The following technologies are listed as critical by the Department of Commerce but are not critical to BellSouth Enterprises as they are not telecommunications oriented:

- Materials
  - Materials synthesis and Processing
  - High-performance metals and alloys
- Manufacturing
  - Systems management technologies
- Information and Communications
  - Computer simulation and modeling
- Biotechnology and Life Sciences
  - Applied molecular biology
  - Medical technology
- Aeronautics and Surface Transportation
  - Aeronautics
  - Surface transportation technologies
- Energy and Environment
  - Energy Technologies

3. The following technologies are defined as critical to BellSouth Enterprises but are not seen as critical to the U. S. Department of Commerce:

- Information Technologies
  - Presentation Technologies
  - Network Management
  - Open Computing Architecture
- Networking Technologies
  - Network Transmission Media
- Radio Technology
  - Wireless Systems
  - Wireless Signal Processing
  - RF Component and Materials Technology
- Power Systems
  - Storage Batteries

We generally agree with the description of the relative U. S. competitive position of these technologies. The Japanese are seen clearly ahead of the U. S. in materials technology. In high definition imaging and displays the U. S. is far behind and will remain far behind. The US is seen generally ahead in the technologies uniquely critical to BellSouth, but Japan seems to be closing the gap in radio technology.

United States industry is at a competitive disadvantage relative to that of other countries due to three primary reasons:

1. The institutional financial market demands continued short term results often at the expense of longer term capital investment.

2. Lack of Federal policy for such things as a National Telecommunications Policy, a National R&D policy. The Japanese central government appears more goal oriented in its policy development.

3. The lack of tax incentives for research and development.

The industry must overcome its timidity towards institutional investor's expectations and equally important must strive for meaningful Federal leadership in research and development. Pending Federal research and development legislation consists merely of the formation of a bureaucracy to evaluate the present environment. Financial incentives, such as tax credits, for high risk and high reward research and development is required.

I appreciate the opportunity to pass along my personal views regarding critical technologies. If you desire additional information, please advise.



SEP 0 9 1991

Coors Porcelain Company
Washington Operations
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Fax: (703) 553-0692
Tel: (703) 553-2536

September 5, 1991

Charles F. Larson
Executive Director
Industrial Research Institute, Inc.
1550 M Street, N.W.
Washington, D.C. 20005

Dear Mr Larson:

This is in response to your solicitation for comments on the accuracy of the competitive analysis in *Report of the National Critical Technologies Panel.* I would like to address the statement on page 21 on behalf of Coors Ceramics Company and the United States ceramics industry.

> Japan is superior to the United States in the processing of monolithic ceramics for non-aerospace commercial applications. Japanese firms dominate the market in ceramic packaging for microelectronic devices, and have established a clear lead over their U.S. counterparts in the introduction of ceramic components in automobile engines.

The first sentence is patently untrue. Coors Ceramics competes favorably with Japanese firms **especially** in commercial applications. We are the world leader in such ceramic applications as automotive seal rings and thick film substrates. We have a strong international presence in numerous oxide and non-oxide ceramic products such as alumina, zirconia, silicon carbide, and ceramic composites. Other U.S. companies have strong capabilities in a wide range of ceramic materials from piezoelectrics to ferrites.

With regard to the second sentence, it is true that a cartel of three Japanese companies dominate the world market for ceramic packages, but certainly not due to any technological superiority. Coors Electronic Package Company possesses a world class manufacturing capability in this technology which is as good or better than anything in Japan. We are a major supplier to Motorola Communications Sector, and manufacture advanced ceramics packages for numerous commercial and defense programs.

The "clear lead" which the Japanese have in engine ceramics has little to do with technology. American firms have (or have had) the technology, but Japanese firms appear to have a decided cost advantage

which enables them to command market share. Coors has manufactured a wide range of ceramic engine parts from valve guides to exhaust port liners, and now has an aggressive program in silicon nitride. The difference between U.S. industry and its Japanese counterpart is the high profile cooperation between component suppliers and engine manufacturers in Japan, which has put the spotlight on the ceramic manufacturers. In fact, one Japanese ceramics company,Kyocera, actually manufactured and demonstrated a ceramic engine - an act, which if done by a U.S. manufacturer, would be perceived as a direct threat to our domestic customers.

I think we have beat up on U.S. manufacturers long enough! It must be realized that it is not due to lack of technology that America is losing its global competitive advantage, but due to loss of access to world markets resulting from aggressive Japanese marketing efforts.

As you can tell, I'm quite outspoken on this subject, and if I can be of any further assistance, please don't hesitate to contact me.

Sincerely,

Grover Coors
Vice President

cc: Jim Wade
President, Coors Ceramics Company

AUG 26 1991

August 21, 1991

Charles F. Lawson
Industrial Research Institute, Inc.
1550 M Street NW,
Washington, DC 20005

Dear Chuck:

In response to your memo of August 8th, I am enclosing comments on two of the sections of the National Critical Technologies Panel Report. This information was prepared by Dale Langer who is our Manager of Software Development. I hope this is of some value to you.

Sincerely,

Derek

Derek Colbeck
Manager, Engineering Administration

DBC/dlc

Enclosure

3201 SPRING FOREST ROAD
RALEIGH, NORTH CAROLINA 27604
(919) 878-9600 FAX (919) 878-1541

EXIDE ELECTRONICS

(c 233)

August 19, 1991

Comments on the Report of the National Critical Technologies Panel

INFORMATION AND COMMUNICATIONS

Software

It appears that the US position relative to Japan is greatly understated. The US currently has a leadership position but will most assuredly lose out to Japan. This is due primarily to the intense effort that the Japanese can and will apply to this area of technology. This is an area that is, for the most part, untapped yet in Japan and it is long overdue for the Japanese to enter the software foray. They have the discipline that is lacking in the US approach to software development. We are leaders because of the very fact that we lack discipline but this can only take us so far. Structure and automation are essential to advance beyond where we are. The Japanese have what it takes and it is questionnable if the US can advance without a major paradigm shift in our software development methodology.

In order to achieve our goal of continuing to maintain a leadership position, it is necessary to convince the software developers to utilize CASE tools. Good CASE tools exist now and better ones are just around the corner but getting software engineers to fully utilize them is the real challenge. They must be non-restictive and inituitively obvious in their operation and use. The use of CASE tools should be promoted in our colleges and universities. CASE tools will provide the free-thinking individual with unprecedented ease of expression and still provide the needed structure and discipline to make the US a leader in the next century.

High-Performance Computing and Networking

There is no doubt that the US is beginning to lose ground in the supercomputer race. This is fairly stated and apears accurate. Advancement is parallel processing and computer architecture is essential to maintain leadership. I would like to suggest that something radical such as a marriage between Reduced Instruction Set Computer (RISC) architecture and Complex Instrcution Set Computer - multiple instruction, multiple data stream - very large instruction word (CISC - MIMD - VLIW) architecture might place the US in a winning position. This would require many technocrats to become very open-minded. If something as radical as this could be accomplished, the US has the potential to do it.

Paul R. Sanger

SEP 11 1991

GTE

GTE Laboratories Incorporated

40 Sylvan Road
Waltham, Massachusetts 02254
Tel. 617 466-2288
FAX 617 890-9320

Graham R. Mitchell
Director of Planning
September 5, 1991

Mr. Charles F. Larson
Executive Director
1550 M Street, N. W.
Washington, D. C. 20005

COMMENTS ON THE NATIONAL CRITICAL TECHNOLOGIES LIST

Dear Chuck,

The list covers most of the appropriate areas but is not very useful. To the extent that the purpose of the report is to address the U.S. competitive position, the IRI members are probably the best qualified group in the U.S. to comment. Much of what we do daily is associated with choosing and developing the critical technologies which will make our companies competitive. The list is a reasonable high level summary of aggregate opinion, but too broad to be of much value to industrial research managers in making internal decisions which bear on competitiveness.

More importantly, it is difficult to discuss the strategic importance of disembodied lists of skills or disciplines without reference to the applications or markets where they are to be exploited. As you probably know, we formally define critical technologies in GTE Laboratories by combining skills and disciplines with applications and markets.* This is, I believe very important, as a number of other constituencies including DOD, DOE, the National Labs, NSF, and various academic and government institutions, have an interest in building the technical skill base. However, to the extent that we wish to address industrial competitiveness in commercial applications these need to be spelled out at some level, and related to the technical area to avoid unrealistic expectations, and conflicting agendas. The connection between scientific discovery and commercial profitability is not well understood in Washington as the recent confusion over high temperature superconductors illustrates.

A second concern is that the report seems biased towards manufacturing and products. Services account for 70% of the GNP, many of them are highly dependent on emerging technology. They are likely to provide significant employment opportunities during the next decade, as well as the high tech infrastructure which will make it possible to retain high value added manufacturing in the U.S.

Best Regards,

Graham R. Mitchell
cc: J. C. Redmond
* "New Approaches for the Strategic Management of Technology," Graham R. Mitchell, *Technology in Society*, (1985) pp. 227-239
* "Strategic Planning and the Changing Agenda of Research Management," Graham R. Mitchell, *Research and Technology Management*, in press.

NYNEX Science & Technology Inc
120 Bloomingdale Road
White Plains NY 10605
914 287 5002

C S Skrzypczak
President

SEP 25 1991

NYNEX

September 12, 1991

Mr. Charles Larson
Executive Director
Industrial Research Institute
1550 M Street NW
Washington D. C. 20005

Mr. Larson,

My staff and I have reviewed the Report of the National Critical Technologies Panel. We reviewed the entire Information and Communications Section and offer the following comments:

In our opinion the sections listed the more critical technologies. We also believe that the report effectively presents the inter-relationship of the various technologies and the importance of these technologies in maintaining U.S. competitiveness. However, most sections mention ergonomics, artificial intelligence and neural networks as key solutions to problems in improving productivity. As such, we believe that these three areas merit individual, expanded focus in upcoming reports.

We find the descriptions of the U.S. Competitive position to be accurate.

Furthermore, we believe that industry can do many things to remedy the problem areas listed in the report:

1) Industry can maintain or increase its commitment to basic, exploratory research that sparks technological breakthroughs. This is particularly critical in areas that improve computer speed and usability from all aspects; material science and fabrication through software productivity concerns.

2) Building upon basic research findings, companies must maintain focus on the applications of the technology. This must be a national goal employing the resources of public and private research laboratories, joint efforts or consortia, and university efforts.

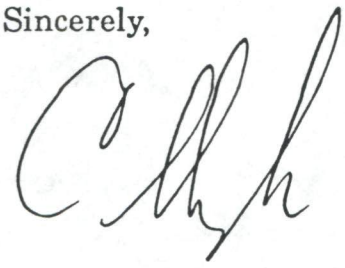
NYNEX Recycles

3) Industry must actively participate in the standards arenas critical in bringing technology applications to the marketplace.

4) Industries must work with all levels of government and with educational institutions to get students involved in science and technology. Citizens that are not comfortable with technology will not be efficient members of our future work force, because all jobs will require some interaction with computers, computer controlled devices or a high technology application.

I hope you find this input useful for the upcoming editions of this report. Please feel free to contact Mr. Alan Scrime (914-644-7272) or Ms. Susan Swidler (914-644-7508) of my staff if you have any questions or concerns.

Sincerely,



500 Westchester Avenue, White Plains NY 10604
914 683-2214
Dr J C Thomas
Director
Artificial Intelligence

AUG 23 1991

AUG 23 1991

NYNEX

August 20, 1991

Charles F. Larson
Executive Director Industrial
Research Institute, Inc.
1550 M Street NW
Washington, DC 20005

Dear Mr. Larson,

Thank you for the opportunity to review the report of the National Critical Technologies Panel. While in agreement with most of the report, from my perspective, there is one major omission -- the technology of Computer-Human Interaction aka "Human Factors" aka Human-Machine Interface Design.

To give a few examples, the 3-mile island incident as well as Chernobyl hinged on poor human factors. The relative ability of weapon systems depends intimately on the speed and reliability of the human-machine loop to respond. Scientific progress, as well as engineering practice, in all fields depends critically on advances in representation. Software productivity -- CASE tools etc. -- depends on advances in human computer interaction methods. Our competitive position in electronic equipment, computing, and communications depends to a large degree on human factors. The internal productivity of our factories and offices is critically dependent on having good human factors.

To give a few concrete examples, a technique called Latent Semantic Index (LSI) developed at Bellcore allows someone to retrieve desired information from a large data base on an 80/80 recall/precision curve as opposed to a 20/20 recall precision curve for Key-Word In Context systems. Another interface technique developed there,

Superbook, allows users to solve problems significantly faster than traditional on-line or hard copy documentation.

In the NYNEX lab, when we test the prototypes of user interfaces and make corrections, the productivity of users almost always improves by a factor of at least 2.

Improving the technology by which humans actually interact with machines will positively impact every other critical technology discussed in the report.

The United States is in the odd position at this point of probably being the (slight) leader in knowledge in this area but Western Europe and Japan are probably ahead in the extent to which such knowledge is actually embodied throughout the processes and products of the society.

John Thomas

JOHN C. THOMAS

COPY TO:
C. Skrzypczak
E.J. Thomas

SEP 0 9 1991

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✓



Central Research

Richard L. Hinman, Ph.D.
Senior Vice President
Chemical Products Research and Development

August 30, 1991

Mr. Charles F. Larson
Executive Director
Industrial Research Institute Inc.
1550 M Street, NW
Washington, DC 20005

Dear Chuck:

You have asked for comments on the report of the National Critical Technologies Panel. The part that I am in a position to discuss is Biotechnology. Frankly, I think that it represents little in the way of a contribution. There is nothing in it which is new, controversial or noteworthy. Most importantly, the report does not capture the revolultionary impact biotechnology is having.

The report does not summarize the state-of-the-art in sufficient depth to be useful except to the most uninitiated. All of the subjects such as "protein engineering", "monoclonal antibody production", and "bioprocessing" are described in such simplistic terms as to be essentially useless. What sets them apart from traditional methods is not captured in the writing. The summary of status and international trends has been stated many times and much more effectively in other places. Indeed it is not even clear to me why the document was put together at all. It seems to be just one more report to collect dust.

I am sorry to comment so negatively on the report, but having read so many good reports such as those from the OTA which are more articulate, comprehensive and profound, I am disappointed in the present contribution. It could only be useful to someone who doesn't read The New York Times or Newsweek.

Sincerely,

R L Hinman

Richard L. Hinman

AUG 2 2 1991

PHILLIPS PETROLEUM COMPANY

BARTLESVILLE, OKLAHOMA 74004
918 661-7965

Research and Development

E. A. ZUECH, Ph.D.
Science and Technology Advisor
Office of the Vice President

August 15, 1991

Mr. Charles F. Larson
Executive Director
Industrial Research Institute, Inc
1550 M Street, N.W.
Washington, D.C. 20005

Dear Mr. Larson,

In your recent mailing, you asked for comments on the Report of the National Critical Technologies Panel. Some of us here feel the report has deficiencies in the areas of energy technologies, particularly with the fuels that the U.S.A. has in abundance, namely coal, shale oil, and natural gas. The large reserves of these materials can go a long way towards satisfying many of our energy and raw material needs. The technology for direct and alternate usages in terms of recovery, chemical conversions, combustion and emissions are not appropriate to serve the country.

It also seems that the overall area of chemistry was not given a proper level of importance. On page 125, you will not find that the American Chemical Society is listed in the acknowledgments. That seems strange in view of the large number of scientists and engineers in that society with considerable expertise that bears directly on the technologies described therein. Please see for example a recent ACS publication entitled "Opportunities in Chemistry".

Thank you for the opportunity to comment on the report. Please accept my best regards.

Sincerely,

E. A. Zuech

SEP 30 1991

THE PROCTER & GAMBLE COMPANY

GORDON F. BRUNNER
SENIOR VICE PRESIDENT

1 PROCTER & GAMBLE PLAZA
CINCINNATI, OHIO 45202-3315

September 26, 1991

Mr. Charles F. Larson, Executive Director
Industrial Research Institute, Inc.
1550 M Street, Northwest
Washington, D.C. 20005

Dear Chuck:

Comments on Report of the National Critical Technologies Panel

We reviewed in some depth the following sections of this report:

Manufacturing - all technologies except Micro- and Nanofabrication
Biotechnology and Life Science - Applied Molecular Biology
Energy and Environment - Pollution Minimization, Remediation, and Waste Management.

These are areas of immediate business relevance to Procter and Gamble and areas where we have some direct experience and expertise.

Overall, we would agree that the specific technologies listed under each of these three areas of technology appear to be the most critical. Certainly, the specific technologies we reviewed in depth are extremely important for our businesses. For those technologies we would also agree that the description of the U.S. competitive position relative to that of other countries appears to be accurate and entirely consistent with our perceptions.

Some additional comments for the specific technologies we reviewed are:

Manufacturing Technologies

1. Factory Scheduling Tools such as MRPII (Manufacturing Resource Planning) and beyond mentioned briefly (pg. 37) in the Flexible Computer Integrated Manufacturing report, are critical to achieving tightly integrated manufacturing and product supply systems which will lead to vastly improved flexibility, customer response and inventory levels. Systems which go beyond MRPII to manage scheduling, material tracking and execution of coupled distribution, procurement and manufacturing processes are being developed and are of high strategic importance. Such systems are frequently referred to as ERP (Enterprise Resource Planning) Systems.

2. Of the four technologies identified in the manufacturing area, Systems Management Technologies offers the most potential for breakthrough in manufacturing effectiveness and results. Data-driven Management Information Systems will be the underpinning of a new paradigm for manufacturing control and information systems in which data, separated from application software, is the foundational element on which these

systems are built. A single logical relational data-base, in which any needed data are accessible in near-real time to anyone with need and right to know, will provide significant strategic gains in product supply effectiveness. Interoperable Information Systems are also of high importance to installing an affordable and supportable computer and communications infrastructure. Not mentioned in this technology description, but of high importance, are Information and Control Architecture and Master Planning processes and efforts, necessary to provide consistent and efficient direction to the deployment of strategic information and control systems.

3. Within Intelligent Processing Equipment, we agree that the advancement of intelligent sensors, particularly machine vision, is critically important to achieving the high-through-put, high-flexibility and high-quality manufacturing systems needed for competitiveness.

Biotechnology and Life Sciences - Applied Molecular Biology

Two issues of major concern in this technology area which were not addressed by the panel are:

1. A need to educate the public regarding the potential positive impact of Applied Molecular Biology on society. There currently exists a large element of uncertainty as to how the public will react when products derived from biotechnology outside of the health care area are introduced on a major scale. Industry trade associations could be helpful in addressing this concern (as they could with regard to the concerns which the panel did list).

2. The application of molecular biology is being seriously hindered by a lack of understanding of basic plant and animal processes. Government should be encouraged to fund the basic research needed to overcome this deficiency. Some additional unrestricted grants by industry in areas of specific interest could also be warranted.

Energy and Environment - Pollution Minimization, Remediation, and Waste Management

To a significant extent this societal issue is as much a management systems challenge as an exercise in developing technology. The challenge is to set sufficiently high yet practical goals for reducing pollutant discharges and managing the reduced level of waste. The focus should be toward getting government and industry to join in setting demanding but practical goals and encouraging system changes (organization, reward structure) to achieve the objectives.

I hope that these comments will be helpful in developing the summary IRI report.

Sincerely,

G. F. Brunner

jkr

SEP 03 1991

The Sherwin-Williams Company
601 Canal Road
Cleveland, Ohio 44113-2498

27th. August, 1991

Charles F. Larson,
Executive Director,
Industrial research Institute, Inc.,
1550 M Street, N.W.,
Washington,
D.C. 20005.

Dear Mr. Larson,

I read, with considerable interest, the report of the National Critical Technologies Panel and have a few comments.

I have only a few comments and shall make them according to the three points that you raised in your letter of the 8th. August, and in that order.

1) None of the sectors listed in the Materials area fall directly within my expertise or that of Sherwin-Williams. However, I believe that Polymers should be one of the sectors in the Materials category because they are crucial materials in many different industries, e.g. paint, packaging, automotive, aerospace, composites etc.. Indeed, there is a lot of polymer research in universities and industrial laboratories throughout the world.

I believe that reference to Artificial Intelligence (AI) systems should be also made in the Software section of Information and Communication, rather than just in the Systems Management Technologies part of the Manufacturing category. AI, e.g. expert systems or neural networks, is as much software development that will help retain and systemize knowledge as it is a manufacturing aid.

2) I have nothing to add to the description of the U.S. competitive position because we have insufficient involvement with the particular topics listed.

3) Similarly, I have nothing concrete or fresh to suggest for industry resolution of the problem areas. In general, I would agree with the rôle laid out for industry in the President's Council on Competitiveness Fact Sheet. However, industry must convince itself and its workforce that real innovation is welcome as part of the spectrum of changes to be sought (together with

more incremental changes). Unfortunately, this is part of the usual arguments and complaints about the short term outlook of stockholders etc. At present R&D organizations must learn to work with these attitudes and remain the guardians of future competitiveness by building upon their successes.

Yours sincerely,

S. G. Croll

Stuart G. Croll,
Director, Materials Science R&D.

cc: G. P. Cunningham.

AUG 23 1991.

Dr. David P. Sorensen
Executive Director

3M

August 19, 1991

Mr. Charles F. Larson
Executive Director
Industrial Research Institute, Inc.
1550 M Street, N.W.
Washington, D.C. 20005

Dear Chuck:

I just finished reading, for the third time, the "Report Of The National Critical Technologies Panel". It is excellent!

Overall, the report has impressive content and is both relevant and complete. In each of the categories, most, if not all of us, could provide some additional detail or point out certain areas where supplement subjects or materials could be included. However, when finished, the report would be too lengthy and cumbersome to be of value to anyone.

I would make two specific comments for improvement, however. First, even though the importance of processing is implied generously across many of the areas listed as critical, I still believe that its importance is understated by a good margin. Second, the section on Biotechnology and Life Sciences is very brief and, again, its importance to the future technological health of the United States is understated.

A very special "Thank You" to you and the committee for providing us with a very valuable document. My comments include input from Dr. M. George Allen of 3M as well.

Sincerely,

Dave

DPS/dn

3M Corporate Technical Planning
and Coordination Department
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612/736 1641

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION DOCUMENT NUMBER: 9122004
ORIGINATOR: 02 STATUS C DIRECTORATE STATUS

****

FROM: BELDEN, DAVID 1.: THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/02/91

SUBJECT: A COPY OF THE TESTIMONY ON CRITICAL MANUFACTURING TECHNOLOGIES THAT WAS PRESENTED TO THE HOUSE SUBCOMMITTEE ON TECHNOLOGY & COMPETITIVENESS, MAY 9, 1991.

****

DIRECTORATE ASSIGNED:

STAFF ASSIGNED:

ACTION REQUIRED:

STAFF ACTION:

****

SENDER'S DUE DATE:

OSTP DUE DATE:

STAFF DUE DATE

DATE COMPLETED:

DATE COMPLETED/DEPT:

****

COPIES TO: D. Allan Bromley
INDUSTRIAL
Carl Bretscher
Steve Olson

****

WHITE HOUSE TRACKING #:

CONTACT PERSON: JANIS TABOR
PHONE: EXT:

REMARKS:

CLOSED

OSTP RECEIVED: 07/08/91

FILE: P- INDUSTRIAL-CRITICAL TECH

DEPT RECEIVED:

2004

The American Society of Mechanical Engineers

Suite 218
1825 K Street, N.W.
Washington, DC 20006-1202
202-785-3756

RECEIVED
91 JUL 8 P 3:16
OFFICE OF THE DIRECTOR

July 2, 1991

The Honorable D. Allan Bromley
Assistant to the President for Science
and Technology and
Director, Office of Science and
Technology Policy
Room 360, Old Executive Office Building
Washington, D.C. 20506

Dear Mr. Bromley:

I am pleased to enclose a copy of testimony on critical manufacturing technologies that was presented to the House Subcommittee on Technology and Competitiveness.

This statement, which was issued by the Council on Engineering and Industry Advisory Board of the American Society of Mechanical Engineers, addresses the question of what we need to do to translate the manufacturing technologies on the national Critical Technologies list into action. The statement emphasizes the following overriding requirements for a competitive U.S. effort in this area:

- We must move quickly and maintain a competitive pace.
- We must have national leadership.
- We must have specific goals, and detailed plans for achieving them.

If you have any comments on this statement, please contact Janis Tabor, Director of Government Relations, in ASME's Washington office.

Sincerely yours,

David L. Belden

David L. Belden
Executive Director

The American Society of
Mechanical Engineers

Suite 218
1825 K Street, N.W.
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202-785-3756

Statement on Critical Manufacturing Technologies

by the
Council on Engineering and Industry Advisory Board
of
The American Society of Mechanical Engineers

before the
Technology and Competitiveness Subcommittee
of the
Science, Space, and Technology Committee
of the
U.S. House of Representatives

May 9, 1991

Mr. Chairman and Members of the Subcommittee:

My name is Daniel T. Koenig, Vice President of Manufacturing for Steinway & Sons, and a member of the Board of Governors of the American Society of Mechanical Engineers (ASME). I am pleased to be here today to present the views of ASME's Council on Engineering and Industry Advisory Board on actions needed to help move America to the forefront of world manufacturing.

ASME is a worldwide engineering society focused on technical, educational, and research issues, with 118,000 members, including 21,000 students. From our vantage point as engineers, we have long advocated national leadership in U.S. technology policy. Since 1988, we have been pleased to see some of our recommendations become reality, including creation of the Technology Administration, renaming NBS the National Institute of Standards and Technology, establishment of the Advanced Technology and Manufacturing Centers Programs, publication of a U.S. Technology Policy, and now the completion of a cooperative, consensus effort to identify the key technologies for America's future.

This series of hearings on what we need to do to exploit these critical technologies is also a milestone. We commend you for this initiative, and we will work to assist you in every way that we can.

We well understand that success in this endeavor depends upon all of us, and that it will take time. While this statement emphasizes government action, it is important to note that government, industry, and academia are all partners, each of whom must take action in their own way. Technical societies such as ASME also have a role to play, particularly in furthering communication among the partners and in the transfer of technology.

U.S. Technology Policy

At the heart of the issue of critical technologies is U.S. technology policy.

It is ASME's position that, while industry must lead the way in technological innovation, the role of government is pivotal to industry's success. Last spring, the Society issued a General Position Paper on U.S. Technology Policy that called on the federal government to develop a coherent technology policy aimed at creating an environment in which technological innovation and application can flourish. Subsequently, the Bush Administration issued its statement of U.S. Technology Policy. This was a step in the right direction, but it is time to take action. The ASME paper recommends that:

--U.S. economic policy should foster investment in the development and application of new technology.

--The federal government should establish national technological goals and assume a more aggressive posture in support of the nation's civilian technology base.

--The federal government's civilian technology functions should be coordinated to facilitate the development and implementation of a national technology policy.

--Government at all levels should assign a higher priority to supporting human resource development and the nation's educational enterprise.

--Regulatory and legal policies should be reformed to provide incentives for technology development and application.

ASME also recommended that the White House Office of Science and Technology Policy (OSTP), "launch an ongoing initiative to establish a consensus among industry, government, technical societies and universities for setting national technological goals and for identifying critical technologies that require government support..." Eight months later, it was our privilege to provide recommendations to the National Critical Technologies Panel on four major technical areas related to mechanical engineering: manufacturing, materials, energy, and environment.

Today, we are pleased to have the opportunity to offer our recommendations for proactive measures to make the nation preeminent in the critical manufacturing technologies presented in the Panel's report.

Critical Manufacturing Technologies

We would like to underscore the strategic importance of manufacturing to our nation's economic competitiveness. While some U.S. manufacturers are doing well and reclaiming market share, others are having a hard time competing in international markets against large, vertically-integrated firms which in some cases are subsidized by their governments. The situation is particularly difficult for small and medium-sized manufacturing operations, which are a mainstay of our economy. While exploitation of the critical technologies is only part of the solution, the actions that can bring them to commercial success can also serve to benefit U.S. manufacturing across the board.

To compete in the world market, American manufacturers must make their products with higher quality and reliability, and must manufacture them more efficiently. Quality and reliability are absolutely essential to earn and to keep customer loyalty. To achieve the highest quality, reliability, and efficiency requires an integrated approach that encompasses organization, design methodology, and production processes.

We concur with the four manufacturing technologies included in the Report of the National Critical Technologies Panel: flexible computer integrated manufacturing, intelligent processing equipment, micro- and nanofabrication, and systems

management technologies. Along with other technologies on the Panel's list, these offer means by which we can minimize the time, energy, and materials required to build products. This will also increase the opportunity for more manufacturing operations to utilize "design for manufacturability" techniques, "just-in-time" inventory procedures, "zero-defects" manufacturing processes, optimized designs through selection of compatible manufacturing strategies, and "near net shape" production.

We believe that development and deployment of critical technologies related to manufacturing should be given a high priority in any national technology initiative. Not only are they interrelated (necessitating concurrent development), they will also draw on and/or will ultimately be used in commercial deployment of other critical technologies. A focus on manufacturing would serve the broad national interests, rather than the special interests of particular sectors.

Overriding Requirements

How can we bring the critical manufacturing technologies to economic fruition for the United States? The urgent nature of technological competitiveness and the interdependence of many critical technologies on the Panel's list make it imperative that the first steps encompass National Critical Technologies overall. For the nation to succeed in critical technology development and deployment, we believe that there are three overriding requirements.

1. We must begin to operate with a clear understanding that the rate of development and commercialization of advanced technologies is very rapid. Time is a competitive weapon that has been used to advantage by our competitors. Cycle time required to introduce new technologies has been excessive in the U.S. We must pick up the pace to compete.

2. We must have national leadership to champion policies and programs in support of technology development. The White House, through the Office of Science and Technology Policy/Critical Technologies Institute and the Technology Administration, should provide this leadership.

3. We must have a detailed plan for critical technologies overall that states where we want to go and how we can get there. The plan would save duplication of effort, avoid gaps, and accommodate the overlapping needs of the various technology areas. It should be directed to emphasize more effective exploitation of the technology we develop in America. Such a plan might be crafted through a summit of national public and private sector leaders along the lines of the education summit convened by the White House. Whatever the vehicle, it is essential that industry have a prominent role in setting the nation's technology agenda.

Technology Development

In addition, there needs to be a fundamental reevaluation of the government's role in support of technology development. The federal government has traditionally been a major source of support for basic science through funding of university research. The closer "science" moves to technology, the more government shies away, leaving technology development almost solely to the private sector.

Mechanisms whereby the government can support technology development, without dictating product lines to industry, are very important. We believe that the federal government should take the following steps to further manufacturing technology development:

- Increase funding for manufacturing under the Advanced Technology Program at the National Institute of Standards and Technology, and the Engineering Directorate of the National Science Foundation.

- Establish national centers for manufacturing research and technology where scientists from industry, government, and universities can work together on technology development and applications. This might be patterned after the Fraunhofer Institutes in Germany.

- Develop government procurement regulations that favor suppliers who invest in advanced manufacturing systems for long-term cost benefit.

- Support industry-initiated, industry-led technology development consortia.

- Establish an award for outstanding manufacturing innovation, along the lines of the Malcolm Baldrige Quality Award, to promote industry interest and public awareness.

Changing How We Do Business

A number of organizations have prepared specific recommendations for advancing development and deployment of some or all of the critical technologies. These recommendations share a common theme: each partner in the enterprise must make fundamental changes in the status quo. For industry, it would necessitate a longer view and greater investment in research and human resources. For the educational community, it would call for greater attention to interdisciplinary approaches that cover the entire manufacturing process, from design to production and marketing. For government, it would mean changes that make it more responsive to three pivotal issues involved in technology development by industry: a need for rapid diffusion from the laboratory to the factory, development capital, and assumption of financial risk.

Among the actions that government should take to give greater support the nation's technology enterprise are:

--Reduce the **cost of capital**, including balancing the federal budget and encouraging private savings.

--**Accelerate depreciation** of high technology machinery to correspond to their shorter product life cycles.

--Institute **regulatory and legal reforms**, including simplification and stabilization of regulatory requirements, enactment of uniform national product liability law, and modernization of antitrust laws for joint production ventures.

--**Coordinate federal R&D** programs on related technologies. With regard to manufacturing, it is particularly important to coordinate Department of Defense programs with the Department of Commerce, and for both agencies to collaborate with industry and academia.

--Manage government advanced technology R&D based on priorities, rather than annual budgets, through **multi-year authorizations and appropriations**.

--Speed up and improve **technology transfer** from the federal laboratories and universities to American industry.

--Expedite **availability of federal facilities** to industry for advanced technology development, and accommodate confidentiality of proprietary data for firms working with federal facilities.

--Recognize that **standards** are an important part of the manufacturing process, both nationally and internationally; in order to get products on the market without delay, it is essential that standards be developed concurrently with the technologies.

--Foster open-minded national policies toward **cooperative international RD&D**.

--Support **manufacturing education**, via grant programs for colleges and universities, and by establishing a manufacturing extension service to diffuse technology advances.

--Overall, **maintain continuity** in government programs that affect the development and deployment of technology. This will help foster confidence among companies and lessen the risks associated with investments in advanced technology.

As I stated earlier, industry should lead the way in technology development but the role of government is pivotal to industry's success. This statement has emphasized government actions because it is presented in a government forum. This should not be construed to mean that government alone can solve the problem.

In closing, I reiterate that we are pleased with the work to date of OSTP on critical manufacturing technologies. We earnestly hope that this will be the start of a stronger government-industry-education partnership to return the United States to preeminence in world manufacturing technology. It is imperative that we begin to develop plans and take specific action on this task without delay.

Thank you very much for the opportunity to contribute to this discussion. I would be pleased to answer any questions you may have.

This paper represents the opinions of the Council on Engineering and Industry Advisory Board of ASME, rather than a position of the Society.

Daniel T. Koenig, P.E.

Daniel T. Koenig joined Steinway & Sons as Vice President of Manufacturing in 1987. He is responsible for preserving the craftsman-like tradition and performance of the world's finest pianos, while at the same time introducing modern manufacturing and design concepts. Prior to 1987, Mr. Koenig was employed for twenty-one years with the General Electric Company in various engineering and manufacturing positions.

He is a member of the Board of Governors of the American Society of Mechanical Engineers, a senior member of the Institute of Industrial Engineers, and a senior member of the Society of Manufacturing Engineers. He is the author of the books, Manufacturing Engineering, Principals for Optimization, and Computer Integrated Manufacturing, Theory and Practice, as well as many engineering and technical publications. In addition, he has held the position of Adjunct Professor, Mechanical Engineering and Manufacturing Management at Illinois Institute of Technology, Rennsaelear Polytechnic Institute, and Schenectady County Community College.

Mr. Koenig received his MSME from Union College, Schenectady, NY, in 1970, and his BSME from the United States Coast Guard Academy in 1962. He is a registered Professional Engineer in New York State.

JUN 19 1991

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION DOCUMENT NUMBER: 9121775
ORIGINATOR: 02 STATUS C DIRECTORATE STATUS

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FROM: RENIER, James: HONEYWELL

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 06/12/91

SUBJECT: RE: THE MEETING OF 06/12/91, ON FOREIGN INVESTMENT IN THE NATION'S CRITICAL TECHNOLOGIES & THE CORPORATE RILE OF THE FEDERAL GOVERNMENT IN GUIDING & SUPPORTING U.S. TECHNOLOGY & INDUSTRIAL STATEGIES.

****

DIRECTORATE ASSIGNED: STAFF ASSIGNED:

Bill Phillips/Karl Eab
Comments due
DSTA.

ACTION REQUIRED: STAFF ACTION:

****

SENDER'S DUE DATE:

OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

****

COPIES TO: D. Allan Bromley
INDUSTRIAL
PHYSICAL SCIENCES

****

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:

REMARKS: DR. Phillips wrote letter for DAB's signature 7/22.

CLOSED

OSTP RECEIVED: 06/17/91 FILE: P-~~TECHNOLOGY~~
Industrial - Critical Tech.
DEPT RECEIVED:

THE WHITE HOUSE

WASHINGTON

July 22, 1991

Dear Dr. Renier:

My colleagues and I appreciated the recent opportunity of hearing of your concerns regarding foreign investment in U.S. technologies. We share your concerns, but at the same time recognize, as do you, the enormous benefits of free trade and the flow of technology across national boundaries. I am involved in bilateral Science and Technology agreements between the U.S. and foreign countries and strongly support the activities of Carla Hills and the Department of Commerce in activities related to "leveling the playing field" in trade and technology issues. More needs to be done. I look forward to the opportunity of calling on you for future input.

Sincerely,



D. Allan Bromley
The Assistant to the President
for
Science and Technology

Dr. James J. Renier
Chairman and
Chief Executive Officer
Honeywell Inc.
Honeywell Plaza
P.O. Box 524
Minneapolis, MN 55440-0524

Honeywell

Dr. James J. Renier
Chairman and
Chief Executive Officer

Honeywell Inc.
Honeywell Plaza
P.O. Box 524
Minneapolis, MN 55440-0524

612 870-2208
612 870-5136 Fax

9121775

June 12, 1991

Dr. D. Allan Bromley
Science Advisor to the President
Old Executive Office Building
17th Street and Pennsylvania Ave., NW
Washington, D.C. 20506

Dear Dr. Bromley:

It was a pleasure to meet you, Bill Phillips and Karl Erb this morning. I appreciated the opportunity to express my concerns regarding foreign investment in our nation's critical technologies, and my views regarding the appropriate corporate role of the federal government in guiding and supporting U.S. technology and industrial strategies.

I am gratified to learn that you and your colleagues share these concerns. As you indicated, progress has been made in terms of identifying our critical technologies, and in furthering acceptance of a federal role in support of pre-competitive, generic commercial technology development. However, I think you will agree that we should not allow such efforts to sustain U.S. technological leadership be undermined by an indifferent foreign investment policy.

I appreciate the sensitivity of this issue, but believe it is imperative that we acknowledge the risk associated with certain foreign investments, and move swiftly to address the challenge. Please know that we are prepared to work with you in finding some answers to this difficult and pressing problem.

Sincerely,

JJRenier/cah

cc: William Phillips
Karl Erb

RECEIVED
91 JUN 17 AM 11:19
OFFICE OF THE DIRECTOR

Ling + return to WDP

"CORRESPONDENCE TRACKING"

TYPE: ACTION DOCUMENT NUMBER: 9121286

****

FROM: WEINSCHEL, Bruno O.: IEEE

TO: DR. BROMLEY

DATE OF CORRESPONDENCE: 04/29/91

SUBJECT: COPY OF THE 1991 IEEE BOOKLET, "HOW THE UNITED STATES CAN COMPETE IN THE WORLD MARKETPLACE" AND A REQUEST FOR THE "REPORT OF THE NATIONAL CRITICAL TECHNOLIGIES PANEL"

****

ASSIGNED TO: INDUSTRIAL

ACTION REQUIRED: PLEASE SEND PUBLICATION

****

SENDER'S DUE DATE: OSTP DUE DATE: 05/15/91

DATE COMPLETED: 5/2/91 sent rpt. pf

****

COPIES TO: D. Allan Bromley

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WHITE HOUSE TRACKING #: CONTACT PERSON:

REMARKS:

DATE RECEIVED: 05/01/91 FILE: INDUSTRIAL-CRITICAL TECHNOLOGIES

9121286

RECEIVED

91 MAY 1 AM 8 43

OFFICE OF THE DIRECTOR

IEEE THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.
345 EAST 47TH STREET, NEW YORK, N.Y. 10017-2394, U.S.A. TELEX 236411

BRUNO O. WEINSCHEL
1986 PRESIDENT

PLEASE REPLY TO:
P. O. Box 576
Gaithersburg, MD 20884 USA
Telephone: (301) 948-8342
Fax: (301) 869-9783

April 29, 1991

Dr. D. Allan Bromley
Chief, OSTP
Old Executive Office Bldg., Rm. 358
17th & Pennsylvania Avenue, NW
Washington, DC 20506

RE: 126-PAGE DOCUMENT OF APRIL 25, 1991 LISTING 22 KEY TECHNOLOGIES BY W.D. PHILLIPS

Dear Sir:

Your November 27, 1990 11-page report on "U.S. Technology Policy and the Path to Competitiveness" is an excellent document. On last Friday, April 26, 1991, I was one of the two keynote speakers at Cornell. My subject was "Engineering Education for Global Competition". I liberally used the information of your November 1990 report.

Please send me a copy of the April 25, 1991 report, the preparation of which was coordinated by W.D. Phillips of your office. Thanks for complying with this request.

Enclosed is a copy of a small booklet prepared in 1991 by the IEEE Committee on U.S. Competitiveness. Additional copies can be obtained at no charge from Jim Ferguson at the IEEE Washington office.

Sincerely yours,

Bruno O. Weinschel
1986 IEEE President
Ex-Chairman of the IEEE Committee
on Competitiveness, 1978-1984

BOW/tfh

Enclosures: "How the U.S. Can Compete in the World Marketplace", by J. Doyle

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION DOCUMENT NUMBER: 9121264

****

FROM: REDDY, Leo: NACFAM

TO: DR. BROMLEY

DATE OF
CORRESPONDENCE: 04/25/91

SUBJECT: A NOTE OF CONGRATULATIONS ON THE REPORT OF THE NATIONAL CRITICAL TECHNOLOGIES PANEL AND THEY WELCOME THE OPPORTUNITY TO MAKE THEIR EXPERTISE AVAILABLE

****

ASSIGNED TO:

ACTION REQUIRED:

****

SENDER'S DUE DATE: OSTP DUE DATE:

DATE COMPLETED:

****

COPIES TO: D. Allan Bromley
Dr. Phillips

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WHITE HOUSE TRACKING #: CONTACT PERSON:

REMARKS:

DATE RECEIVED: 04/29/91 FILE: INDUSTRIAL - CRITICAL TECHNOLOGIES.

9121264

NACFAM
The National Coalition for Advanced Manufacturing

RECEIVED
91 APR 29 P12 : 12
OFFICE OF THE DIRECTOR

April 25, 1991

The Honorable
D. Allan Bromley
Director, Office of Science and Technology Policy
Old Executive Office Building, Room 358
The White House
Washington, D. C. 20506

Dear Dr. Bromley:

On behalf of the members of the National Coalition for Advanced Manufacturing, I would like to congratulate you and Dr. William Phillips for the excellent report of the National Critical Technologies Panel. In identifying 22 critical technologies, you have facilitated a cost-effective concentration of national resources and a sound basis for industry-academic-government cooperation that will help meet a range of pressing national needs.

NACFAM especially welcomes the fact that you have identified and given prominence to four key manufacturing technologies. These technologies are generic and precompetitive and apply to all manufacturing industries irrespective of their product sector. They are also technologies which currently receive less than 1.3% of federal R&D funding (and were reduced in the Administration's FY 92 budget proposal) and in which the United States has fallen well behind competitor nations, as documented both in NACFAM's White Paper and in the recent report of the Council on Competitiveness. Increased investment in these technologies will yield early returns through boosting productivity, quality, and competitiveness.

Through its national trade association and corporate members, NACFAM can reach out to over 70,000 large, medium and small firms nationwide, as well as to over a hundred centers of manufacturing technology research. As you and your team turn to strengthening collaborative R&D in manufacturing technologies, NACFAM would welcome opportunities to make our expertise available to you. If the Administration wishes to work more closely with the private sector in this critical field, you will find a robust response.

Sincerely,

Leo Reddy
President

1331 Pennsylvania Avenue, NW ► Suite 1500 - North ► Washington, DC 20004
Tel. (202) 347-0090 ► Fax. (202) 637-3182

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION DOCUMENT NUMBER: 9120712

****

FROM: BLOCH, Erich: COUNCIL ON COMPETITIVENESS

TO: DR. BROMLEY

DATE OF CORRESPONDENCE: 03/08/91

SUBJECT: LETTER TO DR. PHILLIPS REGARDING THE ESTABLISHMENT OF THE CRITICAL TECHNOLOGY INSTITUTE MANDATED BY CONGRESS.

****

ASSIGNED TO:

ACTION REQUIRED:

****

SENDER'S DUE DATE: OSTP DUE DATE:

DATE COMPLETED:

****

COPIES TO: D. Allan Bromley

****

WHITE HOUSE TRACKING #: CONTACT PERSON:

REMARKS:

DATE RECEIVED: 03/11/91 FILE: Industrial TECHNOLOGY-CRITICAL

9120712

Council on Competitiveness

RECEIVED
91 MAR 11 AM : 24
OFFICE OF THE
DIRECTOR

March 8, 1991

Mr. William Phillips
Office of Science and Technology Policy
Old Executive Office Building
17th Street and Pennsylvania Avenue, NW
Washington, D.C. 20506

Dear Bill:

This letter is to follow-up on the discussions we have had regarding the establishment of the Critical Technology Institute mandated by Congress, and to be established under OSTP management as a not-for-profit organization.

Subsequently, I have discussed the subject with both the management and Executive Committee of the Council on Competitiveness.

The reason for this letter is to suggest to you that OSTP seriously consider the Council as a place to establish this Institute. There are many reasons that would support this recommendation. There are also differences between establishing it at the Council and looking at other possibilities

I want to be as objective as possible, analyzing both the advantages and drawbacks of such a proposal.

1. Advantages to a Council affiliation:

-- The Council is located in Washington, D.C. which allows access to Administration and Congressional leadership and staff, as well as business, industry and academic expertise.

-- Since the structure of the Council is constituted as a not-for-profit organization, the congressional mandate on that point is fulfilled as the Council is a committee under the parent organization, The Foundation for American Economic Competitiveness that maintains a 501(c)3 status. Further, the Council's agenda is a non-partisan one.

--The structure of the Council with a Foundation as its administrative head with substructures such as the Council operation itself, allows the establishment of parallel separate entities, each one different in purpose as well as different from a governing mode viewpoint. The institute could be one of these structures.

900 17TH Street NW • Suite 1050 • Washington, DC 20006
(202) 785-3990 • FAX (202) 785-3998

--Membership of the council is divided among academic institutions, (53) for-profit manufacturing enterprises (63), and service sector companies, (14) and to a smaller extent, labor and technical not-for-profit organization (7) resulting in a broad representation of the American sectors that have an interest in, and can contribute knowledgeably to, the functioning of the proposed institute and the issues it should be addressing.

--Because of the Council's membership, the Institute would have the benefit of easy access to experts in science, technology, manufacturing and management to augment its own expertise. The Council's forthcoming Technology paper was generated by exactly that means--namely the deliberation, debate, and interaction of a diverse group of people, representing the diverse mainstream of American scientific and technical life.

--The established structure of the Council would make it less expensive for the Institute to function because administrative resources and facilities could be shared, therefore saving taxpayers' dollars.

2. Comparison with other alternatives

--An alternative which I know you are considering, is the affiliation with an academic institution. Certainly this partnership would have its advantages, but one must be concerned that a university approach not be too academic and isolated from the realities that impact our technology position and industry.

--Another alternative would be the establishment as a standalone entity. The critical mass issue and greater administrative cost should be an important concern.

--A third alternative is the association with an existing for-profit think tank (e.g. MITRE, Hudson, SRI). These groups are much too specialized and are not associated with diverse private companies and academic institutions. Therefore, their perspective and access to viewpoints is narrower than what is required.

--A fourth alternative, making the Institute a part of the White House OSTP function, could seriously hamper the attraction and retention of qualified people, because of the severe administrative and political restrictions that would prevail under changing Administrations and the civil service rules.

3. Other considerations

--The selection of the Director and other management obligations of OSTP and the provisions of the Congressional mandate

are obviously to be followed, and the Council would have to take this into consideration if this proposed arrangement would be accepted by OSTP.

I hope we can discuss this matter further. I thought it would be helpful to you and Dr. Bromley if the bare outline of this alternative were proposed to you at this time.

Sincerely,

Erich Bloch
Distinguished Fellow

EB:clm
cc: Dr. A. Bromley

"CORRESPONDENCE TRACKING"

TYPE: ACTION DOCUMENT NUMBER: 9120678

****

FROM: COHON, Jared L.: JOHN HOPKINS UNIVERSITY, THE

TO: DR. BROMLEY

DATE OF CORRESPONDENCE: 03/07/91

SUBJECT: A "WHITE PAPER" ON THE CRITICAL TECHNOLOGIES INSTITUTE.

****

ASSIGNED TO: Dr. Phillips

ACTION REQUIRED: ~~FOR DAB SIGNATURE~~ PHILLIPS signature (per Domar 6/7).

****

SENDER'S DUE DATE: OSTP DUE DATE: 03/22/91

DATE COMPLETED: 6/6/91

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COPIES TO: D. Allan Bromley
Life Sciences

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WHITE HOUSE TRACKING #: CONTACT PERSON:

REMARKS:

DATE RECEIVED: 03/08/91 FILE: TECHNOLOGY*Industrial CRITICAL TECH.

9120678

THE JOHNS HOPKINS UNIVERSITY
BALTIMORE, MARYLAND 21218
(301) 338-8765

RECEIVED
91 MAR 8 P12:00
OFFICE OF THE DIRECTOR

JARED L. COHON
VICE PROVOST FOR RESEARCH

March 7, 1991

The Honorable D. Allan Bromley
Director
Office of Science and Technology Policy
Old Executive Office Building
Room 358
Washington, DC 20506

Dear Dr. Bromley:

I have enclosed for your consideration a "white paper" on the Critical Technologies Institute. Although not a proposal, this paper sets out the main features for the Institute if The Johns Hopkins University were to act as its host and manager. The document was prepared by Ted Poehler, Associate Dean for Research in our G.W.C. Whiting School of Engineering, and me, based on conversations that we had with Bill Phillips and others.

As our white paper explains, we believe that a university, and in particular Johns Hopkins, would provide several advantages as a host for the Critical Technologies Institute. We would be very pleased to follow up in any way you think appropriate.

Sincerely,

Jared L. Cohon

JLC:jer
Enclosure

cc: Dr. William Phillips
Dr. D. A. Henderson
Dr. William C. Richardson, President, The Johns Hopkins University
Dr. Theodore O. Poehler

Withdrawal/Redaction Sheet
(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
01. Paper	Critical Technologies Institute at Johns Hopkins University (11 pp.)		(b)(4)	

Collection:

Record Group: Bush Presidential Records
Office: Science and Technology Policy, Office of (OSTP)
Series: Bromley, D. Allan, Files
Subseries: General Science Files
WHORM Cat.:
File Location: Industrial: Critical Technologies [1991]

Date Closed:	3/11/2010	**OA/ID Number:**	62035-007
FOIA/SYS Case #:	2005-0336-F	**Appeal Case #:**	
Re-review Case #:		**Appeal Disposition:**	
P-2/P-5 Review Case #:		**Disposition Date:**	
AR Case #:		**MR Case #:**	
AR Disposition:		**MR Disposition:**	
AR Disposition Date:		**MR Disposition Date:**	

RESTRICTION CODES

Presidential Records Act - [44 U.S.C. 2204(a)]

P-1 National Security Classified Information [(a)(1) of the PRA]
P-2 Relating to the appointment to Federal office [(a)(2) of the PRA]
P-3 Release would violate a Federal statute [(a)(3) of the PRA]
P-4 Release would disclose trade secrets or confidential commercial or financial information [(a)(4) of the PRA]
P-5 Release would disclose confidential advice between the President and his advisors, or between such advisors [a)(5) of the PRA]
P-6 Release would constitute a clearly unwarranted invasion of personal privacy [(a)(6) of the PRA]

C. Closed in accordance with restrictions contained in donor's deed of gift.

PRM. Removed as a personal record misfile.

Freedom of Information Act - [5 U.S.C. 552(b)]

(b)(1) National security classified information [(b)(1) of the FOIA]
(b)(2) Release would disclose internal personnel rules and practices of an agency [(b)(2) of the FOIA]
(b)(3) Release would violate a Federal statute [(b)(3) of the FOIA]
(b)(4) Release would disclose trade secrets or confidential or financial information [(b)(4) of the FOIA]
(b)(6) Release would constitute a clearly unwarranted invasion of personal privacy [(b)(6) of the FOIA]
(b)(7) Release would disclose information compiled for law enforcement purposes [(b)(7) of the FOIA]
(b)(8) Release would disclose information concerning the regulation of financial institutions [(b)(8) of the FOIA]
(b)(9) Release would disclose geological or geophysical information

"CORRESPONDENCE TRACKING"

TYPE: ACTION DOCUMENT NUMBER: 9120295

****

FROM: BECKLER, DAVID Z.

TO: DR. BROMLEY

DATE OF CORRESPONDENCE: 01/31/91

SUBJECT: THE ORGANIZATION OF THE CRITICAL TECHNOLOGIES INSTITUTE; A REQUEST FOR EARLY ESTABLISHMENT OF AN INTERIM INTERAGENCY ADVISORY GROUP ON THE INSTITUTE.

****

ASSIGNED TO: Dr. Phillips

ACTION REQUIRED: DAB
SIGNATURE

****

SENDER'S DUE DATE: OSTP DUE DATE:

DATE COMPLETED:

****

COPIES TO: D. Allan Bromley

****

WHITE HOUSE TRACKING #: CONTACT PERSON:

REMARKS: DAB answered directly on 2/21, per DH.

DATE RECEIVED: 02/04/91 FILE: Industrial Technology CRITICAL TECHNOLOGY

9120295

CARNEGIE COMMISSION ON SCIENCE, TECHNOLOGY, AND GOVERNMENT

10 Waverly Place, New York, N.Y. 10003 (212) 998-2150 FAX (212) 995-3181

RECEIVED

January 31, 1991

91 FEB 4 P2:57

OFFICE OF THE DIRECTOR

Dr. D. Allan Bromley
Director
Office of Science and Technology Policy
Old Executive Office Building
Washington, D.C.

Dear Allan,

I am enclosing a copy of a memorandum I prepared for Bill Phillips at his request concerning the organization of the Critical Technologies Institute. I understand that Bill will be on leave until February 11, and I am providing you a copy at this time in the event you wish to consider the early establishment of an interim interagency advisory group on the Institute as suggested in the first page of my memorandum.

Sincerely,

Dave Beckler

David Z. Beckler
Associate Director

cc Dr. William Phillips

CARNEGIE COMMISSION ON SCIENCE, TECHNOLOGY, AND GOVERNMENT

10 Waverly Place, New York, N.Y. 10003 (212) 998-2150 FAX (212) 995-3181

January 30, 1991

Memorandum for: William Phillips, Associate Director
Office of Science and Technology Policy

From: David Z. Beckler

Subject: Critical Technologies Institute

This is in response to your request for a summary of my views concerning the Critical Technologies Institute expressed during our meeting on January 24, 1991.

Funding: I was pleased to learn that there will be a technical amendment to the appropriations Act to authorize spending of the $5m appropriation over 3 fiscal years. To establish a solid foundation for the institute and attract a top-flight staff, it would be desirable to offer the hope of longer-term funding. If it is unlikely that an OSTP appropriation for this purpose after 3 years would be supported by the White House/OMB, the possibility of multi-agency funding through the FCCSET mechanism could be explored. Interested departments and agencies might be willing to agree to give this possibility serious consideration based on the performance, contributions, and prospects of the institute during its first years of operation.

Interim Advisory Group: I suggested that an informal government advisory group be convened by the OSTP Director at the earliest feasible time to serve as a sounding board for the Director on the organization of the institute, pending the establishment of the institute and its full Board of Trustees. The interim advisory group would be chaired by the Science Adviser and include the government members of the Executive Committee specified in the legislation, namely the Secretary of Defense, Secretary of Energy, Secretary of Health and Human Services, the Secretary of Commerce, the Administrator of NASA, and the Director of the National Science Foundation (or their designees). The Science Adviser could consult with the advisory group on various aspect of the organization of the institute, particularly on the question of longer-term funding, on the pros and cons of various organizational options and choices in establishing the institute as an FFRDC, on possible candidates for the institute director and senior professional staff, on the work program, and on the capabilities and resources that the departments and agencies could offer to the institute. A member of the advisory group might provide staff support to the OSTP in drafting the charter and administrative procedures of the FFRDC. In sum, establishment of an interim advisory group could provide a means for communicating OSTP's interests in the institute, for obtaining ideas on the organization of the institute, and for enlisting agency assistance and cooperation.

Governance: The institute's Board of Trustees established by the Act includes 11 governmental members and 10 members appointed from among representatives of industry,and colleges and universities in the U.S. Irrespective of the long-term duration of the institute, the board can usefully serve as a mechanism for maintaining a dialogue between government officials and industry and the universities on questions related to strategic technologies and the related S&T base. Although the NRC Government-University-Industry Research Roundtable and the Manufacturing Forum serve a very useful purpose in catalyzing such a dialogue, the institute's board would provide a formal mechanism for obtaining the views and advice of industry and academia and for communicating the views of high-level officials from federal R&D agencies.

Role of the FCCSET: The 11 governmental members on the institute's 21-member Board of Trustees in effect constitute the full membership of the FCCSET. Thus, the FCCSET itself can serve as an instrument for mobilizing governmental support of the institute, using its committee structure and ad hoc groups to define issues and provide technical support. The provision of the Act permitting the institute to perform functions for the member agencies of the FCCSET will need interpretation to provide guidance to the agencies and the institute on its implementation.

Duties: The duties of the institute specified in the legislation treat critical technology issues from a fairly narrow perspective. Its studies would largely depend on a "survey" of the views of industry, colleges and universities, and Federal and State agencies, involved in research, development, or utilization of critical technologies. On the other hand, the requirements for analysis specified in the legislation are so broad as to raise questions of feasibility. Meaningful analysis will depend on more than a survey of industry's views. It will need to extend beyond S&T considerations in identifying objectives for research, development, and production and preparing strategies for achieving those objectives. Thus, the scope and limitations of the institute's duties need further definition to decide on the size and diversity of professional staff. There is a related question concerning the balance of effort between in-house and contract studies and use of outside consultants. A case can be made for the institute's engaging in exploratory studies during its first year to provide: (a) a basis for designing the survey of views called for in the legislation, and (b) an understanding of factors and analytical processes involved in "identifying" suitable R&D and production objectives and in preparing possible strategies for their achievement.

Interesting from a longer-range perspective is the requirement that the institute provide technical support and assistance to the committees and panels of the FCCSET regarding policy formulation for activities: (a) that advance the development of critical technologies, and (b) that sustain and strengthen the S&T base of the U.S. The institute is also required to perform such functions for the OSTP as its director may specify consistent with the

overall duties of the institute. The broader statement of duties will enable the institute to develop into an important analytical mechanism for the OSTP since a large part of OSTP's interest could be related to critical technology. It could, for example, undertake a methodological study of the S&T base issue to provide OST an understanding of needs and opportunities for policy analysis and development.

The broad, long-range need for the institute to strengthen the analytical underpinning of the OSTP and FCCSET mechanisms could influence the choice of institute director and staff and decisions concerning its organization and future funding. The institute will need both to respond to and resist pressures for short-term results. Creating unrealistic expectations or products of indifferent quality could shorten its life and short circuit its potential long-term value as a dedicated analytical support mechanism for the OSTP.

Staff: The director and the staff of the institute should have credibility in industry as well as in government and academia. This is particularly true of the director who will project the image of the institute and be responsible for recruiting and selecting the staff. The appointment of an outstanding individual will help attract first-rate professionals to what might otherwise be regarded as an unclear mission and uncertain government commitment. During the start-up phase the institute could lean heavily on staff on leave from government, industry, and academia, and make extensive use of outside consultants.

Organization: The legislation specifies the establishment of "a federally funded research and development center". The provisions for governance and reporting relationships clearly indicate that it is a non-governmental entity in the character of an FFRDC. From this standpoint, FFRDC's may be divided into three principal classes:

a. An independent, free-standing FFRDC supported by and dedicated to the needs of a particular federal department or agency (e.g., RAND, MITRE, Aerospace Corp.);

b. An FFRDC that operates as a subdivision of a parent FFRDC (e.g. the National Defense Research Institute of RAND, the Command, Control, Communications, and Intelligence Division of MITRE);

c. An FFRDC operated by a not-for-profit organization established by contract with a Federal agency [e.g., Center for Naval Analysis (Hudson Institute), Software Engineering Institute (Carnegie-Mellon), Lincoln Laboratory (MIT), Lawrence Livermore and Los Alamos National Laboratories (University of California), Brookhaven and Fermilab (consortium of universities)].

In deciding on the organizational base for the institute, the advantages and disadvantages should be weighed in relation to certain criteria, such as:

-- compatibility of the mission and functions of the institute with those of a parent FFRDC (in the case of options b and c);
-- perception of the institutional arrangement and setting in the eyes of government (Executive agencies and the Congress), industry, and university;
-- ease of establishing the institute (drafting its charter and bylaws, personnel policies and administrative arrangements, etc.);
-- time required to establish the institute, resolve policy issues, recruit staff, and set it in operation, considering the nature of its mandate and less than 3-year assured life;
-- relationship of the board of trustees of the institute to the governing board of a parent body (in the case of options b and c);
-- intellectual resources and value of two-way professional interaction between the institute and the parent organization;
-- advantages and disadvantages in relation to a long-term association or possible dislocations in the case of a short-term life.

The foregoing considerations are not of equal importance, nor are they listed in particular order. With regard to the three classes of FFRDC's:

1. A free-standing FFRDC has the attractiveness of undivided loyalty and attention to its OSTP sponsor and clear lines of governance by the institute's board of trustees, particularly in setting operating policies, selecting the director and establishing pay levels and working procedures. Offsetting this is the administrative difficulty for the OSTP in defining the charter and bylaws and in developing personnel and administrative policies and practices. The short-term of assured life and lack of organic connection to an established outside-of-government organization of high professional reputation and quality could hinder recruitment of the director and staff.

2. Situating the institute within an established FFRDC might raise difficult questions concerning the relative roles and responsibilities of the institute board vis a vis the parent FFRDC board, as well as the compatibility of the institute's charter with the obligations of the FFRDC to its principal agency-contractor. There could also be an image problem, for example, where the parent FFRDC is primarily responsible for defense-related matters under a prime contract with DOD.

3. Establishing the institute as an FFRDC administered by a university or other non-profit organization could avoid troublesome features of the other options. However, efforts to restrict the role of the parent organization to purely administrative and custodial functions may not be well received by the parent's board of trustees which may wish to retain some policy control (e.g.,

appointment of the director and staff and assumption of related obligations). There may also be particular concern about possible future implications of terminating the institute after 3 years in the absence of follow-on funding.

If the above concerns can be overcome to the mutual satisfaction of the OSTP Director and the parent institution, there could be advantages in placing the institute under the auspices of a university or other non-profit organization, particularly one that has had experience in setting up and operating a FFRDC. The start-up time could be relatively short provided basic issues of governance could be avoided and acceptance of responsibility by the institution would not provoke extended internal debate. Providing a stimulating intellectual home for the institute could enrich and invigorate its staff as well as bring professional resources to bear in its work. If the parent organization is sufficiently large, with excellence in areas of interest to the institute, recruitment of institute staff would be facilitated and its work expedited.

Among the possibilities for this role, MIT holds particular interest. MIT pioneered in the establishment of FFRDC's. It has demonstrated its interest and competence in the area of high-tech industrial performance (ref. Made in America). It has a distinguished science and engineering faculty, government policy sensitivity, and extensive contacts with industrial companies. Although the institute would be located in Washington, interaction with MIT faculty and access to its research resources would not pose particular difficulties.

Among institutions located in the Washington area, the Carnegie Institution of Washington offers another possibility. Its attractiveness lies in its scientific reputation and Washington location. However, it does not engage in applied research and development; nor does it have close association with industry. The Stanford Research Institute, by virtue of its operations in the Washington area, international outlook, and longstanding program of technology assessments for industry could be a logical home for the institute and enable it to come up to speed in relatively short order. Other possibilities in the Washington area include the University of Maryland, University of Virginia system, and George Washington University.

In the absence of an ideal arrangement, the choice will need to balance the strengths and weaknesses of various options and institutions.

"CORRESPONDENCE TRACKING"

TYPE: ACTION DOCUMENT NUMBER: 9120294

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FROM: ASHLEY, ROBERT J.

TO: DR. BROMLEY

DATE OF
CORRESPONDENCE: 01/30/91

SUBJECT: EPA REVIEW DRAFT

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ASSIGNED TO: Life Sciences

ACTION REQUIRED: DIRET RESPONSE

****

SENDER'S DUE DATE: OSTP DUE DATE: 02/28/91

DATE COMPLETED:

****

COPIES TO: Dr. Wong
D. Allan Bromley

****

WHITE HOUSE TRACKING #: CONTACT PERSON:

REMARKS:

DATE RECEIVED: 02/04/91 FILE: LIFE SCIENCES-EPA REVIEW

9120294

J. Robert Ashley, Ph.D. (Electromagnetic Theory) 813 961 7617
2523 Lake Ellen Ln.; Tampa, FL 33618

RECEIVED
91 FEB 4 P 2:58
OFFICE OF THE DIRECTOR

1991 January 30

To:
Dr. D. Allan Bromley
Assistant to the President
for Science & Technology
Old Executive Office Bldg., Rm. 360
17th & Pennsylvania Ave., N.W.
Washington, DC 20506

Dr. Robert A. Kamper
National Institute of
Standards & Technology
325 Broadway
Boulder, CO 80303

From: Dr. J. Robert Ashley, Taxpayer J. Robert Ashley

1. I wish to commend Dr. Bromley for his scientific judgment regarding the EPA REVIEW DRAFT "Evaluation of the Potential Carcinogenicity of Electromagnetic Fields". I was able to obtain a copy in time to submit 35 pages of comments before the EPA SAB subcommittee meeting in Washington on Jan. 14-16. After attending all three days of the meeting, I sent 5 more pages of comments to the EPA for the subcommittee. The REVIEW DRAFT and the public comments at the meeting, particularly by engineers and physicists, make it clear that the EPA has grossly overestimated the link between powerlines and cancer.

2. The REVIEW DRAFT covers the frequency spectrum from 3 Hz to 30 GHz. In that range, only 60 Hz three-phase powerlines have the power input and geometry to expose significant numbers of people to fringing electric and magnetic fields. Here are my crude estimates:

A. 115 kV to 765 kV rural transmission powerlines, 1 million people.
B. 69 kV to 138 kV urban distribution powerlines, 10 to 20 million.
C. 10 to 50 kV urban overhead distribution powerlines, 150 million.

Public comment from concerned citizens outside of the scientific community has come from A and B above. However, if the epidemiology data from Denver are proved significant, category C means that we will have to invest billions in burying the overhead distribution lines. Before electric power users are asked to shoulder this burden, we need much more convincing evidence than now available.

3. The REVIEW DRAFT does report the only evidence for linking powerlines to cancer: a) the Wertheimer & Leeper 1979 paper; b) the Savitz 1988 paper; and c) the calcium efflux research by Dr. Adey & colleagues. The only justification for believing the first two papers are significant is the idea that "wiring configurations" are a surrogate for magnetic field exposure. Thus, that issue needs to be proved or de-bunked. And, the reliability of the calcium efflux experiments needs to be greatly improved. Then, the EPA can write a report on the 60 Hz question ONLY. They need help from the NIST Electromagnetic Fields Dept. in Boulder.

4. The balance of the material in the REVIEW DRAFT is important only in occupational health; thus, OSHA is the Federal Agency to write the report. The 60 Hz material needs to be removed and Ch. 2 re-written by NIST engineers before issue of a final version. EPA is not needed further.

5. Copies of my latest recommendations to EPA are appended.

Copy, less enclosure: EPA, Mrs. Conway.

J. Robert Ashley, Ph.D. (Electromagnetic Theory)
Tampa, Florida

Mayor James P. Connors
Scranton, PA

1991 January 26

Dear Mayor Connors:

I have given considerable thought to your remarks at the EPA Science Advisory Board Radiation Advisory Committee meeting in Washington, DC, and to our conversation after the meeting. In the two days following your public comment, several of the sub-committee members mentioned that your questions best expressed what the public wants to know about this issue. My answers may be of use to you in the four months before the sub-committee gives a report to the EPA.

Based on current scientific knowledge, general answers are impossible. However, I can comment on the numbers you gave me regarding the powerline in question. As I remember, it is 69 kilo-volts (kV) and magnetic fields of 6 to 10 milli-gauss (mG) have been measured in homes. If this powerline is supported on single poles and has other wires on smaller insulators, the magnetic field may be caused more by the lower voltage distribution powerline than the 69 kV transmission powerline. (This is a typical situation in Tampa and most of Florida.)

The only viable numbers for judging this matter come from epidemiology research in Denver by Dr. David Savitz and colleagues. (Draft Report pf 3-22.) In the tables given by Savitz, et. al., the highest magnetic data cited is a 2.5 + bracket. The plus sign means that all measurements above 2.5 mG are included in this bracket. In a later paper by Dr. Frank S. Barnes (with Savitz as a co-author), I think the details given would include 6 mG in this bracket. However, the highest voltage in the Denver power distribution system is 13.2 kV -- they do not have the equivalent of your 69 kV powerline in the Denver Metropolitan Area. Thus, one could say that your case MIGHT be covered by these magnetic field data. The Savitz electric field or wiring configuration data DO NOT APPLY to your situation. In the 2.5 + mG bracket, the odds ratio for cancer risk of 1.49 with 95% confidence interval of 0.62 to 3.6 is given by Savitz, et. al. (p 3-26, Draft Report.)

What advice can you give your citizens based on those numbers? Here, I believe that widely divergent answers can be partially explained by personal bias. Certain writers would interpret those numbers with a claim that a 49 % increase in cancer risk would compel people with children to abandon houses where greater than 2.5 mG is measured. However, most of their previous claims about microwaves have been false alarms. An epidemiologist without knowledge of other data on this issue would reason as follows. The confidence interval of 0.62 to to 3.60 means that the result is vague. (The basic statistical reason for this is that only 10 cases and 12 controls were found in this bracket. Thank heavens, childhood cancer is a relatively rare disease.) The lower limit of 0.62 is sufficiently less than 1.0 that a decision cannot be made based only on this epidemiology study. This is the point which is frustrating all of us -- including the scientists you addressed at that meeting.

What other evidence should be considered? As pointed out at that meeting, in the cases of cigarette smoking and asbestos increasing cancer risk, the first indications were from epidemiology. Then, explanations based on bio-chemistry were developed. Finally, laboratory experiments with animals confirmed the theories. Regarding powerlines, bio-physics must give an explanation. Chapter 2 of the Draft Report documents the total lack of a reasonable explanation in physics. In fact, someone remarked at the meeting that explaining the physics that prove a cancer risk associated with powerline magnetic fields should win the scientist a Nobel Prize! The laboratory experiments done in the past say that no biological effects have been reliably measured below 50,000 mG. Based on confirming evidence, I see no need for moving away from powerlines of any size or variety. This basic conclusion is fundamental to the Florida EMF Rule, Ch. 17-274.

Would I live near your powerline? Yes. I am monitoring the magnetic field in our home and it ranges from 2 mG (today, no need for heat or air conditioning) to 5 mG on a hot summer afternoon. Thus, it is comparable to your case even though the powerline in our front yard is rated at 13.2 kV. Also, many cities (including Tampa) have 69 kV powerlines such as yours and we have not seen an epidemic of childhood cancer.

Would I advise our children (who are well educated in physics) to move our 1 to 4 year old grandchildren away from 6 to 10 mG? No. The physics evidence is overpowering. Magnetic fields of less than 5,000 mG have not been shown to cause biological effects, let alone contribute to cancer.

Is there a reasonable chance that new evidence could make me change my mind? I doubt it. The results of a larger epidemiology study in Los Angeles will be published this year. Los Angeles has 69 kV along with lower voltage powerlines; thus, the results will significantly advance our knowledge. My hope is that it will shed light on the electric field question because the electric field gives a more reasonable justification for the wiring configuration statistics of Wertheimer and Leeper. Regarding physics, Dr. Robert Adair of Yale University has made some fundamental calculations using theoretical physics. His theory shows it is physically impossible for powerlines to increase cancer risk. I am well educated in this area of theoretical physics and believe Dr. Adair is right. Regarding the matter of ethics and a constantly heard criticism that those who do not believe magnetic fields cause cancer are biased by their financial support, I point out that Dr. Adair works and teaches in other areas of physics. In terms of bias that can be attributed to funding of research, Dr. Adair is impeccably immune from such criticism. My funding situation is the same.

I can offer you political advice on this matter. If a matter regarding powerlines has been decided by your Public Service Commission, there is no chance of winning in litigation to overturn their decision. Don't waste money on lawyers regarding the powerline public health issue.

I would be pleased to answer further questions by telephone.

Cordially,

J. Robert Ashley

J. Robert Ashley
Copy to EPA sub-committee members via Mrs. Conway

J. Robert Ashley, Ph.D. 813 961 7617
2523 Lake Ellen Ln.; Tampa, FL 33618

To: EPA SAB Radiation Advisory Committee 1991 January 26
Nonionizing Electric and Magnetic Fields Subcommittee

From: Dr. J. Robert Ashley, Taxpayer; Tampa, Florida.

Subject: Further comments on the EPA DRAFT REPORT.

SUMMARY OF MY RECOMMENDATIONS

1. Turn the present DRAFT REPORT over to OSHA for revision (especially Ch. 2), review and issuance. OSHA should not make recommendations regarding public health issues at 60 Hz.

2. EPA must resolve the 60 Hz powerline public health questions. No work should be done before John Peters reports the USC study. Follow Dr. Bergeron's recommendations regarding calcium efflux research.

3. If the USC study does not decisively resolve the questions raised in Denver, then determine wiring configuration correlation with electric or magnetic fields in Denver.

4. EPA write a new report on the 60 Hz issue only.

5. Both OSHA and EPA need to assign electrical engineers to support their epidemiologists and life scientists in writing these reports.

BACKGROUND AND JUSTIFICATION

In accordance with the procedures at the subcommittee meeting on 1991 Jan. 14, 15, & 16, I wish to state that as of today, I have received no funding or paid consulting work related to the 60 Hz EOMF public health issue. Some travel has been funded by State of Florida agencies. I have been able to combine COMAR activities with other IEEE Instrumentation and Measurements Society business to pay for air transportation. In my career of working in RF and microwaves since 1946, occupational health has been a personal concern but not a subject of paid research or engineering. Should mitigation of 60 Hz electric or magnetic fields be proved necessary, I expect appreciable financial gain.

My attendance at your three day meeting gave me a much better understanding of the total situation in engineering, physics, biology, epidemiology and POLITICAL SCIENCE addressed by this report. I was particularly well impressed by the reasoned presentation by Mayor James P. Connors of Scranton, PA. I was able to talk with him after the meeting on Monday to learn some of the engineering details about the situation in Scranton. A copy of my letter trying to answer his questions was supplied to Mrs. Conway for distribution to the subcommittee.

First, I want to give you a taxpayer's view of who should be doing what on this issue. Certainly city and county governments have no business trying to evaluate the science of the EOMF issue. As I sat at that meeting and estimated the cost for the subcommittee members, the attendees, and the

cost of preparing the DRAFT REPORT under review, I realized this was several times the cost of the six years of dealing with the EOMF issue in Florida. Financially, it is futile for a single state to evaluate the science of this issue. Clearly this is a matter for the Federal Government, NOT the individual states.

Second, I wish to comment on the role of federal agencies in this issue. There are three areas delineated by the engineering of the sources of electromagnetic, electric, and magnetic fields: 1) occupational health, 2) public health, and 3) standards for measurements needed in enforcement. The proper federal agencies are: 1) OSHA, 2) EPA, and 3) NIST (National Institute for Standards and Technology, formerly National Bureau of Standards). So far, NIST seems to have been ignored in the poltical science. This is absurd. All the microwave and RF measurements made in the laboratory research and enforcement activities MUST be referred to standards maintained by NIST in Boulder, CO. The 60 Hz equipment standards for the US are maintained in Gaithersburg, MD, by NIST. Earlier, I criticized Ch. 2 of the DRAFT REPORT as "amateurish" in engineering physics. Perhaps the NIST Electromagnetic Fields Division in Boulder is better equipped to understand Maxwell's equations as applied to this issue.

Third, I believe the power spectral density of electromagnetic energy sources and systems divides the roles of EPA and OSHA. This DRAFT REPORT addresses the spectrum range from 3 to 30,000,000,000 Hz (30 giga-hertz). However, most of this range is empty of exposure of people to electromagnetic, electric, or magnetic fields. Here are my estimates of numbers of people exposed.

The spectral range 30 to 100,000 MHz goes from RF to above the highest radar frequency (94 GHz). All television channels are included. An extremely conservative threshold of 100 micro-watts per square cm is my cut-off. The EPA studies quoted on p 2-20 tell me that there are ZERO people exposed in the public health sense below 806 MHz. For the simple reason that microwave power is hard to generate and that microwave antennas are highly directional, there are zero people exposed in a public health sense above 806 MHz. Mobile telephones are a source of occupational exposure. Although data on p 3-57 would indicate otherwise, I now estimate that zero microwave workers are exposed in an occupational sense. The reason is that solid wall coaxial or rectangular waveguides are used for high power transmission. The leakage is truly negligible.

I have not forgotten that most American homes now have a microwave cooking oven. (2,450 MHz, < 750 W magnetrons.) The superb American engineering of the door seals in the 1960's and the copying and excellent quality control in Japan has resulted in a fantastically good safety record for microwave ovens. (Brodeur's THE ZAPPING OF AMERICA sounded a false alarm on this one in 1977.)

The spectral range 1 to 30 MHz has ZERO people exposed to significant radiation in the public health sense. This range has medical equipment, RF sealing equipment in factories, and AM radio transmitters. Thus, an occupational health exposure must be monitored and controlled. (A pure guess on my part is that about 100,000 people might be involved.) However, this is an "old" concern. OSHA, NIST, IEEE-COMAR, and the IEEE/ANSI people responsible for ANSI C-95 have ethically and competently addressed the

concerns. We have ANSI standards for exposure guidelines and for making the measurements to enforce those guidelines. As this DRAFT REPORT documents, no experimental data indicate a cancer link or any other detrimental biological effect for field strength levels below the limits of C-95.1.

The spectral range 30 to 1,000 kHz does contain radiating structures where the near field strenth is of concern. The most important are the clear channel 50,000 W AM broadcast stations in the low end of the AM band. With typical directional antenna installations of 4 to 6 towers on several acres of land, these are of concern to workers and even nearby pedestrians. (I doubt that those in automobiles receive much exposure because of the shielding by the automobile body.) Again, this is more a matter for OSHA. The specifications of C-95.1 apply. I estimate less than 10,000 people are exposed, none to excessive degree.

Television receivers and computer monitors (VDTs) have fringing fields from the horizontal deflection coil and the switching power supply in the above 15 kHz spectral range. However, the magnitudes where people are located are less than a few hundred nano-tesla. Theoretical physics indicates effects on human tissue are below thermal thresholds. The idea that VDT horizontal deflection fields are a health risk is nonsense.

The frequency range from 3 to 30,000 Hz is most significant. The audio frequency range of 20 to 20,000 Hz uses equipment which is small compared to a wavelength; therefore, no signficant fringing electric or magnetic fields can be found. The few special feature communications systems in this range involve few people (several hundred) in an occupational health sense. In a public health sense, there are zero people exposed to significant electric or magnetic fields from audio or communications equipment.

Television receivers and VDTs have fringing fields from the vertical output transformer and vertical deflection fringing fields at 30 or 60 Hz and harmonics thereof. However, the magnitudes where people are located are less than a few hundred nano-tesla. Theoretical physics indicates effects on human tissue are below thermal thresholds. The idea that VDT vertical deflection fringing magnetic fields are a health risk is nonsense.

Where's the beef? The spectrum has Dirac delta functions (singularities) at 60.000 Hz and harmonics (especially 180.000 Hz). The source is the 60 Hz electric energy transmission, distribution, and utilization equipment. Here, the numbers of people do become significant.

For 345, 500 and 765 kV high capacity (rural) powerlines, I estimate a million people are exposed to 60 Hz fringing electric and magnetic fields.

For the 69 to 230 kV transmission powerlines interconnecting substations in urban areas, I estimate 10 to 20 million people are exposed to the 60 Hz fringing electric and magnetic fields.

For the 10 to 50 kV overhead distribution lines in most urban areas over 25 years old, I estimate that 150 million people are exposed to 60 Hz fringing electric and magnetic fields.

Only those who live in newer residential areas with underground utility service avoid exposure, especially to 60 Hz ELECTRIC fields. There is no significant exposure in school buildings.

Those numbers alone say the Federal Government cannot ignore the public health assessment. If we learn that 200 nT, 60 Hz magnetic fields double cancer risk and have adequately narrow confidence intervals, then a massive effort to rebuild our power systems must be mounted. According to the open literature and patents I have recently searched, we find the most viable method for the basic distribution system would be to convert all overhead 10 to 50 kV distribution powerlines to underground distribution. Significant numbers of people would have to be moved away from the 345, 500 and 756 kV rural powerlines. From a standpoint of solutions in the open literature, I find the 69, 115 and 138 kV powerlines running down many of our city streets to be the most vexing problem to deal with.

Let there be no misconception about the cost of burying the problem. The billions of dollars would be paid by every electric power user in the USA. If it saves human lives, the work must be done and the cost paid. HOWEVER, if the risk factor cannot be conclusively identified and quantified with high confidence, public policy prudence and the need for financial resources in so many other well defined areas say "if it ain't broke, don't fix it!"

The power spectral density evaluation indicates that this entire report SHOULD HAVE BEEN PREPARED BY OSHA! The only issue in the EPA ball park is the 60 Hz three-phase powerline exposure. This brings about my recommendations regarding the report.

1. Turn the current DRAFT REPORT over to OSHA for revision of all material. Their task is to concentrate on all but the low level 60 Hz questions as related to public health. I pray they have some engineers skilled in Maxwell's equations to guide this revision. Since the majority of the issues are related only to occupational health, let OSHA finish the process of review and issuance.

2. The nation needs an answer to the low level 60 Hz question and EPA is the proper agency to resolve the issues. An answer of the form now in the draft is not satisfactory. More work needs to be done and then a separate 60 Hz report prepared, reviewed, etc.

Those recommendations require justification. Fundamentally, the solutions for Maxwell's equations and the geometry of powerlines sort the 60 Hz problem from the rest of the spectral range under consideration. EPA has fallen into a physics booby trap in trying to mix the microwave issue with 60 Hz issues. The lay public will continue to be confused if these two separate issues are treated in the same document.

The material in this report along with the current revision of IEEE C-95.1 indicate that there is no link between RF or microwaves and cancer, especially at the field strengths found for public exposure. The train of reasoning for suspecting a link between 60 Hz fringing fields and cancer goes as follows:

A. 1979, Wertheimer and Leeper reported on childhood cancer in Denver giving odds ratios of 2 to 3, most confidence intervals wide but not too much lower than 1.0. Their exposure measure was a 3 level wiring configuration code. They gave the hypothesis that the wiring code was a surrogate for magnetic field. They failed to consider electric fields.

B. 1988, Savitz, et. al., reported a more through study of childhood cancer in Denver. For measured magnetic or electric fields, odds ratios of 1 to 1.5 with confidence intervals going significantly below 1.0 fail to support the hypotheses that either magnetic or electric fields increase childhood cancer risk. I consider the electric field experiment flawed by taking the data during "high power use" conditions. However, for a refined 5 level wiring code, the odds ratios greater than 1 cannot be explained away by confidence intervals. There is still a nagging question that powerlines might increase childhood cancer risk. Either the electric field or a confounder are the most likely explanations.

C. 1988, Adey, et. al., report on alterations in calcium efflux by low frequency "EM" (probably magnetic) fields, low frequency electric fields, and with combined low frequency "EM" fields and static magnetic fields. The work is not adequately respected by other scientists. Note that this is only a biological effect, not necessarily harmful or a link to cancer.

All other evidence cited fails to establish a reason to even suspect that powerlines increase cancer risk. The evidence from theoretical physics as sketched by Dr. Robert Adair damns the idea of a link between powerlines and any kind of biological effect. However, people who might be snowed by closed line integrals of **div E** will not be convinced by physics theory. Something must be done to either improve or disprove items A, B, and C above.

At your meeting, Dr. John Bergeron gave you some excellent advice regarding calcium efflux. I heartily support his recommendation to concentrate research on this issue until there is a good consensus amongst scientists about the results.

Regarding epidemiology, I believe the USC study by John Peters will significantly improve our knowledge. As compared to Denver, Los Angeles also has smog and a similar basic distribution powerline system. Also, Los Angeles has a grid of 69 kV powerlines not found in Denver. This means that a significant number of houses will have higher electric fields in Los Angeles. Electric fields have been measured along with a more thorough (and time consuming) measurement of magnetic fields. The first reports are expected in the spring of 1991. A decision on how to proceed regarding epidemiology research should prudently await these first reports.

If the USC study does not decisively resolve the questions raised by the work in Denver, then an approach implied by Dr. Demitrious Trichopolous at your meeting should be implemented. He gave the idea of correlation between wiring configuration codes and magnetic fields. Thus, I recommend that an independent epidemiologist work with Dr. Frank Barnes at the University of Colorado to adequately determine the correlation between both three and five level wiring configuration codes and electric OR magnetic fields measured in Denver. Then, use these correlations to re-evaluate the wiring configuration statistics of both Wertheimer and Savitz.

Until those research results have been obtained, I do not believe we can make a reasonable decision about the magnitude of cancer risk related to powerlines. Completing this DRAFT REPORT 60 Hz portion must be delayed for the above research completion.

THE WHITE HOUSE

WASHINGTON

February 21, 1991

Dear Dave:

Many thanks for the copy of the memorandum that you sent to Bill Phillips concerning the Critical Technologies Institute. You have a number of excellent points here that I know Bill and the rest of us will consider very seriously. We are moving forward as quickly as possible to get the Institute established and the input from you and from other members of the Commission has been extremely helpful.

With all best wishes,

Sincerely yours,



D. Allan Bromley
Assistant to the President
for
Science and Technology

Dr. David Z. Beckler
Carnegie Commission on
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10 Waverly Place
New York, New York 10003

"CORRESPONDENCE TRACKING"

TYPE: Action Item DOCUMENT NUMBER: 9120119

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FROM: SWIHART, John M: National Center for Advanced Technologies

TO: DAB

DATE OF CORRESPONDENCE: 01/16/91

SUBJECT: Proposal for NCAT to become the Critical Technologies Institute

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ASSIGNED TO:

ACTION REQUIRED: Advise Dr. Bromley

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SENDER'S DUE DATE: OSTP DUE DATE:

DATE COMPLETED: 02/07/91

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COPIES TO: D. Allan Bromley

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WHITE HOUSE TRACKING #: CONTACT PERSON:

REMARKS: Per Tom Russell, 2/7/91--File CTI.

DATE RECEIVED: 01/24/91 FILE: ~~CRITICAL TECHNOLOGIES INSTITUT~~ Industrial Technologies - CRITICAL TECHNOLOGIES

"CORRESPONDENCE TRACKING"

TYPE: ACTION DOCUMENT NUMBER: 9120119

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FROM: SWIHART, JOHN M.

TO: DR. BROMLEY

DATE OF CORRESPONDENCE: 01/16/91

SUBJECT: PROPOSAL FOR NCAT TO TAKE ON THE CTI ROLE FOR OSTP

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ASSIGNED TO: Dr. Phillips

ACTION REQUIRED: ADVISE DR. BROMLEY

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SENDER'S DUE DATE: OSTP DUE DATE:

DATE COMPLETED:

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COPIES TO:

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WHITE HOUSE TRACKING #: CONTACT PERSON:

REMARKS:

DATE RECEIVED: 01/19/91 FILE: TECHNOLOGY

National Center for Advanced Technologies
Key Technologies for the Year 2000

1250 Eye Street, N.W., Suite 1100, Washington, D.C. 20005 (202) 371-8450

January 16, 1991

The Honorable D. Allan Bromley
Science Advisor to the President
and Director, Office of Science
and Technology Policy
Old Executive Office Building
Washington, DC 20506

Dear Dr. Bromley:

The National Center for Advanced Technologies (NCAT) is pleased to forward the attached proposal FOR NCAT to become the Critical Technologies Institute (CTI) specified in the FY 1991 authorization bill for the Department of Defense.

NCAT is a nonprofit educational foundation which was established by AIA two years ago to integrate and coordinate the AIA Key Technologies effort. NCAT was established separately from AIA to extend the method to other industries and to solicit financial support from a wider base. Extending the key/critical technology development process created by AIA/NCAT to other industries will depend on the willingness of representative companies in a given industry to participate in the process.

With the passage of the FY1991 DoD bill, the NCAT Board of Trustees and the Aerospace Industries Association (AIA) Board of Governors realized that the aim of the CTI replicated the aim of NCAT. Therefore they passed a resolution that authorized NCAT to propose assuming the duties and title of the CTI as a Federally Funded Research and Development Center under the sponsorship of OSTP. If the proposal is accepted, NCAT will assist OSTP in selecting the officers of the CTI and will transfer all its assets to the CTI when it becomes operational.

We recognize that there are alternative ways to accomplish the intent of the bill, including contracting directly with NCAT as it is now constituted. We will be happy to discuss this alternative, as well as others, at your convenience.

NCAT has been responsible for producing the only national consensus key technologies strategic plans: one for rocket propulsion, and one for advanced composites. Nine more are in various stages of preparation at this time with most of them scheduled for completion in the next several months. All of them have been or are being developed by an industry-led team with

by AIA and NCAT because it involves national leaders in these technical areas and attracts high-level support from industry which produces the products that naturally flow from these technologies.

The NCAT/AIA process consists of three phases: selection, plan development, and implementation. Technology selection, or making technology lists, has been accomplished by many different organizations including OSTP. Plans have been published to date only by NCAT although DoD is in the process of developing its own plans (NCAT is cooperating with the DoD in five of its 20 plans). Implementation includes periodic review and updating of the plans and monitoring the funding level and consequent schedule.

The process depends on the voluntary effort of all participants. The CTI role is envisioned as coordination and integration among technologies. Implementation is also viewed as voluntary. While a consensus strategic plan can be developed, companies and government agencies individually must make decisions as to resource allocation and schedule. If the plan is compelling, it will be followed; if not, it must be changed or dropped. We are not advocating central direction, but rather increased productivity through cooperation and elimination of unnecessary duplication of effort. Cooperation may also be employed in the implementation phase through consortia or joint ventures for certain portions of the plans.

In addition to the technology planning process which tends to be a bottom-up view, NCAT and AIA have sponsored the Advanced Technology Policy Forum. The Forum consists of decision makers from government, industry and academia to give a top-down view of the process, to facilitate cooperation in technology planning, and to help eliminate legislative or regulative barriers to technology development. The Forum met three times in 1990 and provides valuable insight and comment to the process. This group should continue to be included in future policy discussions regarding key/critical technologies.

We hope that this letter, in addition to the proposal, gives you a good overview of our NCAT activities. If you have any questions regarding NCAT, or the proposal for NCAT to take on the CTI role for OSTP, please call either of us.

John M. Swihart
John M. Swihart
President, NCAT

Don Fuqua
Don Fuqua
President, AIA
Chairman, NCAT

Withdrawal/Redaction Sheet
(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
02. Proposal	Proposal for NCAT to become Critical Technologies Institute for OSTP (7 pp.)		(b)(4)	

Collection:

Record Group: Bush Presidential Records
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Date Closed:	3/11/2010	**OA/ID Number:**	62035-007
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AR Disposition:		**MR Disposition:**	
AR Disposition Date:		**MR Disposition Date:**	

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"CORRESPONDENCE TRACKING"

TYPE: ACTION DOCUMENT NUMBER: 9120039

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FROM: ROBERT J. MURRAY

TO: DR. BROMLEY

DATE OF CORRESPONDENCE: 01/03/91

SUBJECT: POSSIBILITY OF CNA MANAGING AND OPERATING THE CRITICAL TECHNOLOGIES INSTITUTE (CTI)

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ASSIGNED TO: Dr. Phillips

ACTION REQUIRED: AS NECESSARY

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SENDER'S DUE DATE: OSTP DUE DATE: 01/28/91

DATE COMPLETED: No response needed. We have already met with CNA. JDF

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COPIES TO: D. Allan Bromley

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WHITE HOUSE TRACKING #: CONTACT PERSON:

REMARKS:

DATE RECEIVED: 01/09/91 FILE: INDUSTRIAL - ~~CTI~~ Critical Technologies

CNA

CENTER FOR NAVAL ANALYSES

4401 Ford Avenue • Post Office Box 16268 • Alexandria, Virginia 22302-0268 • (703) 824-2000

President

3 January 1991

Dr. Alan Bromley
Director
Office of Science and Technology Policy
Old Executive Office
Washington, DC 20506

Dear Dr. Bromley:

I was pleased that several members of my staff were able to meet with Dr. Phillips last week while I was on vacation to discuss the possibility of CNA managing and operating the Critical Technologies Institute.

I want to assure you that we are enthusiastic about the idea and confident that it would work well. Our business arrangement with the Department of the Navy would make it easy to begin operating CTI under our current FFRDC umbrella. Longer term arrangements could then be crafted without the pressure of an early deadline.

We have two divisions that could support your office immediately. Also, we have organized and conducted numerous multi-agency studies, and that experience could provide a model for CTI's operation.

Finally, I would like to call your attention to the credentials of CNA's research staff, as reflected in the enclosed directory. Many of our staff members have extensive knowledge of advanced technologies as they apply to the civilian sector.

I would welcome an opportunity to discuss this matter with you in more detail.

Sincerely,

Robert J. Murray

Robert J. Murray