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Date: 4-23-90 **Due by:** _____

Subject: BNA Report -- Memo to Bromley

From: Steve Danzansky

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Comments:

THE WHITE HOUSE

WASHINGTON

April 23, 1990

TO: ALLAN BROMLEY

FROM: STEPHEN I. DANZANSKY

I have taken the liberty of "marking-up" a recent BNA report on our recent discussions and activities.

I think it is vital that these distinctions which we so carefully worked out be kept clear. I fully realize you have little control over reportings such as this, but it is these sort of things which raise hackles around the campus here.

I will have Olin Wethington, our EPC Executive Secretary, give you a call to reschedule your lunch so that the EPC group can get started ASAP.

Hope all worked out with the speech.

The OTS warned that any transaction involving a cash-out merger in which the resulting S&L does not meet its fully phased-in capital requirements generally will not be approved.

The agency noted that TB 38-3 applies to "significant transactions," including acquisitions of control, mergers, mutual-to-stock conversions, and branch purchases that do not require federal financial assistance. The new capital guidelines do not apply to simple holding company reorganizations, where an S&L establishes its own holding company and there is no material change in the thrift or its stock ownership, the OTS said.

Capital Maintenance Agreements

The second of the agency's two policy statements makes clear when the OTS will require capital maintenance agreements.

In Thrift Bulletin 5a (TB 5a), the OTS said buyers whose newly acquired thrifts fail to meet fully phased-in capital requirements must sign agreements—limited capital maintenance agreements—promising to infuse the institutions with added capital whenever their capital levels fall below current minimum requirements. Those requirements will increase each year until they meet the fully phased-in capital levels mandated by FIRREA.

The maintenance agreement will have a dollar cap, limited to the difference between the S&L's actual capital and the fully phased-in requirement that would have applied immediately after the transaction. Generally, limited capital maintenance agreements will expire after five years or after the acquirer has demonstrated that the institution has exceeded its fully phased-in capital standards for eight consecutive quarters, the OTS said.

The OTS noted that limited capital maintenance agreements are not required for simple holding company reorganizations, standard conversions, or simple holding company conversions.

OTS added that its latest thrift bulletins do not affect any net worth maintenance agreements and "pre-nuptial" agreements executed before April 12, noting that they remain enforceable by the OTS or the Resolution Trust Corp.

TB 5a rescinds TB 5, which implemented the former Federal Home Loan Bank Board's August 1988 policy toward net worth maintenance agreements.□

Science

BUSH SCIENCE ADVISER SAYS WORK ON TRACK TO DETERMINE TECHNOLOGY PRIORITIES LIST

A special administration panel charged with identifying broad technologies that are important to the future of U.S. economic and national security, will make its first report to President Bush and Congress on Oct. 1, White House chief science adviser D. Allan Bromley said April 12.

Addressing a science and technology conference sponsored by the American Association for the Advancement of Science, Bromley said the Office of Science and Technology Policy is in the process of establishing a special panel required by law to begin developing a list of priority technologies that are important to a range of commercial applications. The panel will merge those "critical technologies" from lists prepared by the departments of Defense and Commerce. Defense has completed its list, released in March, while Commerce will announce its list "soon," Bromley said in a prepared text.

The federal government has an important role to play in supporting the development of those wide-ranging technologies, which cannot be supported by private industry alone. "No single company can capture enough of the benefits to justify investing an adequate amount of R&D in them," Bromley said of those technologies.

While the federal government should support such R&D efforts, the science adviser did not specify in what form and to what extent the government should step in to help private companies. Bromley talked at length about the administration's efforts to establish budget priorities dealing with science and technology.

"Unfortunately, in the reviews that were completed this past fall, the available budget resources would not stretch to cover all agency efforts—nor, I suspect, will there ever be enough resources to cover all of the proposals," he said. "This problem of funding is, of course, one with which OSTP is continually involved."

Bromley underscored what he said are important institutional improvements within OSTP that will funnel more input to the administration from the private sector, which he said was a problem in the past. "In the future, much greater input will come from the President's Council of Advisors on Science and Technology," Bromley said of the group of 12 scientists and engineers that President Bush assembled in February. The group, chaired by Bromley, met at Camp David in February and at the White House in March with the president.

Also helping to coordinate policy within OSTP is the interagency Federal Coordinating Council for Science, Engineering and Technology, which reviews, integrates and coordinates the R&D activities of the government that involve more than a single agency or department. FCCSET, also chaired by Bromley, has held two meetings to date. "For the first time since it was created, FCCSET should be functioning as it was designed to function," he said.

While FCCSET will ~~resolve policy~~ issues dealing with science and technology within the Bush administration, ~~political~~ and economic areas dealing with science and technology, such as global climate change, will arrive at the Domestic Policy Council or the Economic Policy Council through ~~a new~~ working group, again chaired by Bromley, that will report to both councils, the science adviser said.

"Because I chair both FCCSET and PCAST, I have the opportunity to coordinate their actions so that each benefits from the other's activities," Bromley added.□

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THE WHITE HOUSE
WASHINGTON

Steve:

I recognize that this is far too long to serve as a decision memo for the President, but perhaps it could be the vehicle for internal discussion and serve as a background document. I think we need to give thought to the decision- or recommendation-making process internally; you will note that the paper only presents various options, both those identified by the task force and others discussed internally. We had talked about it going forward in this fashion but I am more inclined to at least try to narrow the options for the President's consideration, perhaps limiting the discussion of pros and cons only to points in contention and presenting some consensus options without comment.

Let me know your thoughts on process and your comments on the paper (other than the self-evident one about length - but I swear all of this at least needs to be considered as relevant!)

Barry

File: OKS.

February 20, 1990

I. ISSUE

A decision on the options presented by the Outer Continental Shelf (OCS) Leasing and Development Task Force is needed.

II. BACKGROUND

In your February 9, 1989 budget message to Congress, you imposed a moratorium on three controversial OCS lease sales scheduled for fiscal year 1990 -- Sale 116 in the Gulf of Mexico off the southwestern coast of Florida, Sale 95 off the coast of southern California, and Sale 91 off the coast of northern California -- pending a review of the environmental effects of the sales by a Cabinet-level task force. The Secretary of the Interior, the Secretary of Energy, the Director of the Office of Management and Budget, the Administrator of the Environmental Protection Agency and the Administrator of the National Oceanographic and Atmospheric Administration (NOAA) were named as members of the Task Force and charged with making recommendations on the future of the lease sales within one year. In fulfilling its charge, the Task Force conducted briefings and public workshops in Florida and California, hearing from over 1,000 witnesses, met with Members of Congress from those two states and other parts of the country, and received over 11,000 witten comments. It also commissioned and received a study from the National Academy of Sciences (NAS) addressing the adequacy of the scientific and technical data available on which decisions on the three lease sales could be made.

The Task Force delivered its report to the White House on January 5. It identified 11 options for consideration with respect to the lease sales (three for the Florida sale and four for each California sale). It also proposed various options that are ancillary to the decisions on the lease sales and additional measures for consideration that would address some of the general environmental concerns it identified in analyzing the OCS program. On January 22 you met with the members of the Task Force, Secretary Skinner and members of the White House staff to discuss the report.

III. DISCUSSION

A. POLICY GOALS.

The OCS leasing program has been the focus of local and national controversy in recent years over the environmental effects of offshore oil and gas exploration and development. The controversy has resulted in yearly Congressional moratoria on certain lease sales and even on some pre-lease planning activities. The policy goal of the decisions on these three lease sales and the analysis of the entire OCS program that will inevitably accompany these decisions must be to reconcile the need for adequate domestic energy supplies through robust exploration and development on the outer continental shelf and the need for long-term protection of sensitive environments and ecosystems. An additional goal must be to regain executive branch control of the OCS program by addressing Congressional and local concerns and removing their stranglehold on the program.

B. STRUCTURE OF OCS PROGRAM.

The OCS program is governed by the Outer Continental Shelf Lands Act and overseen by the Minerals Management Service (MMS) within the Interior Department. The sale and development of leases under the Act is accomplished in five-year programs, which begin with thorough analyses designed to assess the potential reserves derivable from the leases and any problems that would accompany their development. That process starts more than two years before the beginning date of a five-year program. The MMS undertakes twelve separate steps as part of this evaluative process, preparing two drafts of the program and an environmental impact statement. The public is given the opportunity to comment at three points in the process and Congress is also formally notified before the program is finally approved.

Following final approval of a five-year program, typically another 24 to 26 months are required before any lease sale can take place. During this period another EIS is prepared and additional opportunities for public comment are provided, along with an opportunity for comment by the governor of the state offshore which the sale is to occur. Once a sale occurs, exploration of the lease can take anywhere from 1 to 10 years and development and production can occur over several decades.

These three lease sales are all part of the 1987-1992 five-year program. The sales were at different stages when the moratorium was imposed:

o The final Environmental Impact Statement (EIS) for the Florida sale was completed in October 1987; the sale could have been held within 5 to 6 months.

o The initial area for the southern California sale was identified in October 1987, but no EIS had been prepared; the sale could have been held within 16 months.

o The public hearings for the northern California sale were completed in February 1988, but the final EIS was delayed; the sale could have been held within 10 months.

The initial steps for the 1992-1997 five-year program are tentatively scheduled to commence in March with Secretary Lujan's release of a proposal for comment. Completion of the program development process is expected to take until the summer of 1992, with the first sale tentatively scheduled for September 1992. That schedule is not mandated by statute or administrative rule or regulation, however, and could be delayed. A delay of up to six months would not significantly affect the timing of the program and the early sales, as only one to two months would be lost.

C. ENERGY OUTLOOK.

The decisions with respect to these three lease sales must take into account their relationship to total domestic oil and gas production over the next 10 to 20 years. The Energy Department has forecast a fall in U.S. crude oil production of 2.7 percent per year through this decade, resulting in an average daily production of 5.9 million barrels in the year 2000. Production is predicted to fall through the succeeding decade until the average daily production in 2010 will be only 4.7 million barrels. Because of predicted continued low prices, U.S. oil consumption is expected to increase, rising to 18.6 million barrels per day by the year 2000 and 20.8 million barrels per day by 2010. Oil imports are predicted to increase to 10.2 million barrels per day in the year 2000 and 12.9 million barrels per day in 2010.

The MMS has developed mean estimates for the undiscovered economically recoverable (using existing

technology) oil and gas resources derivable from each of the areas in which the leases that are the subject of the sales and from the leases involved in the sales themselves:

o Florida (Sale 116)
480 million barrels of oil and 80 billion cubic feet of gas; 110 million barrels of oil and no gas would be leased through Sale 116.

o Southern California (Sale 95)
530 million barrels of oil and 1.07 trillion cubic feet of gas; 230 million barrels of oil and 460/800 billion cubic feet of gas would be leased through Sale 95.

o Northern California (Sale 91)
220 million barrels of oil and 490 billion cubic feet of gas; 200 million barrels of oil and 410 billion cubic feet of gas would be leased through Sale 91.

Greater resources may be available from the larger planning areas within which the areas covered by the two California sales are derived (the Florida sale encompasses all of the unleased resources of the entire planning area). The Southern California Planning Area is estimated to contain 970 million barels of oil and 2.21 trillion cubic feet of gas on unleased acreage. The Northern California Planning Area is estimated to contain 460 million barrels of oil and 1 trillion cubic feet of gas on unleased acreage.

Certain resources are already leased within the areas off Florida and southern California (none of the area off northern California has yet been leased), and the impact on those leases of the decisions on these three sales must also be analyzed. The 73 existing leases off Florida are estimated to contain 140 million barrels of oil and 30 billion cubic feet of gas. The existing leases in the Southern California Planning area are estimated to contain 340 million barrels of oil and 800 billion cubic feet of gas.

All of the figures regarding the resources from these three sales and the areas from which they are derived must be compared to the total undiscovered economically recoverable resources from the U.S. as a whole, including the entire OCS. It is also instructive to compare the resources available from these sales and the OCS to the resources available from the Alaska National Wildlife Refuge (ANWR).

Total U.S. resources are estimated to be 34.8 billion barrels of oil and 263 trillion cubic feet of gas, of which 8.2 billion barrels of oil and 74 trillion cubic feet of gas come from the OCS. In comparison, ANWR is estimated to contain 2.7/3.2 billion barrels of oil and 6.9 trillion cubic feet of gas (although the production of natural gas from ANWR is considered by some to be uneconomical).

Thus the relative values of these sales, the larger areas surrounding the leases that are the subject of these sales, the leased and unleased portions of the planning areas incorporating these sales, the entire OCS and ANWR can be compared as follows:

	Oil (billion barrels)	(Gas) (trillion cubic feet)
Total U.S. Resources	34.8	263.0
Entire OCS	8.2	74.0
ANWR	3.2	6.9
Existing Fla. Leases	.14	.30
Existing S. Cal. Leases	.34	.80
Unleased S. Cal.	.97	2.21
Unleased N. Cal.	.46	1.0
Sale 116 Area	.48	.80
Sale 95 Area	.53	1.07
Sale 91 Area	.22	.49
Sale 116	.11	--
Sale 95	.23	.46
Sale 91	.20	.41

With the above chart in mind, the implications of the cancellation of these sales on the entire OCS program must also be considered. This could provide additional ammunition to opponents of the program in Congress and the environmental community and could result in further and potentially more permanent Congressional moratoria or in an informal but just as effective practical moratorium because of overwhelming political pressures. This could be critical, as reliance on OCS lease sales in areas that to this point have proven largely non-controversial (such as the western and central Gulf of Mexico and the Beaufort and Chukchi Seas in Alaska) has been considered an essential part of domestic oil and gas exploration and development strategy and is perceived as vital in order to maintain domestic energy security.

Evaluating the decisions on these three sales and its impact on domestic energy security issues highlights an incongruity in the timing of this process. If made in the near term, these decisions will occur without the benefit of the National Energy Strategy (NES) which is currently under development by the Energy Department; a preliminary draft of the NES is scheduled to be delivered to the White House in early April. It is logical to assume that the OCS will have some role in the NES. Any final decision on these sales could therefore produce an incoherence in the NES or require significant reevaluation of the strategy between the preliminary and final reports. Delaying these three lease sales without any final decision or structuring a decision to allow a subsequent analysis of the sales would permit them to later be considered in the context of the NES.

D. RELATIONSHIP OF STATE AND LOCAL GOVERNMENTS TO OCS PROGRAM.

The relationship of state and local governments and the citizens they represent to the OCS program is also a relevant issue. The federal government's perspective on the OCS program is premised on its role within the nation's overall energy strategy, with its national security and economic implications. In administering the OCS program the federal government also exercises its national stewardship functions in managing resources on public lands and protecting scarce and valuable environmental resources. States and local governments, on the other hand, represent only their constituents, who will experience the direct impact of OCS development. Most of the financial benefit of OCS leasing and development accrues to the federal government (states receive 100 percent of revenues from OCS leases within the first three miles of shore; states receive 27 percent of the revenues from OCS leases from miles three through twelve, with the federal government receiving all revenues from leases further than twelve miles offshore). Further, the residents of the locality most directly affected by OCS activity may or may not benefit proportionately from the revenues received by the state if those revenues are spent elsewhere. Despite the opportunities granted for participation in the OCS process, persons impacted by federal OCS decisions often feel that their interests have not been represented; this likely accounts for the contentious nature of many recent OCS decisions. Although not a subject

directly addressed by the Task Force, the concept of restructuring the program to give states a greater share of the revenues arose during your meeting with the Task Force.

E. NATIONAL ACADEMY OF SCIENCES STUDY.

The Task Force requested that the NAS study the adequacy of the scientific and technical data available on which decisions for the three lease sales could be made.

The NAS report concluded that generally there is not adequate data on which to base a lease/no lease decision, but that the adequacy varies by lease sale. The NAS conclusions with respect to the three categories of data are as follows:

Sale	Oceanographic	Ecological	Socioeconomic
Florida	marginal	inadequate	inadequate
N. Cal.	adequate	adequate	inadequate
S. Cal.	inadequate	adequate	doubtful

Although the NAS did not specifically identify those studies which must be conducted in order to have a complete scientific data base, the NAS recommended that no decision be made on proceeding with the lease sales until further studies are conducted. There is no clear consensus opinion as to the length of time needed to conduct adequate studies. Staff of the Task Force estimates that it could take as long as five to six years in Florida and as little as two to three years in northern California.

Questions regarding the value of the NAS study and the weight it should be accorded have been raised. Some allege that the strictest academic "peer review" standard was used to assess the available data. This could be construed as far greater than the standard generally used in making governmental decisions. Such a standard could be seen as unreasonable in the context of the real world, imposing a burden that could rarely if ever be sustained, particularly when the costs necessary to meet such a standard and the benefits sought to be gained from the OCS process are weighed against it.

The NAS was also requested to study the adequacy of resource estimate methodology used by the MMS. The NAS report concluded that the MMS methodology for developing resource estimates is adequate and sound.

F. LOCAL CONSIDERATIONS.

As noted in Section A above, in preparing the report the Task Force conducted local meetings in Florida and California. These were designed to give the Task Force the opportunity to discuss the proposed sales with state and local officials, scientists, business leaders and other interested groups and with members of the general public. Demonstrations in opposition to leasing were held at each of the nine public workshops. In addition, the vast majority of residents who spoke at the meetings were adamant in their opposition to new leasing. Local opposition to leasing does not appear to have lessened, and in fact may have strengthened. An August California Poll found that 75 percent of those surveyed opposed more drilling off the coast, the highest level of opposition yet expressed in a statewide poll.

State and local officials are also generally unanimously opposed to the sales. In Florida, the entire Congressional delegation, Governor Martinez and all local elected officials oppose new leasing, and in fact also oppose exploration on existing leases off southeastern Florida. Both California Senators oppose new leasing, as do virtually all local elected officials. The California Congressional delegation is split on the issue, although all affected coastal representatives oppose new leasing.

G. ENVIRONMENTAL AND MITIGATION OPTIONS.

In analyzing the three lease sales, the Task Force identified and addressed six specific environmental concerns: air quality; the risks of oil spills; the impact of OCS activity on commercial fishing; the effects of OCS activity on protected lands and species; water quality; and socioeconomic impacts. In all of these areas, the Task Force developed recommendations for additional studies and control measures, some of which it incorporated into its final options. Certain of the recommendations are related only to the proposed lease sales; others warrant consideration at the present time or when future leasing decisions are made in the three areas. Appendix A contains a detailed discussion of the six environmental concerns and the recommendations.

IV. OPTIONS

The options for the lease sales are presented below as the Task Force presented them, attempting to combine the options in a general philosophical framework. The same general option could be selected for each sale, or distinctions between the sales could be drawn to distinguish between them. The options presented by the Task Force are presented first, followed by separate options developed by White House staff and by individual members of the Task Force independently. It should be noted that the members of the Task Force agreed only to include within the final report options that all members could agree would be acceptable; thus some of the options developed by staff may have been considered and may be supported by individual members of the Task Force. Supporting discussion of the pros and cons of the various options is also presented. Options applicable to the OCS program as a whole are also presented.

Task Force Options for Sales

Option A

Sale 116 (Florida)

Cancel the sale and defer subsequent decision until the additional oceanographic, ecological and socioeconomic data identified by the NAS have been collected.

As for existing leases, proceed with exploration and development decisions under normal procedures.

Sales 95 (Southern California) and 91 (Northern California)

A-1 -- Proceed with preparations for the lease sales but defer final decisions until the additional oceanographic (southern California) and socioeconomic (southern and northern California) data identified by the NAS have been collected.

A-2 -- Cancel the sales and defer subsequent decisions until the additional oceanographic (southern California) and socioeconomic data (southern and northern California) identified by the NAS have been collected.

Discussion

Under these options, leasing in both Florida and California could occur as part of the 1992-1997 five-year plan, which may be proposed by Secretary Lujan as early as March. These are pro-petroleum industry options which signal the Administration's continued commitment to OCS development and affirm to the greatest extent the Interior Secretary's discretion over OCS decisions, consistent with current law. They recognize that the OCS is a national resource the development of which will not be unduly subject to local citizens' views. They will likely meet with strong criticism, however, particularly on the ground that a decision to cancel the sales of the leases, followed almost immediately by the inclusion of the same leases in the next five-year program, smacks of hypocrisy. This criticism can be partially rebutted by responding to the environmental concerns identified by the NAS and imposing additional environmental restrictions on new leases.

Allowing exploration and development to proceed on the Florida leases using normal procedures avoids any interference with current lessees and any "takings" problems that could arise.

Option B

Sale 116 (Florida)

Cancel the sale and exclude the area from consideration for the 1992-1997 five-year program.

As for existing leases, proceed with exploration and development decisions under normal procedures but begin discussions with the state and existing lessees regarding the state's purchase of the leases.

Sales 95 (Southern California) and 91 (Northern California)

Defer decisions on the sales until the 1992-1997 five-year program, conducting additional oceanographic (southern California) and socioeconomic (southern and northern California) studies; if the sales go forward, offer tracts only in limited geographic areas (the Santa Maria and San Diego Outer Basins off southern California and the Eel River Basin off northern California).

Discussion

These are the middle-ground, compromise options. Leasing could occur off California after 1992 (which, given current Congressional moratoria and the time required to complete the studies arising from the NASS report, may be as soon as leasing could occur in any event), but would be restricted to areas where development would be less intrusive and to smaller areas so that environmentally-sensitive features such as the Channel Islands National Park and Marine Sanctuary could be protected. Leasing off Florida would be delayed for at least seven years until 1997. The petroleum industry should find this an acceptable option, as it does not preclude development. There is less certainty that the environmental community will accept it as a reasonable compromise. The delays should allow the Interior Department to complete the studies identified by the NAS, however, and this can be used to rebut environmental concerns.

Beginning discussions with Florida regarding its purchase of the existing leases imposes some burden on it to protect its tourist industry and natural resources, which is reasonable given that the state has also allowed development in this area. This could open the door to moves by the environmental community to cancel the leases, however.

Option C

Sale 116 (Florida)

Cancel the sale and exclude the area from consideration for both the 1992-1997 and 1997-2002 five-year programs.

As for existing leases, begin discussions with the state and existing lessees regarding the state's purchase of the leases and have Interior initiate procedures that could lead to cancellation of the existing leases (which would suspend further exploration or development).

Sales 95 (Southern California) and 91 (Northern California)

Cancel the sales (and the next scheduled sales in both areas) and exclude the areas from consideration for the 1992-1997 five-year program.

Discussion

These are the most restrictive, pro-environmental options, precluding lease sales off Florida until at least 2002 and off California until at least 1997. They do not constitute the permanent ban on leasing in the three areas which some environmentalists seek, however. These options could alleviate pressures in Congress for the creation of ocean sanctuaries or permanent bans on leasing and could provide an opening for legislation to open the ANWR to development.

The move to cancel the existing leases off Florida will be particularly welcomed by environmentalists and will respond to one of the criticisms of the NAS, namely that leasing always leads to future development without any subsequent analysis of environmental impacts. There are questions about the ability of the Interior Department to cancel the leases under currrent law, however, which requires a finding of existing environmental harm.

These options are also the ones on which the FY 1991 budget is based, [including provision in the budget for repurchase of the existing leases off Florida, valued at the lesser of the amount of lease bonuses paid (approximately $107.5 million) or the lease bonus amount plus investment to date], so no adverse impact would result if this course were chosen.

Other Options For Sales Not Identified by Task Force

A. Proceed with lease sales under existing OCS Lands Act process. Pre-lease activities would be reactivated at the point at which they were stopped by the Presidential moratorium.

Discussion

This is one of the two extreme options. It would essentially reject both the NAS study and the report of the Task Force and proceed with "business as usual." It could be perceived as a complete sell-out to the petroleum industry and would likely be severely criticized by the environmental community and probably by the general public, particularly in the two affected states.

B. Cancel the sales, excluding them at this time from the 1992-1997 five-year program, and directing that future decisions on lease sales in these areas

will be made only after the data identified as deficient by the NAS have been identified and collected; if the studies subsequently show that leasing can be done in an environmentally acceptable manner, add the tracts to the 1992-1997 five-year program.

Discussion

This is a new option proposed by the Energy Department. It allows decisive action on the sales and the OCS program as a whole; it also acknowledges that a more objective and scientific basis is needed for decision-making. It avoids an arbitrary decision to defer leasing or delete tracts from consideration for leasing by holding the door open for later inclusion of the leases in the 1992-1997 five-year program; as such, it could thwart the efforts of those who would use a cancellation decision as the precedent for seeking further arbitrary bans on OCS activities elsewhere.

C. Delay any decision on the sales until the NES is finalized and submitted in December.

Discussion

This option alleviates the difficulties posed by making these decisions in the vacuum created without knowing how they and the future of the OCS program relate to the NES. The delay also would likely be greeted favorably by the environmental community; the petroleum industry may be disconcerted, however, by the perceived signal that further development is being significantly slowed. Delaying the sales also adversely impacts the time before which these resources can be tapped (assuming that some development goes forward).

D. Cancel the sales and impose a permanent ban on lease sales in the three areas.

Discussion

This is the other extreme option, clearly the most-environmentally-oriented action that could be Taken. It would undoubtedly be used as "evidence" that no OCS activities are environmentally prudent and as a wedge by those seeking permanent bans on all offshore drilling activities, even on existing leases.

Other Options Presented by Task Force

A. Establish air quality controls for the OCS areas offshore California that are substantially equivalent to those applied onshore.

Discussion

Although the real impact of any emissions from offshore drilling or production platforms and the vessels and helicopters that serve them may be negligible, it is perceived as a substantial problem. The perception is exacerbated by the fact that air pollution is the single most dramatic environmental problem in southern Caliofornia and that the standards for offshore activities are not subject to EPA control but to MMS oversight and have not always been consistent. The MMS has efforts underway to develop a new proposed rulemakking to achieve this objective.

B. In Northern California, reevaluate the effects of OCS activities on the commercial fishing industry and institute measures to reduce conflicts between the petroleum and fishing industries.

Discussion

The potential conflicts posed to the commercial fishing industry in northern California were repeatedly cited. This is a particular problem in that region because of the heavy reliance of local economies on fishing, the limited existing infrastructure for which the commercial fishing and petroleum industries would compete, and the relatively small population base which could be severely impacted by employment dislocations resulting from changes in commercial activity.

C. Revise requirements for OCS oil spill contingency plans to improve effectiveness (particularly for the Everglades and Keys ecosystems) and develop improved means of assessing the risks of oil spills.

Discussion

The unique aspects of the Everglades and the Florida Keys, including the only tropical coral reef in the continental U.S., justify revisions in planning and response capabilities for that area. Additional attention should also be given to northern California due to its extremely narrow continental shelf and

normal high-sea conditions, which would make oil spills difficult to contain with currently available technology and likely to reach environmentally-sensitive areas to the south, such as Redwoods National Park or Point Reyes.

D. Direct Coast Guard to study feasibility of moving tanker routes away from sensitive areas.

Discussion

Events of recent days should provide a sufficient rationale for the need to study tanker routes to see if travel further offshore and away from sensitive areas is feasible.

Other Options Not Presented by Task Force

A. Direct the Secretary of the Interior to begin a study that would lead to proposals for amendments to the OCS Lands Act in order to restructure the revenue-sharing and decision-making provisions of the legislation so that state and local governments will have a greater voice in the OCS program.

Discussion

The lack of financial benefits to the people most affected by OCS activities and the limited participatory role in the actual decision-making process for OCS development have been noted as at least partial sources of the controversies currently surrounding these sales and the entire program. Tasking Secretary Lujan to study these issues with a goal of amending the underlying legislation could have a positive impact on these sales, lessening some of the furor. It would more conceivably be a method to address concerns expressed by Congressmen and others from areas in which OCS developpment is favorabluy viewed on the whole but where additional incentives may be needed to avoid repetitions of current problems. It also is the logical and fair approach to balancing more equitably federal and local interests. The nature and extent of authority given to state and local governments will need to be carefully considered, however, with the goal being to maintain the OCS program as a federal authority.

APPENDIX A

Air Quality. Offshore oil and gas drilling activities produce the same types of emissions as onshore activities, with the notable addition of emissions from support vessels and helicopters. Meteorological conditions may also exist which consistently drive offshore emissions toward land. Despite this, the Task Force found that emissions controls currently imposed by the MMS on offshore drilling are less stringent than those imposed on similar activities onshore. The effects of offshore emissions are of greatest concern in southern California due to the generally already poor air quality; there are more limited concerns with respect to northern California also. The Task Force specifically recommends that offshore emissions controls be made more stringent for all California activities.

Oil Spill Risks. The Task Force found that the risks posed to coastal and marine resources by oil spills are significant and that the environmental impact of a major OCS spill would be severe. It concluded, however, that the increased chances of a major oil spill caused by OCS drilling activities in the three areas are small (in the case of Florida and southern California, only a 1 percent greater risk, and in the case of northern California an 8 percent greater risk) compared to the risk of a spill caused by existing activity, such as non-OCS tanker and barge traffic. The Task Force found that coastal and marine resources warrant greater protection from possible oil spills, whatever their source, than is currently provided.

The Task Force makes two specific recommendations regarding oil spill prevention and containment. It also generally recommends that the federal government and the petroleum and shipping industries act now to improve the protection of coastal and marine resources, regardless of whether the lease sales proceed. To accomplish this, the Task Force makes several general recommendations:

(a) Oil produced from the OCS should be required to be transported in pipelines where feasible and environmentally preferable.

(b) Oil spill response effectiveness should be analyzed more carefully as part of the pre-lease evaluative process.

(c) OCS oil spill drills, governed by revised regional guidelines and involving government and industry, should be increased.

(d) Minimum standards for equipment and technology to respond to OCS oil spills should be established, along with mandatory response time requirements.

Commercial Fishing. Commercial fishing is a vital economic activity in all three areas, especially off southern and northern California. OCS activities pose a variety of conflicts between the petroleum and fishing industries, including competition for available space at sea and for port space onshore. There are also concerns about the loss or destruction of habitat due to the effects of OCS activities and the significant risks posed by oil spills. The Task Force recommends that the effects of OCS activities off northern California be reevaluated and that measures, including those described below, be instituted to reduce conflicts between the petroleum and fishing industries. The Task Force concluded that many of these conflicts can be resolved or largely mitigated through the recommended use of joint committees comprised of representatives of the petroleum and fishing industries in areas where OCS activities are planned. It also recommends other actions, including increased controls in biologically sensitive areas and improvements in planning and activities for oil spill prevention, containment and clean-up.

Protected Lands. Each of these three areas has unique protected lands, most notably the mangrove-coral reef system in the Everglades and Florida Keys. The Task Force found that these sensitive and highly valuable areas now receive only the same level of protection as that of ordinary areas but that they warrant additional consideration and heightened management. General recommendations of the Task Force in this area include deferring certain specific sensitive areas from development or establishing requirements for the maximum practicable protection and the mitigation of impacts wherever practical, implemented either by the Interior Secretary or MMS. The Task Force also makes a general recommendation that federal managers of protected lands prepare special oil spill contingency response plans which provide for full coordination among the MMS, the Coast Guard, the petroleum industry and state and local governments.

Protected Species. Each of these three areas is inhabited by species that have been placed under the protection of federal statutes, most notably the manatees off Florida.

The Task Force concluded that existing protections are sufficient to protect these species so that a delay in leasing cannot be justified on this basis alone. It does make a general recommendation, however, that additional management attention be given to this issue.

Water Quality. OCS activities can have various impacts on the water quality near rigs and platforms. Such activity is currently regulated by EPA under the Clean Water Act through the National Pollutant Discharge Elimination System. The Task Force found that this regulation is adequate in the three areas. It noted, however (as did the NAS), that information on the long-term effects of chronic discharges is lacking and makes a general recommendation that the MMS institute a research program to evaluate the effects of long-term OCS activity on the marine environment. It also makes a general recommendation that special mitigation programs be required for drilling in sensitive environments to reduce any potential adverse impacts.

Socioeconomic Impacts. OCS activities, though offshore, have significant socioeconomic impacts onshore. The Task Force found that these include the possibility of increased conflicts over land use and greater demands on infrastructure that could force changes in the character of an area. Tourism and recreation can also be adversely affected, although the Task Force found that this does not appear to be a sufficient basis for delaying the lease sales. The Task Force concluded that in these three areas such conflicts can be substantially reduced through better consultative relationships among the petroleum industry, government (especially state and local governments) and other affected parties in planning and coordinating the onshore activities of OCS lessees. The Task Force makes a general recommendation that the MMS and NOAA play a mediative role between industry and government in mitigating the adverse impacts of onshore development caused by OCS activities and that local concerns and ordinances relating to the siting of OCS onshore facilities be taken note of in stipulating the conditions for lease development. It also makes a general recommendation that the consolidation of onshore facilities be considered and notes the potential positive impact on land use conflicts and infrastructure demands that could result.

Both Governor Martinez and Senator Wilson are running 1990 gubernatorial campaigns on the issue of OCS leasing. They have both staked out anti-OCS, pro-environmental positions. The conventional wisdom would seem to dictate that an early decision and announcement to postpone or cancel the lease sales would be helpful to their candidacies. Some have argued that this might have an opposite and adverse effect, however, by causing their campaigns to peak ten months too early. In Governor Martinez' case, there are few other issues on which he can run, and resolving the issue too early in the year, it is argued, may cause his campaign to collapse. In Senator Wilson's case, an early decision could force him to stake out another more aggressive position on the environment, most likely attacking existing OCS activities on the California coast. This could place the Administration in a very difficult position. The President will make campaign appearances for both candidates in January and February.

There may also be political fallout in Texas, Louisiana, Mississippi, Alabama and Alaska. A "cancel" decision may leave those legislators and Governors who have been supportive of the OCS program vulnerable to environmentalists' attacks and demands for a rollback of ongoing drilling and production activity.

The value of a "cancel" decision may lie in using it as leverage to open the Alaska National Wildlife Refuge (ANWR) -- making a "cancel" decision now would eliminate any leverage to salvage an ANWR vote in the next session of Congress.

THE WHITE HOUSE

WASHINGTON

February 7, 1990

TO: D. ALLAN BROMLEY

FROM: STEPHEN I. DANZANSKY

I hope you saw the attached lead editorial. It is a tribute to your leadership under difficult conditions that the speech turned out as well as it did.

Thanks.

It also legitimizes what cabinet government is all about. As I said in your office last Thursday, it is not a tragedy if the public gets wind of internal disagreements on major policy issues as long as those differing views are communicated within the structure provided for discussion and do not run contrary to Presidential decision or directive. It is the back-biting, back channel, ad hominem stuff we need to discourage.

Thanks also for joining us at yesterday's session with the entrepreneurs from Lanxide. Your attentive ear and willingness to put them in touch with the brass at Defense and NASA was helpful. I will follow-up with Tom Murrin at Commerce and also at Energy since they've done some exciting work with high efficiency turbine engines.

The Washington Post

AN INDEPENDENT NEWSPAPER

Getting Warmer?

TRUE, THE EVIDENCE of global warming so far is confused and inconclusive. But it's also true that sitting back and waiting for compellingly clear proof would be dangerous. By the time it appeared, it would be too late to do anything about it for many decades. That's the gist of the quarrel that's been going on inside the Bush administration for the past month. President Bush's speech this week to the Intergovernmental Panel on Climate Change was the product of that long quarrel. The noise of the wrestling, and the occasional crash of broken furniture, distracted attention from the message when Mr. Bush finally gave it. But you can say this for the administration: it is taking the implications of global warming seriously, as its predecessor did not, and it is fighting over the right questions.

There is a way around the dilemma in which it has entangled itself. No case exists yet for the kind of emergency action that would require disruptive and hugely expensive changes in the economy. But there are many indisputable reasons for doing sensible things that, incidentally, will also curb the greenhouse effect. The chemicals knowns as CFCs, for example, attack the ozone layer of the atmosphere and increase the incidence of skin cancer. Banning them for reasons of health, as the world is now in the process of doing, will also remove a powerful contributor to the greenhouse effect. Ozone is another greenhouse gas, and to the extent that American cities manage to diminish smog levels for health reasons, they will similarly diminish greenhouse warming.

Above all, there's energy conservation. That's where the administration and the country need to work much harder. When deputy secretary Henson Moore presented the Energy Department's conservation plan last month, he correctly called conservation "the cleanest, cheapest, safest means of meeting our nation's growing energy needs."

One reason for the ferocity of the political combat over environmental policy is the entrenched idea that cleaner air and better protection have to impose enormous new costs on industry, But not always. If this country's consumption of electricity continues upward at the present rapid rate, the construction of new power plants and transmission lines is going to be gigantically expensive. Raising efficiency is essential for purely financial reasons. But each power plant not built will mean coal not burned and tons of carbon dioxide not thrown into the sky to alter the climate.

This country and the world don't have to wait for the scientists' debate over greenhouse effects to be settled. They already have plenty of work to do, well justified for other reasons, that will also diminish the risk of severe global warming.

Wrong Way on Taxes

ARESISTANT chairman Dan Rostenkowski of the House Ways and Means Committee [illegible] and raising the long-run deficit). He says that by stimulating [illegible] investment [illegible] would benefit everyone. Maybe so,

ENVIRONMENTAL C

LETTERS

File: National Science Advisor

THE WHITE HOUSE
WASHINGTON

November 1, 1989

MEMORANDUM FOR MICHAEL J. BOSKIN
ANDREW H. CARD, JR.
C. BOYDEN GRAY
STEPHEN DANZANSKY
ROBERT E. GRADY
LEHMANN K. LI

FROM: D. ALLAN BROMLEY

SUBJECT: THE FIRST ANNUAL REPORT OF THE NATIONAL ADVISORY COMMITTEE ON SEMICONDUCTORS

I am enclosing herein the above mentioned report. Unfortunately it was leaked to the New York Times and I also enclose a copy of the resulting Times article.

Although we cannot change the content of this report of a Presidentially appointed commission (established in last year's trade act - see page vii) it is important that it be transmitted appropriately to the President. Because the recommendations are substantially more aggressive than is usual in such reports, I would ask each of you to take a look at the report, at the Commission's letter of transmittal that they have bound into the report and at my draft cover letter. Any comments or suggestions would be most welcome before I send this on to Jim Cicconi.

Since I shall be away all next week at The Hague and since the leak has generated substantial pressure to release of this report, I would much appreciate your comments by COB Friday -- and I realize that this is very short notice.

Enclosures

AT&T
Bell Laboratories

Ian M. Ross
President

Crawfords Corner Road
Holmdel, NJ 07733
201 949-3242

October 30, 1989

Honorable D. Allan Bromley
Assistant to the President for
Science and Technology
The White House
Washington, D.C. 20506

Dear Allan:

I enclose the first annual NACS report. I would appreciate it if you will deliver it to the President at your earliest convenience. The report contains my letter of transmittal to the President. The Committee plans to transmit the report to the House and Senate tomorrow, and to distribute copies to all Members of Congress by Wednesday. As we discussed, I am scheduled to testify before the House Subcommittee on Transportation, Aviation and Materials on November 8 and, in all probability, will include a summary of the Committee recommendations in my testimony.

A suggestion has been made that representatives of NACS should meet with the President prior to November 8. I would appreciate your advice on this, and if you believe it to be a good idea, would you be willing to explore the possibility of attempting to arrange such a meeting?

Thank you for your considerate assistance.

Sincerely,

Ian

Attachment

New York Times
October 30, 1989
p. D-1

U.S. Aid Sought for Electronics

Report Could Help Get Venture Capital To Bolster Industry

By ANDREW POLLACK

Special to The New York Times

SAN FRANCISCO, Oct. 29 — In a report that will be delivered to the President this week, a national advisory committee on semiconductors will recommend that the Government establish a multibillion-dollar venture capital operation intended to resurrect the American consumer electronics industry.

The report could give new impetus to flagging efforts aimed at forming a Government-industry initiative in high-definition television. The advanced video product has become the focus of efforts to bring American companies back into the consumer electronics business, which they have all but abandoned to Japanese and European companies.

The Bush Administration is divided on that issue, and it has recently backed away from the idea of offering support for any particular industry. But members of Congress and electronics industry representatives say the new report could help swing momentum their way.

'Serious Consideration'

"I think it's a report that will get serious consideration," said Representative Mel Levine, Democrat of California and a leading proponent of a national policy on high-definition television. "Hopefully, something like this will move the debate, both within the Administration and beyond it."

Mr. Levine said he expected to introduce a bill soon that would create a Technology Corporation of America, which would be similar to the semiconductor committee's proposed investment company. The major difference, he said, is that his proposed corporation would get direct Federal financing while the semiconductor committee's proposed company apparently would not.

The semiconductor committee consists of semiconductor and computer industry leaders and high-level Government officials. Its proposal calls for an investment company that would be known as the Consumer Electronics Capital Corporation, which would be privately managed and run for a profit and would serve as a source of "low-cost, very patient capital" for companies wishing to enter the consumer electronics business.

The Government would provide loan guarantees that would enable the corporation to borrow money at low interest rates and invest in new consumer electronics technologies and companies.

The group issuing the report, known as the National Advisory Committee on Semiconductors, was created by last year's trade act to come up with policies to maintain a competitive American computer chip industry.

The panel recommends that the investment company would get initial equity funding from industry sources, private and institutional investors, and state and local governments. The corporation would raise billions of dollars in commercial debt, using Federal, state and local government loan guarantees to insure a low interest rate.

Such an investment corporation would counteract a key advantage the Japanese have in their access to low-cost capital. Many American companies have said they cannot afford the heavy long-term investments needed to get into the manufacture of televisions, videocassette recorders and other consumer products while still showing a profit for their shareholders.

Financing for Sematech

The report, which has not yet been released, also recommends that financing for Sematech, the Government-backed semiconductor research consortium, be immediately increased to $300 million a year from its current level of $200 million, and by $800 million over the next three years.

In his cover letter to the President, the committee's chairman, Ian M. Ross, the president of the American Telephone and Telegraph Company's Bell Laboratories, acknowledges that the recommendations may be controversial.

"We have not shied away from controversy," Dr. Ross says. "In this report we present necessary first steps toward a national semiconductor strategy. We believe that the country needs bold and innovative action."

The report never mentions high-definition television, preferring to focus on all of consumer electronics and avoid the criticisms from those who say the importance of high-definition television has been overblown.

The report documents a decline in the competitiveness of the American semiconductor industry, which makes the silicon chips that are the heart of everything from computers and telephones to robots and weapons. The report finds an equally serious decline in the American industry that produces the sophisticated machinery and raw materials used to make chips.

Tax Breaks

The 29-page report also calls for the Government to play a stronger role in insuring that American companies can participate in consumer electronics. For instance, it asks the Government to consider requiring products sold in the United States to use a certain number of United States components. It also calls for the Government to help American companies license the technology they need from foreign companies that now control many of the key patents in consumer electronics.

The report also recommends numerous steps to lower capital costs by making the research and development tax credit permanent, reinstating the investment tax credit, reducing taxes on capital gains and facilitating the formation of industry consortiums. It also recommends steps to improve education, protect American patents and copyrights, and promote access to foreign markets.

Members of the advisory committee from industry were John A. Armstrong, vice president for science and technology at I.B.M.; Norman Augustine, chairman and chief executive of Martin Marietta; Robert W. Galvin, chairman of Motorola; Jerry R. Junkins, chairman, president and chief executive of Texas Instruments; James C. Morgan, chairman and chief executive of Applied Materials; Charles E. Sporck, president and chief executive of National Semiconductor, and James G. Treybig, president and chief executive of Tandem Computers.

Government members were: John A. Betti, Under Secretary of Defense for Acquisition; Erich Bloch, director of the National Science Foundation; D. Allan Bromley, the President's science adviser; Robert O. Hunter Jr., director of the Office of Energy Research at the Department of Energy; and Thomas J. Murrin, Deputy Secretary of Commerce. Executive director of the committee was William R. Bandy, a program manager for the Defense Advanced Research Projects Agency.

DRAFT

MEMORANDUM FOR THE PRESIDENT

FROM: D. ALLAN BROMLEY

SUBJECT: FIRST ANNUAL REPORT OF THE NATIONAL ADVISORY COMMITTEE ON SEMICONDUCTORS

I am pleased to forward to you the above mentioned report. The Commission was established by Public Law 100-418, as part of the National Advisory Committee on Semiconductor Research and Development Act of 1988; it is chaired by Ian M. Ross, President of the AT&T, Bell Laboratories. Although I am, by statute, a member, I came on board only in time to attend part of the final meeting of the Commission prior to completion of this report.

As Mr. Ross emphasizes in his transmittal letter, the U.S. semiconductor industry -- an industry of vital importance to our economic competitiveness and our national security -- is in serious trouble.

The Commission presents an incisive analysis of the industry and the roots of this trouble. But beyond that it proposes an aggressive approach to revitalizing the industry, specifically through reestablishment of a

competitive U.S. consumer electronics industry that inter alia would serve as a large volume domestic market for semiconductors -- a volume sufficient to support and maintain the packaging and other front line R&D essential to maintenance of a competitive semiconductor industry.

Central to this proposal is the creation of a for profit Consumer Electronics Capital Corporation to provide a multi-billion dollar pool of patient, low-cost capital. Initially it is proposed that this CECC be funded at the mulit-hundred million dollar level through equity investments from industry sources, private and institutional investors and state and local governments. Subsequent major funding would be in the form of commercial debt accompanied by pledges of support from Federal, State and local governments.

In addition, the Commission makes a number of recommendations directed toward improving the business environment for semiconductor manufacturers in the U.S., toward improving the essential flow of trained personnel, and toward fostering cooperative development of basic technologies applicable to this industry.

The problems outlined by the Commission are very real and the time window available for their resolution is relatively small. I believe that the report of the Commission deserves serious study and consideration.

I have enclosed a draft letter that you might wish to forward to Dr. Ian Ross of AT&T Bell Laboratories, acknowledging receipt of the report.

DRAFT

Dear Dr. Ross:

Your report, A Strategic Industry at Risk, is an effective and incisive analysis of the problem and opportunities facing the U.S. semiconductor industry and I should like to express to you and your associates my thanks for the very obvious thought, analysis and effort that has gone into its preparation.

I can assure you that your recommendations will be given very serious consideration and I look forward to working with you to rebuild this vital component of your industrial base.

I shall ask my staff to arrange a time when I can meet and discuss with you, and a few of the Commission members whom you may with to being with you, some of the specific recommendations in your report.

Sincerely,

Dr. Ian M. Ross
President
AT&T Bell Laboratories
Crawfords Corner Road
Room 31650
Holmdel, New Jersey 07733

The Canadian dollar finished the quarter at $00.835, virtually unchanged from the rate at the end of the first quarter. It rose markedly, however, against overseas currencies.□

Science

BUSH TO NOMINATE FORMER NIH HEAD TO SENIOR POST IN SCIENCE OFFICE

President Bush is expected to nominate the former director of the National Institutes of Health, James B. Wyngaarden, as one of his senior science advisers, according to informed administration, congressional and science community sources.

Wyngaarden would be one of four associate directors of the Office of Science and Technology Policy (OSTP), advising Bush's top science adviser, OSTP Director Allan Bromley, on "life science" matters.

Bush also is expected to nominate J. Thomas Ratchford, associate executive officer at the American Academy for the Advancement of Science, to be the OSTP associate director for international affairs.

As associate director for the physical sciences, Bush is expected to nominate James F. Decker, currently deputy director of the Office of Energy Research at the Department of Energy.

The fourth associate position, to specialize in industrial technology, has not been chosen yet, according to sources.

However, a key job to be filled at the assistant director level, with responsibility for environmental matters, is likely to be taken by Nancy Maynard, now associate chief of research for the laboratory for oceans at the Goddard Space Flight Center, sources said.

Bush and Bromley are seeking to rebuild OSTP, and the naming of four associate directors itself will be significant because the authorized jobs went unfilled during the Reagan administration as the office that employed 55 persons under President Kennedy shrank to 10 employees under President Reagan. Bush this year proposed to increase it to 33 in fiscal 1990, and Bromley said he has a gentleman's agreement with the Office of Management and Budget to get a 45-person complement during his second year.

Bromley's full complement of four associate directors will be designated to cover the areas of: physical science and engineering, life sciences, policy and international affairs, and industrial technology.

The four associate directors will require Senate confirmation, and attention probably will focus on Wyngaarden, who served for seven years as head of NIH during the Reagan administration before resigning July 1 when it was clear Bush preferred to name his own NIH director. During his tenure, Wyngaarden, a medical doctor specializing in metabolic diseases, started a program to combat scientific fraud and was active in the effort to map all the genes of the human body. He was criticized by some for letting medical interests dominate development of biotechnology policy.

"There will be a few interesting questions, but in general he has had a very tough job and he survived so he must have been doing something right," commented one person knowledgable on Wyngaarden's record.

Ratchford, who has been helping Bromley part-time as a consultant, is also a physicist and was one of the first scientists to serve Congress on a full-time basis, working on the staff of the House Committee on Science and Technology from 1970 to 1977. He recently completed a three-year term as chairman of the National Science Foundation's Advisory Committee on International Programs.

Among other things, OSTP plays a role in negotiating bilateral science agreements and considering U.S. involvement in international scientific research projects.

Decker, also a physicist, will be nominated to head the physical sciences section of OSTP, sources said. Decker's office at Energy supports all of the basic research at the department, including high energy and nuclear physics, basic energy sciences, health and environmental research, magnetic fusion energy, and scientific computing. During the Reagan administration, Decker chaired two interagency committees concerning recommendations on access to supercomputers and U.S. leadership in the development of supercomputers.□

International Trade

NATIONAL SEMICONDUCTOR COMMITTEE BACKS FEDERAL SUPPORT FOR HDTV EFFORT

The National Advisory Committee on Semiconductors Aug. 31 endorsed an industry-led, government supported policy for development of an American high definition television industry.

Commitment to such a strategy could be an important element in the United States re-entry into the consumer electronics industry, the committee said releasing a letter to President George Bush containing its interim recommendations for a "broad-based, long-term and cooperative national effort to ensure our continuing technological competitiveness."

The advisory committee was created by an act of Congress in 1988 to devise a national semiconductor strategy and to recommend appropriate actions in support of such a strategy.

In a July 21 letter to Bush, committee chairman Ian M. Ross noted that the loss of a U.S. consumer electronics industry has eroded the ability of American semiconductor manufacturers to compete effectively.

HDTV can be a critical semiconductor technology "driver," Ross said, because related equipment will utilize significant numbers of DRAMS, microprocessors, signal, video, and image processing chips.

In addition, the committee concluded, HDTV will create important technological spillovers into critical industries like computers, telecommunications, auto electronics and defense

The committee's final recommendations are expected to be completed by the end of the fiscal year.

Study Opposes Government Support

The Cato Institute Aug. 30 released a study opposing federal support for HDTV development, suggesting that the market should determine the best system.

0148-8155/89/$00.50

THE WHITE HOUSE
WASHINGTON

DATE: 8/31/89

TO: STEVE DANZANSKY

FROM: **DAVID Q. BATES**
Assistant to the President
and Secretary to the Cabinet

Steve--I think we should invite him to all our DPC/EPC meetings, and we should get him involved in Working Groups where he can contribute. Formal membership is tricky, and I will talk to you further about this. Good memo.

Justine -

Lets be sure he's invited to all EPC/DPC

cc: Justine D'Andrea

Steve - I think we should invite him to all our DPC/EPC meetings and we should set him involved in Working Groups where he can contribute. Formal membership is tricky, and I will talk to you further about this. Food mean.

THE WHITE HOUSE

WASHINGTON

August 24, 1989

MEMORANDUM FOR DAVID Q. BATES

FROM: STEPHEN I. DANZANSKY

SUBJECT: THE PRESIDENT'S SCIENCE ADVISOR

I had lunch today with Allan Bromley (resume enclosed), the recently confirmed Director of the Office of Science and Technology Policy. He's really terrific and a kindred spirit. I wanted to establish a close working relationship with him and his office since he has both the confidence of the President and the Governor and will, upon approval of his budget request, become a significant force for the coordination and centralization of science policy, boasting a staff increase from 2 to 30 plus professionals.

Allan wants and needs to be plugged in to the policy process. He has equal reason to be a part of the DPC as well as the EPC deliberations since the issues taken up in both have a science and technology crosscut. I told him that I did not know what the current status was, but would check and try to see that he had equal status in each policy body.

DSB 8/31

I would think, David, that the newly upgraded Science Advisor ought to be given a status similar to that of Darman or Boskin. You might want to go to the Governor on this if there is a problem, but I see a distinct advantage to the Cabinet as well as to our office by including him.

cc Tuesday

If he is as good as he appears, it would be a distinct advantage to us to turn over the DPC Environment Working Group Chairmanship to him rather than to be at the mercy of OPD's staff person. Likewise, there are other issues which he can be a help to us on as well.

From my recent conversations and sit-ins on meetings with the NSC PPC on Environment, I have discovered that the reason the NSC has felt the need to be so active on the Environment (Economic Summit, etc.) is that Ms. Mazolli has not convened meetings and has not taken charge or direction from OCA very well. It would be a natural to move that one to Bromley -- and I think the Governor would support it wholeheartedly.

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0148-8155/89/$00.50

THE WHITE HOUSE
WASHINGTON

Date: 9-19-89

TO: KEN YALE
LEHMANN LI
JUSTINE D'ANDREA

FROM: **STEPHEN I. DANZANSKY**
Deputy Assistant to the President
and Director of Cabinet Affairs

Please ensure that Allan Bromley is included and at the table for the working group and council meetings requested in his letter.

THE WHITE HOUSE

WASHINGTON

September 15, 1989

Dear Steve:

My apologies for the long delay in responding to your letter of August 24th, but unfortunately in the absence of my senior associates I am finding that I am being literally swamped by my attempts to keep the OSTP office functioning.

I thoroughly enjoyed our luncheon and was delighted to have the opportunity to become acquainted and to talk with you about some of our mutual interests on behalf of the President.

You were good enough to send me a list of EPC and DPC activities as of August 18th together with the invitation to let you know which of those activities OSTP would wish to contribute.

Let me begin by listing those EPC areas I feel we have very important contributions to make. They are the following:

II - Commerce

A. Science and Technology
B. High definition television

III - Energy

Moving to the DPC issues, I would list as among the highest priorities the following:

EDUCATION

HEALTH AND HUMAN SERVICES

2. AIDs
3. Food Safety
4. Infant Mortality

MANAGEMENT AND BUDGET

NATIONAL DRUG CONTROL

MANAGEMENT AND BUDGET

(Although the specific topics listed in your memorandum are not those toward which we might make major contributions, I suspect that as time goes on many topics will appear on this agenda item to which we will have close contact and in which we will have substantial interest.)

ENVIRONMENT

(Here again, the specific issues of wetlands, oil leases and solid waste disposal are not among those having greatest interest to OSTP, but again, I certainly anticipate that as time goes on matters of the environment in which we do have major interest will be appearing on the DPC calendar.)

I would wish to emphasize once again how delighted I am to have the opportunity to work with you and our colleagues on the EPC and DPC on some of these very important issues. There are a number of topics that I think we could profitably discuss on an informal basis and I hope that you might be able to join me for lunch some time in the near future to make those discussions possible. I have asked my office to contact yours to try and find a time that would be mutually convenient.

With warmest best wishes,

Sincerely yours,

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

The Honorable Stephen I. Danzansky
Deputy Assistant to the President and
Director of Cabinet Affairs
Room 231
Old Executive Office Building
17th and Pennsylvania Avenue, N.W.
Washington, D.C. 20506

SEMICONDUCTOR

A STRATEGIC INDUSTRY AT RISK

A Report to the President
And the Congress
From the
National Advisory Committee on
Semiconductors

Advance Edition
November 1989

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Advance Edition
November 1989
Washington, D.C.

National Advisory Committee on Semiconductors
1555 Wilson Boulevard, Suite 500
Arlington, VA 22209

November 1, 1989

Honorable George Bush
President of the United States
White House
Washington, D.C.

Dear Mr. President:

The semiconductor industry in the United States is in serious trouble. If this vital industry is allowed to wither away, the Nation will pay a price measured in millions of jobs across the entire electronics field, technological leadership in many allied industries such as telecommunications and computers, and the technical edge we depend on for national security.

The reasons why the once-dominant U.S. semiconductor industry is deteriorating are many. First and foremost is the fact that foreign producers enjoy advantages in ready access to low-cost patient capital for long-term investment. Foreign producers also operate in a business environment hospitable to cooperative ventures that are not general practice here, and they find shelter in home government protection against competition from abroad. But some blame for the semiconductor industry's poor health must also rest on the lack of long-range foresight of top management of American companies, who failed to realize the full consequences of retreating from key markets such as memories and consumer electronics.

The National Advisory Committee on Semiconductors believes that continued deterioration of America's semiconductor industry poses an unacceptable threat to U.S. economic and national security. We believe that this situation deserves your urgent attention. The Nation must act now, with the industry itself taking the lead and government at all levels participating as a strong partner. We believe that the American people, once fully apprised of the stakes involved for this country, will endorse the legislative and executive actions necessary to restore the semiconductor industry to good health.

The Committee recognizes that some of its recommendations may be controversial. We were charged by the Congress with "devising and promulgating a national semiconductor strategy." We have not shied away from controversy. In this report we present first steps toward a national semiconductor strategy. We believe that the country needs bold and innovative action.

This report warns of a major threat to the United States, a threat that endangers American industry, workers, and strategic self-sufficiency. That threat is immediate and serious and warrants the attention of the highest councils of government. In this first report, the National Advisory Committee on Semiconductors offers for your consideration and early action initial recommendations to counter that threat and enable the U.S. semiconductor industry to flourish. If this action succeeds, the whole Nation will benefit through more jobs, the creation of new wealth, and strengthened national defense.

Pursuant to Section 5142(c) of the National Advisory Committee on Semiconductor Research and Development Act of 1988 (Public Law 100-418), therefore, I have the privilege of transmitting to you the first annual report of the National Advisory Committee on Semiconductors.

Respectfully,

Ian M. Ross
Chairman

CONTENTS

PREFACE

The 100th Congress established the National Advisory Committee on Semiconductors as part of the National Advisory Committee on Semiconductor Research and Development Act of 1988 (Public Law 100-418) to devise and promulgate a national semiconductor strategy. The Congress acted in response to growing public awareness of the importance of America's semiconductor industry to the national security and economic destiny, the increasing and pervasive loss of world market share in key elements of the industry, and the necessity of preserving this industry for the national good.

From the outset of the its deliberations, the Committee agreed on the seriousness of the problems in the U.S. semiconductor industry. The Committee also recognized that this situation must be urgently addressed. This report represents early findings of the Committee, and is an effort to bring quickly to the President and the Congress suggestions for action.

In undertaking its work, the Committee drew on a number of Federal studies of issues affecting the U.S. semiconductor industry and national competitiveness in general. In a number of areas, the Committee undertook additional studies to supplement the earlier work. Finally, the Committee called on the expertise of the American electronics community in the persons of Federal Government officials, industry executives, researchers, and private-sector economists and scholars. The Committee is grateful to these individuals for their help.

For development and analysis of the data and preparation of suggestions for recommendations, the Committee formed three Ad Hoc Working Groups -- Business Environment, Market, and Technology -- each headed by a Committee member and each drawing its membership from experts in the electronics field. The Working Group members provided the Committee with a broad and deep base of knowledge of the problems facing the American semiconductor industry.

The enabling legislation requires the Committee to report on its planned activities for the coming year. The Committee believes that this report contains early key recommendations for the President and the Congress, but also believes that continued development of recommendations is in order and that additional recommendations will be forthcoming in subsequent reports. The Committee expects to continue its work throughout fiscal years 1990 and 1991, releasing reports during this period as appropriate.

EXECUTIVE SUMMARY

The semiconductor industry is strategic to America. The industry is the foundation of the information age, playing a crucial role in the consumer electronics sector, the computer and telecommunications industry, and other industries that have a high electronic content in their products. America's national security also depends on the semiconductor industry. United States and North Atlantic Treaty Organization forces rely on the technological advantage of advanced semiconductors to offset the numerical superiority of potential adversaries.

The semiconductor industry, after an era of world leadership, is now in trouble. It has lost its dominant position in the world market. This radical change has occurred in the 1980s despite the fact that American industry invented, developed, and dominated the semiconductor market for three decades. Japanese companies, encouraged by their government, have taken aggressive actions to establish a world-class semiconductor industry that now clearly leads the world marketplace. The U.S. semiconductor industry has been unable, for many reasons, to respond to this challenge.

It is imperative that U.S. industry, in cooperation with government, develop a strategy to retain a strong semiconductor capability. Major U.S. electronics systems industries, such as computers and telecommunications, depend on the timely availability of leading-edge semiconductor devices. In order for U.S. semiconductor manufacturers to produce leading-edge components they, in turn, need timely access to the latest state-of-the-art semiconductor manufacturing equipment and materials. If the U.S. position in semiconductor devices, equipment, and materials continues to deteriorate, the entire domestic electronics products industry will be at the mercy of foreign suppliers. The loss of control of this large segment of the economy puts millions of jobs and billions of dollars of tax revenues in jeopardy.

A major result of losing semiconductor world market share is that U.S. semiconductor manufacturers are not able to fund research and development (R&D) at the level of their foreign competitors. Research and development spending at the top five Japanese semiconductor firms is now twice as high as spending at their U.S. counterparts. Unchallenged, this large difference will accelerate the U.S. loss of market share in the future.

There is no single reason for the decline of the U.S. semiconductor industry. The causes include changes in the business environment, shifts in the markets for electronic products, and weaknesses in the approaches used by the semiconductor industry to advance technology.

The business environment in the U.S. imposes fundamental disadvantages on American semiconductor manufacturers. These include a high cost of capital, weaknesses in the education of the work force, difficulties in enforcing U.S. intellectual property rights abroad, and the ability of foreign competitors to benefit from closed markets and liberal antitrust laws.

One underrated but key factor in the deterioration of U.S. semiconductor leadership is the loss by U.S. producers of the consumer electronics industry. The shift to the Far East of manufacturing for nearly all consumer electronic products, such as televisions, video cassette recorders, and compact disc players, has had serious consequences because almost all the electronic components used in these products are also made in the Far East. In addition, because consumer electronics can drive technology applied to advanced commercial and military systems, for example in component packaging, foreign domination of the industry will put the United States at a greater disadvantage in the future.

As the U.S. position in the world semiconductor market has declined, so has its leading position in technology. For years the Japanese semiconductor industry has recognized the advantages of cooperation in the precompetitive phases of R&D. By contrast, the U.S. industry is characterized by relationships that are mostly competitive. Because U.S. firms have acted independently, each company is burdened with the full costs of advancing every aspect of new technologies. In an era of rapidly increasing costs of technology development, independent and duplicated efforts hinder competitiveness.

In the Committee's judgment, the United States is at a critical crossroad. The decline of the U.S. semiconductor industry, coupled with the increasing costs of staying at the leading-edge, limits the window of opportunity to establish an effective semiconductor strategy. Unless the U.S. industry and government take coordinated, concerted, and timely action, there will be a long-term deterioration of our industrial strength and military security, and an erosion of our economic wealth.

Recommendations: Toward a National Semiconductor Strategy

Timely industry action, supported by government, is required to arrest the deteriorating global position of the U.S. semiconductor industry. Industry and government must cooperate, with each providing its special strengths and acting in its appropriate role. The National Advisory Committee on Semiconductors has developed recommendations that serve as initial steps towards the development of a comprehensive national semiconductor strategy. These initial recommendations are:

1. Re-establish a fully competitive and supportive business environment in the United States to enable the U.S. semiconductor industry to operate on an equal footing with its major international competitors by:

   a. Promoting capital formation;

   b. Improving the education system;

c. Reforming trade law;

d. Protecting intellectual property; and

e. Improving the antitrust climate.

2. Expand the U.S. industry's global semiconductor market share by rebuilding a strong U.S. position in the growing high-volume, high-technology electronic systems market by:

a. Building a supportive business environment. There are several inseperable actions that must be implemented as a unit to accomplish this:

- Establishing a for-profit Consumer Electronics Capital Corporation (CECC) to resurrect the U.S. consumer electronics industry infrastructure by providing a multi-billion dollar pool of very-patient, low-cost capital;

- Urging the President to direct the appropriate agency to determine those factors which reduce the likelihood of a successful U.S. consumer electronics industry. Redress shall then be immediately sought through cooperative agreements (with non-U.S. corporations), consumer electronics technology licensing, local technology content minimums, and local R&D and design (or any combination of the preceeding); and,

- Having the Federal Government encourage and purposefully support the re-entry for the U.S. consumer electronics industry and its potential to compete vigorously. Accordingly, the Office of the U.S. Trade Representative shall ensure that access to the U.S. consumer electronics market shall be contingent upon reciprocal opportunity for U.S. companies to access foreign markets.

b. Providing expanded market opportunities by encouraging private industry to accelerate the development of a nationwide broadband network providing fiber-optic cable to the home, by modifying regulatory policy where necessary and broadly experimenting with prototype and trials.

3. Enable the U.S. semiconductor industry to retain an enduring world-class, competitive technology position with a healthy semiconductor manufacturing equipment industry by:

a. Accelerating research and development in the U.S. semiconductor materials and equipment industry by expanding the mission of SEMATECH, the semiconductor manufacturing technology consortium, in this area. SEMATECH's funding should be increased immediately by $100 million, half of which should be provided by the industry. Additional funding of $800 million will be required over the next 3 years for these programs fully to address the needs of this industry segment.

b. Sustaining the current Departments of Defense (DOD) and Energy (DOE) funding of $200 million per year that was previously allocated to

very-high-speed integrated circuits and direct it toward maintaining long-term industrial R&D efforts related to silicon technology and manufacturing tools.

c. Ensuring that the DOE transfer synchrotron ring x-ray technology and systems for microlithography to U.S. industry and aggressively pursue, with DOD's Defense Advanced Research Projects Agency, and the Department of Commerce programs in mask making, mask repair, aligners, metrology, and small x-ray sources.

The Committee's full recommendations appear in Section IV.

I. The Semiconductor Industry and Its Vital National Role

The uncommonly important semiconductor industry starts from some of the most common materials on Earth--sand, water, and aluminum. Through the application of complex manufacturing processes, these raw materials are transformed into the most intricate devices ever produced. Today, a single semiconductor integrated circuit chip can contain millions of microscopic components that channel the flow of electrons, and they can perform their tasks in a few billionths of a second. Before the next century, chips containing billions of components will be made.

The transformation of sand into complex silicon integrated circuits requires exceedingly high levels of scientific and engineering knowledge. The semiconductor industry's technological know-how encompasses a broad range of fields in the physical sciences such as physics, chemistry, electrical engineering, and materials science. The needs of the industry stimulate fundamental advances in these fields, and the resulting gains spill over to fill the Nation's reservoir of technological capability.

As chips become more complex, the costs of staying at the leading-edge escalate rapidly. Chip makers are at the forefront of all U.S. industries in their annual investment (as a percentage of total revenues) for research and development, and new plants and facilities. Since 1980, the cost of a typical state-of-the-art facility for semiconductor memory chips has risen eight-fold, from $25 million to $200 million. Over the next several product generations, state-of-the-art manufacturing facilities are expected to cost between $500 million and $750 million. Last year alone, the U.S. semiconductor industry spent about $3 billion on R&D and another $3.5 billion in capital investment. Such spending strains the resources of even very large companies.

Because more and more transistors can be packed on each chip, the cost per electronic function has fallen by a factor of 100 over the past 15 years. The gains in product performance have been commensurate with this extraordinary improvement in productivity. Compare, for example, the world's first electronic computer, America's ENIAC built in 1946, with an equivalent computer built today. ENIAC was room-sized, weighed 2 tons, drew power equivalent to 100 lighthouses, and used unreliable vacuum tube technology that frequently broke down. Today, American companies produce single semiconductor chips that have 1,000 times the processing power, almost never break down, draw no more energy than a night-light, weigh less than a gram, and cost 30,000 times less.

This tremendous improvement in productivity and performance has, in turn, opened semiconductor markets to ever wider applications. Semiconductor components are used ever more pervasively and intensively in almost all aspects of daily life. Today, chips drive products that help us to defend America, make medical diagnoses with sophisticated imaging equipment, navigate commercial aircraft, and warn when dangerous weather is approaching as well as improve the quality of our everyday lives through a broad range of consumer electronic products.

Today's $50 billion world chip industry leverages a $750-billion dollar global market in electronics products and 2.6 million jobs in the United States. This is more than double the number of jobs in the U.S. steel and auto industries combined. As products such as TVs, computers, anti-lock brakes, microwave ovens, and phone systems improve in performance and cost, demand for them increases. That increased demand prompts producers of these products to seek further advances from chip technology, pushing the industry forward toward further innovations. Such cycles of improved productivity and performance, and expanding demand for the products that take advantage of the

improvements, create enormous economic and social gains. The benefits range from saving lives through improved medical safety systems to communicating by voice and data with any point in the world.

America's national security also depends on excellence in semiconductors. United States and North Atlantic Treaty Organization forces rely on a technological advantage ultimately traceable to semiconductors to offset the numerical superiority of our adversaries, as a Department of Defense task force affirmed in 1987:

> The superiority of U.S. defense systems of all types is directly dependent upon superior electronics, a force multiplier which not only enhances the performance of the weapons themselves, but also maximizes the efficiency of their application through sophisticated intelligence and command and control systems... The United States has historically been the technological leader in electronics. However...U.S. defense will soon depend on foreign sources for state-of-the-art technology in semiconductors. The Task Force views this as an unacceptable situation.[1]

Progress in the semiconductor industry advances the technical capabilities of industries that are linked to chips in the production chain, from computers and telecommunications to new materials, and indirectly advances many other industries. The semiconductor industry promotes the development of ever purer chemicals and materials, more powerful computer-aided engineering and design, and computer-integrated manufacturing, all of which find broad application in other industries. In addition, the products of the electronics industry are essential tools used to achieve the increased productivity, lower cost, and higher quality that are required from all U.S. manufacturing. Leadership in chips can result in leadership in many industries--a fact widely recognized by our major international competitors.

Because the semiconductor industry is so vital to the national economy, it is important to understand the structure of the industry and its position in world markets. The semiconductor industry has two major business segments. The first consists of the semiconductor manufacturers who actually produce semiconductor components (U.S. annual revenues are approximately $20 billion). These companies turn simple raw materials into finished wafers in expensive, ultra-clean manufacturing facilities. They also provide the packaging, testing, sales, marketing, and product support that are essential for success in the marketplace. The second segment of the industry includes the semiconductor materials and equipment (SM&E) firms that produce both the raw materials and the manufacturing equipment that go into the production of integrated circuits (U.S. annual revenues are about $5 billion). Together, semiconductor manufacturing and SM&E firms enable the entire U.S. electronics products industry, as illustrated by Figure 1.

The core of the electronic products industry is made up of SM&E companies. These firms supply the common set of tools and materials, used by most manufacturers, that enable efficient, low-cost, high-quality production. They supply both the equipment for various stages of the manufacturing process (photolithography, materials processing, chip handling, packaging, and testing) and the ultra-pure silicon, gases, chemicals, and metals that are transformed into circuits. Loss of leadership in these technologies undermines more than just semiconductors. Indeed, the SM&E industry advances[2] manufacturing disciplines as diverse as machine tools, vacuum control, automated controls,

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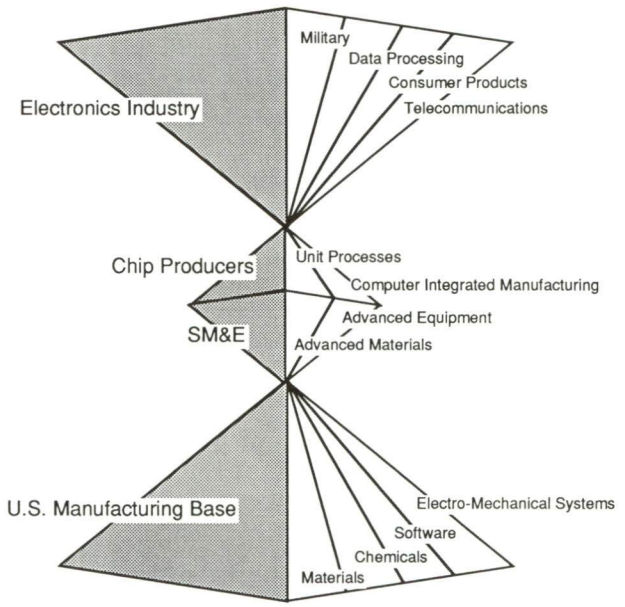
[1] "Report of Defense Science Board Task Force on Defense Semiconductor Dependency," Feb. 1987, p.1.

and computer-aided design. Advances within the SM&E industry, therefore, spill over into almost all aspects of the American manufacturing base.

Both the chip and SM&E industries have suffered declines in their world market positions over the past decade, as is demonstrated in the next section.

FIGURE 1: SEMICONDUCTORS: THE ENABLING INDUSTRY



Source: National Advisory Committee on Semiconductors.

II. The Decline of the Semiconductor Industry

Evidence of the Decline in the U.S. Semiconductor Manufacturing

The U.S. merchant semiconductor industry has lost its dominant world market share in the past 10 years.[2] Leadership of the industry has largely shifted to Japan, as shown in Figure 2. As a result, while United States semiconductor revenues nearly tripled from 1981 to 1988, revenues for Japanese producers rose six-fold. In addition to the loss of leading-edge semiconductor markets, the U.S. is continuing to lose market share in less complex discrete devices, as shown in Figure 3. These devices are key to a wide range of products from military equipment to consumer electronics.

Despite high investment rates relative to other U.S. industries, the U.S. chip industry is being substantially outspent by its major Japanese competitors in R&D and the gap is growing larger, as shown in Figure 4. In addition, Japanese firms have led U.S. firms in capital spending since 1982, although the United States had greater semiconductor sales until 1986. In 1988, Japanese capital spending was nearly $2 billion higher than that of the United States.

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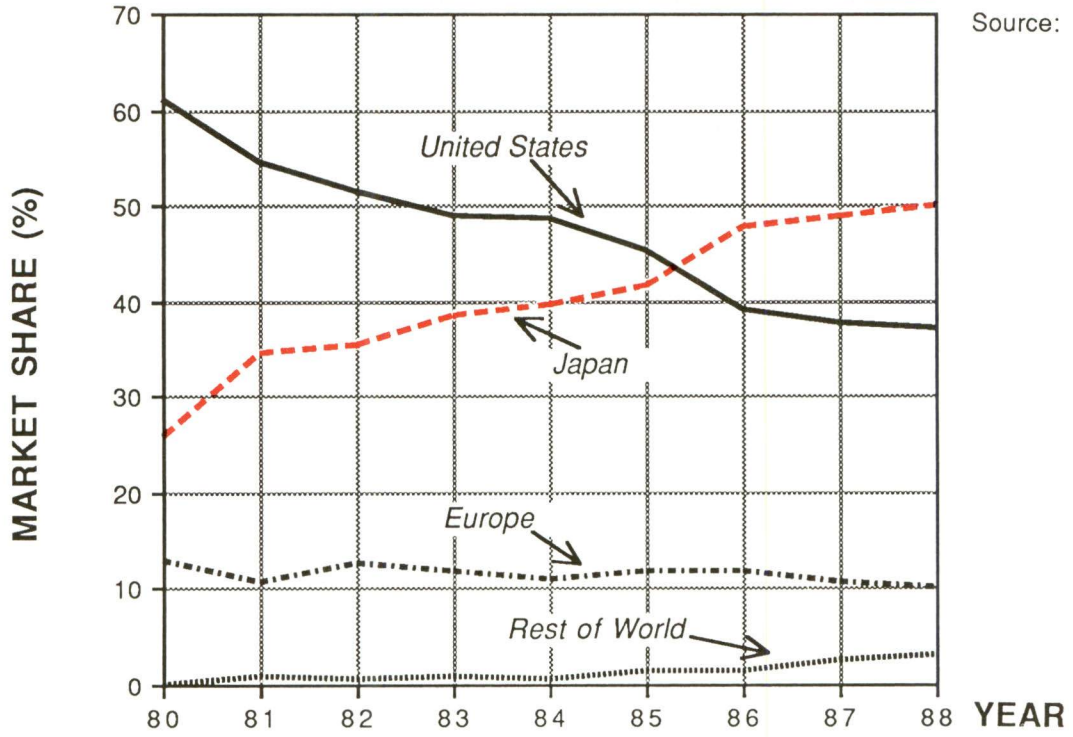
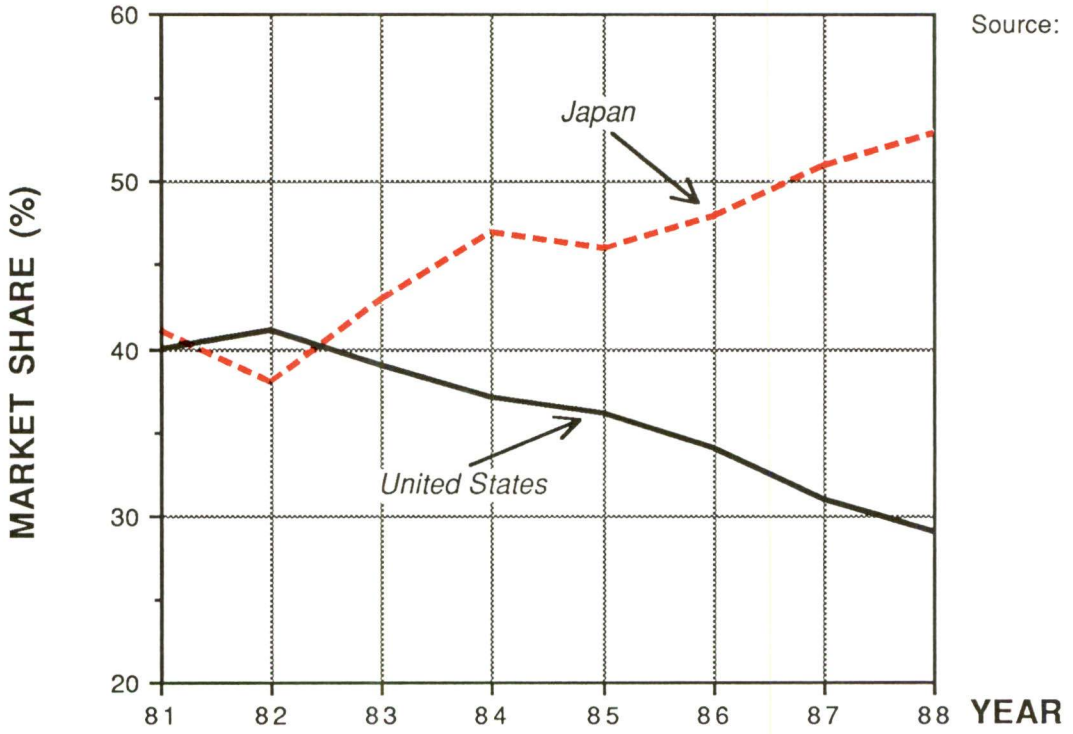
[2] Since U.S. captive semiconductor manufacturers do not disclose their financial position, data is presented only for the U.S. merchant industry. Data for the Japanese semiconductor industry include all production. Inclusion of U.S. captive production would slightly increase the market shares shown for the U.S. in several figures, but would not change the trends described. Based on experience in the field, the Committee believes the conclusions of this report apply equally well to merchant and captive chip producers.

FIGURE 2: WORLD SEMICONDUCTOR PRODUCTION BY REGION



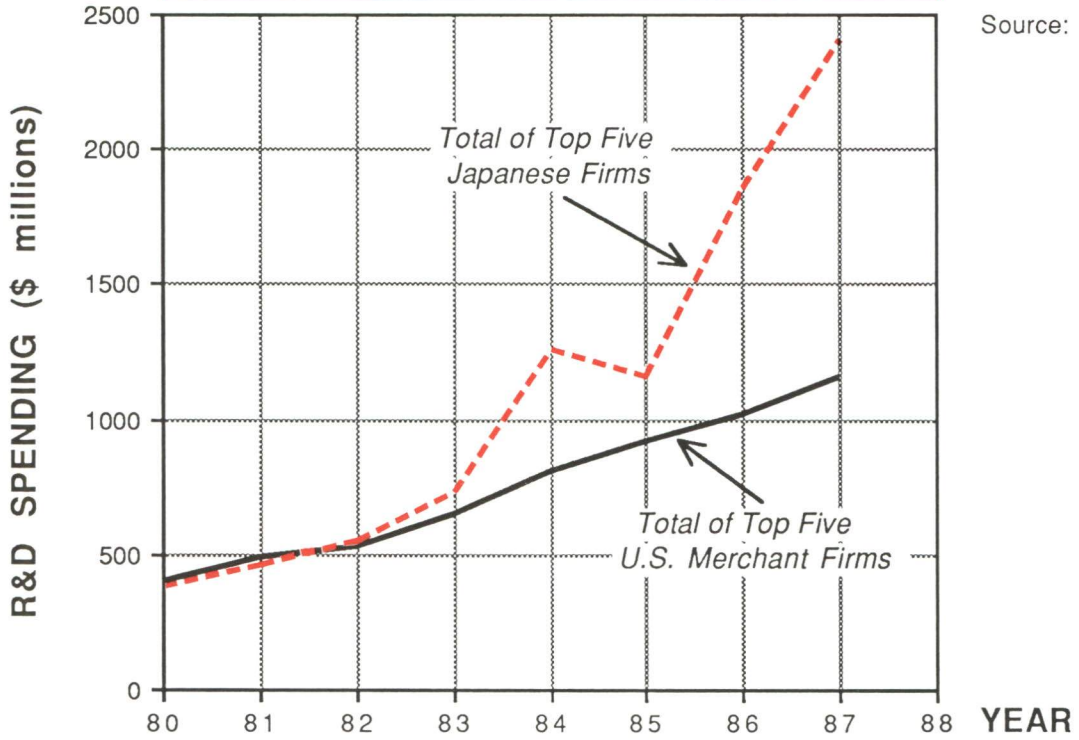
Source: Dataquest.

FIGURE 3: WORLD DISCRETE PRODUCTION BY REGION



Source: Dataquest.

FIGURE 4: WORLD SEMICONDUCTOR R&D SPENDING



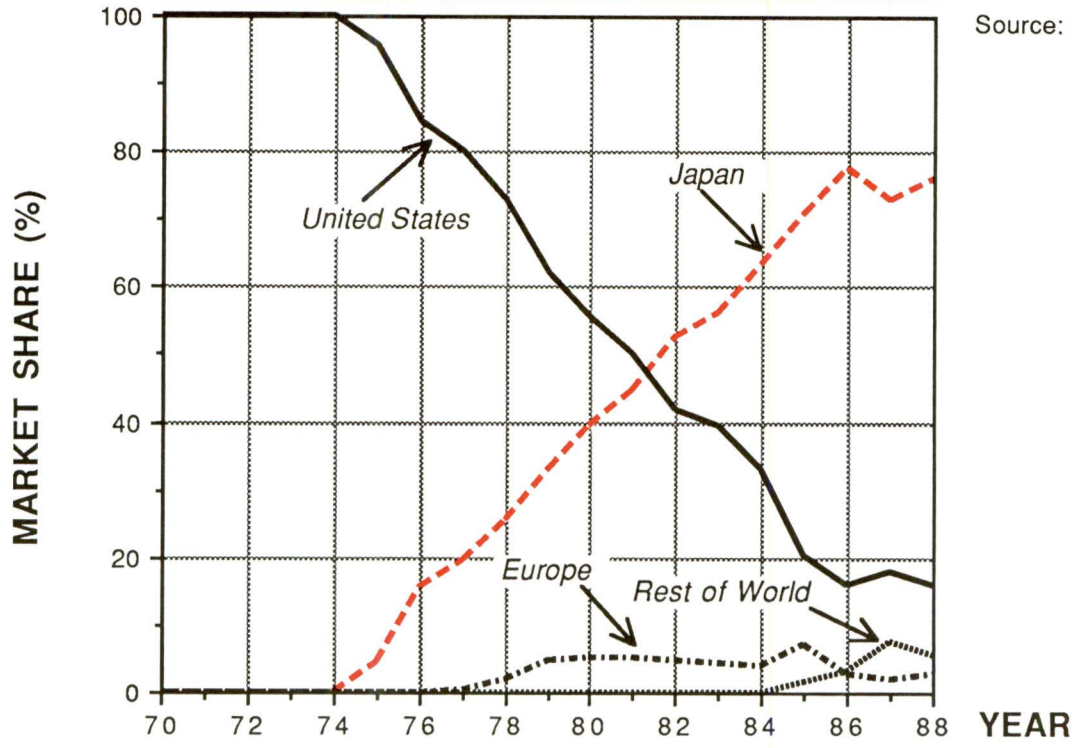
Source: Dataquest.

The erosion of the U.S. position is equally apparent in key semiconductor product markets. In 1970, when the first integrated circuit memory was being sold, Japan's market share was zero. In 1988, the world Dynamic Random Access Memory (DRAM) market share of Japanese producers was nearly 80 percent This market share loss by U.S. merchant firms is shown in Figure 5. The loss of position in memory is particularly disturbing because leading-edge memory drives technological advances in a broad range of process and manufacturing areas. DRAMs not only act as a technology driver for chip makers, but they are also an important driver for SM&E firms, as new equipment and materials are often first developed for memory production.

The U.S. semiconductor industry's simultaneous loss of global technology and market position results in lower revenues, further reducing R&D and capital spending and leading to further decline in market share. It has already led to a change in the world leadership among semiconductor producers, as illustrated by Figure 6. This figure shows the change in the regional control of the market for metal-oxide-semiconductor (MOS) devices, which is the largest and fastest growing segment of the semiconductor market.

Reversing this trend will not be easy. Indeed, the cumulative loss of world market position by U.S. producers has had a serious effect on America's position relative to Japan's in many important aspects of semiconductor technology. The United States is holding its technological position in only a few areas, and gaining position nowhere. In critical technologies such as computer-integrated manufacturing, production quality control, and component packaging and testing, the United States has lost its technological superiority. Because technological knowledge is cumulative, once technological leadership is lost, it is very difficult to regain. The United States, therefore, has an ever-shortening window of opportunity in which to regain technological leadership before it finds itself behind the state-of-the-art.

FIGURE 5: WORLD PRODUCTION OF DRAMS BY REGION



Source: Dataquest, PREL '88.

FIGURE 6: LEADING MOS PRODUCERS REVENUES ($ millions)

1973		1978		1983		1988	
Texas Inst.	65	Intel	283	*NEC*	786	*NEC*	3114
AMI	56	Texas Inst.	238	Intel	720	*Toshiba*	2546
Intel	41	*NEC*	183	Motorola	697	Intel	2328
Rockwell	40	Motorola	143	*Hitachi*	638	*Hitachi*	1885
Mostek	39	*Hitachi*	139	Texas Inst.	572	*Fujitsu*	1437
NEC	37	Mostek	125	*Toshiba*	458	*Mitsubishi*	1399
Hitachi	35	National	95	*Fujitsu*	406	Motorola	1399
RCA	35	*Toshiba*	88	Mostek	315	Texas Inst.	1271
National	21	AMD	71	National	280	*Matsushita*	882
Mil	20	AMI	71	*Mitsubishi*	247	*Oki*	841
Total Market	591		2332		7951		26964

Source: Intel.

(Japanese Firms *Italicized*)

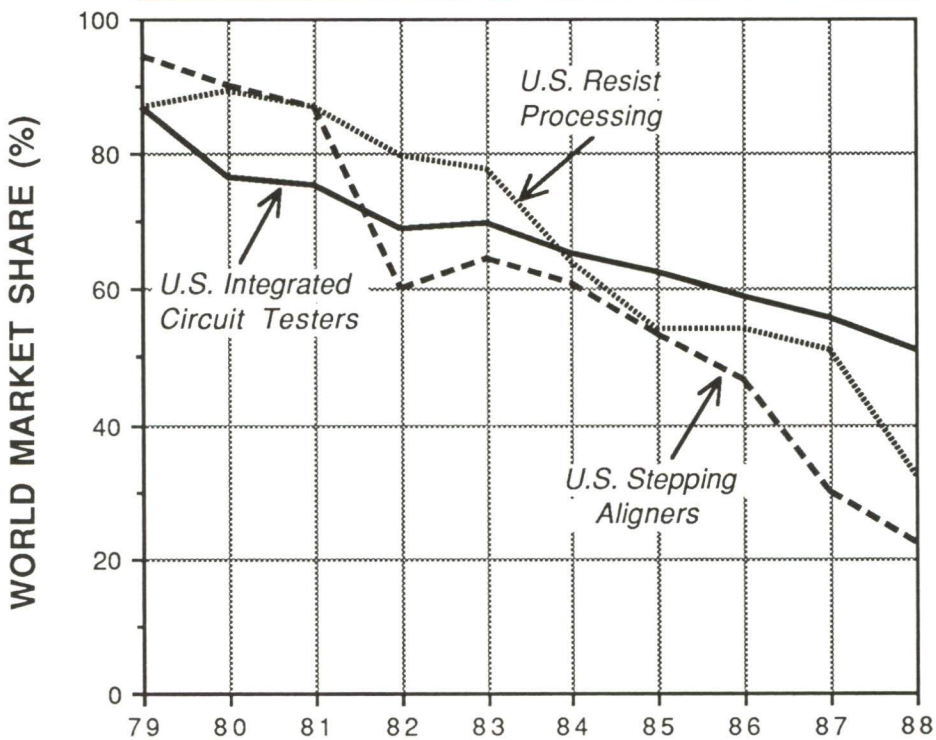
Evidence of the Decline of the U.S. SM&E Industry

Paralleling the loss in world market share for U.S. chip manufacturing has been a serious loss of market share for U.S. SM&E firms. Because SM&E firms supply the common tools and materials used by all chip manufacturers, weakness in semiconductor equipment and materials leads to weakness in semiconductor component manufacturing, and ultimately to weakness in electronic products markets.

Today's state-of-the-art silicon processing, driven principally by the manufacturing requirements of semiconductor memory chips, is moving toward decreasing feature sizes. Eighty-five percent of all leading-edge submicron manufacturing capacity is currently in the Far East. The predominance of leading-edge chip manufacturing outside the United States has very seriously undermined segments of the U.S. SM&E industry, largely because major foreign chip producers prefer working with local sources of supply they can control. These close working relationships spur equipment advances at foreign SM&E firms working with chip producers at the leading-edge.

The U.S. SM&E producers of lithography equipment, test equipment, and materials have seen their commanding market shares reduced, as shown by the examples in Figure 7. The three equipment markets shown in this figure represent critical tools used in chip manufacturing, and are representative of the declining U.S. share of most equipment markets. In 1982, U.S. SM&E firms were dominant suppliers worldwide; today, Far East firms are dominant, as shown in Figure 8. The only major U.S. SM&E survivors have succeeded by establishing close customer relationships in Asia.

FIGURE 7: SELECTED U.S. SEMICONDUCTOR EQUIPMENT



Source: VLSI Research, Inc.

FIGURE 8: TOP 10 SEMICONDUCTOR EQUIPMENT SUPPLIERS' WORLDWIDE SALES ($ millions)

1982		1988	
Perkin Elmer	$162	*Nikon*	*$521*
Varian	100	*Tokyo Electron (TEL)*	*508*
Schlumberger	96	*Advantest*	*385*
Takeda Riken (Advantest)	*84*	Applied Materials	382
Applied Materials	84	General Signal	375
Eaton	80	*Canon*	*290*
Teradyne	79	Varian	211
Canon	*78*	Perkin Elmer	205
General Signal	77	Teradyne	190
Nikon	*58*	LTX	180

(Japanese Firms *Italicized*)

Source: VLSI Research, Inc., Electronic Business.

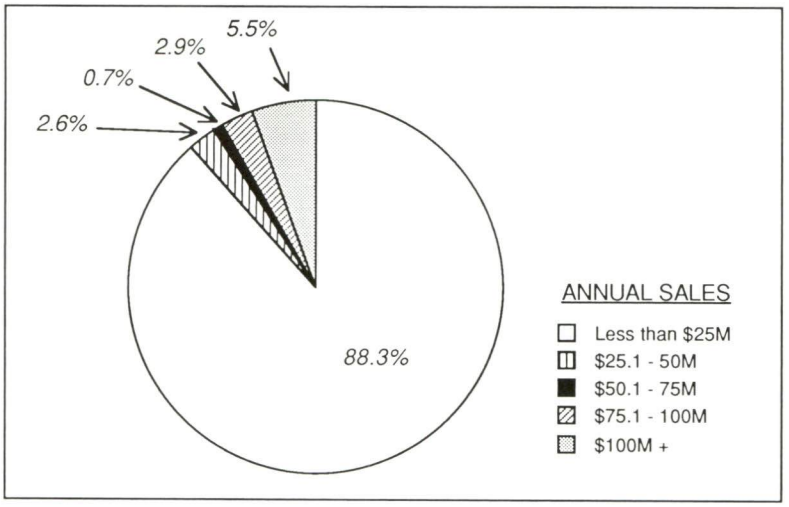
Maintaining a competitive position both in the United States and in the Far East is difficult for most U.S. SM&E producers, partly because their industry is highly fragmented and financially weak. While many Japanese SM&E firms are part of large, diversified companies, Figure 9 shows that 88 percent of the 850 U.S. SM&E companies had 1988 annual sales of less than $25 million. These companies face a difficult competitive environment of escalating capital requirements and R&D costs, while at the same time their major market is shifting to Asia.

Many U.S. SM&E firms still have excellent technology; the problem is that they will not be able to sustain their competitive position over time. They are also small enough to be attractive acquisitions for foreign conglomerates. Only recently, Materials Research Corporation (MRC), a critical U.S. manufacturer of semiconductor equipment and materials, accepted a tender offer from Sony. In addition, for several months Perkin Elmer has sought to sell its semiconductor lithography division. These companies represent important capabilities in the United States, and it would be damaging to the semiconductor industry, and to U.S. manufacturing as a whole, if these skills continue to migrate abroad. An example of the result of such a loss of U.S. capability is the sale of Monsanto's silicon materials business to the West German firm Huels, dropping U.S.-owned silicon wafer production from a 15 percent share of the world market to 1.8 percent. An initial analysis indicates that up to $1.2 billion over the next 3 years is required to restore this industry's health.[3]

The U.S. semiconductor manufacturing firms are already heavily dependent on foreign sources of critical materials and equipment, as shown in Figure 10. Even the largest and technologically strongest U.S. chip producers are at risk of failing to gain timely access to the SM&E technologies they need to remain competitive. Unfortunately, the prospect is for increased dependence and continued deterioration of the U.S. SM&E

[3]Analysis performed by the Semiconductor Equipment and Materials International (SEMI).

FIGURE 9: U. S. SM&E INDUSTRY SEGMENTED BY ANNUAL SALES



Source: Semiconductor Equipment and Materials International.

FIGURE 10: U.S. DEPENDENCE ON CRITICAL FOREIGN SEMICONDUCTOR EQUIPMENT AND MATERIALS

EQUIPMENT	1988 PERCENT IMPORTED
Stepping Aligners	68
Resist Processing	69
Scanning Electron Microscopes	>80
Wafer Saws	75
Die Bonders	80
Tape Automated Bonders	81
Mold and Sealing Equipment	65
Molding Presses	75
Lead Trim and Form	80
MATERIALS	
Silicon Wafers	97
Mask Blanks (share of U.S. market only)	91
Sputter Targets	96
Lead Frames	>95
TAB Tapes	85
Molding Compounds	78
Ceramic Packages	96
Ceramic Multilayer Packages	84
Ceramic Substrates	97
Hybrid Packages	80
Bonding Wire	>95

Source: SEMATECH.

industry as long as its major customers, the U.S. chip industry, is itself in relative decline. The decline of the U.S. SM&E industry will likely be hastened by further inroads of Asian SM&E manufacturers; an industry survey indicates that 75 percent of the next generation of processing equipment purchased by U.S. companies will be produced in Japan.

The Committee believes that the continued decline of the U.S. semiconductor manufacturing and SM&E industries is unacceptable. Neither segment of the semiconductor industry can remain strong without the other. Manufacturers depend on early access to advanced materials and equipment, and SM&E firms rely on the revenues generated by sales to domestic chip manufacturers. America needs a domestic-based and controlled semiconductor industry with a full complement of leading-edge activities from R&D through production, and with production costs, quality, and performance second to none. For the foreseeable future, neither imports nor foreign direct investment can ensure that the United States receives the same level of military, technological, and economic benefits that an American industry guarantees.

Consequences of the Decline

The economic, technological, and national security gains that flow from semiconductors provide a rare combination of benefits for America. The United States was able to capture those gains effectively so long as U.S. chip producers led the world and conducted nearly all of their leading-edge R&D and manufacturing activities at home. As the U.S. industry's competitive position and state-of-the-art domestic activities weaken, so does America's ability to reap the lion's share of the available national gains.

This point is most obvious from the perspective of national security. The qualitative edge in advanced weaponry that underlies America's strategic posture is put at risk by depending on trade flows that can be disrupted in wartime, and on foreign-owned capabilities, even if they are based in the United States.

Indeed, a recent publication[4] by Sony chairman Akio Morita and former Japanese minister Shintaro Ishihara, highlights the growing issue of Japan's pivotal role in developing leading-edge military electronics technology that contributes to the U.S. - Soviet balance of power. They argue that because Japan has such dramatically advanced production skills, their semiconductors have achieved a level of sophistication unmatched anywhere. As a result, they contend the United States could become almost totally dependent on Japan to supply chips for its weapon systems. They go on to point out that if the supply of advanced Japanese chips to the United States were interrupted, and if Japan were to make these chips available to the Soviet Union instead, the balance of power would change dramatically.

The absence of a strong domestic U.S. semiconductor industry would also give leverage to foreign competitors to control the flow of economic gains from semiconductors to the rest of the U.S. economy. Indeed, a scenario believed possible by many observers in industry and government foresees the withering away of the U.S. semiconductor materials and equipment industry in the face of cyclical downturns in U.S. semiconductor production and increased Japanese competition. In this scenario, the fate of the U.S. semiconductor industry--and, by extension, U.S. downstream industries--would soon be in the hands of mostly Asian suppliers. In the scenario's denouement, Asia dominates the U.S. downstream electronics industry and ultimately the global electronics landscape.

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4 The Japan that Can Say "No", The New U.S.-Japan Relations Card, Akio Morita and Shintaro Ishihara.

Our major competitors have a demonstrated capability -- compelled either by policy or their own strategy and organization -- to act in concert and exercise market power sufficient to control access to technology and its price. Compelling examples include the DRAM shortage, the inability of U.S. supercomputer companies to purchase the fastest foreign chips, and the inability of most U.S. chip producers to gain timely access to the most advanced foreign semiconductor manufacturing equipment and materials. In all of these areas, U.S. industry has already lost control of its own destiny, and as a result U.S. economic strength and national security is at risk.

Exploitation and realization of the economic gains that flow from semiconductors depends upon the development of a cumulative, readily accessible, and leading-edge knowledge base. In the absence of a viable domestic industry, these factors would reside under foreign control. And they would reside there for a long period, because resurrecting a leading-edge U.S. industry, once lost, would take an extraordinary, concerted investment of time and resources. Neither imports nor foreign direct investment can relieve this dependency. Because nearly all of the R&D will be done outside the United States, imports can neither generate the kind of skill and knowledge base that a domestic-based industry generates, nor substitute for the cumulative learning that domestic activities provide. Nor, without taking substantial risks, can the Nation depend on foreign producers operating within the United States to carry on sufficient state-of-the-art science, engineering, and production and adequately to support the country's research base.

For all of these reasons, the Committee concludes that the United States can be certain of enjoying the economic, technological, and national security benefits that flow from semiconductors only if America's industry is at the leading-edge, with a full complement of world-class activities from R&D through production here at home.

III. Major Root Causes of the Semiconductor Industry Decline

At the root of the U.S. semiconductor industry's loss of world position lie critical factors that have worked to the advantage of Far East producers. These factors include differences in the business environment that result in policies and practices, abroad and at home, that are detrimental to the U.S. industry. In addition, the markets available for U.S. semiconductors have shrunk as a result of shifts in the markets for electronic products. Finally, basic technological problems exist for the industry.

The Business Environment

One fundamental cause of decline in the semiconductor industry results from differences in policies and practices between the United States and its major international competitors, differences that lend advantage to foreign producers. The most critical differences are the access to low-cost capital, the ability and willingness of foreign producers to benefit from trade practices such as closed markets and dumping, the failure of U.S. schools adequately to train the work force, and the difficulty of enforcing U.S. legal rights abroad.

For U.S. chip makers, one of the most serious disadvantages is a lack of access to low-cost capital. This disadvantage is critical for U.S. chip firms because of the semiconductor industry's increasing capital intensity. While there is some debate over the precise values for the real cost of capital in the United States and Japan, there is agreement that costs in Japan have been significantly lower. This differential was particularly

important during the early part of the 1980s when the Japanese semiconductor industry was investing heavily to expand capacity. A lower cost of capital enables foreign competitors to enjoy lower risk in making investment decisions, and consequently to operate with longer time horizons and greater immunity to swings in the business cycle.

Foreign competitors also benefit from supportive industrial policies and practices in their home markets. Policies range from closed domestic markets to subsidies and the coordination of precompetitive research and development. Practices range from concerted pricing behavior to captive customer and distribution arrangements (e.g., through increased vertical integration and cross-ownership). Together, these factors have helped to create an unstable market environment with unpredictable financial returns for U.S. chip firms. This condition has discouraged the long-term investment perspective required for success in the semiconductor industry. The instability in the market was, for example, directly responsible for the dramatic decline in U.S. DRAM production.

These problems of the semiconductor industry are compounded by America's ineffective efforts to stay at the forefront of education and training. In a world where capital and technology move rapidly across national boundaries, a nation's competitive performance will depend on the continued quality of its work force. This fact is especially significant in advanced technology industries such as semiconductors. Successful firms blend theoretical physics and practical manufacturing skills. While our educational system has concentrated on educating talented students in theoretical disciplines, it has neglected training for manufacturing. In addition, manufacturing industries have been slow to communicate their needs to institutions of higher education. A revised education emphasis is required to support the gains in productivity and quality in manufacturing needed to keep the United States competitive. Companies that have recognized quality programs have found they have had to implement extensive corporate training programs for their employees at a cost that can, at times, rival their R&D budgets. Much of this training should have been a part of a fundamental educational curriculum.

The advantages of active quality programs are demonstrated by success in the marketplace. Asian companies were quick to recognize the importance of the customer's perception of quality in electronic products, as well as for semiconductor components. The U.S. firms that were late to understand that comprehensive quality programs are fundamental to manufacturing at the leading-edge have found themselves at a serious competitive disadvantage.

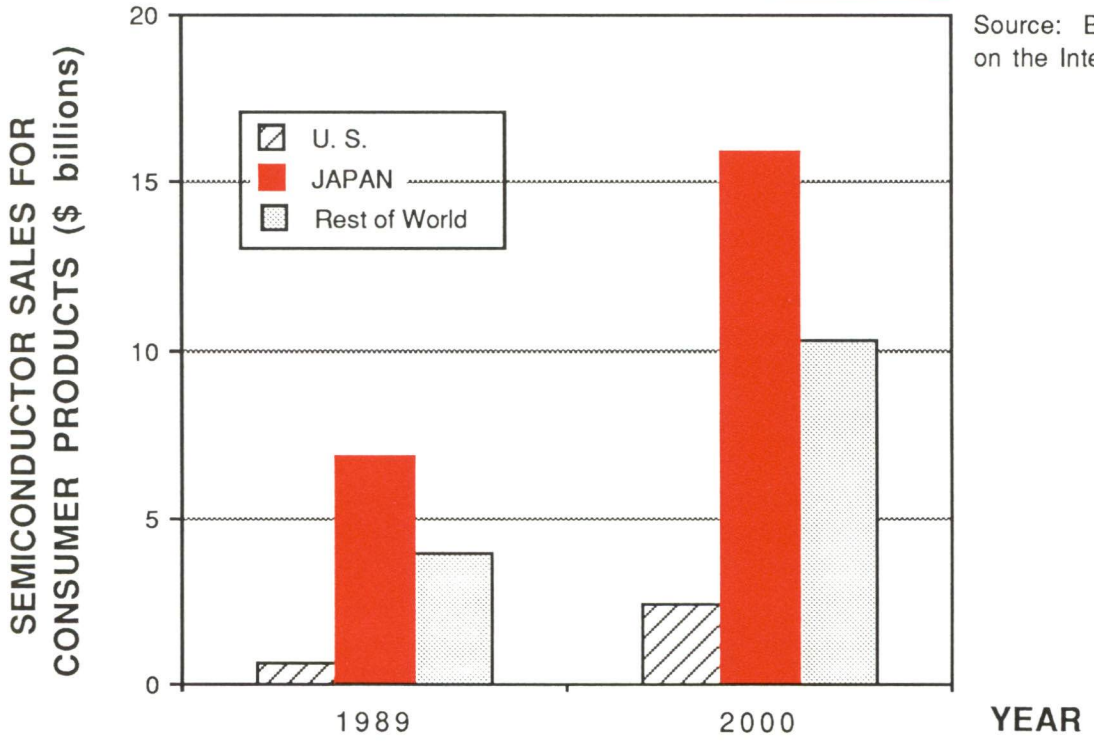
In addition, the Japanese have effectively used consensus and negotiation as a methodology for solving technical problems. This approach works well because of the relentless pace of technological change and the need for close cooperation between suppliers and customers in the semiconductor industry. In contrast, American industry has often been built on adversarial and contractual relationships. This approach slows reactions to emerging technologies, consumes valuable resources, and ultimately delays products' introduction to the market. In a rapidly changing market, such delays can mean the difference between success and failure .

Finally, differences exist in the legal system and practices of chip producing countries. In several key areas, notably intellectual property and antitrust, asymmetries between domestic and foreign laws frustrate the ability of U.S. companies to take full advantage of their competitive assets. Few countries in the Far East provide comprehensive protection of intellectual property, making it easier for foreign producers to reap the returns that would otherwise accrue to U.S. inventors. Similarly, foreign producers often engage in cooperative and coordinated behavior that would not be permitted under U.S. antitrust laws.

The Market

A fundamental problem facing U.S. chip makers is the migration of their customer base to the Far East. More and more of the world's electronics systems are being produced outside the United States, especially in Asia. In 1984, electronics systems produced in the United States and Europe consumed 63 percent of all semiconductors; by 1989, their combined share was only 47 percent, and Japan had supplanted the United States as the world's largest market. Even more important has been the shift in the production of consumer electronics products. At one time the United States held a dominant position in the production of products such as radios, televisions and video cassette recorders, but one by one U.S. market shares have been reduced dramatically. At the same time, the electronic content of these products has increased dramatically. As shown in Figure 11, consumer electronics products will consume more than $11 billion of semiconductors in 1989--more than 20 percent of the world's semiconductor production. Looking toward the year 2000, Japanese sales of semiconductors for consumer products are projected to be $13.5 billion greater than those of U.S. chip producers. If this projection is accurate, consumer products could fund more than $1 billion dollars of R&D in Japan in excess of that being funded in the United States. This difference in R&D funding attributable to the consumer products market alone is equivalent to the total R&D spending of the top five U.S. semiconductor firms in 1987.

FIGURE 11: WORLD SEMICONDUCTOR SALES FOR CONSUMER PRODUCTS APPLICATIONS

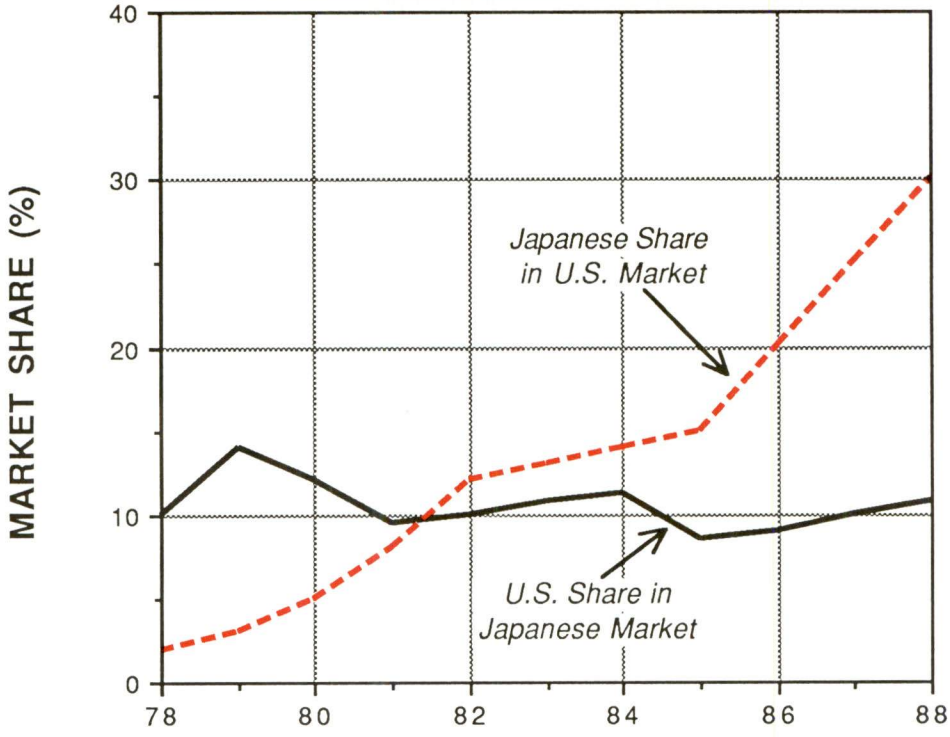


Source: Berkeley Roundtable on the International Economy.

Changes in the location of product manufacturing are important because the U.S. chip industry is more successful selling into the U.S. market than into foreign markets. Although losing market share, U.S. semiconductor manufacturers still control nearly 70

percent of the domestic chip market. In Japan however, in spite of intense efforts by both U.S. manufacturers and governmental agencies, the United States has about a 10 percent market share, as shown in Figure 12, with no growth through the 1980s. Thus, as product manufacturing shifts to Asia, the total market available to U.S. chip producers is shrinking.

FIGURE 12: U.S. AND JAPANESE MARKET SHARE IN EACH OTHER'S HOME MARKET



Sources: Semiconductor Industry Assn., Dataquest.

It should be noted that the Japanese share of the U.S. market has increased from 5 to 30 percent in the 1980s, as shown in Figure 12. There are two major reasons for the increasing use of Asian manufactured components in the U.S. market. First is the decline of U.S. market share in DRAMs. DRAMs now account for about 15 percent of the total semiconductor market, but the U.S. market share has dropped to less than 20 percent. Another reason for the decline in U.S. semiconductor market share at home is the use of foreign components in products assembled in this country by foreign firms. Although many Japanese companies assemble personal computers and consumer products in the United States, the designs are usually done in Japan and call for Japanese components. Although assembly jobs are created, the U.S. semiconductor industry is hurt by the reduction in sales volume and by a corresponding reduction in R&D funding.

Participation in consumer electronics markets will be even more critical in the future, as the newest consumer products increasingly use highly sophisticated chip technologies and are effective drivers of chip scale-of-integration, packaging, and sub-system assembly. Indeed, Far East producers are defining a new electronics market segment: high-volume, high-technology products such as camcorders and compact disc players, facsimile machines, laptop computers, optical disk mass storage systems, laser printers, and portable telephones.

Such products constitute the fastest growing world markets for chips. American electronics manufacturers currently participate only at the fringes of these critical new

markets. Developing a substantial new U.S. participation in these new consumer electronics markets would address a number of problems facing U.S. chip firms. First, increased U.S. presence in the manufacture of high-technology consumer products would provide additional markets for U.S. semiconductor manufacturers. Second, the same chips that would support a renewed U.S. consumer products industry could be marketed to foreign consumer products producers. Given the small market share currently held by U.S. firms, and the resistance to U.S.-sourced products outside of the domestic market, this effort may not produce substantial revenues initially. It would provide a better match, however, between the products U.S. semiconductor manufacturers sell and foreign markets demand.

Technology

For semiconductor firms to stay at the leading-edge of technology, the industry needs a long-term perspective, the patience to achieve high-quality through steady incremental improvements, and an understanding that the technical knowledge required for success is cumulative over many product generations. Very large, precompetitive investments in people, technology, and facilities must be made years before products are ready for market. Precompetitive investments are not related to specific products, they are aimed at the development of the common tools and technologies that will be used later in a variety of applications. With each succeeding technology generation, the precompetitive costs are rising. Because major process generations must be started 5 years or more before products are brought to market, and major product generations are introduced every 3 years, it is necessary for semiconductor firms to bear the costs of more than one precompetitive effort at once. The process development costs for a single generation now reach $150 million, and are escalating rapidly. These costs strain the financial resources of even the largest firms in the industry. The Japanese semiconductor industry has recognized this for some time, and has engaged in cooperative precompetitive research.

In the past, U.S. semiconductor firms have not supported cooperative research in the early phases of process and materials development. They viewed their early research efforts as proprietary, and did not share the results with competitors or with equipment and material suppliers. This adversarial atmosphere created inefficiency, redundancy, and even the misapplication of equipment, and it limited the financial resources applied to any single effort to those that could be borne by a single firm. One opportunity for cooperative precompetitive research efforts is x-ray lithography technology development, which is critical to the production of future generations of advanced integrated circuits. This development is expected to be extremely expensive and could greatly benefit from the pooled resources of the semiconductor industry. The U.S. effort in x-rays lacks the breadth, cooperation, and organization of the program in the Far East.

The U.S. semiconductor industry has been late to recognize the advantage of such cooperative research efforts, and have only recently organized to pool their resources. One result is SEMATECH, a government supported industry consortium dedicated to improving semiconductor manufacturing technology. By bringing together semiconductor manufacturers and SM&E firms prior to the competitive phase, it is hoped that some of the adversarial nature of their relationship can be avoided. A more cooperative atmosphere would reduce the costs for new equipment development at U.S. SM&E firms that have been hard pressed to fund enough R&D to remain competitive with foreign firms. A better working relationship would also remove risk from new product development, because SM&E firms would have more insight into the emerging needs of semiconductor manufacturers. Although a necessary effort, the $200-million-per-year SEMATECH program is by no means sufficient to solve the semiconductor industry's problems.

IV. Recommendations for Initial Steps Toward a National Semiconductor Strategy

Timely action by industry and government is urgently required to arrest the deteriorating global position of the U.S. semiconductor industry and restore that industry to competitive health. Industry and government must cooperate, with each providing its special strengths and acting in its appropriate role. Because of the immediacy of the threat and the extraordinary losses that will befall the Nation without prompt action, this first Committee report offers recommendations for immediate consideration and early action.

The following recommendations respond to the issues outlined in the last section. Taken together, they represent initial steps toward a national semiconductor strategy. They aim to:

- Expand the U.S. industry's global semiconductor market share.
- Establish a fully competitive and supportive business environment in the United States.
- Enable industry to achieve an enduring, world-class, competitive technology position with a healthy SM&E industry.

MARKET

1. REBUILDING THE U.S. CONSUMER ELECTRONIC INDUSTRY: An effective way to expand the U.S. semiconductor industry's market share would be to reverse the flow of the consumer electronics and equipment manufacturing (and company ownership) to Asia, while simultaneously increasing significantly the likelihood of success in rebuilding the U.S. consumer electronics industry. Accordingly, we recommend that the following inseparable actions be implemented as a unit:

a. ESTABLISH A CONSUMER ELECTRONICS CAPITAL CORPORATION (CECC): The CECC should be a for-profit, privately managed investment holding corporation. Its mission should be to provide the momentum necessary to resurrect the U.S. consumer electronics industry infrastructure by creating a multi-billion dollar pool of low-cost, very patient capital. Its investments would be judged both on their long-term profit potential and their strategic value to the mission. The key objective should be the establishment of sustainable market share through the introduction of innovative, high-quality consumer electronics products. In light of the importance of establishing market share, profits should not be expected in the short term. The CECC would be responsible for financial and investment decisions and facilitating the development of independent operating companies; these companies would be run by proven business executives.

- Initial funding for CECC would be in the form of a multi-hundred-million-dollar equity investment from industry sources, private and institutional investors, and State and local governments. Subsequent major funding should be forms of commercial debt, accompanied by pledges of support from Federal, State, and local governments. The CECC would be subject to a maximum debt/equity ratio in order to ensure that CECC bore some risk with respect to its debt. Multiple secondary offerings are anticipated to attract private equity investments directly in CECC's independent operating companies, gradually leading these companies to total financial self-sufficiency.

- CECC would fund operating companies in the consumer electronics industry through equity investments. Emphasis should be on advanced technology development and productization.

- CECC would work with State and local governments in conjunction with its operating companies with regard to the establishment, location, and support of manufacturing facilities.

- CECC would search out consumer electronics-related technologies developed in United States laboratories, such as universities and the national laboratories.

- CECC would function as a clearinghouse for consumer electronics R&D by working with U.S. electronics and components manufacturers to select key technologies and identify specific opportunities.

- CECC would provide its operating companies with a range of support, the most important being financial and managerial.

b. PROVIDE AN EQUITABLE INDUSTRY OPERATING ENVIRONMENT: The President should direct the appropriate Federal agency to: (1) determine, under applicable U.S. law, those factors that detract from the industrial operating environment and the expectation for successful investment by private U.S. investors in consumer electronics; and (2) seek redress of those factors. Such redress of these factors could include but not be limited to the following:

- Establishing cooperative agreements;

- Initiating industry-led negotiations for the licensing of consumer electronics technology to U.S. companies;

- Formulating and evaluating implementation policy options for local technology content; and

- Conducting substantial local R&D and design work.

c. ENFORCE FAIR TRADE PRACTICES: By means of the following, the Federal Government should encourage and purposefully support the entry and potential for U.S. industry to compete vigorously:

- The Office of the U.S.Trade Representative should ensure that access to the U.S. consumer electronics market be contingent upon reciprocal opportunity for U.S. companies to access foreign markets; and

- The Department of Commerce should ensure and enforce timely application of anti-dumping laws with commensurate penalties.

2. CHAMPIONING BY THE COMMERCE DEPARTMENT: The Department should be empowered to champion the establishment and maintenance of a benevolent operating environment for the U.S. consumer electronics industry and should coordinate the efforts of other cooperating Federal agencies. Additionally the Department should chair a working group of the Economic Policy Council concerning consumer electronics.

3. ESTABLISHING STANDARDS: The Federal Government (including the Federal Communications Commission) should expedite the establishment of standards affecting the introduction of consumer electronics technologies and should cooperate therein with U.S. industry.

4. ACCELERATING FIBER OPTIC SERVICE: By changing and harmonizing regulatory policy where necessary and broadly experimenting with prototype and trends, the Nation should encourage private industry to accelerate the development of a nationwide broadband network providing fiber optic services to the home. Such a network would stimulate next -generation development of a broad range of semiconductor-intensive consumer products (facsimile machines, digital photography, image compression, high definition television, etc.) that would serve as a technology driver for high-volume, high-technology consumer product manufacturing. Priority should be given to U.S.-produced goods containing significant local technology content in prototype trials.

BUSINESS ENVIRONMENT

1. CAPITAL FORMATION: The single most important consideration for the current and future health of the semiconductor industry is the availability, cost, and patience of capital. Therefore the following actions are recommended:

a. MAKING THE R&D TAX CREDIT PERMANENT (Channeling capital): The U.S. R&D (technically research and engineering, or R&E) tax credit has been renewed for 1989, but remains temporary. Stimulation of corporate R&D, through improving and making permanent the R&E credit, is essential to U.S. competitiveness in high-technology industries. Legislation should be enacted to make the R&E credit a permanent part of the Tax Code, ensuring that a wide base of taxpayers is eligible for the credit, and allowing start-up ventures to claim the credit, even before market sales. The size of the credit should be increased, and it should be made applicable to all, not just incremental R&D.

b. REINSTATING THE INVESTMENT TAX CREDIT (Channeling capital): The Tax Reform Act of 1986 eliminated the investment tax credit (ITC). Limitations on the use of the ITC carry forward amplified the negative impact of ITC elimination. The Congress should reinstate the ITC. Carry forward of the credit should be permitted. The market for U.S.-built over foreign- built equipment could be increased if tax credits favored U.S.-made equipment. The semiconductor equipment industry together with the semiconductor industry should propose ways to make the ITC favor the purchase of U.S.-made equipment.

c. REDUCING TAXES ON CAPITAL GAINS (Supply and cost of capital): The 1986 Tax Reform Act eliminated a long-standing policy of favoring capital gains with lower tax rates. The Committee supports proposals now before the Congress to reduce the taxation of capital gains. Special support is given to those aspects of the proposals that provide extra benefits for longer term investments.

d. INCREASING PATIENT AND RISK-TOLERANT CAPITAL (Quality of capital): There is widespread concern that American business management has an excessive preoccupation with immediate profit, sacrificing longer term, more risky opportunities that in other times may have been undertaken and formed the basis for major technological and economic breakthroughs. Financial regulators should review their regulations on investment advisers and pension funds and rules governing private placements and public issuance of new securities, to identify

actions that discourage longer term investments and appropriate risk-taking, and to correct such biases.

e. FACILITATING CONSORTIA (Channeling capital): Industry and government have jointly funded SEMATECH. Other industry R&D consortia in semiconductors (such as the Semiconductor Research Corporation (SRC) and the Microelectronics and Computer Technology Corporation (MCTC)) have cleared antitrust and other restrictions. Some of these efforts do not, however, qualify for basic research tax credits. The Congress should enact and the Administration should support legislation to extend the definition of organizations qualified as eligible for the basic research credit to include a broad range of cooperative R&D efforts in semiconductors and other high-technology fields.

f. IMPROVING SM&E DEPRECIATION RULES (Channeling capital): The Congress revised the depreciation schedule for semiconductor equipment in the 1986 Tax Reform Act to reduce it to 5 years from 8 years. At the same time, it mandated that the Treasury Department's Office of Depreciation Analysis review this matter and make a recommendation to the Congress by 1992. At this time, the Treasury Department has postponed an investigation on depreciation rates for semiconductor equipment until 1991. As groundwork for a proposed acceleration of depreciation schedules, the semiconductor industry should update the study of economic depreciation lives, and include data on Japan, where there are much shorter depreciation schedules assigned for most advanced semiconductor equipment (1 to 3 years).

g. EASING THE BURDEN OF SECTION 482 (Quality of capital): Section 482 of the Tax Code requires that transfers of goods, services, and intangibles between U.S. companies and related parties outside the United States be priced as if they were market-based, arm's-length transactions between unaffiliated parties. A recent Treasury Department White Paper made comprehensive recommendations that included many modifications in current practices. These changes will result in greater paperwork, difficulties in interpretation, and greater uncertainty in intercompany relationships with especially onerous problems for semiconductor firms where risk and intangibles are shared among different corporate entities. The Treasury Department should revamp its entire approach to intercompany transfer pricing to incorporate less onerous documentation and recordkeeping, greater accommodation of accepted, proven business practices, and greater certainty and less complexity in pricing transfers and allocating value.

h. REDUCING THE FEDERAL DEFICIT (Supply and cost of capital): The continuing deficits reduce our national savings and investment, contributing to our low rates of productivity growth. Although the shortfall of saving and investment may be offset to some degree by inflows of foreign capital, these inflows entail larger trade deficits and a reduced standard of living for Americans. The Congress should place a high priority on continuing to keep the growth of Federal spending below the growth of nominal gross national product. To the extent that changes in the Tax Code are considered necessary, they should be revenue-neutral adjustments used to tilt the tax structure away from consumption and toward increases in saving and investment.

i. OPPOSING FOREIGN CAPITAL CONTROLS (Supply and cost of capital): The net inflow of foreign capital into the United States has increased substantially over the past 6 years. There is growing dependence on foreign capital to make up

for the shortfall of domestic savings. Disrupting these inflows could have potentially disastrous consequences for the United States. However, foreign purchases of U.S. corporate assets--especially in strategically sensitive industries such as electronics--are creating concerns that the United States is mortgaging its economic future. The recent increase of oversight authority to the interagency Committee on Foreign Investment in the United States (CFIUS) goes at least part way toward minimizing that concern. The CFIUS should comprehend the impact on entire industries, rather than case by case. The Committee opposes all forms of legislated restrictions on foreign capital flows, including reporting requirements for foreign investment.

j. INCREASING PERSONAL SAVING INCENTIVES: (Supply and cost of capital): Personal saving in the United States is lower than among its major competitors, including Japan. Using the income tax system to favor personal saving offers one means to increase personal saving. The Congress should broaden individual retirement account (IRA) provisions, including removal of restrictions on eligibility, increasing the allowed contributions, and expanding the uses of IRA savings--for higher education, for example. The taxation on interest from savings should be eliminated or reduced.

k. ELIMINATING DOUBLE TAXATION OF CORPORATE DIVIDENDS (Channeling capital): In our income tax system, corporate dividends are taxed twice--as corporate profits and when received as dividends. This double taxation may discourage the use of equity financing and unduly encourage leveraging and earnings retention. The Congress should integrate the corporate and individual income taxes to eliminate this bias. Any move toward integration that results in the loss of tax revenues should be accompanied by offsetting increases in consumption taxes or reductions in Federal spending so as not to increase the Federal deficit.

l. OPPOSING LIMITS ON LEVERAGED BUYOUTS (Quality of capital): Media coverage of large, leveraged buyouts (LBOs), in which new debt is issued to buy in equity in order to take corporations private, has brought calls for public policy to restrain such activity. Among the proposed "solutions" are limits on the tax deductibility of interest payments, as well as other legislative and regulatory restrictions. The Committee opposes ad hoc policies targeted at restricting LBOs and other forms of corporate restructuring.

m. OPPOSING THE SPECULATION TAX (Quality of capital): There is some support for a tax on short-term turnover of securities in financial markets. Advocates assert that such a tax would not only raise funds to cut the deficit, but would also discourage speculative turnover that can create instability, and does shorten managerial horizons. The Committee opposes such a tax on the grounds that it depresses stock prices and raises the cost of capital generally, and that the asserted benefits for capital market behavior are unproven. Any scheme to tax short-term investments should be considered only in the context of providing additional resources to further reduce taxes on long-term investment to rates below what they would be in the absence of the short-term tax.

2. EDUCATION: The semiconductor industry requires well-educated workers who can adapt to new technologies and who are flexible enough to respond quickly to an increasingly sophisticated workplace. Additionally, technical training, frequently at the advanced degree level, is the lifeblood of the rapid evolution of new generations of products and processes required for world-class competitive performance. Increasingly, additional emphasis must be placed on training

related to manufacturing engineering and on coursework supporting thrusts into advanced applications of total quality control.

a. PRESCHOOL: Early childhood education offers the greatest potential for improving the quality of our educational system. A nationwide, quality, comprehensive preschool for economically disadvantaged, at risk, 4-year-old children should be implemented. For every dollar invested in quality preschool, $7 are returned to society during the lifetime of the child in the form of increased earnings, less crime, and less welfare.

b. PRIMARY/SECONDARY EDUCATION: To meet the needs for a literate work force, teacher competency should be enhanced and educational standards raised. A system of national teacher certification should be established that will supplement the States' minimum competency measurements. Business should share management skills with educators. Summer sessions taught by industry experts would help to develop mathematics and science teachers.

c. DROPOUTS: The currently unemployed, uneducated, and unskilled must be provided the literacy and skills to qualify for current and future jobs in the workplace. Government should support literacy, mathematics, and science education under the Job Training Partnership Act. The country should develop an intensive, West German-type skills-training-employment alternative to high school.

d. HIGHER EDUCATION: The semiconductor, and other high-technology industries will require increasing numbers and quality of technical personnel to meet the standards established by international competition. Curricula stressing manufacturing engineering and total quality concepts should be emphasized. The Federal Government should increase immigrant permanent resident status visa quotas, and relax labor certification rules for non-U.S. Ph.D. graduates of U.S. universities.

e. WORKPLACE LITERACY: Most remedial programs are not available to people who are on the job, yet 20 million to 30 million adults have basic literacy problems. Alternatives should be explored to promote business and government involvement in improving workplace literacy. Federal and State tax credits for employee literacy training should be provided. A new title under the Job Training Partnership Act should be created to deal with adult work force needs.

3. TRADE LAW REFORM:

a. NEW INITIATIVES: A senior U.S. Government interagency committee should consider, in the context of trade remedies or actions undertaken to counter unfair trade policies, whether additional governmental and/or private sector actions or policies are necessary to complement the current statutory processes as a means of promoting the competitiveness of the U.S. semiconductor industry.

b. MARKET ACCESS: Full access to foreign markets is critical. As the largest semiconductor market in the world, Japan must take immediate and meaningful steps to increase its purchases of U.S. semiconductor products. Specific sectors in Japan's market should segregated for increased purchases, and the success of these efforts should be measured in terms of increased market share. The Administration should investigate the effectiveness of the sanctions currently in place to ensure compliance with Japan's commitments under the Semiconductor Arrangement.

c. EXPORT CONTROLS: Export controls for both semiconductors and semiconductor manufacturing equipment should be adjusted to maximize export opportunities for U.S. producers to the highest degree possible consistent with security needs.

d. ANTI-DUMPING LAW REFORM: Anti-dumping law should be strengthened and made more effective by incorporating the principles being developed by the Semiconductor Industry Association and the American Electronics Association. Embodied principles should include accelerated processing of dumping cases, more effective penalties to deter dumping, and alternative approaches for the use of revenues collected from the dumping in third countries. The United States should actively support the strengthening of the General Agreement on Tariffs and Trade (GATT) anti-dumping code.

4. INTELLECTUAL PROPERTY:

a. SECTION 337: The U.S. Government should maintain that the GATT panel report on Section 337 is legally faulty, and will not be accepted by the United States. The Administration should maintain continued support and appropriate enforcement in accordance with existing regulations and practices of Section 337, while seeking broadly supported alternatives to resolve any valid conflicts between Section 337 and GATT.

b. GRANTING OF FOREIGN PATENTS: Government and private initiatives seeking more efficient patent-granting systems and harmonization of differences between national patent systems should receive increased emphasis.

c. NEW INITIATIVES: The Administration should convene a group to study and make recommendations within this Congressional term concerning clarification of mask works regulations regarding application-specific integrated circuits (ASICs) and new forms of protection such as design protection. National trade secret legislation should be reviewed in light of possible GATT and other international agreements to determine whether to urge accession by other countries to the Hague litigation conventions.

d. USE OF CURRENT MECHANISMS: The U.S. semiconductor industry should focus on protecting its intellectual property by availing itself of existing means.

5. ANTITRUST: Legislation to facilitate production joint ventures, as the 1984 National Cooperative Research Act (NCRA) facilitated R&D joint ventures such as the Semiconductor Research Corporation and SEMATECH, would help to strengthen the U.S. presence in strategic infrastructure electronics industry sectors and thereby bolster American competitiveness. The Congress should amend the NCRA to expand the scope of the legislation to include Production Joint Ventures. Under the expanded NCRA, the "rule of reason" and not "per se" would apply to any court challenge to a Production Joint Venture. In addition, providing notice had been given, liability would be limited to actual, not treble, damages.

TECHNOLOGY

1. INCREASING R&D FOR EQUIPMENT AND MATERIALS: The U.S. semiconductor and SM&E industries must identify means to increase significantly the level of R&D activity dedicated to manufacturing tools, materials, and processes.

SEMATECH's mission should be expanded to include project management for these development programs extending beyond 1993. SEMATECH's funding should be increased immediately by $100 million, half of which would be provided by the developers of such equipment materials and processes. Additional funding of $800 million would be required over the next 3 years for these programs to fully address the needs of this industry segment.

2. CONTINUING FUNDING FOR SILICON R&D: The Departments of Defense (DOD) and Energy (DOE) should sustain the current $200 million per year funding previously allocated to very high-speed integrated circuits to maintain long-term industrial R&D efforts related to silicon technology and manufacturing tools.

3. ENHANCING X-RAY LITHOGRAPHY: The synchrotron ring x-ray technology that has been developed in the national laboratories represents a unique capability and opportunity for future advancement of a critical semiconductor manufacturing technology. The DOE should ensure the transfer of synchrotron ring x-ray technology and systems for microlithography, by having two corporations design and build prototype rings and by funding the participation of national laboratory experts in these projects. In order to ensure timely availability and rapid insertion of this critical technology, DOD's Defense Advanced Research Projects Agency (DARPA), DOE, and the Department of Commerce programs in mask making, mask repair, aligners, metrology and small x-ray sources must be pursued aggressively as well.

4. ENHANCING ACADEMIC RESEARCH AND TEACHING: The DOD, DOE, and the National Science Foundation should substantially enhance their funding of personnel, equipment, and especially facilities in support of academic research and teaching associated with silicon technology.

5. ESTABLISHING METROLOGY AND STANDARDS: The National Institute for Standards and Technology should establish the sophisticated metrology and standards that industry will need for manufacturing technology in the coming generations of advanced semiconductors, including the x-ray era of microlithography. The new Technology Administration Act of 1989 is an appropriate step in that direction.

6. ACCELERATING RESIDENCY: The Federal Government should evaluate and implement procedures allowing foreign-born students receiving M.S. and Ph.D., and equivalent degrees in natural science and engineering from U.S. academic institutions to obtain permanent residency permits within 3 months after graduation, without departure from the United States.

7. DOUBLING SCHOLARSHIPS AND FELLOWSHIPS: The Congress should double the number of federally funded undergraduate scholarships and graduate fellowships for natural science and engineering, and the real monetary value of these awards should be made more competitive with starting salaries in industry.

V. Next Steps

The recommendations presented in this report represent the first critical steps towards a national semiconductor strategy. Further developing and working to implement that strategy is the goal of the next year of the Committee's activities. In fiscal year 1990, the Committee intends to:

- Establish the Consumer Electronics Capital Corporation:

  a) Develop business plan;
  b) Obtain seed capital;
  c) Begin operation as implementation of the other unit actions permit;
  d) Achieve major equity infusion;

- Continue examination of issues pertaining to a national fiber optic network. Future efforts by the Committee will be directed towards further development of the business and government initiatives required to put this network in place;

- Release a separate and more detailed report on the impact of the business environment recommendations on the semiconductor industry;

- Continue analysis of what is further needed to revitalize the semiconductor manufacturing and equipment industry; and

- Examine two new areas: the status of American industry involved in compound semiconductors (those made from materials other than silicon), and the implications for American industry of the development of photonics (integrated electrical and optical devices), which many observers expect to constitute the next major area of growth in electronics technology.

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James G. Treybig
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U.S. Department of Defense

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Director
National Science Foundation

Honorable D. Allan Bromley
Assistant to the President for
Science and Technology Policy
Executive Office of the President

Dr. Robert O. Hunter, Jr.
Director
Office of Energy Research
U.S. Department of Energy

Honorable Thomas J. Murrin
Deputy Secretary
U.S. Department of Commerce

* Participated in beginning phase
of NACS activities.

CONTRIBUTING STAFF

Coordinating Director	Michael B. Marks
Office of Science and Technology Policy Liaison	David Beecham
Office of Science and Technology Policy Administrative Support	Barbara Diering
Editor	Joseph Foote
Research and Integration	Michael Borrus David A. Longfellow William W. Troutman
Economic Analysis	Robert B. Cohen
Legislative Analysis	W. Clark McFadden II

NACS PROJECT MANAGEMENT STAFF

Program Manager	Sammy R. Smith
Deputy Program Manager	Hazel B. Houston
Analyst	Brian A. Morsch
Office Manager	Debra L. Brewer

AD HOC MARKET WORKING GROUP

Chairman:
Charles E. Sporck
President and CEO
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Norman R. Augustine
Chairman and CEO
Martin Marietta Corporation

Dr. William R. Bandy
Executive Director
National Advisory Committee on Semiconductors

Michael Borrus
Berkeley Roundtable on the International Economy
University of California

Dr. Robert B. Cohen
Visiting Scholar
Economic Policy Institute

Warren Davis
Vice President
Semiconductor Industry of America

Dr. Craig Fields
Director
Defense Advanced Research Projects Agency
U.S. Department of Defense

Fred W. Horne
Vice President Corporate Strategic Development
National Semiconductor Corporation

James McGroddy
Assistant General Manager Technology Products
IBM Corporation

Michael B. Marks
Vice President Corporate Development
Science Applications International Corporation

Timothy Richards
Director, Information Industry Trade Policy
Office of U.S. Trade Representative

Larry Sumney
President
Semiconductor Research Corporation

Jack Tramiel
Chairman of the Board
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James G. Treybig
President and CEO
Tandem Computer

Dr. Albert R. C. Westwood
Vice President Research and Development
Martin Marietta Corporation

John Zysman
Berkeley Roundtable on the International Economy
University of California

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President and CEO
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Manager Industry Affairs
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Director Governmental Programs
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AD HOC TECHNOLOGY WORKING GROUP

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Vice President and President, General
Technology Division
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Executive Director
National Advisory Committee on
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Dr. Robert M. Burger
Vice President Research
Semiconductor Research Corporation

Irwin Carroll
Director, Joint Development Programs
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Dr. James F. Decker
Director of Energy Research
U. S. Department of Energy

Dr. Frank L. Huband , Director
Division of Electrical, Communications and
Systems Engineering
National Science Foundation

Dr. Robert O. Hunter,
Director
Office of Energy Research
U.S. Department of Energy

Dr. James D. Meindl
Senior Vice President of Academic Affairs
and Provost
Rensselaer Polytechnic Institute

James C. Morgan
Chairman and CEO
Applied Materials, Inc.

Dr. David B. Nelson
Executive Director
Office of Energy Research
U. S. Department of Energy

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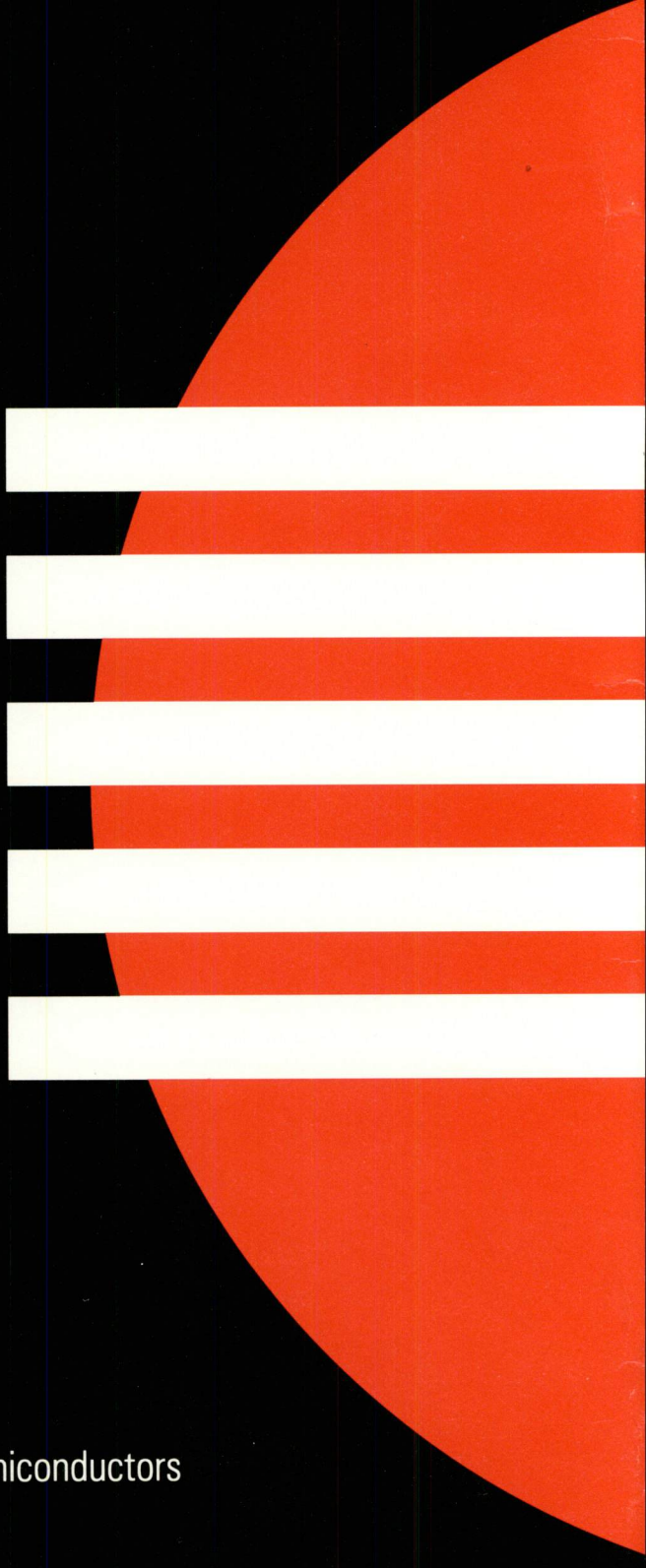

National Advisory Committee on Semiconductors
Suite 500
1555 Wilson Boulevard
Arlington, Virginia 22209

(703) 528-6090