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FOIA MARKER

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Record Group/Collection: George H.W. Bush Presidential Records
Collection/Office of Origin: Science and Technology Policy, Office of (OSTP)
Series: Bromley, D. Allan, Files
Subseries: General Science Files

OA/ID Number: 62041
Folder ID Number: 62041-005

Folder Title:
Physical Science: General [5 of 8] [1991]

Stack:

Row:

Section:

Shelf:

Position:

0

0

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"CORRESPONDENCE TRACKING"

TYPE: INFORMATION

DOCUMENT NUMBER: 9121295

FROM: HARNISH, Reno L.: COUNSELOR FOR SCIENTIFIC & TECHNOLOGICAL
AFFAIRS

TO: DR. BROMLEY

DATE OF
CORRESPONDENCE: 04/12/91

SUBJECT: A PHOTOGRAPH OF THE CONTROL PANEL OF THE NEW ITALIAN
BUILT HIGH SPEED SUPERCOMPUTER APE 100.

ASSIGNED TO:

ACTION REQUIRED:

SENDER'S DUE DATE:

OSTP DUE DATE:

DATE COMPLETED:

COPIES TO: D. Allan Bromley
Dr. Wong

WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS:

DATE RECEIVED: 05/02/91

FILE: P- PHYSICAL SCIENCES

Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
01a. Letter w/ attachment	To: Allan Bromley From: Reno Harnish Re: Italian built supercomputer [attached photocopy of photograph] (2 pp.)	4/12/91	(b)(1)	

Collection:

Record Group: Bush Presidential Records
Office: Science and Technology Policy, Office of (OSTP)
Series: Bromley, D. Allan, Files
Subseries: General Science Files
WHORM Cat.:
File Location: Physical Science: General [5 of 8] [1991]

Date Closed:	3/18/2010	OA/ID Number:	62041-005
FOIA/SYS Case #:	2005-0336-F	Appeal Case #:	
Re-review Case #:		Appeal Disposition:	
P-2/P-5 Review Case #:		Disposition Date:	
AR Case #:		MR Case #:	
AR Disposition:		MR Disposition:	
AR Disposition Date:		MR Disposition Date:	

RESTRICTION CODES

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

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

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

PRM. Removed as a personal record misfile.

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

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

Withdrawal/Redaction Sheet

(George Bush Library)

Document No. and Type	Subject/Title of Document	Date	Restriction	Class.
01b. letter	To: Distribution list From: American Embassy Rome Re: Italian Super Computer (3 pp.)	4/5/91	(b)(1)	

Collection:

Record Group: Bush Presidential Records
Office: Science and Technology Policy, Office of (OSTP)
Series: Bromley, D. Allan, Files
Subseries: General Science Files
WHORM Cat.:
File Location: Physical Science: General [5 of 8] [1991]

Date Closed:	3/18/2010	OA/ID Number:	62041-005
FOIA/SYS Case #:	2005-0336-F	Appeal Case #:	
Re-review Case #:		Appeal Disposition:	
P-2/P-5 Review Case #:		Disposition Date:	
AR Case #:		MR Case #:	
AR Disposition:		MR Disposition:	
AR Disposition Date:		MR Disposition Date:	

RESTRICTION CODES

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

P-1 National Security Classified Information [(a)(1) of the PRA]
P-2 Relating to the appointment to Federal office [(a)(2) of the PRA]
P-3 Release would violate a Federal statute [(a)(3) of the PRA]
P-4 Release would disclose trade secrets or confidential commercial or financial information [(a)(4) of the PRA]
P-5 Release would disclose confidential advice between the President and his advisors, or between such advisors [(a)(5) of the PRA]
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C. Closed in accordance with restrictions contained in donor's deed of gift.

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

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

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION

DOCUMENT NUMBER: 9121713

ORIGINATOR: 02

STATUS C

DIRECTORATE STATUS

FROM: MENKE, John R.

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 06/06/91

SUBJECT: RE: THE LIGO GRAVITY WAVE EXPERIMENT

DIRECTORATE
ASSIGNED:

STAFF
ASSIGNED:

ACTION
REQUIRED:

STAFF
ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE:
DATE COMPLETED:

STAFF DUE DATE
DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
PHYSICAL SCIENCES

WHITE HOUSE TRACKING #:

CONTACT PERSON:
PHONE:

EXT:

REMARKS:

OSTP RECEIVED: 06/11/91
DEPT RECEIVED:

FILE: P- PHYSICAL SCIENCES

44 Opden Rd.
Scarsdale N.Y.
MEMO 10583

JOHN R. MENKE

Dr Allan Browley
Science Advisor

June 6, 1991

Dear Allan:

One small voice
for the LIGO Gravity Wave
Experiment. There is no
"Michelson-Morley" confirmation
anywhere of the gravity theories.
It is experiments which create
the surprises and gravity can
have one or two.

[I have no personal[&]
interest in this recommendation!]

Best, John M.

& other than love for the physics of it



Dr. Allan Browneley
Science Advisor to the President
The White House
Washington D.C.



RECEIVED

91 JUN 11 AM: 01

OFFICE OF THE
DIRECTOR

JOHN R. MENKE
44 OGDEN ROAD
SCARSDALE, N.Y.

THE WHITE HOUSE
WASHINGTON

July 9, 1991

Dear John:

It was good to hear from you after a long break in our communications and also good to hear you coming out in favor of the gravity wave experiment.

I have the unfortunate feeling, however, that this is simply not going to be the year when that particular large experiment gets started.

As you may have noted in the NSF budget, we have asked for an 18 percent increase in Fiscal Year '92 which would put the Foundation back on the doubling trajectory that David Packard and I recommended originally back in 1986 and which has been accepted by both Presidents Reagan and Bush. What is different this year is that I have insisted that 16 percent increases actually find their way through the NSF bureaucracy all the way down to the brand name sciences like, physics, chemistry, biology and engineering where in the past this did not happen. All too frequently, even though we got large increases for NSF, the additional funding went to new activities of environmental and other sorts so that very little of the funding was available to support individual researchers at the Nation's universities. That situation had become rather serious. In addition to what we are doing at NSF, we have requested something like a 10 percent increase in the funding for individual investigators through the National Institutes of Health and, between NIH and NSF they cover more than 80 percent of all the academic research in the Nation.

I had occasion a few months ago to have dinner with the UNC Board and although many of the members have now changed, it is apparently a company on its way back to some kind of financial stability. Dan Colussy has managed to eliminate everything but the aviation maintenance companies and they, at least, appear to be making profits.

As you undoubtedly know, Justin Davidson unhappily has been diagnosed as having fairly advanced Alzheimer and I saw him and Shirley when I was at Ohio State for a commencement address a month or so ago. He still manages remarkably well but at the same time is obviously operating under very severe difficulties as far as memory is concerned.

I must say that I miss the old UNC Board and the fellowship that was part of our meetings.

With warmest best wishes to both you and Betty. May you have a happy and healthy year and may you find some parts of the earth that you have not previously visited that are both exciting and rewarding.

Sincerely yours,

A handwritten signature in dark ink, appearing to read 'D. Allan Bromley', with a stylized flourish extending to the right.

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

Mr. John R. Menke
44 Ogden Road
Scarsdale, New York 10583

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION

DOCUMENT NUMBER: 9121281

FROM: RITTNER, Edmund S.

TO: DR. BROMLEY

DATE OF
CORRESPONDENCE: 04/24/91

SUBJECT: LETTER TO PRESIDENT BUSH CONCERNING AN AUTOMOTIVE
ENERGY PLAN.

ASSIGNED TO:

ACTION REQUIRED:

SENDER'S DUE DATE:

OSTP DUE DATE:

DATE COMPLETED:

COPIES TO: D. Allan Bromley
Dr. Wong

WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS:

DATE RECEIVED: 04/30/91

FILE: *P* PHYSICAL SCIENCES **ENERGY**

SECRET

Dr. Edmund S. Rittner
Consulting Scientist
700 New Hampshire Ave, NW, #116
Washington, DC 20037
202-365-0650

91 APR 30 AM 11:03

April 29, 1991

President George Bush
The White House
Washington, DC 20500

OFFICE OF THE
DIRECTOR

Dear Mr. President,

I am attaching herewith a brief automotive energy plan which is capable of eliminating the need for oil imports as well as automobile exhaust air pollution and the accompanying contribution to global warming. The plan calls for the introduction of a well-known non-polluting engine of much higher efficiency and for the replacement of gasoline by a fuel derived from solar energy. The plan does not require any additional monies and it builds upon DOE accomplishments in the biomass area and upon a successful demonstration of the new engine in an automotive application. It also endorses the recent emphasis of the National Academy of Sciences on conservation except for the requirement of a 30% increase in auto fuel efficiency, which would be unnecessary in view of the much higher efficiency of the new engine.

In short, the plan appears to be just what the nation needs!

Sincerely yours,

Edmund S. Rittner

cc: Vice President
Secretary DOE
Secretary DOT
Science Advisor
National Academy of Sciences
Chairman, Senate Energy & Natural Resources Committee
Chairman, House Energy & Commerce Committee
Chairman, House Energy Subcommittee
Senate Majority Leader
Senate Minority Leader
Speaker of the House
House Majority Leader
House Minority Leader

Proposed Automotive Energy Plan

Edmund S. Rittner

The goal of the present plan is to eliminate the need for petroleum imports with their deleterious economic, environmental and potential military impacts; and to eliminate air pollution from automotive exhaust as well as the accompanying contribution to global warming.

The plan calls for the replacement of the gasoline powered internal combustion engine by an external combustion engine employing a Stirling cycle and powered by a fuel derived from photosynthesis and fermentation of agricultural products.

The external combustion engine, the thermodynamic basis for which dates back to the early nineteenth century, has a huge advantage with respect to pollution because the burning of the fuel is completely separated from the internal working. This permits complete oxidation to carbon dioxide and water and avoids formation of oxides of nitrogen because of the absence of high temperature sparking. Extensive development work has been carried out over a twenty five year period by the N.V. Philips Co. and a published account¹ in 1959 describes a 40 HP experimental engine with an efficiency of 38% at an engine speed of 1500 rpm and exhibiting very low noise and vibration. The weight required was 11 lb/HP. Since the efficiency of the internal combustion engine is only 25%, the Stirling cycle engine represents a 50% improvement. A technology transfer to General Motors Corporation took place about twenty years ago but did not result in adoption of the engine. Over the past decade DOE has carried out application research on this engine with the specific aim of incorporation into automobiles. The project was a complete success technically but was discontinued because of lack of interest on the part of the automotive industry.

The advantages of a fuel derived from solar energy are domestic availability, renewability, energy storage, sufficient energy content (for fuels yet to be discussed) for automotive use when employed with the Stirling cycle engine, and avoidance of contributions to global warming. The last advantage results because in the photosynthesis step carbon dioxide is absorbed from the atmosphere in an amount which compensates exactly for that released later in the fermentation and burning steps.

The two most widely practiced industrial processes to produce materials employable as fuels employ grain stocks high in starch content which is converted to glucose. In one of the processes ethanol (ethyl alcohol) is produced by use of one of a variety of fermentation agents (eg, yeast enzymes), a process which has its antecedents in antiquity. In the other process a different class

of fermentation agents is used (eg, *Bacillus butylicus*) and leads to the formation of butyl alcohol and acetone as the principal products in a volumetric ratio of 2:1. This process, which was introduced by Weizmann,³ has been in wide industrial practice since World War I for the production of acetone. The butyl alcohol is more useful as a fuel than acetone and the latter may be converted by hydrogenation to isopropyl alcohol. The latter is also a better fuel than acetone and can be blended with the butyl alcohol to improve the overall fuel yield. A major improvement in energy content can then be achieved by conversion of these alcohols to ethers by means of dehydration (eg, by the use of concentrated sulfuric acid).

The quantities of greatest importance for fuel use in external combustion engines are the heat of combustion/cc and the boiling point which is a rough indication of volatility. These quantities are listed in Table 1 for a number of alcohols and ethers as well as acetone. Also included are octane, which is the quintessential component of gasoline, and the caloric data for several commercially employed mixed blends.

Table 1

Substance	No. C atoms in chain	Heat of Combustion, ³⁾ kcal/cc	Boiling Point, °C
methyl alcohol	1	6.8	64.5
ethyl alcohol	2	9.0	78.5
propyl alcohol	3	10.0	82.0
butyl alcohol	4	10.6	117
amyl alcohol	5	11.0	138
acetone	3	9.3	56.5
ethyl ether	4	12.3	34.6
propyl ether	6	12.8	67.5
butyl ether	8	13.0	142
amyl ether	10	13.1	190
octane	8	16.3	126
gasolene	-	15.6	-
kerosene	-	13.4	-
furnace oil	-	11.8	-
fuel oil	-	10.4-12.1	-

Note that the heat of combustion/cc increases with the number of carbon atoms in the chain of the molecule, that the ethers are substantially more energetic than the corresponding alcohols, and that propyl and butyl ethers are the best choices amongst the listed alcohols and ethers when combustion heat and boiling point are jointly considered. The blend of ethers resulting from the Weizmann fermentation followed by hydrogenation and dehydration would have a heat of combustion of 12.9 kcal/cc. This mixture of ethers will henceforth

be referred to as "ether blend". The combustion heat of ether blend exceeds that of ethanol by 43%, that of furnace oil by 9.3%, and is 83% that of gasoline. It is also of interest to note that butyl ether has a molecular structure identical to that of octane with the addition of an oxygen bridge in the center.

However, consideration of the yields of the two fermentation processes indicates that production of ethanol would permit better utilization of the agricultural resources. Yield data for the ethanol case are available in a recent publication⁴⁾ for wood and corn. The yield expressed as mass of ethanol produced per mass of dry feedstock is 0.33 for wood and 0.35 for corn. This yield includes the possible conversion losses of cellulose or starch to glucose. The corresponding yield for the Weizmann process as reported²⁾ in 1920 is 0.15 - 0.20 for rice, maize or other grains. It turns out that relative to the available resources the ethanol process will produce more total energy than the Weizmann process followed by conversion to the ethers by at least a factor of 1.3. Thus, the opposing tendencies of higher energy content/cc for the ether blend and higher total energy availability from ethanol will call for trade-offs.

Reference (4), which represents an important milestone in the DOE Ethanol from Biomass Program (where the fuel is intended for use in conventional engines), provides data on the annual U.S. energy consumption in quad (1 quad = 10^{15} BTU) during 1989: transportation, 22 quad; total petroleum, 34 quad; total energy, 81 quad. Use of the more efficient external combustion engine would reduce the transportation requirement to 14.5 quad. Reference (4) also concludes that wood is much cheaper than corn at high ethanol production levels where the market for corn coproducts would be saturated. It then estimates the ethanol production potential for cellulosic feedstocks including agricultural-, forestry- and municipal solid wastes; woody or herbaceous high productivity energy crops (HPEC); and trees produced by conventional forestry. Account is taken of available land including forest land not suitable for growing crops, existing cropland available because of excess agricultural capacity, and potential cropland that could become available. Of particular interest is the significant potential of the readily available waste materials which could contribute a total of 3.8 quad, one quarter of the modified transportation requirement. The full 14.5 quad will not be required until complete conversion of all automobiles to the new engine, which could take as long as a decade. The total ethanol production potential is expressed in Table 3 of Ref (4) as 12.4 - 26.5 quad. The lower value is based upon current HPEC productivity and 1988 existing cropland, whereas the higher value refers to anticipated HPEC productivity and projected available cropland in the year 2012. Reference (4) concludes that cellulosic materials potentially available from energy crops, wastes and conventional forestry could provide enough ethanol to meet the current transportation requirement and projects a wholesale selling price of \$0.60 per gallon (mid-1980 basis) by the year 2000, provided that aggressive R&D is continued.

Identical considerations apply to the production of the ether blend as the only changes are substitution of a different agent for fermenting glucose and the addition of the hydrogenation and dehydration steps. The price of the ether blend will be higher than that of ethanol because of the additional processing, but more importantly, because of the lower fermentation yield. R&D with a goal of increasing the latter quantity could prove very valuable because an increased yield would result in both a lower price and an increased energy availability.

Table 2 presents a comparison of ethanol and the ether blend as well as two interesting mixtures of the two with respect to heat of combustion/cc, the total energy production potential (with the lower and higher values defined earlier), and the multiplying factor to obtain expected miles/gallon performance with the Stirling cycle engine.

Table 2

Composition of Fuel	Heat of Combustion, kcal/cc	Energy Potential, quad	Miles/g Factor
ethanol	9.0	12.4 - 26.5	0.88
$\frac{2}{3}$ ethanol + $\frac{1}{3}$ ether blend	10.3	11.4 - 24.3	1.00
$\frac{1}{3}$ ethanol + $\frac{2}{3}$ ether blend	11.6	10.4 - 22.2	1.13
ether blend	12.9	9.4 - 20.0	1.26

Ethanol has the advantages of lowest price and highest total energy production, but would result in a 12% lowering in miles/gal. (Use of pure ethanol in the conventional engine would result in a 25% lowering in miles/gal.)⁴⁾ The ether blend would produce a 26% increase in miles/gal but a diminution in total energy production relative to ethanol by a factor of 1.32 and would have the highest price of the fuels considered. The fuel consisting of a mixture of $\frac{2}{3}$ ethanol and $\frac{1}{3}$ ether blend is of particular interest as it offers the prospect of no loss in miles/gal while causing relatively little reduction in total energy production and little increase in cost. The mixture of $\frac{1}{3}$ ethanol and $\frac{2}{3}$ ether blend has a caloric content/cc nearly identical with that of furnace oil.

Fuel in excess of that required to serve the automotive requirement could be employed advantageously to replace the high sulfur oil employed in electric utilities, thus reducing the sulfur dioxide emissions leading to acid rain. Such fuel could be stretched considerably further by use of conservation measures such as those recently proposed by the National Academy of Sciences.

The plan has not yet dealt with the problems associated with use

of Diesel engines, which are internal combustion engines particularly useful for large power requirements. Although the exhaust emissions are not being subjected to municipal restriction and inspection, presumably because in the aggregate they are small compared to automobile emissions, this rationale will gradually disappear if the present plan is adopted. Diesel emissions not only offend the senses but contain fine carbon particulates saturated with unburned Diesel fuel which are probably hazardous to respiratory function. Elimination of , or at least major reductions in, such emissions by use of filters and/or catalytic converters should be possible. Legislation requiring a low level cap on particulate emissions is highly desirable. Replacement of Diesel by Stirling cycle engines in automobiles will solve that facet of the overall problem. R&D to replace Diesel fuel by an alternative derived from solar energy is also desirable and the candidates listed in Table 2 should be tried.

A few words are in order to respond in advance to the expected reluctance of the automotive and oil industries to make the necessary adjustments to adoption of the plan. The automotive industry would be relieved of the CAFE standards or equivalent conservation measures presently under consideration, because the desired efficiency improvements in the engine have been exceeded in the Stirling cycle engine. Moreover, the happy prospect of being able to offer an environmentally clean vehicle powered by fuel derived domestically from solar energy should permit recapture of market share lost previously to foreign competitors. On the other hand, failure to offer such a product in advance of foreign competitors would be courting financial disaster. The oil companies face both a challenge and an opportunity. Because they control the fuel distribution network and are highly skilled in handling fuels and in carrying out chemical and physical processing thereon, they are in a premium position to diversify and to continue to serve the present domestic market. Failure to rise to the challenge will result in debilitating loss of market share. Moreover, freedom from criticism and expenses associated with environmentally damaging tanker oil spills should be a welcome advantage.

In summary, the goals of the plan, energy independence and elimination of automotive exhaust pollution and accompanying global warming, may indeed be met by use of a combination of the two mature technologies discussed here. Reductions in fuel cost by the DOE Biomass Program can be expected before they are needed on a large scale because of the long life span of modern automobiles. Any shortfall could be made up by temporary use of fuel oil since the Stirling cycle engine can be operated on any combustible fuel. With respect to cost, it should be kept in mind that achievement of fuel costs competitive with gasoline really implies a large price reduction because of the greatly added value of the environmentally compatible fuel.

Finally, the new plan does not require any new money from the Federal treasury. The added costs, possibly increased engine cost and somewhat higher fuel prices to early users, will be borne by the users and not by the taxpayers. In view of the plethora of advantages surrounding use of the "new" automobile, such price increases will be well tolerated in view of value added.

References

- 1) R.J. Meijer, Philips Technical Review, 20, 245-262, (1958/1959)
- 2) C. Weizmann, British Patent 4845, (March 1915)
C. Weizmann and G.A. Hamlyn, US Patent 1,329,214, (January 1920)
- 3) Combustion values for pure organic substances taken from:
M.S. Kharasch, Bureau of Standards Journal of Research, 2, 359 (1929).
Final products of combustion are $\text{CO}_2(\text{g})$ and $\text{H}_2\text{O}(\text{l})$.
Corresponding values for the blends from:
Handbook of Chemistry and Physics, 25 Edition, Chemical Rubber
Publishing Co., Cleveland, OH, (1941), p. 1422.
- 4) L.R. Lynd, J.H. Cushman, R.J. Nichols, and C.E. Wyman
Science, 251, 1318-1323 (1991).

"CORRESPONDENCE TRACKING"

TYPE: ACTION

DOCUMENT NUMBER: 9121271

FROM: ANDERSON, Jimmie

TO: DR. BROMLEY

DATE OF
CORRESPONDENCE: 04/20/91

SUBJECT: REQUEST FOR INFORMATION ON THE POSSIBILITY/
AVAILABILITY OF A GRANT TO BEGIN RESEARCH ON A PLAN
TO PRODUCE ELECTRICITY.

4/30/91
Bv - would you
handle this, please
Thanks
Carl

ASSIGNED TO: PHYSICAL SCIENCES

→ Beverly Fleisher

ACTION REQUIRED: AS NECESSARY

SENDER'S DUE DATE:

OSTP DUE DATE: 05/13/91

DATE COMPLETED:

5/9/91 by Bv

COPIES TO:

WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS:

DATE RECEIVED: 04/29/91

FILE: P- PHYSICAL SCIENCES

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20506

May 9, 1991

Mr. Jimmie Anderson
P.O. Box 8484
Red Bluff, CA 96080-8484

Dear Mr. Anderson:

Thank you for your letter on developing alternative sources of energy. As you know, the President recently announced a National Energy Strategy that includes significant efforts in the area of alternative energy.

The majority of energy-related research and development activities funded by the Federal government are sponsored by the Department of Energy; I suggest that you correspond directly with that Department.

Sincerely,

A handwritten signature in dark ink, appearing to read "B. Fleisher", with a long horizontal flourish extending to the right.

Dr. Beverly Fleisher

9/2/271

April 20, 1991

RECEIVED

91 APR 29 P 3:49

OFFICE OF THE
DIRECTOR

To: the Office of Science
And Technology,
Mr. D. Allen Bromly.

Dear Sir.

I have a idea!! Or to say a plan to produce electricity.
From a new and different resource. That does not use fossil
fuel, such as; gas, coal, or oil. And with out dams, or
nuclear power plants, IT does not use the wind or the
sun for power. They are already in use, and are doing
the job now. But we seem to need more. A different re-
source, that can back up, and become part of the; whole
power supply.

With the demands on are resources, and the problems,
we have with pollution. The uncertainty, of the oil and
gas supply, and the wind, sun and the rain. We are lucky
if we have power at all.

I started looking for a new and different way, that
we as a nation, might have another dependable power supply
That could back up, and would not rely on any of are
resources, that we are already using. I have found An
answer, that could supply some states with up to 25% of
there future needs. At the same time, cut our dependency
on imported oil, and gas. At a lower cost than most, of
the other supplies that we now use.

My purpose for writing you is for help!! I need to know if there is any, agency, or office, person, or foundation. that I might write to or call. TO find out, what it would take? The qualification, and the availability, and the possibility, of a grant, So that I will be able to start, and continue, my research, and development, of what I call "C" power.

If you know any one that might be interested they, can contact me at; Jimmie Anderson, P.O.Box; 8484 Red Bluff, Ca.96080-8484

Hope to hear from you soon, with all the information that you may have at your disposal.

Very Truly Yours

Jimmie Anderson

"CORRESPONDENCE TRACKING"

TYPE: ACTION

DOCUMENT NUMBER: 9121071

FROM: MCKENZIE, James M.

TO: DR. BROMLEY

DATE OF
CORRESPONDENCE: 04/08/91

SUBJECT: REQUEST FOR COMMENT ON ELECTRIC POWER.

ASSIGNED TO: PHYSICAL SCIENCES

→ Dan Pryor

ACTION REQUIRED: AS NECESSARY

What do you think, Dan?

SENDER'S DUE DATE: OSTP DUE DATE: 04/25/91

DATE COMPLETED:

5/9/91 by DAB/DEP

COPIES TO: D. Allan Bromley

WHITE HOUSE TRACKING #:

CONTACT PERSON:

→ John O'Neil

REMARKS:

This appears to be a reasonable contribution and leads to the notion of reviewing the MOX decision which is potentially significant. It should be reviewed by someone familiar with nuclear safeguard technology to see if a response is warranted

DATE RECEIVED: 04/11/91

FILE: PHYSICAL SCIENCES

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20506

April 29, 1991

MEMORANDUM FOR: D. ALLAN BROMLEY

THROUGH:

KARL ERB

FROM:

DONALD PRYOR

SUBJECT:

Response to James M. McKenzie

Mr. McKenzie's description of a technique to check the seals of mixed oxide (MOX) fuel assemblies seems reasonable and clever. However, I am not familiar enough with the problem to be able to make a detailed technical judgement. I discussed this with Torrey Froscher (CIA) who is familiar with non-proliferation systems. He suggested that the appropriate organization to evaluate this technically, if that were desired, was either DOE or NRC. He also indicated that the decision not to use MOX in this country was based on a number of other considerations in addition to confidence in the seal.

Several responses are possible:

1. refer the letter to DOE and/or NRC with a request for evaluation
2. pass the letter on to DOE and/or NRC for information
3. suggest that Mr. McKenzie contact DOE and/or NRC
4. thank him for his letter

I will be glad to draft whichever response you chose.

*Please draft
(1) a transmittal
letter to DOE/NRC
(2) an interim response to
McKenzie*

THE WHITE HOUSE
WASHINGTON

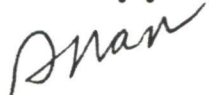
May 9, 1991

→ Mary
Suit for
Close Out
Int. 52

Dear Jim:

A former colleague has written to me to describe his success in developing a technique to check the seals of mixed oxide (MOX) fuel assemblies. Enclosed is a copy of his letter. He feels that this work might open the door to the use of MOX fuel in this country and the associated economic advantages. I would be very appreciative if your experts in the Department of Energy could examine this possibility.

Sincerely yours,



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

Enclosure

The Honorable James D. Watkins
Secretary of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

9121071

RECEIVED

April 8, 1991

Dr. Al. Bromley
Office of Science and Technology
Executive Office of the President
Washington D.C. 20500

DIRECTOR

Dear Al:

I duly retired February 6th having spent the last 10 years in International Safeguards. At one time I worked with Vic Allen ultrasonically sealing CANDU spent fuel stacks. The seal was from AECL and I developed the reading box at Sandia. This was a big first. The IAEA accepted the principle of inspection using seals.

About 3 years ago the IAEA assigned JRC Ispra to develop a MOX fuel ultrasonic seal. The USA was designated the reader builder. A year or so ago I elected to try. This turned out to be a fantastic last project. The first thing was a reasonable set of specifications. It is just not practical to drag oscilloscope and camera or strip recorder around a reactor site not to mention ultrasonic power supplies. From the AECL experience I set a maximum weight of 5kg even if it required a fancy John Waugh power supply. The technician assigned to help me on a time-available basis was just an incredible match. We put all the sensitive circuits on top, made the appropriate changes and he changed the printed circuit all in the personal computer. About two iterations and it looked good.

The JRC seal has inclusions just below the surface. The identity readings were obtained by rotating the pulse/echo transducer in a 1" circle with 100 pulses in 360°. I used the high level language FORTH to program the microcomputer to start the motor, pulse the transducer, digitize the reflection, and store the result. We looked at some of the readings and the penny dropped. Each reading started where the motor stopped after the previous reading. JRC always showed excellent correlations but never mentioned this random start. The statistical nature of the readings exclude picking a value. A good pattern recognition technique was required but with some measure of the similarity of the patterns. This excluded the practical parameters mean and RMS. I now went to the Ted Hinks principle "when you don't know what to do keep working". Somewhere I remembered reading. If you look at your results in the frequency domain you get a different perspective. To make efficient use of the FFT algorithm requires a power of two points. After what seemed eternity I realized I could read 128 points in 360° and quickly changed the FORTH program. It should have been quite apparent now that the system was preordained to work. When I looked at the Transforms of two readings of the same seal I thought I must have used the same readings for each. Pearson's correlation coefficient could be used to measure the similarity of the patterns. Thus reading 128 points and taking the Fourier Transform takes care of the random start and the correlation coefficient gives a measure of how closely the patterns are related. Statistics are not complete. However 190 correlations of reading pairs of different seals or intracorrelations gave a maximum value of r_{xa} of 0.92. 200 correlations of reading pairs of

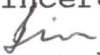
the same seal or intercorrelations gave a minimum value of r_{re} of 0.992. These results are just fantastic. A critical value of 0.990 could be used to separate "identity confirmed" and "identity compromised".

The PWR has been a challenge. The upper surface of the fuel assembly is flat to allow the control rod to sit down. The fuel designer is not happy about anything screwed in there. The answer is incredibly simple using the Fourier Transform solution to random start. A 1" circle of weld, 128 point measurement, and the FFT would provide an identity. The electronics would require a bit of work.

Japan and France both MOX fuel countries have cheaper electric power than the USA a non MOX fuel country. When the non MOX fuel USA decision was made the preceding development was probably not envisaged. The devices can be installed on the manufactured fuel assemblies. This has been demonstrated at Versuchssatomkraftwerk Kahl. The reader is practical and light. All this together with other relevant technology probably warrants a review of the non MOX decision. The utilities would undoubtedly welcome a reversal as it would solve their storage problems and make available many millions of \$ of fuel.

The preceding is presented for your consideration. I would be delighted to provide more details or greater depth of discussion if you so desire. I look forward to hearing from you.

Sincerely yours


James M. McKenzie
1005 Cuatro Cerros Tr.
Albuquerque
NM 87123

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION

DOCUMENT NUMBER: 9120841

FROM: BELDEN, David L.: AMERICAN SOCIETY OF MECHANICAL ENGINEERS, THE

TO: DR. BROMLEY

DATE OF
CORRESPONDENCE: 03/18/91

SUBJECT: A LETTER TO INFORM THAT HE IS UNABLE TO ACCEPT THE
INVITATION TO MEET WITH DR. BROMLEY AND OSTP STAFF.

ASSIGNED TO:

ACTION REQUIRED:

SENDER'S DUE DATE:

OSTP DUE DATE:

DATE COMPLETED:

COPIES TO: D. Allan Bromley
Dr. Wong
Dr. Phillips

WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS:

DATE RECEIVED: 03/22/91

FILE: 9- INDUSTRY*PHYSICAL SCIENCES

David L. Belden, Ph.D., P.E.
Executive Director
212-705-7730
FAX 212-705-7739



The American Society of
Mechanical Engineers

RECEIVED
345 East 47th Street
New York, NY 10017

9120841
91 MAR 22 A10:35

OFFICE OF THE
DIRECTOR

March 18, 1991

Dr. D. Allan Bromley
Director
Office of Science and Technology Policy
Executive Office of the President
Washington, DC 20506

Dear Dr. Bromley:

Thank you for inviting me to meet with you and other senior officials of the Office of Science and Technology Policy. It is my misfortune that I am unable to accept due to an unavoidable schedule conflict.

I am particularly pleased that you are planning this interaction with the executive directors of a number of the engineering societies. ASME's relationship with you and others at OSTP have been positive. ASME truly appreciated your participation in the Industry Advisory Board meeting. Further, we were pleased to prepare the technology policy and critical technologies position papers.

Best wishes for a most successful meeting.

Sincerely,

A handwritten signature in dark ink, appearing to read 'David L. Belden', is written over the typed name.

David L. Belden

"CORRESPONDENCE TRACKING"

TYPE: ACTION

DOCUMENT NUMBER: 9120582

FROM: AMIN, S.K.

TO: DR. BROMLEY

DATE OF
CORRESPONDENCE: 02/25/91

SUBJECT: REQUEST FOR INFORMATION ON DEVELOPING AND MARKETING
AN INVENTION: A PROPULSION SYSTEM WHICH PROVIDES
DIRECT THRUST TO LAND, AIR & MARINE VEHICLES.

ASSIGNED TO: Dr. Wong

ACTION REQUIRED: AS APPROPRIATE

SENDER'S DUE DATE:

OSTP DUE DATE:

DATE COMPLETED:

3/26/91 by [signature]

COPIES TO: D. Allan Bromley

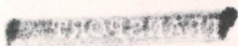
WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS:

DATE RECEIVED: 02/28/91

FILE: P- PHYSICAL SCIENCES- TRANSPORT



EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20506

March 26, 1991

Dear Mr. Amin:

Thank you for your letter of February 25. Unfortunately, our office is not equipped to evaluate and promote inventions. You may find the following office useful to you:

Office of Energy Related Inventions
National Institute of Standards and Technology
Gaithersburg, Maryland 20899

(301) 975-5500

Sincerely yours,


Eugene Wong
Associate Director
for Physical Sciences and Engineering

Mr. S. K. Amin
275 East Main Street
Bergenfield, New Jersey 07621

RECEIVED

91 FEB 28 P 4: 28

S.K.AMIN
275 EAST MAIN STREET
BERGENFIELD, NJ 07621.

OFFICE OF THE
DIRECTOR

Dt: February 25, 1991.

To,
The Assistant to the President for Sci & Tech.
D. Allen Bromley.
The White House Office
Washington DC 20500.

Dear Sir,

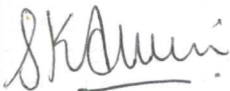
I have invented a Propulsion System which provides direct Thrust (motive power) to **land, air and marine vehicles** and has the following advantages.

- (1) It has a very high propulsive efficiency of above 97% and can thus provide significant savings in the energy consumption of the vehicles and greatly increase their mileage.
- (2) Its application results in improved maneaverability and control of the vehicles thus making the vehicles extremely safe for their operators.
- (3) It can be readily produced on the existing production lines.
- (4) It has a very high Thrust to weight ratio and can be extremely useful to army vehicles.
- (5) It can operate in extremely harsh climatic conditions.

This invention can be a great boost to our nations Technological competitiveness and it also has a very large Global market. Thus kindly inform me on how your department can help in developing and commercialising the invention and the procedure to be followed for obtaining a grant for the above purpose. Please send me the necessary application forms at the earliest.

Thanking you,

Yours Sincerely,



S.K.Amin.

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION

DOCUMENT NUMBER: 9121300

FROM: CREAGNA, Robert J.

TO: DR. BROMLEY

DATE OF
CORRESPONDENCE: 02/15/91

SUBJECT: RE: OIL ON OCEAN WATER CHANGES THE PROPAGATION OF
ELECTROMAGNETIC WAVES AT LOW ALTITUDES.

ASSIGNED TO:

ACTION REQUIRED:

SENDER'S DUE DATE:

OSTP DUE DATE:

DATE COMPLETED:

COPIES TO: D. Allan Bromley
PHYSICAL SCIENCES

WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS:

DATE RECEIVED: 05/02/91

FILE: P- PHYSICAL SCIENCES

RECEIVED

9121300

91 MAY 2 A9:51

OFFICE OF THE
DIRECTOR

February 15, 1991

Professor D. Allan Bromley
The White House
Washington, D. C.

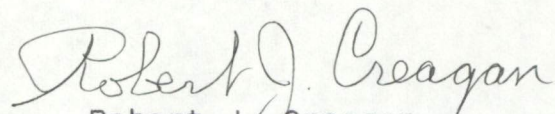
Dear Professor Bromley:

Oil on ocean water changes the propagation of electromagnetic waves at low altitudes, because of the exclusion of water and its dielectric properties from the air.

Please convince yourself that the right expert is evaluating this phenomenon for the benefit of the U. S. Military.

Technicalities on next page.

Sincerely,



Robert J. Creagan
2305 Haymaker Rd.
Monroeville, Pa. 15146
(412) 372-0708
Natl. Acad. Eng.
Harvard: Ultra-High Freq.
M.I.T.: Airborne Radar
USNR: So. Pacific-Bikini
Naval Research Lab
Yale: Ph.D. Physics '48
Reunion-'89

TECHNICALITIES

1. Water's dielectric constant is so high that the presence of moisture above sea water, and its change in density with altitude, bends electromagnetic wave propagation so that it tends to channel close to the surface of the water. Oil on ocean water may distort moisture above the sea.
2. Results which verify the above statement are many.
 - (A) I, personally, have observed radar returns from mountains over the horizon with X-Band Radar, off San Diego, and in the South Pacific.
 - (B) Radar installations on aircraft carriers in WW II were modified, in some cases, to add antennae below the level of the flight deck to take advantage of this phenomenon.
 - (C) Microwave transmission theory predicts bending in space with varying dielectric constants.
3. My concern is that command, communication, and control of ships, aircraft, missiles and electronic countermeasures can be perturbed so as to confuse operators and reduce effectiveness of U. S. war effort.

"CORRESPONDENCE TRACKING"

TYPE: ACTION

DOCUMENT NUMBER: 9120384

FROM: HAFF, PETER K.

TO: DR. BROMLEY

DATE OF
CORRESPONDENCE: 02/07/91

SUBJECT: THE DIRECT MECHANICAL/GEOLOGICAL/ECOLOGICAL EFFECTS
OF BOMB AND ARTILLERY CRATERING DUE TO THE PERSIAN
GULF WAR.

ASSIGNED TO: D. Allan Bromley

ACTION REQUIRED: AS NECESSARY

SENDER'S DUE DATE:

OSTP DUE DATE:

DATE COMPLETED: -----

COPIES TO: Dr. Wong

WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS: Reassigned to DAB.

DATE RECEIVED: 02/13/91

FILE: P- PHYSICAL SCIENCES

"CORRESPONDENCE TRACKING"

TYPE: ACTION

DOCUMENT NUMBER: 9120384

FROM: HAFF, PETER K.

TO: DR. BROMLEY

DATE OF
CORRESPONDENCE: 02/07/91

SUBJECT: THE DIRECT MECHANICAL/GEOLOGICAL/ECOLOGICAL EFFECTS
OF BOMB AND ARTILLERY CRATERING DUE TO THE PERSIAN
GULF WAR.

msg - 2/12
per EW, pls.
reassign to
DAB - Rex.
SACG

ASSIGNED TO: Dr. Wong

→ bring to the attention of
DAB

ACTION REQUIRED: AS NECESSARY

SENDER'S DUE DATE:

OSTP DUE DATE:

DATE COMPLETED: -----

COPIES TO: D. Allan Bromley

WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS:

Haff is a former colleague of DAB's.
Allan might wish to respond.
K

DATE RECEIVED: 02/13/91

FILE: PHYSICAL SCIENCES

THE WHITE HOUSE
WASHINGTON

February 21, 1991

Dear Peter:

Many thanks for your note about the possibility of applying your expertise to some of the postwar geological situations in the Middle East. I am sure that your expertise would find a great many places for useful application, but right at the moment it may be a little premature to think about the Middle East as such. I would hope, however, that it might be possible for you to interest the Army in some pilot activities in appropriate areas here within the U.S. to develop the techniques and approaches that will be required when hostilities wind down.

As I see it, the Army Research Office or the Corps of Engineers would be the two appropriate places to make application for this sort of activity. I shall certainly keep your letter in mind and if an appropriate opportunity arises, will make sure that it gets into the right hands.

With warmest best wishes,

Sincerely yours,



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

Professor Peter K. Haff
Department of Civil and Environmental Engineering
Duke University
Durham, North Carolina 27706

9120384

Duke University
School of Engineering
DURHAM NORTH CAROLINA 27706

RECEIVED

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

91 FEB 13 A 9: 11

TELEPHONE (919) 660-5200
TELEX: DUKTELCOM DURM 802829
FAX (919) 660-5219

OFFICE OF THE
DIRECTOR

February 7, 1991

Dr. D. Allan Bromley
Science Advisor to the President
Executive Office of the President
Office of Science and Technology Policy
Old Executive Office Building
Room 360
17th and Pennsylvania Avenues
Washington, D.C. 20506

Dear Allan:

Being somewhat restless at continuing to work on "ordinary" scientific problems while the war assumes ever larger proportions, I have been trying to think how my own talents and expertise might be directed toward a more near term goal.

One obvious fact is that after the fighting is over, environmental issues arising as a result of the war are going to loom very large indeed. Most news reports are focussing now on items such as oil slicks, possible chemical and nuclear contamination and so forth, but there has been relatively little discussion of the direct mechanical/geological/ecological effects of bomb and artillery cratering, besides the acknowledgement that some areas of Kuwait already look like "the moon".

It is my opinion that it is not too soon to begin thinking about putting that issue into a rational, scientific framework, first of all so that remedial measures can eventually be taken where appropriate, and second so that hysterical extremists do not have a field day as a result of the footage that the media will bring back after the war is over.

As a member of the Department of Civil and Environmental Engineering at Duke, and as a member of the Geology Department

here, and having 10 years field experience in the Mojave Desert looking at landscape changes due to man-made and natural causes, and, finally, having a quantitative, physics background, this is one area in which I think I can be as effective as anyone else. Presently, I am trying to prod the Army Research Office (one of my scientific sponsors) into organizing some activity in this area, but I thought it was also timely and proper to contact you personally as well.

Perhaps this is all in hand. If so, good. But if not, perhaps it would be worthwhile putting together in a low-key way a small group of experts (engineers, geologists, etc.) to scope out the issues and to begin to put them into a scientific/engineering framework so that we are not surprised or put on the defensive at some time in the future.

I would be eager to participate in any such work-study forum. Meanwhile, I will continue to lobby ARO.

Hope all is going well,

Kind regards,

A handwritten signature in dark ink, appearing to read 'Peter K. Haff', with a long, sweeping horizontal line extending to the right.

Peter K. Haff
Professor

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION

DOCUMENT NUMBER: 9120112

FROM: AMERICAN SUPERCONDUCTOR CORPORATION

TO: DR. BROMLEY

DATE OF
CORRESPONDENCE: 01/07/91

SUBJECT: ALEXIS MALOZEMOFF'S APPOINTMENT

ASSIGNED TO: Dr. Wong
Dr. Phillips

ACTION REQUIRED:

SENDER'S DUE DATE:

OSTP DUE DATE:

DATE COMPLETED: -----

COPIES TO: D. Allan Bromley
Steve Olson

WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS:

DATE RECEIVED: 01/19/91

FILE:

p-Physical Sciences

AMERICAN SUPERCONDUCTOR

CONFIDENTIAL

FOR IMMEDIATE RELEASE**ALEXIS MALOZEMOFF APPOINTED VP RESEARCH & DEVELOPMENT BY
AMERICAN SUPERCONDUCTOR**

WATERTOWN, Mass., Jan. 7, 1991 -- American Superconductor Corporation today announced the appointment of Dr. Alexis P. Malozemoff to the position of Vice President, Research & Development. He will be responsible for the firm's research and development programs.

Dr. Malozemoff, an eminent researcher in the field of superconductivity, comes to American Superconductor following a distinguished career at IBM where he spent 19 years in a variety of research and management positions. Acknowledged for his pioneering work in the field, Dr. Malozemoff is recognized in the discovery of "giant flux creep" -- a factor in determining the maximum amount of current a superconductor can carry. This phenomenon is a key element in development of applications with superconducting materials.

Most recently, Dr. Malozemoff served as IBM's Research Division Coordinator for high temperature superconductivity. Previously, he was responsible for the development of programs in amorphous magnetism, nanostructure physics and scientific applications of Josephson technology. He is also well-known for his work on magnetic materials and his discoveries related to magnetic bubble technologies.

"We are extremely pleased to have Alex join American Superconductor," said Greg Yurek, president and CEO. "He brings the scientific skills, international relationships and expertise to help guide our program to make commercially viable superconductors available to the marketplace."

(more)

In his position, Dr. Malozemoff will be responsible for managing all R&D programs in materials science, applied physics, materials processing, and process and conductor development.

He is also charged with management of American Superconductor's collaborative programs, including the firm's technical Advisory Board, its patent estate, its interaction with the federal High Temperature Superconductivity Pilot Center Programs, and its work with university and government laboratories.

"ASC is one of the companies most committed and best positioned to drive the commercialization of flexible high temperature superconducting wires, a major new high-technology area," said Malozemoff. "I look forward to participating in this exciting and important enterprise."

Dr. Malozemoff holds a PhD in Materials Science Engineering from Stanford University and a BS degree in Physics and Chemistry from Harvard University. He is a Fellow of the American Physical Society and a Senior Member of the IEEE. He was at IBM when he and co-worker Yosef Yeshurun published their landmark paper on "giant flux creep."

American Superconductor Corporation creates and develops materials and manufacturing processes for making flexible ceramic superconducting wires -- a class of materials that are exceptionally efficient at conducting electricity and in producing magnetic energy. ASC manufactures a broad range of ceramic superconductors, marketing them worldwide in the form of wires and electromagnetic coils for use in commercial and defense applications, such as electric motors, power cables and magnetic devices.

#

For further editorial information, contact:

Joseph A. Barresi
American Superconductor Corp.
617/923-1122

Jack Jackson/Kim Sarkisian
Miller Communications
617/536-0470