

ER-16

WMP
Ppolansky
05/01/89

May 2, 1989

ER-16

WMP
R. Gajewski
05/01/89

Ms. Carolyn J. L. Moore
University of Hartford
8 Walker Lane
West Hartford, CT 06117

Dear Ms. Moore:

Your letter of April 11, 1989, to President Bush on the possibility that recent nuclear fusion results could contribute to a better environment has been referred to me for reply.

The Department of Energy is cautiously optimistic about recent disclosures regarding a possible breakthrough in nuclear fusion research. The benefits would be overwhelming if an unlimited and benign energy source results from this research. Even if these preliminary claims prove to be partially true, a new field of science will have emerged with potentially profound benefits for society. We also need to remain objective because, throughout history, science has been littered with enthusiastic claims of technical achievements which subsequently resulted in disappointment.

In order for the experiments related to harnessing nuclear fusion to receive a credible hearing, scientific details need to be made available. This must be accomplished through the publication of scholarly papers and direct interaction among researchers. The Department is actively monitoring recent developments in nuclear fusion research in terms of what the process of scientific discovery will reveal for future energy technologies. The successful utilization of a technology that might emerge from this research must be preceded by confirmation of reported results, an understanding of the basic phenomena involved, and dedicated development.

Thank you for informing us of your thoughts on fusion and how its implementation might help the environment.

Sincerely,

Ryszard Gajewski, Director
Division of Advanced Energy Projects
Office of Basic Energy Sciences, ER-16

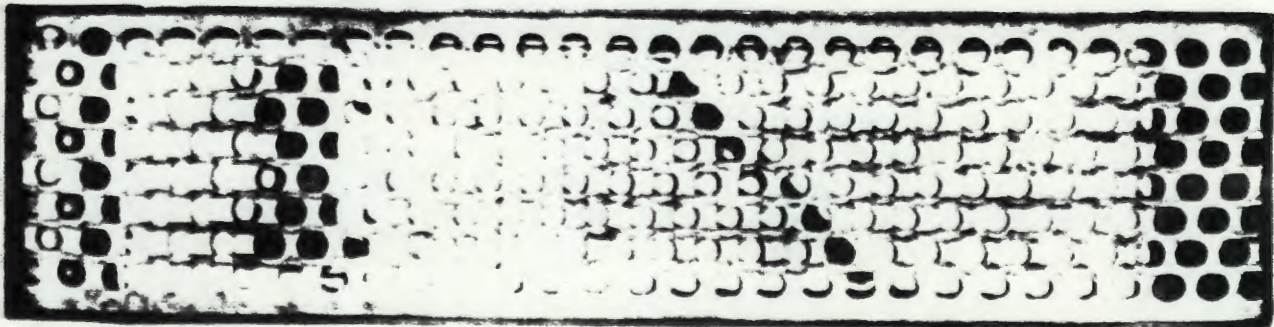
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PREPARED BY: WPolansky/lh:5/1/89:ER-16:3-5995

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FROM: White House Moore, Carolyn		DATE OF INCIDENT:		DATE RECEIVED:		89-180	
TO: George Bush		CLASSIFICATION/CONTROL MARKINGS: Encl		OTHER:			
REG. NO.:	DUE DATE: 5/5/89	FILE CODE:	DATE ANSWERED:		BY:		
DESCRIPTION (Must Be Unclassified) Nuclear Fusion May Prove To Be The Energy Source Of The Future		REFERRED TO:	DATE	RECEIVED BY:	DATE		
		A. Davies-Action	4/2				
		I. Miller - Info	4/2				
ENCLOSURES:		Gajewski		4/26		ACTION	
REMARKS: ES# 89-005709 Reply direct DUE 5/5/89		DESTRUCTION RECORD:		COPY NUMBER(S)		PAGE COUNT	
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**UNIVERSITY
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College of Arts and Sciences
Department of Politics and Government
West Hartford, CT 06117
203-243-4234

April 11, 1989

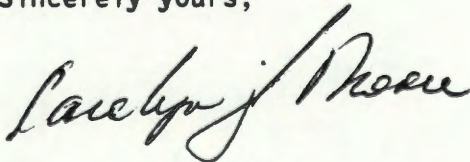
President George Bush
The White House
Washington, DC 20500

Dear President Bush:

As one concerned about our environment, I have long been against nuclear fission as a means of attaining nuclear power. I have wondered why we as a country decided to develop fission facilities when the fuel and waste products are so costly and destructive. Recently in our paper, The Hartford Courant, I read the attached article with new hope that perhaps this is the step necessary for the United States to reconsider the whole nuclear question. I heard on the CBS news last evening that this research has been confirmed in two other locations since the initial announcement. I believe this country should now support these efforts generously because fusion appears possible with readily available materials without producing harmful by-products. With nuclear fission we are left with the horror that the waste may never really dissipate and may destroy our fragile earth for future generations.

Certainly we cannot go on indefinitely using fossil fuels-- these are damaging our air and atmosphere. Using nuclear energy is preferable for the environment only if it doesn't pollute in toxic ways. Thus it seems fusion, if research is encouraged, may well prove to be the energy source of the future--safe, clean, and abundant. Let's find out!

Sincerely yours,



Carolyn J. L. Moore
8 Walker Lane
West Hartford, Connecticut 06117

cc: Senator Dodd
Senator Lieberman
Congresswoman Kennelly
Hartford Courant

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SPEC INT: _____ CONTROL NO: ES89-005709
DATE CORR: 04/11/89 DATE RECD: 04/24/89 DATE CNTRL: 04/25/89 DATE DUE: 05/09/89
LETTER: X MEMO: _____ TWX: _____ OTHER: _____ TO: SECY: _____ DEP SEC: _____ UN SEC: _____ OTHER: WH

FROM: MOORE, CAROLYN CT 0
UNIVERSITY OF HARTFORD

REMARKS:

SUBJ: NUCLEAR
FUSION
NUCLEAR FUSION MAY PROVE TO BE
THE ENERGY SOURCE OF THE
FUTURE

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ACTION TO: ER TYPE ACTION: Reply direct SIG OF: ER

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Scientists announce Fusion breakthrough hailed as revolutionary

By **AS H. MAUGH II**
and **LEE DYE**
Los Angeles Times

SALT LAKE CITY — Scientists announced Thursday that they have achieved nuclear fusion at room temperature, a long-sought breakthrough which, if confirmed by other scientific experiments, could move clear power into an entirely new era.

The scientists have produced an incredibly simple, table-top device that they say uses a weak electric current to produce more energy than takes to run the experiment.

If they are right, they have reached a goal that has eluded scores of other scientists who have had at their disposal fusion research reactors costing hundreds of millions of dollars.

"The breakthrough means the world may someday rely on fusion for a clean, virtually inexhaustible source of energy," the University of Utah said in a press release announcing the development.

Nuclear fusion is the opposite of nuclear fission, the reaction process in conventional nuclear power plants. In fission, atoms are split to release energy. In nuclear fusion, forces push atoms together to release energy. The advantage of fusion is that the fuel — deuterium, an isotope of hydrogen — is abundant in sea water and the fusion reactions produce few waste products.

B. Stanley Pons, chairman of the department of chemistry at the University of Utah, and his former professor, Martin Fleischmann, professor of electrochemistry at the University of Southampton, Eng-

See Fusion, Page A11

Continued from Page 1

land, announced the results during a press conference on the Utah campus.

Their work follows a course that is so different from conventional wisdom on fusion research that many of the leaders in the field were not familiar with it.

But several who were aware of the research said it could not be dismissed. The two scientists have been working on the project for more than five years, and they have spent \$100,000 of their own money on it. They conceived of the idea while hiking in a canyon east of Salt Lake City and conducted their first experiment on Pons' kitchen.

"We thought the idea was so stupid that we decided to finance it ourselves," Fleischmann said.

Beginning in May, however, the two men will have the support of the U.S. Department of Energy, which said Thursday that it would fund their work for 18 months with a \$322,000 grant.

Pons and Fleischmann claim to have succeeded where so many others have failed by trying a totally different approach that involves a glass flask and an electrode.

"It's one of those ideas that hasn't occurred to other people," said a Department of Energy scientist familiar with the research. "I have no other explanation."

"If it's true, it's wonderful," said Robert Conn, director of the Institute of Plasma and Fusion Research at the University of California at Los Angeles. He said, however, that "it would be surprising" if the work is confirmed.

That is partly because the physics of fusion is believed to require extremely high temperatures — millions of degrees — before fusion can occur. The high temperature is needed for positively charged atomic nuclei to have the energy to fuse together in a process that releases enormous amounts of heat.

Conventional wisdom also holds that the fuel for a fusion reaction must be extremely compressed, forcing hydrogen atoms close enough together for fusion to occur. In most major research projects, that is done by subjecting the fuel — in the form of a pellet or a dense gas — to either a strong magnetic field or intensely powerful lasers. That is done with huge instruments costing many millions of dollars.

Pons and Fleischmann used none

of that. Their apparatus consists of a flask about the size and shape of a round-bottomed drinking glass with a fitted glass plug at the top. Inside the flask is a cylinder made of the metal palladium, about 6 inches long, wrapped in a platinum coil, creating an electrode.

The flask is filled with 99.5 percent heavy water, water that looks ordinary but is made of one part oxygen and two parts deuterium, a form of hydrogen that is about twice as heavy as ordinary hydrogen. Deuterium is the most common fuel for fusion experiments and is easily obtainable from sea water.

A 6- to 8-volt current was applied to the apparatus, causing deuterium from the water to concentrate in the palladium. That, in turn, caused the closely packed deuterium atoms to fuse together.

"The deuterium is simply driven [from the heavy water] into the metal rod and fused, with a considerable release of energy," Pons said. The energy released from the reaction is in the form of heat.

That amount of heat "can only be accounted for by nuclear reactions," Pons said.

The scientists first suspected that they were beginning to get a fusion reaction "one day when we turned up the power and the electrode melted," Fleischmann said. "We've been running at much lower power since then."

Ordinarily, results such as these are first announced in professional journals so other experts can study the experiments before the findings are published. It is unusual to hold a press conference before a formal presentation to scientific peers, and the procedure followed by the University of Utah and the two researchers was of some concern to other scientists.

The university decided to hold a press conference because the results were "so exciting that we were beginning to have a lot of rumors," said Jim Brophy, the university's vice president for research. The two scientists said their findings would be published in May in a professional journal, but they would not identify the publication.

Repeatedly, other experts said they could not comment extensively on the report because they knew nothing about it. Those who would comment were generally skeptical, but several familiar with the work said they expected it to spawn a vast amount of research.