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United States Government | Department of Energy

memorandum

DATE: APR 19 1989

REPLY TO ATTN OF: ER-1

SUBJECT: Special Cold Fusion Report

TO: Gary Gibbs, S-1

This report summarizes intensified steps we are taking to resolve the technical issues related to cold fusion and is primarily a follow-up to information provided to the White House last Friday on the next steps to be taken. It also contains information on related matters. The following items are covered:

1) ERAB Panel Study

2) Offer by Senators Garn and Hatch

3) White House Summary on Cold Fusion Situation 4/14/89

4) DOE Interlaboratory Meeting

5) Proposed press release

6) Draft testimony on cold fusion

1) ERAB STUDY

We are requesting an ERAB panel be set up to review the evidence on cold fusion and advise the Department on research and development to be undertaken to resolve the technical issues. Attached is a draft "charge letter."

2) OFFER BY SENATORS GARN AND HATCH TO VISIT THE U. OF UTAH

Attached is a copy of the letter sent to the Secretary. The purpose of the visit is to witness a demonstration of the cold fusion experiment at the University of Utah. OMB (Judy Bostock) has called us and expressed great reservations about sending any administration personnel on this trip. Dr. Hunter recommends that no administration personnel participate in this trip. There will be publicity attached to the visit and we do not wish to participate while the technical issues are still being pursued.

3) WHITE HOUSE SUMMARY ON COLD FUSION

Attached is the summary sheet submitted to the White House on the above subject on 4/14/89. We are following up on all the next steps listed. An interlaboratory meeting was held on 4/19/89 to direct the laboratories to aggressively resolve the technical issues. An ERAB panel is being requested to review the entire situation as discussed in item one.

4) DOE INTERLABORATORY MEETING ON COLD FUSION

On Wednesday, April 19, 1989, a meeting of senior representatives of the DOE national laboratories took place at DOE Headquarters. The participants (list attached) were scientists designated by the laboratories as leaders and/or contact points for research pertaining to cold fusion.

The meeting was chaired by Dr. Louis Ianniello, Deputy Associate Director for Basic Energy Sciences, Office of Energy Research, who outlined the meeting's main objectives: 1) exchange information on experiments completed and planned; 2) discuss high priority research needs; and 3) to direct the laboratories to intensify efforts to help resolve the technical issues.

Dr. Robert O. Hunter, Jr., Director of the Office of Energy Research, talked to the group to make a strong appeal for an intensive effort towards the resolution of the scientific issues pertaining to the recently reported cold fusion phenomenon.

In the course of a vigorous and substantive discussion, laboratory representatives presented an impressive picture of ongoing efforts, aimed at reproducing the calorimetric effects reported by the University of Utah team, as well as specific signatures of nuclear reactions (such as neutron emissions or the presence of helium in the electrodes). They also outlined research plans for the immediate future. While no confirmation of the reported cold fusion effects has been seen, there was a consensus that experimental options have not been exhausted, and that, therefore, it would be premature, at this time, to render any final scientific verdict as to the validity of the recently announced findings from the University of Utah.

The Department of Energy will sponsor a workshop on cold fusion phenomena to be held at Santa Fe, New Mexico, on May 23-25, 1989. The workshop is being organized by the Los Alamos National Laboratory. It will provide an opportunity for active researchers from around the world to get together, compare experimental results, exchange views on theoretical explanations being offered, and discuss plans for future research directions.

5) PROPOSED PRESS RELEASE ON COLD FUSION

Attached is a proposed press release which describes the steps being taken to intensify our efforts to resolve the technical issues surrounding the cold fusion phenomena.

6) DRAFT TESTIMONY ON COLD FUSION

Draft testimony on cold fusion has been prepared for Dr. Hunter's appearance on May 2, 1989, before the Subcommittee on Research and Development of the Senate Committee on Energy and Natural Resources. Senator Johnston will chair the hearing. A copy of the draft testimony is attached.

Robert O. Hunter, Jr.
Director
Office of Energy Research

5 Attachments

(1)

DRAFT

Dear Mr. Schoettler:

In recent weeks, there has been a great deal of interest in the prospects for "cold fusion", based on experiments at the University of Utah. At present the determination of significant quantities of energy from cold fusion are unconfirmed. However, because of the enormous potential benefits from practical fusion energy, I request that the Energy Research Advisory Board (ERAB) assess this new area of research. Specifically, I would like the Board to:

1. Review the experiments and theory of the recent work on cold fusion.

2. Identify what technical issues must be resolved to confirm the existence of significant energy from "cold fusion".

3. If it is likely that the results will be confirmed, then what R&D direction should the U.S. pursue for the next five years to capitalize on these results?

I request that the Board provide an interim report on the first item by July 31 and a final report on all items by November 15, 1989.

The Secretary

(2)

SUMMARY ON COLD FUSION SITUATION

FACTS TO DATE

- Small numbers of fusion neutrons produced by nuclear deuteron reactions claimed to be observed in a few laboratories.
- Conflicting and unsubstantiated claims about macroscopic heat release in electrolysis cells.
- Putative neutron count rates in cells imply fusion energy production that could account for only about 1 part in 10^{10} of the heat release.

UNKNOWNS

- Perhaps 100 laboratories actively working on reproducing these results without being able to substantiate either of the claims (heat or neutrons). A few laboratories have claimed observations of heat or neutrons.
- Origin of the heat release observed not established - nuclear, chemical, mechanical or other.
- Mechanism for production of fusion reaction, if any, at room temperature in solids not established.
- Mechanism or reaction to produce large fusion energy release without large neutron count.

NEXT STEPS

- Independent confirmation by reproduction of experimental results.
- Chemical assays for chemical reactants and products in the process.
- Control experiments run with light water.
- Careful scientific approach to determine mechanism for fusion reactions in solids.
- Verification of neutron and heat release in the Utah experiment by independent researchers.
- Responsible and aggressive efforts to resolve the issue in national and other laboratories.
- Review of entire situation by an independent panel comprised of uncommitted and unbiased experts.

April 14, 1989

(3)

April 19, 1989 Interlaboratory Cold Fusion Meeting

Name	Lab	Phone No.
Louis Ianniello	DOE/Hqtrs	8-233-3081 301-353-3081 .....6594 (fax)
Dieter M. Gruen	ANL	312-972-3513
Russell H. Jones	PNL	509-376-4276 8-444-4276 509-376-0418 (fax)
Richard A. Van Konynenburg	LLNL	8-532-0456
Bob Marlay	DOE/Hqtrs	8-896-9770 .....4120 (fax)
Tom Barton	Ames	515-294-2770
Mike Saltmarsh	ORNL	8-624-1145
Keith Thomassen	LLNL	8-532-1166 415-423-2395 (fax)
Rulon Linford	LANL	8-843-7857
Gerd M. Rosenblatt	LBL	8-451-6606 415-486-5401 (fax) 8-451-5401 (fax)
Peter D. Bond	BNL	516-282-4063 8-666-4063 516-282-5820 (fax)
Tom Picraux	SNL	505-844-7681 8-844-7681 505-846-2009
R. Gajewski	DOE/Hqtrs	301-353-5995 8-233-5995 .....6594 (fax)
Tom Finn	DOE/Hqtrs	8-896-2956 202-586-2956 .....3119 (fax)
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DRAFT

DOE LABS TO RESEARCH COLD FUSION;
PANEL TO REVIEW RESEARCH TO DATE

Due to the worldwide interest in announced research results in electrolytic or "cold" fusion in metals, the Department of Energy has directed its national laboratories to intensify their research efforts to more clearly understand the phenomenon. DOE also will request its Energy Research Advisory Board to establish a panel to conduct an independent review of the entire research situation.

Since Brigham Young University and the University of Utah announced research results, DOE laboratories have been conducting experiments in the area. To date, DOE laboratories have not succeeded in substantiating the publicized results.

The intensified work at the national labs will include continued attempts to reproduce the experiments in order to confirm research claims. Additional experiments will include conducting tests for chemical reactants and products resulting from the experiments. Control experiments using light water in addition to heavy water will also be performed. Scientists will seek to determine the mechanism for the production of a fusion reaction in solids.

The participating laboratories are: Ames Laboratory, Ames, Iowa; Argonne National Laboratory, Argonne, Ill.; Brookhaven National Laboratory; Long Island, N.Y.; Idaho National Engineering Laboratory, Idaho Falls; Lawrence Berkeley Laboratory, Berkeley, Calif. Lawrence Livermore National Laboratory, Livermore, Calif., Los Alamos National Laboratory, Los Alamos, N.M.; Oak Ridge National Laboratory, Oak Ridge, Tenn.; Pacific Northwest Laboratory, Richland, Washington; and Sandia National Laboratory, Albuquerque, N.M.

The ERAB panel will consist of experts in the fields of electrochemistry, solid state physics, nuclear physics, engineering and other fields important to the type of experiments conducted. The purpose of the review is to provide DOE with an assessment of this new area of research. ERAB provides guidance to the Secretary of Energy and advise on overall R&D conducted in the Department. DOE will request that ERAB prepare an interim report by July.

The main reason for the research by DOE laboratories is the potential for a new energy ~~supply.~~ source However, the origin of any heat released has not been established, be it nuclear, chemical, mechanical or another process. Similarly, a mechanism for production of a fusion reaction, if any, at room temperature in solids has not been established.

-DOE-

R-89-
4/19/89
@ 1730

DRAFT

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Statement of Robert O. Hunter

Director

Office of Energy Research

Department of Energy

before the

Subcommittee on Energy Research and Development

of the

Senate Committee on Energy and Natural Resources

May 2, 1989

Mr. Chairman and Members of the Subcommittee, I am pleased to appear before you to discuss recent technical developments on the subject of cold fusion and the Department of Energy's activities and plans in this area.

"Cold fusion" is a generic term referring to a variety of phenomena in which nuclei can be made to "fuse" together without the need for high temperatures normally associated with the fusion process. Nuclear fusion processes taking place in the sun and in the more conventional man-made approaches, such as inertial confinement and magnetic confinement fusion, all take place at high temperatures.

As reported in recent experiments, cold fusion is said to take place by inducing high concentrations of deuterium, a heavy form of hydrogen, into a metallic matrix of palladium or titanium. There is then claimed to be an accompanying large release of heat energy in certain experiments and radiation in other experiments.

My prepared statement on this subject is brief, as much remains unknown. Indeed, in the time that has elapsed since March 23, 1989, the day that Drs. Pons and Fleischmann, both of the University of Utah, announced their experimental observations, research activities have been undertaken in laboratories around the world to confirm all or parts of these claims, yet no clear technical consensus has emerged.

Some laboratories have claimed confirmation, for example, only to withdraw their claims days later. On the other hand, the lack of understanding concerning the possibilities of this intriguing phenomena requires us to pursue it. As of this date we are not able to definitely confirm or rule out a new energy source.

The Department of Energy's position on these developments is to pursue actively the technical avenues opened up by the cold fusion experiments. We need to be cautious, however, because the history of science is littered with enthusiastic claims of technical breakthroughs which later prove to be unconfirmable. Even so, it is important to keeep an open mind on these claims because, if proven to be even partly true, a new field of scientific endeavor will have been discovered with potentially profound energy benefits for society.

Accordingly, the Department through its Laboratories is vigorously investigating the reported phenomena. The Department and its National Laboratories have many of the special facilities, scientific instruments, and human resources which can help test these claims and, if proven true, can help elucidate the underlying physical phenomena. Once the phenomena are found to be true, the Department will undertake the next phase of our plan, namely to undertake specific research and development aimed at optimizing and quantitatively understanding the process.

I have directed our Laboratories to intensify their research efforts and to undertake whatever experiments are necessary to replicate the various claims regarding cold fusion and to test the important elements of prevailing theories which might explain the observations. In addition, the Department's researchers are actively participating in the day to day developments as reported both in the press and among the members of the scientific community.

The Department has formed an ad-hoc committee of its technical staff to review these developments and keep the Department's management and the

Secretary appraised. We support and encourage the research activities initiated and now underway at nearly all the Department's National Laboratories and associated university laboratories. Moreover, the Department continues to support the research on cold fusion at Brigham Young University and stands ready to consider proposals from other groups and provide support as circumstances warrant.

We have also formed an interlaboratory coordinating group, with key members representing each of 10 Laboratories. A meeting with all Laboratories represented was held on April 19, 1989, to discuss the important technical questions in cold fusion. The numerous experiments ongoing at the Laboratories were described and a useful exchange of information took place. Priorities were agreed upon as to what aspects of the phenomena should be resolved first.

Since the ability to exchange information among scientists is now at a crucial juncture, the Department is planning a working-level workshop on cold fusion phenomena. The workshop is scheduled for May 23-25, 1989, in Santa Fe, New Mexico. It is expected to attract leading workers in the field and will be aimed at clarifying the known and unknown aspects of the issue.

In assessing the potential for this concept, I have requested of the Secretary that he work with the Chairman of Department's Energy Research Advisory Board to make use of the unique contributions that can be made by their outside experts. The Board will be asked to set up a panel to review the technical evidence available and provide expert advice on the research needs in cold fusion.

Finally, we shall factor cold fusion related developments into our FY 1991 budget process. If warranted, we shall also take appropriate measures to support related research within the FY 1989 and FY 1990 budgets.

In sum, the Department is actively pursuing the validation of experimental claims and is keeping an open mind as to what the process of scientific discovery will reveal. The prospect of achieving a new energy source is both tantalizing and compelling. The Department will continue to follow these developments with great interest, with an eye toward their implications for future energy technologies.

Mr. Chairman and Members of the Subcommittee, this concludes my prepared remarks. I would be pleased to answer any questions you might have. Thank you.