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November 15, 1973



SECY-74-217

INFORMATION REPORT

SUMMARY SHEET

Subject: NOVEMBER 9, 1973, PRESENTATION TO GOVERNOR LOVE BY KMS-TEXAS GAS-BURMAH OIL

Purpose: To inform the Commission of this presentation.

Discussion: On Friday, November 9, 1973, Professor Keeve Siegel and Dr. Henry Gomberg of KMS Fusion, Incorporated, Mr. Bill Elmer, Chairman and Chief Executive Officer, Texas Gas Transmission Corporation, and Mr. Max Roberts, President, Burmah Oil, Incorporated, met with Dr. William McCormick of Governor Love's staff to make a presentation relative to a novel approach they have been studying in the laser-fusion area. Following their presentation to Dr. McCormick, they made a similar presentation to Governor Love. AEC representatives were invited to both sessions. (Attendees at the two meetings are shown in Enclosure I.)

We are arranging a similar presentation for the Commission by KMS now scheduled for the afternoon of November 20. This paper is intended to briefly inform you in advance of the expected content of this presentation and to raise some considerations relating to the KMS proposal.

The industry representatives stated reason for the presentation was not to request funding for their program, but to inform those responsible for the Nation's energy program of a promising approach to fusion power. They proposed that account be taken of their concepts and that this Nation's laser-fusion program be reoriented such that Government support is provided to their approach.

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The new twist that they have proposed and for which they have filed appropriate patent applications is a method for producing hydrogen through use of the laser-fusion process. The hydrogen is then supplied directly to industrial users or converted to methane and added to natural gas lines. They claim that hydrogen and methane energy can be produced in this manner in a significantly shorter time and at a lower cost, with simpler engineering solutions, than would be required to build laser-fusion electric generating stations. They are prepared to propose a seven-year program leading to a laser-fusion gas pilot plant of 200 megawatts in being by June 30, 1979, a 250 megawatt electric plant by January 1, 1983, and a 100,000 megawatt gas plant producing four billion cubic feet/day by 1985.

Governor Love expressed an interest in the proposal and asked Dr. McCormick for an evaluation. Dr. McCormick may utilize a White House panel to evaluate the KMS-Texas Gas-Burmah Oil proposal.

A copy of a brief of the presentation as prepared by Professor Siegel is enclosed (Enclosure II).

This KMSF proposal raises several areas for consideration by the Commission.

The key to this program is the successful achievement of laser-fusion in order to provide the required energy to separate hydrogen from oxygen. This in turn involves the development of efficient high energy lasers such as the gas lasers now under development in our laboratories. KMS has listed this and several other areas in Enclosure II where they believe that their efforts should be supported by a cooperative arrangement with AEC.

We believe that the AEC should immediately evaluate the basic scientific merits of this approach. We are initiating steps to form a high level independent AEC panel for this purpose.

On the assumption that the panel concluded such an approach is worth pursuing, we should begin giving consideration to the kind of cooperative Government/Industry arrangements that would be appropriate both for KMS and other industrial and university participants in the laser-fusion area. Our initial reaction is that the gas production features of this proposal do not raise the kind of patent and proprietary data problems that we faced in the original KMSF effort aimed at an electrical generating plant. There would, of course, still be the question of how results of any achievements would be shared between AEC and the industrial participants.


General Manager

Enclosures:

1. List of Attendees
2. Presentation

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Information Services	2
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ENCLOSURE I

ATTENDEES

November 9, 1973, Presentation to
the Energy Policy Office, The White House

Meeting No. 1

Dr. William McCormick, Energy Policy Office
Mr. Gordon Moe, National Security Council
Mr. Fred Schuldt, Office of Management and Budget
Professor Keeve Siegel, KMS Industries, Incorporated
Dr. Henry A. Gomberg, KMS Fusion, Incorporated
Mr. Bill Elmer, Texas Gas Transmission Corporation
Mr. Max Roberts, Burmah Oil, Incorporated
Mr. Edward B. Giller, AEC
Mr. J. Pender, AEC
Mr. V. Hudgins, AEC
Dr. C. Gilbert, AEC

Meeting No. 2

Governor John A. Love, Energy Policy Office
Mr. Charles DiBona, Energy Policy Office
Professor Keeve Siegel, KMS Industries, Incorporated
Dr. Henry A. Gomberg, KMS Fusion, Incorporated
Mr. Bill Elmer, Texas Gas Transmission Corporation
Mr. Max Roberts, Burmah Oil, Incorporated
Mr. Edward B. Giller, AEC

ENCLOSURE II

NOVEMBER 9, 1973 PRESENTATION TO
THE HONORABLE GOVERNOR JOHN A. LOVE
DIRECTOR OF THE ENERGY POLICY OFFICE, WHITE HOUSE

Commercial Laser-Fusion Reactors as a Possible
Solution to the Energy Crisis by 1985

by
Keeve M. Siegel*

KMS Fusion has conducted an extensive research program for the past 4 years working toward the development of a commercial laser-fusion reactor. In connection therewith, Texas Gas Transmission Corporation (Texas Gas) has conducted, through KMS research, work for the production of hydrogen and methane associated with the laser-fusion program. Both programs are progressing on schedule and definitive experiments planned for December 1973 and early 1974 should, in our opinion, prove the feasibility of both phases of the program. To date, the programs have been adequately financed with private capital and are on schedule. In our opinion, the conclusion of these programs should result in a very important contribution to the future energy requirements of our country.

In view of the President's urgent desire of accelerating all research programs connected with our country becoming self-sufficient in energy, we have come today to discuss with you the possible coordination of the programs being carried on by KMS Fusion and Texas Gas with any potential national effort.

Starting with laser-driven fusion, our work to date leads us to the conclusion that hydrogen and methane energy can be produced in a shorter time and at a lower cost with simpler engineering solutions than would be required to build laser-fusion electric generating stations. This is particularly important since approximately one-third of the primary energy supply of our country comes from natural gas. A major laser-driven fusion plant or plants producing hydrogen and methane is planned for construction on the Gulf Coast,

*Chairman, KMS Industries, Inc. and KMS Fusion, Inc.

the starting area of most of the major pipelines now transporting natural gas. The laser-fusion produced hydrogen or methane could be intermingled with the natural gas or certain of the pipelines could be converted to transport pure hydrogen.

The reasons for favoring gas over electricity are straightforward once our inventions are understood. We have found a simple way to use the neutrons and other radiation from the laser-fusion reaction directly for hydrogen generation instead of transforming all the energy to heat first. Engineering solutions favor gas because certain protective measures can be used both inside and outside the reaction chamber when one is producing gas, thereby avoiding major material problems. Also for the same amount of energy output there is a lower capital cost for a gas pilot and production plant than for their electrical counterparts. This arises partially from the inherent lower capital costs in chemical plants compared to electrical plants. Another reason is the much higher efficiency of the gas plant we are designing than that of a corresponding electric plant.

Solving the gas generation problem will also help with the design problems of an electric plant. It is our belief that two and a half years after a gas pilot plant is completed, an electric pilot plant could also be completed. This is based on the time gained by utilizing the gas pilot plant in addition to its primary purpose as a high-flux test facility for materials for the electric plant.

We are prepared to propose in detail, a seven-year program which will have in being by June 30, 1979, a gas pilot plant of 200 megawatts, (thermal) producing 8.68 million cu ft/day of high BTU gas (methane) and delivering that methane to the pipelines of Texas Gas. By January 1, 1981, according to the program, the engineering drawings for a 250 megawatt laser-fusion electric plant would be completed. Construction of such a pilot plant could be completed by January 1, 1983.

The seven-year program would include a) satisfactory operation of a gas pilot plant, producing gas and serving also as a high-flux test facility to get engineering answers for the electric plant, b) completion of the electric

~~plant engineering drawings and c) plans for 100,000 megawatts (thermal)~~
~~4.34 billion cubic feet/day capacity in one plant or multiple plants for pro-~~
~~duction of hydrogen-based fuel.~~ With proper governmental priorities, we be-
lieve the construction could be completed and those additional plants on line
~~producing hydrogen and methane by 1985.~~

In short, we visualize a national program being put together by your
office, in which KMS Fusion and Texas Gas, working cooperatively with the
Government, would complete its seven-year proposal by January 1, 1981.

This program will accelerate and insure the development of a laser-
fusion prototype for gas production.

Texas Gas foresees this source of gas as an ultimate solution to
meeting the needs of its customers; to owning an interest in full-scale produc-
tion facilities; and licensing its patent rights at reasonable rates to others.

The pilot plant, after being fully utilized for its purpose, will be
used by KMSF as a test facility for tritium breeding.

In its contract with the AEC, KMS Fusion has already undertaken to
license others on a reasonable basis. Should the national interest require that
our current laser-fusion reactor program for gas production be telescoped in
time and simultaneously broadened in scope to accelerate energy production,
KMS Fusion is willing to guarantee that the corporation will observe the policies
and practices that will preserve competition in the procurement of equipment
and services, will see that the public is assured that it can acquire ownership
in KMS Fusion directly and will see that fifty percent of KMS Fusion stock can
be acquired by energy companies and energy equipment supply companies.

The national program could encompass the following additional major
contributions :

1. The U.S. AEC would make all the tritium required through 1985
by the program, as the initial gas plant we envisage would not be a tritium
breeder.

2. The U. S. AEC, through presumably Los Alamos, could carry on major research programs on the CO₂ laser, particularly to "frequency multiply" those lasers and have the equipment which will operate at adequate pulse repetition rates. This will provide either primary or back-up lasers for the pilot plants, both gas and electric and prototypes of production lasers.

3. Lawrence Livermore Laboratory could design gas lasers and other lasers of high energy and high efficiency with high repetition rates again to obtain either primary or back-up laser systems for the pilot plant involved and prototypes of production lasers.

4. The Argonne National Laboratories could assist on materials and engineering programs for the electric plant and recommend experiments for the high-flux test facility, which function the gas pilot plant would serve in parallel with its other duties.

5. We would also like the support of the Department of Defense in developing for primary or back-up use, high energy lasers for the pilot plants and production plants being considered.

6. We would like assistance in the form of tests to be performed at Oak Ridge, Livermore, or Los Alamos, designed to test the validity of the KMSF thesis that pellets suitable for fusion reactors operating in gas or electric plants of the type proposed by KMSF will not lead to proliferation of nuclear weapons information.

7. We would like to cooperate with the U. S. AEC in setting up a new set of licensing and safety provisions for the operation of gas and electric plants based on the laser-fusion process. It is clear that fusion reactors would create far fewer problems than fission but we feel that the licensing and safety provisions should be tackled anew for these new type reactors rather than come by amendment to existing rules and regulations.

.....

Private enterprise could not avail itself, in any significant way, of the capacity of the national laboratories for solving problems related to laser-fusion generation of hydrogen-based fuel, except through a national program such as we propose.

The national energy crisis demands an expanded program with simultaneous pursuit of alternate and parallel solutions to technical problems. On that basis, we can meet the announced goal of our Government to achieve total self-sufficiency as symbolized by "Project Independence." It would be appropriate for the U. S. Government to supply the additional risk capital required for the expanded parallel approach necessary to meet this national objective.

This information has not been presented to the Government before and, as pointed out above, is owned by KMS Fusion and Texas Gas. It would have been better had we waited until early in 1974, when we should complete our programs now in progress, to discuss this with you, but we felt that because of the urgent energy problems our country faces, we should acquaint you with our programs and our suggestions for accelerating those programs.

We would be happy to work with you, or anyone you designate, in accelerating our commercial laser-fusion reactor and related hydrogen-methane programs.