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POST OFFICE BOX 2008, OAK RIDGE, TENNESSEE 37831-6285

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FOREIGN TRIP REPORT
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DATE: November 20, 1990

SUBJECT: Report of Foreign Travel of Martin A. Broders, Group Leader, Efficiency and Renewables Research Section, Energy Division.

TO: Alvin W. Trivelpiece

FROM: Martin A. Broders

PURPOSE: To participate in the activities of the International Energy Agency Heat Pump Center (IEA-HPC) second Working Team meeting.

SITES VISITED: 11/14/90 NOVEM, Sittard, The Netherlands. Principal Contact: Jos Bouma, General Manager of the Heat Pump Center.

11/15-16/90 Kasteel Elsloo, Elsloo, The Netherlands. Principal Contact: Jos Bouma, General Manager of the Heat Pump Center.

ABSTRACT: The traveler, serving as Delegate from the United States Heat Pump Center National Team, participated in the activities of the second IEA-HPC Working Team meeting. This included a 20 minute presentation by the traveler about the "Development and Activities of the IEA Heat Pump Center U.S. National Team." Highlights of this meeting included development of 1991 IEA-HPC work plans including a prioritization of activities, introduction of the newly appointed IEA-HPC Advisory Board, and discussion of a new IEA Clearinghouse Network initiative. Pre-meeting discussions were held with IEA-HPC staff members which focused on U.S. Heat Pump Center National Team contributions to the IEA-HPC Newsletter and participation in other IEA-HPC sponsored activities.

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BACKGROUND

The United States is one of eight member countries that participate in the activities of the IEA-HPC, a center which has as its basic objectives: the transference of heat pump technology amongst member nations, and the promotion of energy efficient heat pump applications worldwide. The Netherlands Agency for Energy and The Environment (NOVEM) located in Sittard, The Netherlands, is both headquarters and operating agent for IEA-HPC.

United States participation is sponsored and funded by the U.S. Department of Energy, Office of Building Technologies (DOE:OBT), Building Equipment Division; and is represented on the IEA-HPC Executive Committee by John D. Ryan. The Oak Ridge National Laboratory serves as the lead laboratory, providing direct technical support to DOE:OBT for IEA-HPC activities. The traveler, representing the U.S. Heat Pump Center National Team, serves as Delegate to the IEA-HPC Working Team.

SUMMARY OF ACTIVITIES

On Wednesday, November 14, the traveler participated in pre-Working Team meeting discussions with IEA-HPC staff members at NOVEM, headquarters for the IEA-HPC. The following highlights emerged out of these in-depth discussions:

- The December 1990 (Volume 8, No. 4) issue of the IEA-HPC Newsletter will include three articles from the United States.
 - "260°C Absorption Working Pair Ready for Field Test" by Energy Concepts (Howe and Erickson).
 - "The Columbia Gas Double-Effect Absorption Heat Pump" by Columbia Gas (Meacham).
 - "Market Opportunities of Industrial Chemical Heat Pumps in the United States" by DOE:OIT (Scheihing).
- The upcoming IEA-HPC Newsletter (Volume 9, No. 1) to be issued during March 1991, will be on the theme of "Heat Pump Applications in Cold Climates". Thusfar the United States has three candidate articles to be included in this upcoming issue.
 - "The Development of an Advanced Ground Source Heat Pump" by Water Furnace (Ellis).
 - "Commercial Earth Coupled Heat Pump Demonstration in Northern Climates" by The Fleming Group (Fleming).
 - "Sewage Source Heat Pump Systems Installed at a U.S. Army Installation in Alaska" by the U.S. Army (Phetteplace).
- The U. S. pointed out the IEA-HPC Newsletter articles have in the past been predominately technical in nature. The IEA-HPC should seek more balance, focusing on market development and institutional issues as well as technical articles. Furthermore, newsletter

articles should be about newly emerging technologies, concepts and programs and not a repeat of conventional wisdom.

- Paul Scheihing of the U.S.D.O.E. Office of Industrial Technologies will consider co-funding a special study in concert with other IEA-HPC member countries that is concerned with the worldwide application of advanced industrial heat pumps that use non-ozone depleting fluids. The primary mission of this study would be to estimate the energy conservation potential, and reduction of adverse impacts upon our global environment by using these advanced industrial heat pumps on a world-wide basis. This special study proposal was discussed further at the IEA-HPC Working Team meeting and circulated to meeting delegates for an expression of interest.
- IEA-HPC staff members were advised that the article in the April 1990 issue of the IEA-HPC Newsletter about dual fuel heat pumps contained several discrepancies. The IEA-HPC staff will contact Mort Blatt of EPRI and conduct a quality check on this article.

The IEA-HPC second Working Team meeting was held at Kasteel Elsloo in Elsloo, The Netherlands on November 15 and 16, 1990. Martin Broders, representing the U. S. Heat Pump Center National Team, served as the United States Delegate to this meeting. Gerald Groff, President of Marquardt and a member of the IEA-HPC Advisory Board; and Dr. Wayne Reedy, Vice President of Engineering, Nordyne Inc. and a member of the U. S. Heat Pump Center National Team, also participated in the activities of this meeting. The Working Team meeting was attended by seven of the eight IEA-HPC member countries (Austria, Canada, Japan, The Netherlands, Norway, Sweden, and the United States). Representatives from Italy were not able to attend this meeting. Outlined below are highlights of this meeting:

- Jos Bouma, General Manager of the IEA-HPC presented highlights of the Executive Committee meeting held recently in Graz, Austria. At this meeting the 1990 analysis topic "Impact of Heat Pumps on the Greenhouse Effect" was approved as well as two new annexes; i.e., Annex XIX - "Second Law Analyses for Heat Pumps" (Germany), and Annex XX - "Working Fluid Safety" (Belgium). The user club for sorption heat pump systems was also approved at this Executive Committee meeting.
- Jos Bouma also reported that France is applying for IEA membership and will probably become a participating member of CADDET and possibly the IEA-HPC.
- The 1990 analysis on the "Impact of Heat Pumps on the Greenhouse Effect" was discussed in depth. The U. S. stressed that the analysis must be more than a distillation of available information and should include a thorough analysis that attempts to fill in the gaps in the existing technology. Each IEA-HPC member country identified studies planned and underway that could serve as input to this analysis. The U. S. identified the AFEAS/U.S.D.O.E. sponsored "Analysis of the Net Contribution of HCFC's and HFC's to Calculated Global Warming Using a Systems Approach" as a study that could contain useful information in support of this analysis. The 1990 analysis on the "Impact of Heat Pumps on the Greenhouse Effect" is scheduled for completion in the August/September 1991 timeframe. The IEA-HPC reports that completion of this 1990 analysis does not depend upon Italy's funding support.
- A draft proposal for a special task on "The Role and Competitive Strength of Electrical Heat Pumps" has been prepared for submission to the International Power Utility Heat Pump Committee (IPUHPC). The IPUHPC, in concert with the private sector and its utility

membership, will be responsible for coming up with the necessary funding (\$750,000) to implement this special task. The IEA-HPC staff will only serve as a secretariat for this activity. Note: Michael Bell from Ontario Hydro in Canada was elected by the IPUHPC to serve as their representative on this IEA-HPC Advisory Board.

- The IEA-HPC is a new member of the International Institute of Refrigeration (IIR). Note: Professor Fritz Steimle, a member of the IEA-HPC Advisory Board, is the President of the IIR. Jos Bouma, General Manager of the IEA-HPC, is now an associate member of ASHRAE. The ASME Heat Pump Technical Committee is also interested in establishing a cooperative arrangement with the IEA-HPC.
- Jos Bouma, General Manager of the IEA-HPC, represents The Netherlands on the European Community's (EC) Heat Pump Experts Group (EC DG XII). Other member countries include France, Germany, Italy, and the United Kingdom. The primary function of this experts group is to exchange heat pump information within EC countries (supportive of industry). Current activities of this experts group include development of an RD&D project database, and planning for a workshop to be held in Paris on June 11 and 12, 1991.
- Progress on the Strategy Plan for the IEA Implementing Agreement for Advanced Heat Pumps has been delayed. The Chairman of the Executive Committee (Professor Per-Erling Frivik) has been unable to issue a first draft of this Strategy Plan because of extenuating circumstances. Accordingly, the IEA-HPC has taken the initiative to prepare a rough draft of the Strategy Plan and has submitted it to Prof. Frivik for review.
- The next issue of the IEA-HPC Newsletter (Volume 8, No. 4) will be issued on or about December 8, 1990, and will feature articles on absorption heat pumps. It will include three articles from the U. S. (discussed previously), and will be sent to 3,700 subscribers. The various IEA-HPC National Teams report that, in general, the Newsletter is well received in their respective countries. The IEA-HPC staff summarized several problems encountered during the past year including damaged shipments, inadequate copies of early issues to meet National Team needs, an excess of articles for recent issues necessitating an increase in Newsletter size, and lack of input to the "News and Views" section. The U. S. suggested a new "Letters to the Editor" section that would encourage feedback about the IEA-HPC Newsletter. Gerald Groff, the U. S. member of the IEA-HPC Advisory Board suggested a summary tabulation of RD&D projects including an identification of who was performing the work.
- The IEA-HPC work plan for 1991 was discussed in-depth. Suggested lists of candidate IEA-HPC Newsletter topics, workshop themes, and analysis study topics were debated, amended and finally voted upon. The results of these deliberations are as follows:
 - Four Newsletter Topics were selected for 1991/92 (in order of priority)
 1. Member country programs and activities to find replacements for CFC's (including ammonia-based refrigerant systems).
 2. Technical advancements in heat pumps to improve performance and reliability.
 3. Heat pumps combined with thermal storage (heat/cool storage).

4. Effective use of waste heat by heat pumps (residential, commercial and industrial applications).

- Two Workshop Themes were selected for 1991 (in order of priority)

1. CFC replacements. Note: NIST is planning a workshop/short course on this theme which is tentatively scheduled for the fall of 1991 in Europe. A preliminary contact was made with NIST, and IEA-HPC collaboration appears feasible.
2. Comfort control (including inverter driven heat pumps, air distribution, humidity control, etc.).

- One Analysis Study Topic was selected for 1991

1. Domestic hot water heat pumps
Note: The topic "Standards Codes and Regulations" received the next highest vote as an analysis study topic.

- Theo VanRossum, International Liaison Officer for NOVEM, introduced a new IEA Committee on Energy Research and Development initiative to establish a "Clearinghouse Mechanisms and Data Networks on Energy Technologies to Limit Greenhouse Gas Emissions". This clearinghouse network will serve as a central resource for information about greenhouse gas emissions and global climate change. It will also serve as a "gateway" to five existing IEA centers including CADDET and the IEA-HPC. Mr. VanRossum pointed out that progress on this new IEA initiative has been very slow during the past few months, due in part to the untimely death of Mr. Dennis Kearney of the IEA Secretariat.
- The newly appointed IEA-HPC Advisory Board were introduced, and each board member gave a short presentation about their background, experience and major concerns. The IEA-HPC Advisory Board is comprised of the following members:

<u>Member</u>	<u>Country</u>	<u>Affiliation</u>
Mr. Michael Bell	Canada	Ontario Hydro
Mr. Gerald Groff	U. S.	Marquardt
Dr. Moriyashi Sakamoto	Japan	Toshiba Corporation
*Dr. Fritz Steimle	Germany	Univ. of Esseu

*Note: Dr. Fritz Steimle was not able to attend this meeting.

- A delegate from each IEA-HPC National Team represented at this Working Team meeting gave a short presentation about the organization and recent activities of their respective National Teams. In general, National Teams range in size from 5 - 15 members, with the exception of Japan which has a large official and semi-official National Team network. Most National Team delegates expressed a global environmental concern and focus. The traveler, serving as Delegate from the United States Heat Pump Center National Team, gave a 20 minute presentation about the "Development and Activities of the IEA Heat Pump Center U. S. National Team". This presentation highlighted U. S. National Team organization activities, United States contributions to the IEA-HPC Newsletter, and participation in recent IEA-HPC sponsored workshops.

APPENDIX 1 - FULL ITTNERARY

11/11/90	Departed from Knoxville, Tennessee.
11/12/90	Arrived in Sittard, The Netherlands.
11/13/90	Day of Rest, Sittard, The Netherlands.
11/14/90	Participated in in-depth discussions with IEA-HPC staff members at IEA-HPC Headquarters in Sittard, The Netherlands.
11/15/90 to	Participated in the activities of the IEA-HPC Working Team meeting in Elsloo, The Netherlands.
11/16/90	
11/17/90	Departed from Elsloo, The Netherlands, and arrived in Knoxville, Tennessee.

APPENDIX 2 - PERSONS CONTACTED

- **Jos Bouma** General Manager of the IEA Heat Pump
NOVEM
Sittard, The Netherlands
- **Lucinda MacLagan** Chief Editor
IEA-HPC Staff
Sittard, The Netherlands
- **Theo J. VanRossum** International Liaison Officer
NOVEM
Sittard, The Netherlands

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