Center for energy studies

100 WALL, KANSAS STATE UNIVERSITY, MANHATTAN, KS 66506

August 15, 1978

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Washington, DC 20545

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REF: Final Report for Contract EU-78-C-02-4904.A000; Workshop on
"Perspectives in Energy: 1978"

MASTER

Dear Mr. Rauckhorst:

Enclosed please find: (1) a copy of the lecture notes especially prepared for the workshop, (2) two copies of the brochure used to recruit participants, (3) a listing of the participants, (4) a schedule of the daily workshop activities and, (5) the completed workshop questionnaires. A final accounting of the workshop expenditures will be sent to you in the near future.

This year our energy workshop was extended to a ten-day period from July 31 to August 10 to allow for the inclusion of field trips and new energy topics of particular interest to our area of the country. The format of the workshop was one in which a wealth of information was presented to the teacher/participants. Although some educational material on energy was provided the teachers which could be used directly in their classrooms, the purpose of the workshop was aimed at the teachers themselves and was intended to provide them with facts and assessments so as to make them better qualified to discuss various aspects of the energy situation with their students.

From the response of the participants, it is apparent that this summer's workshop was very successful. The workshop staff and I again found the workshop a most rewarding and enjoyable experience. The participants were very eager and concerned about the subject matter of the workshop. There was exceptional rapport this year between the participants and workshop staff as evidenced by several after-hours meetings and commitments to meet during the coming year.

This year we had more inquiries and applications for the workshop than ever before. We received almost two hundred applications from Kansas and the bordering communities. As a result of the national publicity given to the workshop program, we also had about 30 inquiries or applications from states in which no solicitations were made. All of the participants chosen were active high school or junior high school teachers.

In the selection of participants we strove for a mixture of different science teaching areas and as uniform a geographical distribution in Kansas and the border areas as was possible with the limited travel funds available.

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Of the 30 official participants (the maximum number for which support was available), eight were women and two were black.

With the expanded format of this year's workshop, all aspects of the energy situation were covered with emphasis being placed on those facets of most interest to midwest teachers (agricultural energy use, biomass potential, wind energy, and Kansas energy planning). Throughout the workshop we strove to present a complete and balanced overview of most energy-related activities. The topics covered and content of the 27 formal lectures presented are to be found in the notes given to each participant. Besides these formal lectures three tours or field trips were incorporated into the workshop program (a coal-fired power plant, area solar homes, and the KSU reactor). In addition, many group discussions, special tutorial sessions and four guest lecturers were also part of the workshop program.

The bulk of the instruction was conducted by a small workshop staff which was in almost constant attendance throughout the entire program, thereby allowing for a better transition and cohesion between lecture topics and much more interaction between the participants and the staff. Dr. Dean Eckhoff (Director of K-State's Center for Energy Study), Dr. Tom Lester (an expert of fossil fuels and combustion), and I presented the bulk of the workshop program. Mr. John Selfridge, a faculty member of the College of Architecture and a solar house designer, presented the material on solar energy. Dr. James Hamilton, a philosopher, presented a well-received and thought-provoking discussion on legal and moral aspects of determining a national energy policy. Finally, Mr. Ralph Lipper, from the Agricultural Engineering Department, discussed energy use in agriculture, an area of considerable interest to the participants.

This year we were very fortunate to have several excellent outside speakers visit the workshop. Mr. Steven Harris, Head of the Kansas Energy Office, discussed future plans of this State Office and how they would impact Kansans. A representative of Carrier Air Conditioning, Mr. E. Cassing, brought an interface to a talking computer which allowed us to perform energy audits of several of the participant's homes. We also made available to the participants a home energy analysis program written at K-State and which we plan to run for them and their classes in the coming year. Finally, we had as outside speakers two vice-presidents of two Kansas electric power utilities to present to the workshop their views on the national and local energy dilemma. These utility gentlemen went over very well with the workshop group, even though they presented a rather hard line viewpoint.

Because of the longer format used for this year's energy workshop, we were able to include several tours in the workshop schedule. The participants visited three solar homes, ranging from completely passive structures to very advanced active solar homes. A visit was made to a factory which made solar collectors and to a novel farming operation in which solar energy was being used in a combination hog farrowing and grain drying operation. A morning was also spent touring the Jeffrey Energy Center, 40 miles east of Manhattan, in which four 700 MW coal-fired units will eventually be in operation. We chose an excellent summer to visit this site since the first unit has just recently

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gone into operation, and the second unit which is about half constructed allowed the participants to see many features of a coal unit which normally would be hidden (e.g., boiler tubes, insides of the scrubber units, etc.). Finally a tour was made of K-State's TRIGA reactor. The use of these tours were well-received by the participants and served to break up the lecture schedule nicely. More importantly, the tours gave the participants an opportunity to see devices we discussed in the workshop lectures and to gain a better feeling about the magnitude and the physical nature of the energy systems.

From the responses to the questionnaires it is apparent that the participants have gained a great deal of new information and a better understanding of the many complex problems involved with energy production and consumption. All of the participants thought the workshop content and quality of presentations was "excellent" (77%), or "good" (23%) and all would recommend this workshop to a colleague. All but two of the participants thought the quality of the presentations were "excellent" (50%) or "good" (43%). In fact, over one-third of the participants made specific comments about the high quality of the bulk of the workshop program. Almost all the participants stated that they expected to gain new information and a better understanding of the many aspects of the energy situation, and no one felt he/she had failed to achieve his/her objectives (87% feeling their objectives had been achieved and 13% feeling at least partial achievement). I am very sensitive to biased perspectives on many energy questions, and we tried in the workshop to give very balanced assessments. It was gratifying, in light of the many lively discussions that occurred during the workshop, that no participant felt we had given unbalanced presentations on controversial subjects.

Since one of the main objectives of this workshop was to prepare the teacher/participants to incorporate or to discuss at greater length various energy topics in their classrooms, the workshop staff was pleased to see from the questionnaires that this objective will be largely achieved. Eighty-seven percent of the participants indicated they were going to make changes in their courses as a result of the workshop. All of the participants stated that the workshop would have either a "high" (70%) or "medium" (30%) probability of significant long-term benefits in their teaching.

The only negative comments received on the questionnaires were about the solar energy presentation (in which I felt too much time was spent stressing the "soft path" philosophy) and an indication that more breaks or variations in the program were needed. However, the large amount of material which is contained in the workshop necessarily requires somewhat of an intensive approach, and the staff feels that the lengthening of this energy workshop from five to ten days has produced a near ideal framework for a general energy workshop.

For the third hour of university credit, which almost all of the participants elected to take, the participants are to prepare a lesson plan or course outline based on some aspect of the workshop. In this way, we hope to maximize the possibility of the teacher/participants actually using some of the workshop material in their classrooms. We have already received several of these assignments and when we get them all, I would be glad to share them with you if you are interested. From past workshop experiences we have found

that this assignment procedure is effective in encouraging the participants to use the knowledge gained during the workshop.

One of the most successful and well-received aspects of the workshop was the detailed lecture notes given to all participants. The notes were based on last year's notes but were extensively revised and expanded to include the most recent energy data and related information as well as major new sections on agricultural energy use, Kansas energy policy and energy supplies, biomass, and wind energy. The ability to revise quickly and present current data is perhaps the most important feature of using workshop notes instead of several books from the plethora of energy/environment textbooks currently available. By use of these notes it was possible to cover a large amount of material, much more than could be done through a strictly formal lecture format. The participants indicated these notes will be very useful as a reference as well as a means by which they can refresh their memories on the many aspects of energy generation presented in the workshop. As with last year's notes, we expect to receive a large number of requests for them, and consequently we have prepared a nominal number of extra copies. If you would like a few additional copies, please let me know.

As with past workshops, members of the workshop staff have been invited to deliver several talks around the state. Additionally several of the participants indicated that they want to bring some student groups for tours of our reactor facility, for demonstrations of the energy/environment simulator, and for computer analyses of home energy audits. This workshop also fits nicely with a high school education package on energy which has been developed by the Center for Energy Studies with support from local utilities. Under this program, recently renewed for a fourth year, a wide variety of presentations are made ranging from a general energy lecture/demonstration to the entire student body to individual classroom modules on special topics. Additionally, the workshop material is planned to be used in a series of mini (one or two day) workshops held throughout the coming year for high school teachers in the state. Two such mini-workshops were held in Kansas last year and both were great successes. We feel the subject area of the workshop is of vital importance, particularly in the education of high school teachers and their students.

The workshop participants unanimously agreed again this year that the workshop was extremely useful to them and that there was a need for similar workshops for other teachers in the future. There is an obvious need for public education in the many facets of energy production and one of the best manners to achieve this goal, in my opinion, is to acquaint secondary school teachers with the many facts and complex interrelationships involved in the energy dilemma. The Department of Energy is to be commended for their sponsorship of the Faculty Development program.

The staff have found these workshops to be most enjoyable experiences both with regard to the enthusiasm of participants and to the societal benefits accrued from the program. We would be most pleased to participate in future workshops and a proposal for a workshop next summer will be sent to you in the near future. From the enclosed material and the brief discussion of the

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workshop in this letter, I hope you will have the necessary information to evaluate the success of the workshop program. If you require additional information, please call me.

Sincerely,

J. Kenneth Shultis
Black & Veatch Professor
Workshop Director

Enclosures

JKS/sk