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ORNL

FOREIGN TRIP REPORT

ORNL/FTR-3637

DATE: June 11, 1990

SUBJECT: Report of Foreign Travel of R. M. Moon, Head,
Neutron Scattering Section, Solid State Division

TO: Alvin W. Trivelpiece

FROM: R. M. Moon

PURPOSE: To attend meeting of the Steering Committee for the
U.S.-Japan Cooperative Program on Neutron Scattering
and to discuss participation in the design of the Advanced
Neutron Source (ANS) with representatives of the Japan
Atomic Energy Research Institute (JAERI).

SITES VISITED:	05/22/90	JAERI Headquarters, Tokyo, Japan	M. Iizumi
	5/23-25/90	JAERI, Tokai, Japan	S. Funahashi

ABSTRACT: The traveler participated in a meeting on May 22, 1990, at
JAERI Headquarters, Tokyo, Japan, to discuss methods of
arranging for JAERI participation in the design of the
ANS. On May 23, 1990, while at the Tokai Research
Establishment, Tokai, Japan, he toured the new JRR-3
reactor and attended the Steering Committee Meeting at
which plans and budgets for the U.S.-Japan Cooperative
Program on Neutron Scattering were discussed and
approved.

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MEETING ON THE ADVANCED NEUTRON SOURCE
JAPAN ATOMIC ENERGY RESEARCH INSTITUTE HEADQUARTERS
TOKYO, JAPAN

A meeting was held at the Japan Atomic Energy Research Institute (JAERI) Headquarters in Tokyo on May 22 to discuss methods of implementing a collaboration with JAERI on the Advanced Neutron Source (ANS) design. Attendees representing JAERI were M. Iizumi, Head of Office of Planning; S. Matsuura, Deputy Director General, Tokai Research Establishment; N. Shikazono, Deputy Director General, Tokai Research Establishment; E. Shirai, Deputy Director, Department of Research Reactor Operation; A. Kohsaka, Office of Planning; and M. Tanaka, Office of International Affairs. Attendees representing the U.S. were D. K. Stevens, I. L. Thomas, and R. M. Moon.

Iizumi noted that there were three groups in Japan with interest in the ANS: JAERI, university people led by T. Shibata, and potential users (neutron scattering community). He stated that Shibata has given up in his individual effort and has asked JAERI to take over the collaboration.

Stevens suggested that the collaboration be accomplished by expanding the U.S.-Japan Cooperative Program on Neutron Scattering. Iizumi countered with the suggestion of an exchange of letters between ORNL and JAERI. Such an arrangement would call for an exchange of people and ideas but no transfer of funds. The Japanese had prepared a draft letter and an outline of specific areas of cooperation. They also supplied a copy of a letter of agreement with Argonne National Laboratory which might serve as a model. The intent is to provide a means for some JAERI people to come here (supported by JAERI), some work to be done at JAERI, and some ORNL people to go to JAERI, if desirable (supported by ORNL). One particularly interesting item is that JAERI supplies free computer time to their staff.

There was general agreement that it is desirable to start this collaboration as quickly and simply as possible. A possible JAERI contribution toward construction was not discussed, other than to note that any transfer of funds would require a more formal agreement.

Stevens stated that the U.S. did not want to create a situation where the university people in Japan would feel they had been cut out of the project.

Iizumi suggested that a future development might be the formation of a Japanese domestic committee involving both JAERI and university people.

An unresolved issue was the level at which the exchange of letters should take place. I believe they would create a project leader on their side if we wanted the exchange at that level. Other possibilities would be at the Laboratory Director level or the Associate Laboratory Director level.

E. Shirai announced that he will attend the National Steering Committee for the Advanced Neutron Source (NSCANS) meeting on June 25 and will visit both DOE and ORNL during that trip to discuss details of the proposed collaboration.

This topic was also discussed at the meeting of the Steering Committee of the U.S.-Japan Cooperative Program on Neutron Scattering held at Tokai on May 24. The Steering Committee endorsed the idea of JAERI-ORNL collaboration on the ANS but felt that an expansion of the neutron scattering agreement was not the appropriate method.

TOUR OF JRR-3 REACTOR TOKAI RESEARCH ESTABLISHMENT TOKAI, JAPAN

On May 23, 1990, accompanied by N. Onishi, General Manager of the Research Reactor Development Division, and Y. Morii of the Neutron Scattering Group, Stevens, Thomas, and I enjoyed a tour of the JRR-3 reactor.

Construction of this reactor began in 1985 with a total cost to date of about \$200M. It is on the site of the old JRR-3 reactor; only the containment building has been retained from the old installation. The old reactor was removed and is now in the basement of a new guide hall adjacent to the reactor building. The new JRR-3 is a 20-MW reactor, light water cooled with a heavy water reflector and a peak thermal flux of 2×10^{14} n cm⁻²s⁻¹. The fuel is 20% enriched UAl in MTR-plate-type fuel elements. There is a liquid hydrogen cold source feeding three curved neutron guides of 12 × 2 cm² cross section delivering neutrons to the guide hall, which is 30 × 50 m². In addition, there are two curved thermal guides of 2 × 20 cm² cross section delivering neutrons to the guide hall. Seven horizontal beam tubes deliver neutrons to the experimental hall in the reactor building. Granite floors

have been installed in the reactor hall and the guide hall to accommodate air cushion instruments. The guides were manufactured in Japan using natural nickel as the reflecting surface. The installation looks very similar to that at the Orphée reactor in France.

The plan is to install 25 neutron beam instruments, some belonging to JAERI and some to various universities. Only a few of these instruments are now in place. There is a current dispute over beam charges to be levied against the university instruments.

There is a spacious control room with a console featuring a number of video displays of the current status of reactor systems. The computer system used in reactor control is duplicated as a safety measure.

The reactor went critical on schedule in March 1990, and they seem to be on track to meet the planned ascension to full power in November 1990. It is a most impressive facility and will be a major addition to the worldwide capability in neutron scattering.

MEETING OF THE JOINT STEERING COMMITTEES
U.S.-JAPAN COOPERATIVE PROGRAM ON NEUTRON SCATTERING
TOKAI RESEARCH ESTABLISHMENT
TOKAI, JAPAN

This was the annual joint meeting of the DOE-JAERI and DOE-Institute of Solid State Physics (ISSP), University of Tokyo, Steering Committees. The U.S. member on both committees is D. K. Stevens. The JAERI member is N. Shikazono, Deputy Director General, Tokai Research Establishment, and the ISSP member is Y. Yamada, Professor of Physics. Also in attendance as observers were I. L. Thomas, Division of Materials Sciences, DOE; J. D. Axe, Brookhaven National Laboratory; R. M. Moon, Oak Ridge National Laboratory; Y. Endoh, Tohoku University; S. Funahashi, JAERI Tokai; and Y. Morii, JAERI Tokai.

The activities and budgets for the Japanese fiscal year (JFY) 1989 were reviewed, and the plans for JFY 1990 were approved. Preliminary budgets for JFY 1991 were presented. I had the pleasure of reporting 85 MW operation of the High Flux Isotope Reactor (HFIR) beginning on May 18, 1990. This made the outlook for the U.S.-Japan program considerably brighter than a year ago,

when both the HFIR and the High Flux Beam Reactor (HFBR) were out of operation. Axe reported that the current estimate for restart of the HFBR is November 1, 1990.

There was general agreement that future projects should include development of new instrumentation concepts as well as research using existing instrumentation. All sides agreed that the U.S.-Japan program has been very productive and should be continued.

The next meeting of the Steering Committees was scheduled for May 1991 at Oak Ridge.

CONCLUSIONS

The collaboration with the Japanese in neutron scattering has been very beneficial to both sides. New instruments and new auxiliary equipment have been acquired, and these facilities have been put to good use in a productive research program. The proposed collaboration on the ANS design should enhance the resources available for this project at no cost to DOE. This collaboration may ultimately lead to a significant investment by the Japanese in the ANS facility.

A. ITINERARY

B. LITERATURE ACQUIRED DURING FOREIGN TRAVEL

APPENDIX A

ITINERARY

Dates	Location	Individuals Contacted	Subject of Discussion
05/20-21/90	Travel en route from Oak Ridge, Tennessee, to Tokyo, Japan, via plane		
05/22/90	JAERI Headquarters, Tokyo, Japan	M. Iizumi S. Matsuura	JAERI participation in ANS design
05/23-25/90	JAERI, Tokai, Japan	S. Funahashi Y. Morii	U.S.-Japan Cooperative Program on Neutron Scattering
05/26/90	Travel en route from Tokyo, Japan, to Oak Ridge, Tennessee, via plane		

APPENDIX B

LITERATURE ACQUIRED DURING FOREIGN TRAVEL

1. Draft agreement on ORNL-JAERI Cooperation on the ANS Project.
2. Brochure, *New JRR-3*.
3. Y. Morii, "Status of the New JRR-3 at JAERI," *Neutron News*, 1 (2), 14 (1990).
4. Minutes of the Joint Meeting of the DOE/ISSP and DOE/JAERI Steering Committees, U. S.-Japan Cooperative Program on Neutron Scattering, Tokai, Japan, May 24-25. 1990.
5. Annual Report of the Steering Committee to the DOE and the ISSP.
6. Annual Report of the Steering Committee to the DOE and the JAERI.