

IAEA/82-6



International Atomic Energy Agency

IWGFR/82

---

24th ANNUAL MEETING

OF THE

INTERNATIONAL WORKING GROUP ON FAST REACTORS

TSURUGA, JAPAN,

15 - 18 APRIL 1991

SUMMARY REPORT

MAY 1991

1. Introduction

The 24th Annual Meeting of the IAEA International Working Group on Fast Reactors was held at the Atom Plaza of Power Reactor and Nuclear Fuel Development Corporation, Tsuruga, Japan on 15-18 April 1991.

The meeting was attended by the members and some alternate members of the group from the IWGFR Member States - France, Germany, Italy, Japan, the Union of Soviet Socialist Republics, the United Kingdom, the United States of America, as well as by one observer from China. The Commission of the European Communities also was represented at the meeting. A list of participants is given in attachment I. The OECD and Brazil did not send observers.

Mr. Wydler from Switzerland, Mr. Paranjpe from India, Mr. Gho from Argentina and representative of CSFR were unable to attend the meeting.

The meeting was opened by Mr. Iwabuchi, Deputy Director of Power Reactor Development Division in Science and Technology Agency and the welcome speech was given by Mr. J. Kupitz, Head of Nuclear Power Technology Development Section of IAEA. The meeting was chaired by Mr. Horton from USA.

2. Introduction of IWGFR Members and Observers

Mr. Arkhipov informed the IWGFR about changes in its membership.

Mr. H. Taniyama was nominated by Japan to participate in this meeting as a member from Japan, and Mr. Matsuno as an observer.

3. Approval of the Agenda

The agenda of the meeting (attachment II) was approved by the participants.

Mr. Marth expressed the opinion that all members of the IWGFR should provide the status of their national LMFBR Programmes to the IWGFR Annual Meeting even if they do not attend. The IWGFR agreed with this and expressed the view that in case of absence for some reason from the IWGFR meeting, national papers should be sent in advance to the Scientific Secretary of IWGFR for distribution at the IWGFR meeting and for publication in the IWGFR Proceedings. The IWGFR asked the Scientific Secretary and Mr. Taniyama to contact to Mr. Bhoje with request to provide a short information on the Indian FBR Programme by 17-04-91.

4. Approval of the Minutes of the 23rd IWGFR Meeting

Approval of the minutes of the 23rd IWGFR meeting was confirmed. The members expressed the view that the last sentence of item 9 represents more correctly the IWGFR's opinion on the proposed TC on DSR for FBR.

5. Review of the IWGFR activities

A review of the IWGFR activities for the period since the 23rd Annual Meeting of the IWGFR had been distributed in advance to the members of the group. The Scientific Secretary reported some changes which had taken place after the distribution of the document.

Presentations and discussions were based on working documents, which had been distributed in advance to the participants.

6. Presentation on the national positions in nuclear energy

Short presentations were made on the national positions in nuclear energy and, in particular, on fast reactors in member and observer countries.

7. Consideration of conferences on fast breeder reactors

- a) "International Conference on Fast Reactors and Related Fuel Cycles", Kyoto, Japan, October 28 - November 1, 1991.

Mr. Taniyama gave information on preparations for this conference. (IWGFR members had represented their countries at a meeting of the International Steering Committee held in O-arai on 11-12 April.)

- b) "Liquid Metal Reactor Fuels for Reliable Energy", Idaho Falls, Idaho, USA, September 13-17, 1992.

Mr. Horton provided some information and distributed a preliminary programme of the conference.

- c) Other meetings of interest to IWGFR members

Mr. Kupitz gave some information on five forthcoming conferences.

- Senior Expert Symposium on Electricity and the Environment to be held by IAEA in May 1991 in Helsinki.
- Small and Medium-sized Nuclear Reactors (post-SMIRT seminar) to be held in August 1991 in India.
- IAEA International Conference on the Safety of Nuclear Power to be held in September 1991 in Vienna.
- International Conference on Design and Safety of Advanced Nuclear Power Plants (ANP'92) to be held in October 1992 in Japan.
- IAEA Symposium on Advanced Nuclear Reactor Design and Safety to be held in 1993 in Vienna.

8. Consideration of recommendations for Specialists' Meetings in 1991:

- a) Mechanical Properties of Structural Materials in Liquid Metal Environments, Karlsruhe, Germany, 18-20 June, 1991.

The Scientific Secretary reported the status of preparations for this meeting. An official agreement of Germany to host the meeting has been received by the IAEA and official invitation letters to the Member States were sent on 21 February 1991. The deadline for nomination of participants was 1 April 1991. The Scientific Secretary informed the meeting that no nominations have reached the Agency yet. He asked all members of the IWGFR to undertake appropriate steps to speed-up nominations and distribute copies of the IAEA invitation letter and information sheet of the meeting.

Mr. Marth on behalf of Mr. Heusener also asked members of the group to undertake efforts to nominate participants as soon as possible.

The Scientific Secretary was asked to inform the representative of India to the IWGFR on the importance of Indian participation in this meeting.

- b) Inherent Safety Features of LMFBR to be held on 5-7 November 1991 in Oarai Engineering Center, Japan.

The Scientific Secretary informed the IWGFR that in accordance with ongoing activities in the IAEA on Harmonization in the Use of Safety Related Terms, the IWGFR was requested to change the title of the meeting to "Passive and Active Safety Features of LMFBRs" and to amend the programme of the meeting accordingly. The request was based on "Description of Safety Related Terms for Advanced Nuclear Plants" established by Consultants Group in Vienna on 3-6 December 1990.

The Chairman of the meeting, Mr. Okabayashi of Japan, has accepted the title change and proposed also to use the term LMFRs instead of LMFBRs. The new title is now approved by the IAEA. The IAEA official letter on host agreement has been sent to Japan recently.

Mr. Taniyama distributed an updated programme of the meeting and informed the IWGFR that Mr. Yamashita will be a Chairman of the meeting. Participants recommended that the programme should list topics of the meeting rather than strict session arrangements. This would give participants of the meeting more flexibility in preparation of their presentations.

9. Selection of topics for Specialists Meetings to be held in 1992

Participants have agreed that two Specialists Meetings should be held in 1992. As a result of voting, it was recommended that the IAEA should organize the following Specialists Meeting, in 1992.

- Seismic Isolation Technology, USA, April-May, 1992

The group agreed with Mr. Kupitz proposal to enlarge the scope of the meeting on Seismic Isolation to include Thermal Reactors.

- The Use of Fast Breeder Reactors for Actinide Transmutation, USSR, September-October, 1992.

France expressed the willingness to host this meeting in case the USSR can not hold it.

Dates and place of the meeting will be later agreed upon.

The Scientific Secretary noted the request of participants that each version of the list of topics should be dated to avoid confusion.

10. Consideration of joint research activities:

- a) Co-ordinated Research Programme on Acoustic Signal Processing for the Detection of Boiling or Sodium/Water Reactions in LMFBRs.

The Scientific Secretary informed the members that at the first Research Co-ordination Meeting of this CRP held in Vienna on 20-22 November 1990 participants welcomed a suggestion received from India following a recommendation of the SM on ALD held in Aix-en-Provence in October 1990. The suggestion was made to extend the scope of the CRP to include the following topic: "Background Noise in SGUs - comparison of results from different countries with special attention to measurement and in-site calibration systems". The RCM recommends this extension to the IAEA.

Delegates of the CRP were asked to approach their own national organisations for suitable data. It was recognized that involvement of the French organisations would greatly contribute to the overall success of the the project.

It was agreed that the work of the CRP would be aided if the next RCM could be held at the laboratory of one of the participating countries. The UK representative accordingly offered the facilities of AEA Technology at Risley, UK. Mr. Bramman confirmed the willingness of UK to host the RCM in September.

The second set of data prepared by AEA Technology, Risley, was distributed by IAEA in February 1991.

The members of IWGFR agreed to inform the Scientific Secretary on the possibility of providing data on SGU Background Noise by June 1991.

b) The Co-ordinated Research Programme on "Intercomparison of LMFBR Seismic Analysis Codes"

The Scientific Secretary informed the IWGFR that the consultancy on Intercomparison of LMFBR Seismic Analysis Codes was held in Vienna on 16-18 October 1990.

The purpose of the meeting was to establish the CRP and to define and agree upon the scope and time table.

It was agreed that each participant might concentrate his efforts at least in one particular topic while taking a broad interest in all.

Italy, France and Japan proposed to provide data from experiments.

The proposed time schedule is the following:

- Supply of data from Japan is expected in May 1991
- The first RCM in October-November 1991

The participants pointed out the potential benefit if some RCMs could be held at organizations where tests providing data for the CRP have been carried out. The first RCM is expected to be held in Bergamo, Italy on 19-21 November 1991.

The CRP has been approved by the IAEA and "Request for Research Agreement" forms have been distributed.

Participation from France, India, Italy, Japan and the USSR in the CRP are expected. Participation of the USA, United Kingdom and Germany would be very much welcomed by all participants. Up to now the IAEA received a "Request for Research Agreement" from USSR only. Japan agreed to interpret the European data.

The IWGFR members agreed to inform the scientific secretary on participants from their countries in May 1991.

11. Presentations and discussions on national programmes on fast breeder reactors

Presentation on national programmes and LMFBR developments were made by the Members of the Group, as well as by the observer from China and representative of the CEC. Presentations were followed by lively discussions.

12. Consideration of recommendations of some of the IWGFR Specialists Meetings on topics for future meetings

Recommendations made in previous Specialists Meetings were noted. A list of recommendations of IWGFR Specialists Meetings 1981-1990 was discussed.

13. Information on Joint Papers for International Conferences

With regard to BNES International Conference on Fast Reactor Core and Fuel Structure Behaviour, Inverness, United Kingdom, 4-6 June 1990 Mr. Arkhipov informed the members that a joint paper on the results of the CRP on Intercomparison of LMFBR Core Mechanics Codes has been presented to this conference and had been well received; there were also individual papers presented by the CRP participants.

14. Updating of 'LMFBR Plant Parameters'

The Scientific Secretary reported to the Members of the Group that "LMFBR Plant Parameters 1991" has been published in April as IWGFR/80 document and distributed by the IAEA. More than 400 changes and additions have been incorporated in the document.

Mr. Rinevsky expressed his concern that there are still many omissions in "Plant Parameters 1991" for reactors which have been built and are operating.

He considered that all members should at least fill in the existing data for the reactors which are in operation now.

Mr. Asty agreed to provide the data for Superphenix which were not included in "Plant Parameters 1991" and will distribute these data through IAEA.

Mr. Marth proposed updating of "Plant Parameters" document every 2 years.

The IWGFR agreed with this proposal.

15. Consideration of activities:

a) Users' Expression of Desired Characteristics for Advanced Reactor Systems

Mr. Kupitz briefed the IWGFR on the content of this document and on discussions which have taken place in other IWGs.

Prof. Pierantoni raised strong opposition to the use of words "accidents" and "incidents" in the IAEA Nuclear Event Scale which was attached to the document and which could be misunderstood. The news media would not recognize the difference between "incident" and "accident" and a minor incident could be thought to be a more serious accident. He strongly advised the Agency to reconsider the wording.

Mr. Asty thought that Appendix 1 need not be part of the present document.

Mr. Horton raised his concern about the continued use of the word "requirement" and "shall" in the document. It could still be thought that the recommendations were mandatory.

Mr. Kupitz expressed the willingness of the IAEA to have a special meeting (Technical Committee) on this subject with IWGFR representation, if this would help to improve the paper.

Mr. Taniyama supported the document.

Mr. Xu Mi expressed his support on the importance of this document.

Mr. Bramman, Mr. Asty and Mr. Horton were concerned about the setting of quantitative requirements.

Mr. Rineysky expressed his favour to continue talks over this document.

Mr. Asty expressed that of several "desired characteristics" (such as passive safety features) would be a matter of choice.

Mr. Kempken expressed his view that the document must not attempt to set quantitative requirements and that it would perhaps be best if it excluded fast reactors.

Mr. Marth noted the document's usefulness for developing countries.

Mr. Balz expressed his view that utilities need to define the requirements, though R&D organizations can make a useful input. Both should be involved in any meetings to discuss the document.

After lengthy discussion, the IWGFR agreed to support the proposal to hold a Technical Committee Meeting in Vienna in September-October 1991 to discuss the document in detail in a fast reactor context.

b) A Strategy for the Development and Demonstration of an Advanced Reactor System

Mr. Kupitz described the document and posed two questions;

- 1) Is IWGFR ready to contribute to the document and
- 2) Did the IWGFR consider it timely to proceed to develop an international LMFR project.

Mr. Pierantoni stated that the document is a possible structure rather than a strategy.

Mr. Xu Mi confirmed the interest in this document including FR.

Mr. Bramman said that experience of the EFR group could help Agency in the development of this document, but felt that IAEA assistance in setting up an international fast reactor project was not needed.

Mr. Rineysky explained that this activity is useful for the future and expressed his support of the document.

Mr. Marth emphasized that utilities must play the leading role in programme on International Advanced Reactor Project as they are doing in the EFR.

Mr. Horton indicated that the US DOE informed the IAEA that it should not proceed with this document.

c) Description of Safety Related Terms for Advanced Reactor Plants

Mr. Kupitz informed the IWGFR about the purpose of this document prepared and now being published by IAEA.

Mr. Pierantoni expressed his concerns that the description of "inherently safe reactor" excluded such a development in the future.

Mr. Rineysky hoped that there would be official UN translations into languages other than English in order to enable precise use of words with the same understanding of their meanings in all countries.

The IWGFR expressed its support of the document.

d) Underground Siting of Nuclear Power Plants

The short information on the document was presented by Mr. Kupitz.

The IWGFR considered that there is no need in the IWGFR framework to proceed with this work.

16. Updating of "Status of Liquid Metal Cooled Fast Breeder Reactors". IAEA TRS No. 246, 1985

The Scientific Secretary informed the IWGFR that other IAEA international working groups have already published updated versions of status reports (i.e. on water cooled reactors and on gas cooled reactors).

The Technical Report Series No. 246 "Status of Liquid Metal Cooled Fast Breeder Reactors" was published by the IAEA in 1985. Mr. Arkhipov thought that a working document of about 100 pages would be appropriate to describe new reactors (EFR, PRISM) and experience from existing FBRs.

The USSR, Japan and China representatives supported the updating of the Report.

Other participants expressed the view that this work should be postponed to have more data available on EFR and PRISM. However, the relevant information on reactor descriptions and operational experience will be available after the Kyoto FR '91 Conference. The IWGFR will consider the possibility of further updating at the next meeting, work may proceed on a chapter-by-chapter basis taking, about, five years to complete.

17. The date and venue of the 25th Annual Meeting of the IWGFR

It was agreed that the 25th Annual Meeting of the IWGFR should be held in Vienna on 27-30 April 1992. It was proposed that the meeting be chaired by the member of USSR (Mr. Rineysky)

Members discussed the way to commemorate the 25th anniversary of the IWGFR.

0519p/cp/rt



LIST OF PARTICIPANTS

CHINA

Mr. Mi Xu  
Department of Reactor Engineering  
and Technology  
China Institute of Atomic Energy  
P.O. Box 275 (95), 102413  
Beijing  
Telex: 222373 IAE CN  
Tel: 868221 - 336

FRANCE

Mr. M. Asty  
Commissariat à l'énergie atomique  
CEA/IRDI/CNR/Saclay  
B.P. No. 524  
F-91191 Gif-sur-Yvette  
Fax: 1 69 08 82 60  
Tel: 1 69 08 45 08

GERMANY, FEDERAL REPUBLIC OF

Mr. M. Kempken  
Bundesministerium für Forschung  
und Technologie  
Godesberger Allee 185-189  
Postfach 20 07 06  
D-5300 Bonn  
Fax: 59 36 05  
Tel: (06) 0228 593 733

Mr. W. Marth  
KFK, European Fast Reactor, EFR  
Postfach 3640  
D-7500 Karlsruhe  
Fax: 7247 82 5503  
Tel: 7247 82 5500

ITALY

Mr. F. Pierantoni  
ENEA External Relations  
Via Martiri di Monte Sole, 4  
I-40129 Bologna  
Fax: 051 498688  
Tel: 051 498441

Mr. R. Tavoni  
ENEA Innovative Reactor Depart.  
Via Martiri di Monte Sole, 4  
I-40129 Bologna  
Fax: 051 498629  
Tel: 051 498511

JAPAN

Mr. H. Iwabuchi  
Power Reactor Development Division  
Science and Technology Agency  
2-2-1, Kasumigaseki  
Chiyoda-ku, Tokyo 100  
Fax: 03 3592 1239  
Tel: 03 3581 5271

Mr. H. Taniyama  
Reactor Technology Development Div.  
PNC, Tokyo, 1-9-13, Akasaka  
Minato-ku, Tokyo - 107  
Fax: 03 5562 9437  
Tel: 03 3586 3311

Mr. Y. Matsuno  
Japan International Science  
and Technology Exchange Center  
PNC, Tokyo  
1-9-13, Akasaka  
Minato-ku, Tokyo 107  
Fax: 03 5562 9437  
Tel: 03 3586 3311

UNITED KINGDOM

Mr. J. I. Bramman  
AEA Technology  
UK Atomic Energy Authority  
Risley, Warrington, WA3 6AT  
Fax: 0925 78 2860  
Tel: 0925 25 3672

UNITED STATES OF AMERICA

Mr. K.E. Horton  
US Department of Energy  
Int. Nucl. Programs Division  
Mail Stop NE-14  
Washington, D.C. 20545  
Fax: 301 353 4211  
Tel: 900 1 301 353 3218

UNION OF SOVIET SOCIALIST REPUBLICS

Mr. A.A. Rineysky  
Institute of Physics and  
Power Engineering  
Obninsk, Kaluzhskaja Region  
Telex: 412509 URAN SU

Mr. V. Ryzhov  
USSR Ministry of Nuclear Power  
and Industry  
Staromonetny Pereulok 26  
Moscow  
Fax: 230 24 20  
Tel: 233 30 53

COMMISSION OF THE EUROPEAN COMMUNITIES

Mr. W. Balz  
Commission of the European Communities  
Office DG XII/D/2  
200, rue de la Loi  
B-1049 Bruxelles  
Belgium  
Fax: 322 236 2006  
Tel: 322 235 4164

IAEA

Mr. J. Kupitz

Mr. V. Arkhipov

IAEA, Division of Nuclear Power  
P. O. Box 100  
A-1400 Vienna, Austria  
Fax: 43 1 234 564  
Tel: 2360 ext. 2814 or 2812

OBSERVERS (from Japan)

Mr. O. Kubota  
Power Reactor Development Division  
Science and Technology Agency  
2-2-1, Kasumigaseki  
Chiyoda-ku, Tokyo 100  
Fax: 03 3592 1239  
Tel: 03 3581 5271

Mr. T. Kobori  
Monju Construction Office, PNC  
2-1, Shiraki, Tsuruga 919-12  
Fax: 0770 39 1170  
Tel: 0770 39 1031

Mr. K. Yamamoto  
Monju Construction Office, PNC  
2-1, Shiraki, Tsuruga 919-12  
Fax: 0770 39 1170  
Tel: 0770 39 1031

Mr. H. Sunaoshi  
Monju Construction Office, PNC  
2-1, Shiraki, Tsuruga 919-12  
Fax: 0770 39 1170  
Tel: 0770 39 1031

Mr. K. Ozawa  
Monju Construction Office, PNC  
2-1, Shiraki, Tsuruga 919-12  
Fax: 0770 39 1170  
Tel: 0770 39 1031

Mr. S. Sakai  
Monju Construction Office, PNC  
2-1, Shiraki, Tsuruga 919-12  
Fax: 0770 39 1170  
Tel: 0770 39 1031

Mr. T. Odo  
Monju Construction Office, PNC  
2-1, Shiraki, Tsuruga 919-12  
Fax: 0770 39 1170  
Tel: 0770 39 1031

Mr. K. Setoguchi  
Monju Construction Office, PNC  
2-1, Shiraki, Tsuruga 919-12  
Fax: 0770 39 1170  
Tel: 0770 39 1031

Mr. K. Ito  
Monju Construction Office, PNC  
2-1, Shiraki, Tsuruga 919-12  
Fax: 0770 39 1170  
Tel: 0770 39 1031

Mr. S. Takeda  
Monju Construction Office, PNC  
2-1, Shiraki, Tsuruga 919-12  
Fax: 0770 39 1170  
Tel: 0770 39 1031

Mr. K. Nomoto  
Monju Construction Office, PNC  
2-1, Shiraki, Tsuruga 919-12  
Fax: 0770 39 1170  
Tel: 0770 39 1031

Mr. T. Kosugi  
Monju Construction Office, PNC  
2-1, Shiraki, Tsuruga 919-12  
Fax: 0770 39 1170  
Tel: 0770 39 1031

Mr. F. Nakajima  
Monju Construction Office, PNC  
2-1, Shiraki, Tsuruga 919-12  
Fax: 0770 39 1170  
Tel: 0770 39 1031

Mr. A. Inose  
Monju Construction Office, PNC  
2-1, Shiraki, Tsuruga 919-12  
Fax: 0770 39 1170  
Tel: 0770 39 1031

Mr. Y. Yokota  
Monju Construction Office, PNC  
2-1, Shiraki, Tsuruga 919-12  
Fax: 0770 39 1170  
Tel: 0770 39 1031

\*\*\*\*\*

24th Annual Meeting of the  
International Working Group on Fast Reactors  
Tsuruga, Japan, 15-18 April 1991

A G E N D A

1. Approval of the Agenda.
2. Approval of the minutes of the 23rd meeting of the IWGFR.
3. Report of the Scientific Secretary regarding the activities of the Working Group.
4. Short presentation on national situation in nuclear energy and in the fast reactor field in particular in members and observers countries.
5. Consideration of conferences on fast breeder reactors.
  - a. International Conference on Fast Reactor System and Fuel Cycles, Kyoto, Japan, October 27-31, 1991.
  - b. "Liquid Metal Reactor Fuels for Reliable Energy", Idaho Falls, Idaho, USA, September 13-17, 1992.
  - c. Other meetings of interest to IWGFR members.
6. Consideration of arrangements for Specialists' Meetings in 1991.
  - a. Mechanical Properties of Structural Materials in Liquid Metal Environment. Karlsruhe, Germany, 18-20 June 1991.
  - b. Passive and Active Safety Features of LMFBRs. PNC Oarai Engineering Center, Japan, 5-7 November 1991.
7. Selection of topics for Specialists' Meetings to be held in 1992 and discussion of a proposal for the Technical Committee Meeting on Desired Characteristics for LMFRs.
8. Consideration of joint research activities:
  - a. Co-ordinated Research Programme on Acoustic Signal Processing for the Detection of Boiling or Sodium/Water Reaction in LMFBR.
  - b. Co-ordinated Research Programme on Intercomparison of LMFBR Seismic Analysis.
9. Presentations and discussions on national programmes on fast breeder reactors.
10. Consideration of activities:
  - a. Users' Expression of Desired Characteristics for Advanced Reactor Systems.
  - b. A Strategy for the Development and Demonstration of an Advanced Reactor System.
  - c. Description of Safety Related Terms for Advanced Nuclear Plants.
  - d. Underground Siting of Nuclear Power Plants.
  - e. Updating of "Status of Liquid Metal Cooled Fast Breeder Reactors", IAEA TBS No. 246, 1985.
11. Informal discussion on "The Economics of Fast Reactors".
12. The date and venue of the 25th Annual Meeting of the IWGFR.

INTERNATIONAL WORKING GROUP ON FAST REACTORS  
LIST OF MEMBERS, ALTERNATES AND REPRESENTATIVES

APRIL 1991

M E M B E R S

A L T E R N A T E S

FRANCE

Mr. M. Asty  
Commissariat a l'Energie Atomique  
DRN/P-CEA/Saclay-Bât.524  
F-91191 Gif-sur-Yvette-Cedex  
Tel. 1.69.08.45.08  
TLX: 604641 F  
Fax: 1.69.08.82.60

GERMANY

Mr. M. Kempken  
Bundesministerium für Forschung  
und Technologie  
Godesberger Allee 185-189  
Postfach 20 07 06  
D-5300 Bonn  
Tel. (06) 0228 593733  
TLX: 885674A BMFT D  
Fax: 59 36 05

Mr. G. Heusener  
Kernforschungszentrum Karlsruhe  
Research of Nuclear Safety (PSF)  
Postfach 3640  
D-7500 Karlsruhe  
TLX: 17724716  
Tel. (06) 7247 82 5509/5510  
Fax: 07247 82 5508

Mr. W. Marth  
KFK, European Fast Reactor, EFR  
Postfach 3640  
D-7500 Karlsruhe  
Tel. (0) 7247 82 5500  
Fax: (0) 7247 82 5503

INDIA

Mr. S. R. Paranjpe  
Indira Gandhi Centre  
for Atomic Research  
Kalpakkam-603 102  
Chengalpattu-212  
Tamil Nadu  
TLX: 041-6244  
Tel. 04117-240  
Fax: 04117-360

Mr. S.B. Bhoje  
Indira Gandhi Centre  
for Atomic Research  
Kalpakkam-603 102  
Chengalpattu-212  
Tamil Nadu  
TLX: 041-6244  
Tel. 04117-351/386

ITALY

Mr. F. Pierantoni  
ENEA External Relations  
Via Martiri di Monte Sole, 4  
I-40129 Bologna  
Tel. 051-498441  
TLX: 510487 ENEAVR I  
Fax: 051-498688

Mr. R. Tavoni  
ENEA Innovative Reactor Depart.  
Via Martiri di Monte Sole, 4  
I-40129 Bologna  
Tel. 051-498511  
TLX: 510487 ENEAVR I  
Fax: 051-498629

JAPAN

Mr. H. Taniyama  
Reactor Technology Development Div.  
PNC, Tokyo  
1-9-13, Akasaka  
Minato-ku, Tokyo  
Japan  
Tel: 3 3526 3311  
Fax: 3 5562 9437  
Telex: J 26462

UNION OF SOVIET SOCIALIST REPUBLICS

Mr. A.A. Rineysky  
Institute of Physics and  
Power Engineering  
Obninsk, Kaluzhskaja Region  
TLX: 412509 URAN SU

Mr. V. Ryzhov  
USSR Ministry of Nuclear Power  
and Industry  
Staromonetny Pereulok 26  
Moscow  
TLX: 411888 MEZON  
Tel. 233-30-53  
Fax: 230 24 20

UNITED KINGDOM

Mr. J.I. Bramman  
International Collaboration  
Development  
Corporate Business Services  
AEA Technology  
UK Atomic Energy Authority  
Risley, Warrington WA3 6AT  
Tel. 0925-25-3672  
Telex: 629301 ATOMRY G  
Fax: 0925-78-2860

UNITED STATES OF AMERICA

Mr. Sol Rosen  
US Dept. of Energy  
Int. Nucl. Programs Division  
Mail Stop B-107 GTN  
Washington, D.C. 20545

Mr. K.E. Horton  
US Department of Energy  
Int. Nucl. Programs Division  
Mail Stop NE-14  
Washington, D.C. 20545  
Tel.: 900-1-301-353-3218  
TLX: 710-8280475  
Fax: 301-353-4211

COMMISSION OF THE EUROPEAN COMMUNITIES

Mr. W. Balz  
Commission of the European Communities  
Office DG XII/D/1  
200, rue de la Loi  
B-1049 Bruxelles  
Belgium  
Tel. 00322/2354164  
TLX: 21877 COMEU B  
Fax: 00 322/2362006

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

Mr. G. Stevens  
OECD Nuclear Energy Agency  
38, boulevard Suchet  
F-75016 Paris  
TLX: 630668 OCDE  
Tel. 524 82-00

OBSERVER

CHINA

Mr. Mi XU  
Deputy Director of Department of  
Reactor Engineering and Technology  
China Institute of Atomic Energy  
P.O. Box 275 (95), 102413  
Beijing  
Tel. 868221-336  
Telex: 222373 IAE CN

S C I E N T I F I C S E C R E T A R Y

Mr. V. Arkhipov  
International Working Group  
on Fast Reactors  
International Atomic Energy Agency  
P. O. Box 100  
A-1400 Vienna, Austria  
Tel. 43/222/2360/2812  
Telex: 1-2645/1-13697 ATOM A  
Fax: 43/222/234564