الوكالة الدولية للطاقة الذرية
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INTERNATIONAL ATOMIC ENERGY AGENCY
AGENCE INTERNATIONALE DE L'ÉNERGIE ATOMIQUE
МЕЖДУНАРОДНОЕ АГЕНТСТВО ПО АТОМНОЙ ЭНЕРГИИ
ORGANISMO INTERNACIONAL DE ENERGÍA ATÓMICA

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IN REPLY PLEASE REFER TO:
PRIERE DE RAPPELER LA REFERENCE:
C7-RER-9.076-001

DIAL DIRECTLY TO EXTENSION:
COMPOSER DIRECTEMENT LE NUMERO DE POSTE 25985
25982

2003-11-24

Subject: **Request to the Government of the United States of America to host a Regional Training Course on Fuel Safety Argonne, Illinois, USA, 22 March-2 April 2004**

Sir,

I have the honor to inform you that the Secretariat of the International Atomic Energy Agency (IAEA) is planning to hold a Regional Training Course on Fuel Safety from **March 22 to April 2, 2004**. The purpose of the training course is to provide information on topics relevant to fuel safety (core design description, fuel safety analysis, operation and maintenance relevant to fuel safety, improvements and effective use of fuel, licensing, US NRC maintenance rules, licensing of new fuel, safety justification, safety criteria and fuel integrity, etc.). Twenty persons from IAEA Member States as listed in Annex A are expected to attend.

I have the honor to inquire whether your Government would wish to host the training course in question, and, if so, whether your Government would agree to make the following arrangements:

1. The Government of the United States of America will accord to the Agency, its property, funds and assets, and to the officials of the Agency and individuals employed by it and participants representing Member States officially designated to attend the training course in their official capacities, the privileges and immunities provided by applicable United States law, including the International Organizations Immunities Act and the Internal Revenue Code.

2. The Government will accord to the persons mentioned above every facility necessary for the performance of their function in connection with the training course, including entering, remaining in and leaving the United States of America. The Government will issue any necessary visas as expeditiously as possible and, where the legislation of the United States of America permits, free of charge. The Government, however, reserves the right to deny, irrespective of nationality, visas to individual participants for national security reasons. Annex A contains a list of Member States to be invited to participate.

H.E. Mr. Kenneth C. Brill
The Resident Representative of the United States of America
to the International Atomic Energy Agency
Obersteinergasse 11/1
A-1190 Vienna

01-Dec-03 08:41A

The Agency will inform the Government promptly of all its officials and individuals employed by it and participants representing Member States officially designated to attend the training course. The IAEA will also advise such persons to apply for visas, if necessary, in good time before the opening date of the training course, and the Government is expected to issue such visas promptly so as to allow participants to attend the training course.

3. The Government will facilitate customs formalities for those persons on entering and leaving the United States of America to the extent such services, if any, are made generally available.

4. The Government will make available to the Agency, without charge, and for the duration of the training course, premises and facilities adequate and appropriate for the training course, as listed in **Annex B**.

5. The Government will exercise reasonable care to arrange security on the premises in which the training course takes place and to ensure the safety of the persons mentioned above while on the premises of the training course. The Government will take those steps that may be reasonable in the circumstances to arrange for such security and safety, including such supervision of the premises as may be warranted.

Should your Government wish to host the training course in question, I would be grateful if you would inform me in writing of your Government's agreement on the above enumerated points by 5 December 2003 so as to enable the Secretariat to proceed with timely arrangements.

Accept, Sir, the assurances of my highest consideration.

Ana María Cetto

Ana María Cetto
Deputy Director General
Head of the Department of Technical Co-operation

for DIRECTOR GENERAL

External Copy: Dr. Harold W. Myron, Director
Division of Educational Programs
Argonne National Laboratory (ANL)

Enclosures
Annex A: List of Member States to be invited
Annex B: Proposed arrangements
Course Prospectus & Syllabus

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ANNEX A

Regional Training Course on Fuel Safety
Argonne, Illinois, USA
22 March - 2 April 2004

Ref. No. C7-RER-9.076-001

LIST OF MEMBER STATES TO BE INVITED

ARMENIA
BULGARIA
CZECH REPUBLIC
HUNGARY
LITHUANIA
ROMANIA
RUSSIAN FEDERATION
SLOVAKIA
SLOVENIA
UKRAINE

ANNEX B

Regional Training Course on Fuel Safety
Argonne, Illinois, USA
22 March - 2 April 2004

Proposed Arrangements

Ref. No. C7-RER-9.076-001

1. The purpose of the training course is to provide information on topics relevant to fuel safety (core design description, fuel safety analysis, operation and maintenance relevant to fuel safety, improvements and effective use of fuel, licensing, US NRC maintenance rules, licensing of new fuel, safety justification, safety criteria and fuel integrity, etc.). More details are contained in the draft Prospectus and Syllabus, which are attached.

2. The training course will be held in Argonne, Illinois, USA, from 22 March to 2 April 2004. The course will be conducted in English.

Responsibilities

3. The Host Government undertakes to provide the following:

(a) the premises, services and equipment necessary for the proper functioning of the training course, including maintenance and operation;

(b) the services of a Course Director who will be responsible for the logistics of the training course and for maintaining contact with the Agency;

(c) administrative and auxiliary staff as may be required for the proper conduct of the training course, including a Finance Officer who will be responsible for making payments on behalf of the Agency to the participants, lecturers and other parties as authorized;

(d) lecturers and instructors from the Host Country as required; and

(e) arrangement of technical visits and local transportation as required.

4. The Agency undertakes to provide the following:

(a) one Officer from the Agency's staff, assisted by such other staff members as may be necessary for the proper conduct of the training course;

(b) the cost of international travel to and from Argonne, as well as a stipend, covering the cost of accommodation, food and incidentals of the participants selected by the Agency from developing countries;

(c) the cost of international travel to and from Argonne, as well as subsistence allowance and any fees of lecturers to be recruited by the Agency from outside the Host Country;

(d) publications and reference materials as required for the purpose of the course; and

(e) a contribution towards one hospitality event for all persons involved in the course as participants and lecturers or as managerial, administrative and auxiliary staff.

Organization

5. The training course will be organized by the Agency in co-operation with the Government of the United States of America, through the Argonne National Laboratory (ANL), Argonne, Illinois.

6. The programme of the course will be worked out jointly by the Course Director and the Agency.

7. The lecturers and instructors from the Host Country to be appointed for the course will be invited by the Course Director. The lecturers from outside the Host Country will be recruited by the Agency.

Participation

8. The course is open to 20 participants from IAEA Member States as listed in Annex A.

9. The participants will be persons officially nominated by the Member States. The selection of participants from among Government nominees will be made in accordance with the Agency's established procedures. Invitations to the selected participants will be issued by the Agency.

10. The Agency will inform the Host Government promptly of all persons officially designated to attend the course. The Agency will also advise such persons to apply for visas, if necessary, in good time before the course.

Accommodation

11. The Host Government will ensure that the Host institution makes the necessary arrangements for suitable accommodation to be available for all persons taking part in the training course.

INTERNATIONAL ATOMIC ENERGY AGENCY
TECHNICAL CO-OPERATION DEPARTMENT

PROJECT RER/9/076
"STRENGTHENING SAFETY AND RELIABILITY OF NUCLEAR FUEL AND MATERIALS IN NUCLEAR POWER PLANTS"

PROSPECTUS

FOR A

REGIONAL TRAINING COURSE

ON

FUEL SAFETY

22 March - 2 April 2004
ANL, Argonne, Illinois, USA

Technical Co-operation Project RER/9/076
"Strengthening Safety and Reliability of Nuclear Fuel and Materials in NPPs"

PROSPECTUS

TITLE:	Regional Training Course on Fuel Safety
PLACE:	Argonne National Laboratory (ANL), Argonne, Illinois, USA
DATE:	22 March - 2 April 2004
ORGANIZERS:	IAEA in co-operation with the government of the United States of America through the Argonne National Laboratory (ANL), Argonne, Illinois, USA
DEADLINE FOR NOMINATIONS:	22 December 2003
TARGET COUNTRIES:	The training course is designed for staff members of utilities, nuclear power plants and regulatory authorities for countries in receipt of assistance from the TC Department's Europe Section
PARTICIPATION:	The training course is open to 20 participants.
LANGUAGE:	The training course will be held in English.
PURPOSE OF THE TRAINING COURSE:	Many operational nuclear power plants in Central and Eastern European Countries (CEEC) were designed and supplied by the former Soviet Union without development for adequate local infrastructure and technology transfer, in particular, in the areas of nuclear fuel development and fuel safety. The Agency supports increased efforts of Member States for their independent capability to review and improve safety and reliability of nuclear fuel. The TC project RER/9/076 assists the CEEC in the development of necessary tools to fulfil their own nuclear fuel operation and licensing needs. The main objective of the project is to provide quality data on fuel and experiments carried out in Material Test Reactors (MTRs). Within the TC project, the purpose of this training course is to provide participants who are in charge of design, operation, maintenance and licence of fuel in CEEC with knowledge relevant to fuel safety. The needs for such a training course and the basic directions to be covered have been identified by the International Program Group of the TC project. Argonne National Laboratory (ANL) in the USA has offered to host the training course.

In addition to topics relevant to fuel safety, recent topical issues such as the new US NRC maintenance rule will be addressed by the lecturers.

PARTICIPANTS' QUALIFICATIONS:

The participants should be professionals of NPPs/utilities or regulatory bodies and their technical support organizations involved in performing of design, operation, maintenance and licensing of fuel. A good knowledge of English is essential to understand the lectures. Active participation in practical exercises and topic discussions will be required.

NATURE OF THE WORKSHOP:

The training course consists of lectures, practical exercises and panel discussions. During the course, comprehensive topics relevant to fuel safety will be covered.
These include:

- Introduction
- Core design description
- Fuel safety analysis
- Operation and maintenance relevant to fuel safety
- Improvements and effective use of fuel
- Licensing

In addition to the standard topics shown above, recent specific topics shown below will be included:

- New US NRC maintenance rule, in particular, regulatory interpretation
- Licensing of new fuel safety justification
- Licensing of fuel in non-vendor countries
- Differences in safety criteria
- Maintaining fuel integrity

In the practical exercises, participants will be divided into groups and each group will evaluate the sample problems relevant to fuel safety that will be provided by the lecturers.

The course will also feature panel discussions devoted to selected problems. Time will be provided for individual study and consultation with experts regarding problems of specific interest to the participants. Participant comprehension will be evaluated through quizzes. Moreover, individual working groups will present their work done and results obtained to other course participants. Certificates confirming successful course completion will be provided. Participants will have the opportunity to submit comments expressing their views on the training course.

Technical Co-operation Project RER/9/076
"Strengthening Safety and Reliability of Nuclear Fuel and Materials in NPPs"

SYLLABUS

FOR A
REGIONAL TRAINING COURSE
ON FUEL SAFETY

22 March - 2 April 2004
Argonne National Laboratory (ANL), USA

1. **Introduction**
   - 1.1. Core and fuel design description
     - 1.1.1. WWER440
     - 1.1.2. WWER1000
     - 1.1.3. Western PWR
   - 1.2. Fuel safety criteria
     - 1.2.1. Safety criteria
     - 1.2.2. Operational/licensing criteria
     - 1.2.3. Design criteria
   - 1.3. Comparison of fuel safety criteria between WWER and Western PWR

2. **Core design information for safety analysis**
   - 2.1. Nuclear design information
     - Information required
     - Conditions to be analyzed
     - Analysis codes and procedure
     - Verification of results
   - 2.2. Thermal-hydraulic design information
     - Information required
     - Conditions to be analyzed
     - Analysis codes and procedure
     - Verification of results
   - 2.3. Fuel rod thermal and mechanical design information
     - Information required
     - Conditions to be analyzed
     - Analysis codes and procedure
     - Verification of results
   - 2.4 Fuel assembly thermal and mechanical design information
     - Information required
     - Conditions to be analyzed
     - Analysis codes and procedures
     - Verification of results

3. **Fuel safety analysis**
   3.1. Initiating events
   3.2. Major accidents and their scenarios
      3.2.1. Reactivity insertion accident
      3.2.2. Power cooling mismatch accident
      3.2.3. Loss of coolant accident

   3.3. Phenomena important to fuel safety
      3.3.1. Heat transfer
      3.3.2. Cladding deformation
      3.3.3. Metal water reaction
      3.3.4. Fuel-cladding interaction
      3.3.5. Others

   3.4. Selection and use of computer codes
      3.4.1. Analysis methods
      3.4.2. Types of accident analysis
      3.4.3. Types of computer codes
      3.4.4. Physical models installed in computer codes
      3.4.5. Code V and V and accuracy
      3.4.6. User effects

4. **Operation and maintenance relevant to fuel safety**
   4.1. Technical specifications relevant to fuel safety
   4.2. Relation of operating limits and fuel safety
   4.3. Core monitoring relevant to fuel safety
   4.4. Fuel loading and unloading procedure
   4.5. On-site fuel examination
   4.6. Troubles experienced and lessons learned

5. **Safety issues in operational improvements**
   5.1. Up-rating
   5.2. Long operation cycle
   5.3. Extended burn-up

6. **Licensing**
   6.1. New US NRC maintenance rule relevant to fuel safety
   6.2. Licensing of new fuel, safety justification
   6.3. Licensing of fuel in non-vendor countries

7. **Future development**

   7.1. Near term deployment
   7.2. Generation 4 and INPRO