

## THE EUROPEAN NUCLEAR EDUCATION NETWORK ASSOCIATION

ENEN-Association is a non-profit international organization established under the French law whose mission is the preservation and further development of expertise in the nuclear field by higher education and training.

### ENEN-Association main objectives:

- To deliver a European Master of Science degree in nuclear engineering
- To encourage PhD studies, to promote exchange of students and teachers participating in the network
- To establish a framework for mutual recognition
- To foster and strengthen the relationships between universities, nuclear research laboratories, industries and regulatory bodies.

ENEN Association results from the cooperative action of partners of the ENEN project funded by the European Commission under the Euratom 5th framework programme.

ENEN Association effective members are academic institutions providing high level scientific education in nuclear disciplines. Associated members are nuclear companies, research institutes and organizations having an established tradition in the field of nuclear education, research and training.

**56 institutions from 18 countries\* are currently members of ENEN Association.**

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### ENEN Association

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INSTN BUILDING AT SACLAY  
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Realization: info@nova-iraduction.com

MELOX, MOX fuel assembly ©AREVA/P. Lesage

## INTERNATIONAL SEMINAR ON NUCLEAR FUEL CYCLE 2012 – FRANCE



13<sup>th</sup> – 24<sup>th</sup> FEBRUARY 2012

\*AUSTRIA, BELGIUM, CZECH REPUBLIC, FINLAND, FRANCE, GERMANY, GREECE, HUNGARY, ITALY, JAPAN, POLAND, ROMANIA, RUSSIA, SLOVAKIA, SLOVENIA, SOUTH AFRICA, SPAIN, SWEDEN, SWITZERLAND, THE NETHERLANDS, UKRAINE, UNITED KINGDOM.

# Outline Programme

## Main Goal

To disseminate comprehensive information and acquire in-depth knowledge on the industrial operations related to the nuclear fuel cycle in France, from the extraction of the uranium ore to the reprocessing of spent fuel, as well as on the management of waste produced during the different stages of the fuel cycle.

## Topics

### 1/ Introduction and transverse activities

- Overview of the nuclear fuel cycle
- Technical and economical aspects
- Transport of nuclear fuel cycle materials

### 2/ Front end

- Geology of uranium: exploration, mining and resources
- Concentration stage: from uranium ore to yellow cake
- Conversion stage: from uranium ore concentrates to uranium hexafluoride UF<sub>6</sub>
- Uranium enrichment: gaseous diffusion and gas centrifuge process

### 3/ Fuel design

- General design of fuel assembly
- Thermal-mechanical design of fuel rod and assembly
- Boiler/Fuel constraints
- Fuel services

### 4/ Recycling industry

- Options for spent fuel management
- Reprocessing operations and technology (PUREX process)
- Reprocessed recycling uranium
- Reprocessed recycling plutonium (MOX)

### 5/ Waste management

- Inventory of fuel cycle wastes
- Interim storage technologies
- Long term waste management : R & D in the field of advanced chemical separation and transmutation
- Long term waste management : R & D in the field of deep geological storage

## Visits (subject to acceptance)

- Fuel fabrication plant (**FBFC – AREVA NP**)
- Uranium refining and conversion plant (**COMURHEX**)
- Uranium enrichment plant (**EURODIF**)
- MOX fuel fabrication plant (**MELOX**)
- Na – FNR (**PHENIX**)
- La Hague spent fuel reprocessing plant (**AREVA NC**)
- Storage site for low radioactivity waste (**ANDRA**)



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# Information

## Venue

During each week of the seminar, 2 days will be devoted to conferences and 3 days to technical visits with presentations as appropriate; the first week will address the front end, the second week, the back end of the fuel cycle. The conferences will be given at the National Institute for Nuclear Sciences and Technology (INSTN), as member of European Nuclear Education Network (ENEN Association), located at the CEA Saclay site (20 km south of Paris) and possibly, depending on the final organization of the technical visits, in another location.

## Fee Covers

Lectures, documentation, workshop papers, lunches, most dinners, hotel accommodation (3 stars hotels) and transportation (high speed TGV trains, 1st Class and AC buses) during the seminar and the technical visits. The fee does not cover travel expenses to France.

## Course registration

To get the registration form, please contact:  
Nadia Nowacki ([nadia.nowacki@cea.fr](mailto:nadia.nowacki@cea.fr))

Registering for the course is a commitment to attend all lectures and the condition to get the attendance certificate at the end of the seminar.

Payment should be made by bank-to-bank transfer. An invoice will be sent after your registration.

## Registration deadline

January 9<sup>th</sup> 2012

Please note that the number of places is limited, all registrations are classified by their date of arrival. Due to the entrance procedure to the installations no registration is accepted after January 9<sup>th</sup> 2012

**Location:** Saclay, France  
**Duration:** 2 weeks

## Date:

February 13<sup>th</sup> – 24<sup>th</sup> 2012

## Registration fee:

**Full rate:** €7000

**ENEN members:** €5600

**ENEN members:** €3500

**Rate without accommodation on request**

**Language:** English

For further information or to obtain a registration form, please contact:

## Organizer:

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