EUROPEAN FISSION TRAINING SCHEMES

THE ENEN-III PROJECT STATUS

presented by P. De Regge, J. Safieh, R. Kusumi
European Nuclear Education Network Association
on behalf of the ENEN-III Consortium

EUNET WORKSHOP
14 December, Preston, United Kingdom

EFTS Project ENEN-III
ENEN Fission Training Schemes

- Four training schemes
  - A: Basic Nuclear Topics for Non-Nuclear Engineers
  - B: Design Challenges for Generation III NPP
    - 2 professional profiles
  - C: Construction Challenges for Generation III NPP
    - 2 professional profiles
  - D: Design Challenges for Generation IV Reactors

- Objective
  - To train selected individuals for a specific job in a specific employment situation for acquiring the learning outcomes in the areas of knowledge, skills and attitudes
EFTS Project ENEN-III
Summary of Project Evolution

- Formal Project Start 1 May 2009
- Kick-Off meeting 13-14 May 2009
- Grant agreement signed by EC 2 December 2009
- Pre-financing arrived 9 December 2009
- Accumulated delay about 1 year
- Planned project ending date April 30, 2013

Specifics

- 3 years duration
- 65 persons trained
- budget 2 Mio € - EC funding requested 1 Mio €

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Partners

- 19 Partners in 11 countries (original consortium)
  - ENEN (F) Coordinator,
  - SCKCEN (B), JSI (SI), ISAR (D)
    - Research and technical support centers
  - UCL (B), TKK (FI), LUT (FI), INSTN (F), BME (H),
    CIRTEN (I), DUT (NL), UPB (RO), UL (SI),
    UNED (E), UPM (E), UPC (E), SULTAN (UK)
  - Academic education institutes
  - TECNATOM (E) Training organisation
  - AREVA (F,D) Industry training center
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WP1 TRAINING FRAMEWORK
- To set up the framework and the training scheme
- To set up the accreditation structure for mutual recognition
- To launch the training passport concept

WP2 QUALIFICATION PROGRAMME
- To establish the qualification programme
- To run the qualification programme

WP3 SKILLS DEVELOPMENT
- To establish the training programme for developing the required skills
- To run the training sessions for developing the required skills

WP4 INTERNSHIPS & INCREASING AUTONOMY
- To increase the autonomy of trainees
- To create schemes and procedures matching the trainees to different policies and cultures of employers in various EU countries

WP5 RESPONSIBILITY & AUTONOMOUS ACTIVITIES
- To acquire responsibility, self-confidence and autonomy through on-the-job training
- To get acquainted with employer environment, policy, culture and with professional counterparts

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Summary of Project Evolution

- WP1 deliverables = learning outcomes finalised for job profiles A, B1&B2, C1&C2, D
  Some work done on Recognition and Passport
- WP2 Knowledge courses available for profiles A, B1&B2, C1&C2 training to be achieved for the trainees 30 April 2012
- WP3 Skills and Attitudes training identified for profiles A, B1&B2, C1&C2
- WP4 Internships for the trainees May - September 2012
  Concept has been developed, pilot session has been held and evaluation has been made
- WP5 On-the-Job training with mentor till March 2013
EFTS Project ENEN-III
Summary of Project Evolution

- Amendment submitted to EC September 2, 2011
  - 1. Termination of participation by HMS Sultan
  - 2. New beneficiary accepted UCLAN
  - 3. Extension of project duration till April 30, 2013
  - 4. Revision of Description of Work – Annex I
- Additional justification requested and provided, in particular with respect to expenses and funding level: only 20% of the budget is spent and 25% of the funding is claimed.
- Revised amendment is submitted on November 17, 2011
  - 5. Three reporting periods at 18, 36 and 48 months
  - 6. TKK is merged into AALTO
- New project structure with UCLAN (20) and AALTO (21)

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Work package 1:
Setting the training framework
defining qualifications and skills, accreditation structure

1.1 General Framework for EFTS  ENEN + UCLAN
Available

1.2 EFTS for Non Nuclear Engineers  UPC + DUT
Available

1.3 EFTS for GEN III Design Engineers  AREVA
Available

1.4 EFTS for GEN III Construction Engineers AREVA
Available
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SAFETY ANALYSIS EVALUATION ENGINEER

Knowledge
- Extended Nuclear Safety Knowledge
- Thermo-Hydraulic Knowledge
- Basic Knowledge of Power Plant Engineering
- Basic Knowledge of Plant, System and Component Engineering

Skills
- Working with Self-developed Engineering Tools or Off-the-Shelf Tools
- Order Processing (Project Management)
- Formal Quality Control of Result Reports
- Presentation and Documentation of Work Results
- Teamwork-Communication

Attitudes
- Individual. Critical Examination of the Tasks

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TSB K02
"Hand-Out" (Manufacturing)

1. Identify the structures corresponding to the following terms: Nuclear Island and Conventional Island
2. Differentiate between systems and components belonging either to the primary or secondary circuit
3. List the main components of the primary circuit
4. Recall the functionality of the primary circuit
5. Review the main components of the secondary circuit or the conventional island
6. Name the main systems connected as support functions to the primary circuit and secondary circuit
7. Recall the types of nuclear wastes produced by a NPP and their associated systems
8. Describe schematically the overall operation principle of the PWR
9. Identify the type of fuel used in nuclear reactors

TSB 502
"Hand-Out" (Manufacturing)

1. Use effectively tools required for system layout and design. Examples:
   a. System layout: VREL, PDMS
   b. Core design codes e.g. ORIGEN,
   c. Core and System Thermal-hydraulic codes like FLICA3D-F, RELAP-5 and CATHARE etc.
   d. Drawing tools like AutoCAD,
   e. Documentation tools.

As defined by Training Scheme B and C
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ENEN Fission Training Schemes

<table>
<thead>
<tr>
<th>Area of skills</th>
<th>Learning Outcomes</th>
<th>Required knowledge</th>
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<tbody>
<tr>
<td>TSD &amp; K</td>
<td>1. Review the basics of ultrasonic visualisation techniques</td>
<td>As defined by Training Scheme D</td>
</tr>
<tr>
<td>LFR Instrumentation</td>
<td>2. Explain the impact of a lead-bismuth environment with high temperature and high</td>
<td></td>
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<tr>
<td></td>
<td>3. Describe the concepts of reflection and attenuation</td>
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<td></td>
<td>4. Describe the characteristics of piezoelectric sensors</td>
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<td></td>
<td>5. Analyse the differences between single sensors and sensor arrays</td>
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<tr>
<td></td>
<td>6. Identify challenges in designing sensors for a lead-bismuth, high temperature</td>
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<tr>
<td></td>
<td>7. Define the principles of operation of a lead-bismuth environment</td>
<td></td>
</tr>
</tbody>
</table>

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Work package 1: Setting the training framework
defining qualifications and skills, accreditation structure
1.5 EFTS for GEN IV Design Engineers SCK•CEN
1.6 Concept for EFTS Accreditation Structure TECNATOM
1.7 Barriers and Acceptance for Mutual Recognition CIR TEN
1.8 Concept of Training and Skills Passport UCLAN
Passport of competences – personal transcript under preparation by UCLAN in cooperation with NSAN
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Work packages 2 and 3:
- **Establishing** the training programme

WP2 acquiring the knowledge

WP3 acquiring the skills and attitudes

On the basis of the learning outcomes described in WP1 for each of the training schemes A, B, C and D

- Identify the curricula, courses, training sessions, etc. among the partners (a) and within the EU (b) which are able to realise the learning outcomes in successful trainees
- Describe a few “reference training schemes” which include a selection of the identified curricula, courses, training sessions, etc.
- Develop training sessions for uncovered learning outcomes
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**Work packages 2 and 3:**

**Running** the training programme

WP2 acquiring the knowledge

WP3 acquiring the skills and attitudes

For each of the training schemes A, B, C and D:

- Identify the staff, trainees, recruits, etc. who will be running through the training schemes on a pilot basis in this project
- Identify and evaluate the learning outcomes already acquired on an individual basis
- Arrange the participation to courses, training sessions, etc. to acquire the missing learning outcomes as much as possible within the projected time span July 2011 – May 2012
- Report the percentage of learning outcomes acquired

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**Table:**

<table>
<thead>
<tr>
<th>Introduction to nuclear engineering</th>
<th>CIRITEN - University of Pisa</th>
<th>NA - ELECTRODE Coor</th>
<th>Sandro Piao</th>
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</thead>
<tbody>
<tr>
<td>Radiation protection course (level 1)</td>
<td>UPM</td>
<td>NA</td>
<td>1 week</td>
</tr>
<tr>
<td>Nuclear Safety in Advanced Reactors</td>
<td>CIRITEN - Politecnico di Torino</td>
<td>Euny Lethoese/Markus Schonauer</td>
<td>Euny Lethoese/Markus Schonauer</td>
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<tr>
<td>Numerical Methods in Nuclear Engineering</td>
<td>CIRITEN - University of Pisa</td>
<td>Euny Lethoese/Markus Schonauer</td>
<td>Euny Lethoese/Markus Schonauer</td>
</tr>
</tbody>
</table>
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Step 1
Definition of training scheme learning outcomes and modules

Step 2
Student prerequisites assessment and student selection

Step 3
Student interview for development of the individual training plan

Step 4
Start of the training activities (training scheme)

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Learning to know
A. Training Method
   1. Classroom Training
   2. E-Learning
   3. Case Studies
   4. Know How transfer during on the job training
B. Evaluation method
   1. Written examination
   2. Oral presentation of a chosen subject

Learning to do
A. Training Method
   1. Analytical calculation during workshops
   2. Practical Training on mock-ups
   3. Experiments at small scale facilities
   4. Partially on the job training
B. Evaluation Method
   Practical examination (oral or written)

Learning to be
A. Training Method
   1. Visit nuclear facilities
   2. Sensitisation workshops
   3. On the job training
B. Evaluation Method
   1. Feed back of the mentor

Step 5
Mutual recognition and European Pass
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Work package 2:  
Establishing and running the qualification programme WP2
20111213-database-of-trainees-organization-name.xls

2.1 Qualification Programme Non Nuclear Engineers
UPM and LUT Available

2.2 Qualification Programme GEN III Design Engineers
LUT and CIRTEM Available

2.3 Qualification Programme GEN III Construction Engineers
CIRTEM Available

2.4 Qualification Programme GEN IV Design Engineers
AALTO in preparation

2.5 Evaluation of Qualification Programmes
INSTN To be started

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Training
- AREVA 24 Staff members – GEN III  
  16 Internships offered – GEN III
- SCKCEN 2 Design engineers GEN IV
- CEA–INSTN 2 Design engineers GEN IV
- AALTO & LUT 2-4 Engineers GENIV
- JSI 3 Engineers
- CIRTEM 10 Trainees
- ISaR 8 Trainees
- UNED 5 Trainees
- UPM 2 Trainees
- UCL 2 Trainees
- DUT 1 Trainee
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Work package 3:

Establishing and running the training programme for further developing the required skills - practical part

3.1 Skills Development Programme Non Nuclear Engineers
TECNATOM Draft available

3.2 Skills Development Programme GEN III Design
Engineers – Draft available AREVA

3.3 Skills Development Programme GEN III Construction
Engineers – Draft available AREVA

3.4 Skills Development Programme GEN IV Design
Engineers – in preparation LUT

3.5 Evaluation of Skills Development Programmes INSTN
To be started

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Work package 4:

Increasing autonomy of trainees
internships, participation to activities

4.1 Basic Autonomous Internship Approach ISaR
In preparation

4.2 Evaluation of Pilot Cases SCK•CEN
In preparation

4.3 Development of European Concept for Coordinated
Internship Approach JSI
Starting

4.4 Protocol on the Stakeholder Agreement ENEN
Not started
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Work package 5:
Autonomous conduction of activities by trainees with mentor

5.1 Description of on-the-job Training by Employers  
SCK•CEN INSTN AREVA JSI

5.2 Follow-up Reports of on-the-job Training  
SCK•CEN INSTN AREVA JSI

5.3 Feedback Report and Recommendations  
Non Nuclear Engineers TECNATOM

5.4 Feedback Report and Recommendations  
GEN III Design Engineers AREVA

5.5 Feedback Report and Recommendations  
GEN III Construction Engineers AREVA

5.6 Feedback Report and Recommendations  
GEN IV Design Engineers SCK•CEN

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Work package 6:
Coordination and Meetings

6.0 Lessons learned from ENEN, NEPTUNO, ENEN-II ENEN

6.1 Project Progress Meeting Reports ENEN  
Continuous - available on ENEN Web site

6.2 Project Financial Statements and Reports ENEN  
First period of 18 months covered

6.3 Dissemination of Project Information and External Communication - Covered on the ENEN web site and on the EC Participant Portal - >20 presentations ENEN

6.4 Project Final Report ENEN  
Not started
New ENEN EFTS Project ENEN-III

Administrative matters

Work package 6:
Coordination and Meetings

6.2 Project Financial Statements and Reports
ENEN
First period completely covered

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<th>Maximum amount</th>
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<tr>
<td>Management</td>
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<td>Others</td>
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Total: 388712.87

Claimed

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<th>EC contribution</th>
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<td>950000.00</td>
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Preston
United Kingdom
12-14
December 2011

Coordination
303316.67
EC contribution 232459.55
Management 47212.90
EC contribution 42999.28
Others 38183.30
EC contribution 38183.30
Total 388712.87
ENEN
Claimed

272988.85

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Work package 7:
Collaboration with other training networks

7.1 Presentation of ENEN-III activities to SNETP – ETKM, ENEF and HLG E&T Working Groups
ISaR

7.2 Map of E&T Activities across SNETP – ETKM, ENEF and HLG E&T Working Groups
ISaR and DUT

7.3 SNETP – ETKM, ENEF and HLG E&T Working Group Summary Reports
ISaR

7.4 E & T Workshop around end 2010
ENEN
Exchange of experience at Cordoba meeting under EC coordination 21 January 2011

Preston
United Kingdom
12-14
December 2011
ENEN Web Site
http://www.enen-associ.org

THANK YOU
FOR YOUR ATTENTION

European Nuclear Education Network Association
CEA-Centre de Saclay
INSTN Bldg 395
F-91191 Gif-sur-Yvette, FRANCE
Tel +33 1 69 08 34 21 and +33 1 69 08 97 57
Fax +33 1 6908 9950
Email see.enen@cea.fr
Web http://www.enen-assoc.org