WP2 – Work Plan

Walter Ambrosini & WP2 Participants

Kick-off Meeting of the ANNETTE Project
February 9-10, 2016 – University of Pisa, Italy

This project has received funding from the EURATOM research and training Work Programme 2014 – 2015
WP2 content
The main target

DESIGN AND IMPLEMENTATION OF COORDINATED E&T EFFORTS
[Months: 7-48]

Task Leader: CIRTEN

This project has received funding from the EURATOM research and training Work Programme 2014 – 2015
## WP2 content

### Involved Partners and Effort

<table>
<thead>
<tr>
<th>Partner number and short name</th>
<th>WP2 effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - ENEN</td>
<td>8.00</td>
</tr>
<tr>
<td>2 - CEA</td>
<td>10.00</td>
</tr>
<tr>
<td>3 - SCK-CEN</td>
<td>6.00</td>
</tr>
<tr>
<td>4 - UPC</td>
<td>2.00</td>
</tr>
<tr>
<td>7 - CIRIEN</td>
<td>1.50</td>
</tr>
<tr>
<td>8 - JSI</td>
<td>2.00</td>
</tr>
<tr>
<td>9 - AALTO</td>
<td>3.00</td>
</tr>
<tr>
<td>10 - UU</td>
<td>3.00</td>
</tr>
<tr>
<td>11 - JRC</td>
<td>8.25</td>
</tr>
<tr>
<td>14 - CTU</td>
<td>6.00</td>
</tr>
<tr>
<td>15 - HH-IFIN</td>
<td>2.00</td>
</tr>
<tr>
<td>16 - Juelich</td>
<td>6.00</td>
</tr>
<tr>
<td>17 - KIT</td>
<td>7.00</td>
</tr>
<tr>
<td>18 - UCL</td>
<td>2.00</td>
</tr>
<tr>
<td>19 - UL</td>
<td>4.00</td>
</tr>
<tr>
<td>20 - UNIMAN</td>
<td>2.00</td>
</tr>
<tr>
<td>22 - UPM</td>
<td>2.00</td>
</tr>
<tr>
<td>23 - UCLAN</td>
<td>2.00</td>
</tr>
</tbody>
</table>

**Total** 76.75
WP2 content
The time schedule and objectives

- Discuss the learning outcomes of the courses for a European Programme for CPD and for a Summer Course with EHRO-N, the platforms and with stakeholders.
- Prepare and advertise the course plan for the European Master Programme for CPD and the Summer School.
- Run the European Programme for CPD and the Summer School
- Assess the quality of the Advanced European Programme for CPD and of the Summer School and discuss the possible means to ensure sustainability of these initiatives beyond the end of the project
WP2 content
Deliverables

<table>
<thead>
<tr>
<th>Description of deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>D2.1 Report on the specific needs (in terms of learning outcomes) and their relations to job profiles for an advanced European Programme for CPD and a summer school in the nuclear areas (month 18)</td>
</tr>
<tr>
<td>D2.2 Report on the course plan for the advanced European Programme for CPD and the summer school (month 24)</td>
</tr>
<tr>
<td>D2.3 Web pages for advertising and registering participants (month 24)</td>
</tr>
<tr>
<td>D2.4 Report on the practical implementation of the pilot courses (month 44)</td>
</tr>
<tr>
<td>D2.5 Report on the evaluation of the pilot European Programme for CPD and the summer courses (month 48)</td>
</tr>
<tr>
<td>D2.1 : Specific needs for an advanced European Programme for CPD in the nuclear areas [18] Report on the specific needs (in terms of learning outcomes) and their relations to job profiles for an advanced European Programme for CPD and a summer school in the nuclear areas</td>
</tr>
<tr>
<td>D2.2 : Course plan for the advanced European Programme for CPD and Summer Courses [24] Report on the course plan for the advanced European Programme for CPD and the summer school</td>
</tr>
<tr>
<td>D2.3 : Course Web Pages [24] Web pages for advertising and registering participants</td>
</tr>
<tr>
<td>D2.4 : Implementation of the pilot courses [44] Report on the practical implementation of the pilot courses</td>
</tr>
<tr>
<td>D2.5 : Evaluation of the pilot European Programme for CPD and the summer courses [48] Report on the evaluation of the pilot European Programme for CPD and the summer courses</td>
</tr>
</tbody>
</table>
This project has received funding from the EURATOM research and training Work Programme 2014 – 2015

## WP2 content

### Milestones

<table>
<thead>
<tr>
<th>Milestone number</th>
<th>Milestone title</th>
<th>Lead beneficiary</th>
<th>Due Date (in months)</th>
<th>Means of verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS24</td>
<td>M2.1</td>
<td>1 - ENEN</td>
<td>18</td>
<td>Identification of the needs for courses, Means of verification: Deliverable D2.1</td>
</tr>
<tr>
<td>MS25</td>
<td>M2.2</td>
<td>7 - CIR TEN</td>
<td>18</td>
<td>Discussion with the End-User Group about the course learning outcomes, Means of verification: Specific Meeting</td>
</tr>
<tr>
<td>MS26</td>
<td>M2.3</td>
<td>1 - ENEN</td>
<td>30</td>
<td>Running the courses, Means of verification: Website announcement</td>
</tr>
<tr>
<td>MS27</td>
<td>M2.4</td>
<td>8 - JSI</td>
<td>48</td>
<td>End of quality and sustainability evaluation Means of verification: Deliverable D2.5</td>
</tr>
</tbody>
</table>
T2.1 IDENTIFY AND VALIDATE THE SPECIFIC LEARNING OUTCOMES FOR THE COURSES (Leader: ENEN)

• The offer set up in preparing the proposal should be presented and discussed with stakeholders’

• As already mentioned in the “updated view”, we went for a survey of the available offer in order to start the discussion with something sound

• The needs for a European Programme for CPD and a Summer School will be identified and the main learning outcomes as well as content to be covered will be specified
T2.2 SPECIFY THE EUROPEAN PROGRAMME FOR CPD AND THE SUMMER SCHOOL (Leader: CIRTEN)

- The offer of the participating institutions in terms of existing courses or other informal or non-formal learning (e.g. site-visits, internships, on-the-job-training) collected since the start of the project will be analysed.

- A specific event will be organised involving the End-User Group in order to discuss in detail the problems and the challenges involved in the matching of the available offer with the identified needs.
WP2 content
T2.2: Detailing the offer (2)

• It will be specified which existing courses will have to be upgraded, and which (limited number of) new courses will have to be developed to respond to the specific needs.

• As a result of this task, the structure and content of the programme, composed of diverse modules addressing different learning outcomes, and the summer school will be specified.

• Good coverage of the different nuclear areas will be assured, also including modules to be developed in the frame of the activities addressing nuclear safety culture (WP5) and the transition from non-nuclear to nuclear in the fusion field (WP6).
T2.3 PREPARE AND ADVERTISE THE EUROPEAN PROGRAMME FOR CPD AND THE SUMMER SCHOOL

- Coordination and harmonisation of the various modules with the specified learning outcomes
- Diffusion of the announcement and, where appropriate, preparation of tools necessary for recording and broadcasting by web selected lectures
- As already stated in T2.2, access to relevant infrastructures for achieving skills and developing attitudes will be also considered in some modules.
- Contributions to this action in terms of resources and modules will also come from WP5, related to nuclear safety culture, and from WP6, related to fusion.
T2.4 RUN THE PILOT EUROPEAN PROGRAMME FOR CPD AND THE SUMMER SCHOOL (Leader: CIRTEN)

- The pilot programme will be run according to the prepared plan.
- All the possible efforts will be made in order to gather the greatest number of attendees, compatible with the available resources.
T2.5 EVALUATE THE QUALITY AND SUSTAINABILITY OF THE EUROPEAN PROGRAMME FOR CPD AND OF THE SUMMER SCHOOL

- The quality and the success of the courses will be measured by objective indicators (teaching material, presence of experienced teachers, level of coverage of the relevant learning outcomes by the courses, feedback from the attendees).
- The quality criteria developed in WP1 will be applied in this frame.
- The number of attendees will provide a further measure of the attractiveness of the courses, to be considered anyway in view of the difficulties that nuclear matters have in gathering attendance throughout Europe.
- EHRO-N and the representatives of the platforms in the Advisory Board will be called to contribute to draw the main lesson learned from the activities.
**WHICH PRELIMINARY PLAN FOR WP2?**

- Examples from a wider offer on NS/NE, GD&WM, RP

<table>
<thead>
<tr>
<th>Institution</th>
<th>Course content</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>UCLAN</td>
<td>UK perspective on safety and security</td>
<td>2</td>
</tr>
<tr>
<td>JRC / ITU</td>
<td>Nuclear Fuel Characterisation, Back End Fuel Cycle, Radioactive waste management, Hands-on training in radiation protection</td>
<td>10</td>
</tr>
<tr>
<td>KIT / IFRT</td>
<td>Fuel Cycle, Decommissioning, Waste Disposal and Safeguards</td>
<td>6</td>
</tr>
<tr>
<td>UU, SCK-CEN, FZJ, JRC-ITU</td>
<td>Nuclear Safeguards</td>
<td>6</td>
</tr>
<tr>
<td>UU, SCK-CEN, FZJ, JRC-ITU</td>
<td>Possible Summer School on Safety Security and Safeguards + Thematic Workshops</td>
<td>12</td>
</tr>
<tr>
<td>UL, UPM; CVUT</td>
<td>Course on Geological Disposal with Field Experimentation</td>
<td>8</td>
</tr>
<tr>
<td>IFIN-HH</td>
<td>Radiation protection and international framework</td>
<td>2</td>
</tr>
</tbody>
</table>
WHICH PRELIMINARY PLAN FOR **WP2**?

- **Examples from a wider offer (continued)**

<table>
<thead>
<tr>
<th>Institution</th>
<th>Course content</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCK_CEN</td>
<td>Internships on different matters</td>
<td>NA</td>
</tr>
<tr>
<td>UCL</td>
<td>Nuclear Thermal-hydraulics</td>
<td>5</td>
</tr>
<tr>
<td>UPC</td>
<td>Nuclear Reactor Operation (with simulators)</td>
<td>5</td>
</tr>
<tr>
<td>CEA-INSTN</td>
<td>Basic Reactor Operation (with ISIS reactor)</td>
<td>3</td>
</tr>
<tr>
<td>CEA-INSTN</td>
<td>Thermal-hydraulics of LWRs</td>
<td>6</td>
</tr>
<tr>
<td>CEA-INSTN</td>
<td>Neutronics for LWRs</td>
<td>6</td>
</tr>
<tr>
<td>CEA-INSTN</td>
<td>Radiological Risk Management</td>
<td>3</td>
</tr>
<tr>
<td>AALTO</td>
<td>Summer School on present and future challenges of nuclear power production</td>
<td>3</td>
</tr>
<tr>
<td>CVUT</td>
<td>Advanced Training Course in VR-1 Reactor</td>
<td>6</td>
</tr>
</tbody>
</table>
WHICH PRELIMINARY PLAN FOR WP2?

• Examples from a wider offer (continued)

<table>
<thead>
<tr>
<th>Institution</th>
<th>Course content</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AALTO</td>
<td>Summer School on present and future challenges of nuclear power production</td>
<td>3</td>
</tr>
<tr>
<td>CVUT</td>
<td>Advanced Training Course in VR-1 Reactor</td>
<td>6</td>
</tr>
<tr>
<td>UM</td>
<td>Ample choice of courses. e.g. Nuclear Power Plant Management, Nuclear Installation Safety, etc.</td>
<td>Various</td>
</tr>
</tbody>
</table>

THESE ARE EXAMPLES COLLECTED IN ORDER TO SHOW THAT THE CONSORTIUM HAS AN ADEQUATE POTENTIAL FOR CPD

IN ADDITION, THE OFFER OF “BASIC COURSES” IN NUCLEAR ENERGY IS NOTICEABLY LARGE
ESARDA
Contribution to WP2

• Selected proposal by the Coordinator

<table>
<thead>
<tr>
<th>CONTRIBUTION</th>
<th>PM INSTITUTION</th>
<th>ETCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Nuclear Safeguards” Course in Advanced Master/VET</td>
<td>2</td>
<td>In-kind 6</td>
</tr>
<tr>
<td>Summer School on “Nuclear Security and Safeguards” (included in AALTO SS)</td>
<td>1</td>
<td>In-kind 3</td>
</tr>
<tr>
<td>Workshop on Safeguarding NFC</td>
<td>1.5</td>
<td>1</td>
</tr>
<tr>
<td>Workshop on Proliferation Resistance</td>
<td>1.5</td>
<td>1</td>
</tr>
<tr>
<td>Workshop on State-level Safeguards Concept</td>
<td>1.5</td>
<td>1</td>
</tr>
<tr>
<td>Workshop on Safeguards-relevant Open Source Information</td>
<td>1.5</td>
<td>1</td>
</tr>
</tbody>
</table>

This project has received funding from the EURATOM research and training Work Programme 2014 – 2015
ESARDA
Contribution to WP2

• More general offer
  – We offer to coordinate European teaching efforts in the field of nuclear safeguards, based upon the well-established ESARDA platform (European Safeguards Research and Development Association). The ANNETTE collaborators include central persons within ESARDA and its TKM working group, which enables coordinated efforts from ESARDA’s partners.
  – We offer to provide world-wide connection to NuSaSET, which is an international initiative of the IAEA, the INMM (US) and ESARDA that manages a portal to support professionals in the field of Nuclear Safeguards and Security, and to promote the provision of training and education.

• Role of E-learning and MOOCs
  – E-learning modules preparation in the long term
  – MOOC: Course “Introduction to Safeguards” (for students in Nuclear Engineering, Nuclear Energy etc.)
ESARDA

Contribution to WP2

• In-kind offer to ANNETTE of existing safeguards course (in addition to the Advanced Master course, summer school and workshops).


This project has received funding from the EURATOM research and training Work Programme 2014 – 2015
• **Course 1**
  Aurelian F. Badea (IFRT), Xu Cheng (IFRT), Thorsten Schäfer (INE)

Fuel Cycles, Decommissioning, Waste Disposal and Safeguards
- Front End of the Fuel cycle
- Transuranium Elements in the Nuclear Fuel Cycle
- Decommissioning of Nuclear Plants
- The Scientific Basis of Nuclear Waste Management
- Proliferation Resistance and Safeguards

• MOOC possibility
• Maximum 20 participants in practical training units.

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<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Instructor</th>
<th>MOOC Possibility</th>
<th>Participant Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course 2</td>
<td>Starflinger</td>
<td>AREVA Nuclear Professional School @ KIT</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Course 3</td>
<td>Sanchez</td>
<td>AREVA Nuclear Professional School @ KIT</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Course 4</td>
<td>Chiara</td>
<td>AREVA Nuclear Professional School @ KIT</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Course 5</td>
<td>Stempniewski</td>
<td>AREVA Nuclear Professional School @ KIT</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

**Reactor Exercises**
- MOOC possibility, max 20 participants on-site

**Design basis accidents for light water reactors and numerical simulation tools**
- MOOC possibility, max 20 participants on-site

**Computational fluid dynamics with OpenFOAM**
- MOOC not possible, max 20 participants on-site

**Design of Pipelines against Earthquake Loads**
- MOOC possibility, max 15 participants on-site
AREVA Nuclear Professional School @ KIT (ANPS / Andreas Class):
Members of ANNETTE will have reduced fees (1/3 of the original) for all ANPS lectures

1) Flow modelling in Fuel Assemblies
2) Monte Carlo criticality and shielding calculations
3) Reactor physics calculations with deterministic methods
4) Beyond-design accidents, core-melt accidents
5) Coupled Neutron Kinetics /Thermal Hydraulic Codes for Safety Assessment of Nuclear Power Plants
6) Thermohydraulic Stability Analysis
7) Technology and Management of the Decommissioning of Nuclear Facilities
AREVA Nuclear Professional School @ KIT (ANPS / Andreas Class):
Members of ANNETTE will have reduced fees (1/3 of the original) for all ANPS lectures

8) Containment thermohydraulics and hydrogen behaviour
9) Stress Analysis
10) Light Water Reactor (LWR) core design and fuel management
11) Light Water Reactor (LWR) core feedback and transient response
Severe Accident Simulation in Liquid Metal Reactors
Aalto University
Contribution to WP2

• Summer school on current and future challenges of nuclear power production
  – Summer of 2017 (original suggestion was 2016)

• EC contribution: 30.000 Eur (travel support for lecturers etc) + 2 pwm (if online plan ok, 1-2 pwm more are needed)

• Possibility to put the course lectures (video?) online
  – Three parallel tracks, 3 ECTS each
  – Post-school web-based work (incl. online lectures): additional 2x3 ECTS also for school participants?
JRC-ITU
Contribution to WP2

• Selected proposal by the Coordinator
  – (1) Nuclear fuel behaviour and characterisation (including severe accident conditions); (as part of a master – contact person D. Manara)
  – (2) Back end of the nuclear fuel cycle (as part of a master – contact person S. Van Winckel)
  – (3) Spent fuel and radioactive waste management (including legal basis, ethical aspects, the role of storage, establishing national programs); (as contribution to a summer-school – contact persons G. Buckau and A. Van Kalleveen)
  – (5) Hands-on training in the area of radiation protection (as part of a master – N. Rausch)
  – (6) Contribution to preparation of the safeguard module (through ESARDA consortium – contact person K. Abbas)

• More general offer
  – Adaptation (as far as possible) of the nuclear fuel, the back-end of the nuclear fuel cycle and the waste management themes to stakeholders' needs
  – When possible create a link between the "spent fuel and radioactive management" to other initiatives in this field e.g. JOPRAD

This project has received funding from the EURATOM research and training Work Programme 2014 – 2015
JRC-ITU

Contribution to WP2

• Role of E-learning and MOOCs
  – (1) and (2) can be prepared also as e-learning/MOOC

• In-kind offer to ANNETTE of existing courses
  - (4) Physics and chemistry of actinides (to be discussed)
  - International School on Decommissioning and Waste Management (to be discussed)

JRC-ITU will contribute with the topics above according to guidelines defined in task 2.1
Lab visits and hands-on training can be organised for all themes proposed above

This project has received funding from the EURATOM research and training Work Programme 2014 – 2015
CVUT
Contribution to WP2

• Selected proposal by the Coordinator

1. Vašíček, R. - Experimentation in Josef Underground Facility – by Faculty of Civil Engineering (FCE) - Underground Facility Josef; geological disposal; 1 ECTS; 100% training; 2PM

2. Sklenka, L. - Advanced training course at VR-1 reactor - by Faculty of Nuclear Sciences and Physical Engineering (FNSPE); Master/PhD; 6ECTS; for Master/SS; 100% training; 4PM

• More general offer

1. CVUT FCE operates own underground facility - course duration and content can be adapted on demand (e. g. according to number of providers or focus – CVUT only or others; bentonite/ monitoring of experiments/ large scale in-situ models...; PETRUS group knows...)

2. CVUT FNSPE operates the VR-1 nuclear training reactor and provides advanced reactor training courses there. The courses can be organized for groups of up to ten students. The course tasks are reactor dynamics, thermal effects, neutron activation analysis, neutron flux measurement using Campbell technique, reactor I&C, etc.
Training at the Josef facility
Training course at VR-1 reactor

This project has received funding from the EURATOM research and training Work Programme 2014 – 2015
CVUT
Contribution to WP2

• Role of E-learning and MOOCs
  1. As the „Josef course“ is 100% practical (in-hand work in laboratory and underground) currently the (on-line) e-learning is only supporting tool used in advance - during related, preceding courses provided by UL, UPM... It might play role as „entrance test“ before accepting to the course...
  2. CVUT FNSPE doesn’t provide E-learning now, but could prepare online experiments at the VR-1 nuclear training reactor

• In-kind offer to ANNETTE of existing courses
  1. The offered Josef course with its potential to adaptation comes out from current course on geological disposal at CVUT FCE; no more ones are on-going
  2. CVUT FNSPE could provide courses in nuclear reactor technology, fuel cycle, thermohydraulics, dynamics, nuclear reactor I&C systems, etc.

This project has received funding from the EURATOM research and training Work Programme 2014 – 2015
Provision of Master courses in the section related to the geological disposal in collaboration with PETRUS partners. We can propose lectures on: site selection, safety requirements, near field and far field behavior, geological analogues and thermo-hydro-mechanical modeling.

Summer school: We can adapt one or 2 above lectures to the summer school format. Lectures for a larger audience can also be proposed, for instance about the treatment of uncertainty.

Both synchronous and asynchronous e.Learning methods can be proposed.
Selected proposal by the Coordinator

- Principles of radiation protection and international framework. Regulatory control

An updated course on ICRP fundamental principles and their reflection in the revised IAEA's Basic Safety Standards (BSS) and European Directive 2013/59/EURATOM

New E-learning ideas/tools could be developed for supporting understanding of RP principles (see few slides forward)
Contribution to WP2

More general offer

- Radon and its radiological impact

A course that would be supported by prof. Maria Sahagia about Radon, topic that seems not to be addressed by the existing RP programs, but is of great interest in the last period. We have also approached this topic especially for training programs on RP in the uranium mining.
Role of E-learning and MOOCs

If it assume that e-learning means not only distance learning, but also any kind of software tools helping in teaching (i.e. assisted computer teaching in classroom or lab, virtual experiments, multimedia, etc.), then

New software tools could be designed/developed (depends on cost) for better understanding of the proposed course.

Examples of few such applications developed by our training center:

Otherwise, we could have contribution for setting up the e-learning system within project.

This project has received funding from the EURATOM research and training Work Programme 2014 – 2015
HH-IFIN
Contribution to WP2

In-kind offer to ANNETTE of existing courses


or

• Particle accelerators and related radiation protection issues

or

• Designing/Developing of the software tools proposed previously in order to increase the E-learning role in the ANNETTE project

This project has received funding from the EURATOM research and training Work Programme 2014 – 2015
• Selected proposal by the Coordinator

– Operation of Nuclear Power Plants. Practices with nuclear power plant conceptual simulator at UPC: 1 week (30 h - 6h/day) including 2 practical sessions each day. Power plant conceptual simulator : SIREP-1300.
  • 10 practical sessions
  • P4: Isothermal coefficient and moderator coefficient. Moderation relation. Isothermal coefficient and moderator coefficient determination. Design principle of intrinsic security. Boron limit concentration determination
  • P6: Reactor standard states. Transition from hot full power to hot zero power.
  • P7: Reactor standard states. Transition from hot zero power to cold zero power.
  • P8: Control rods calibration.
  • P9: Reactor auto stabilization.
  • P10: Electric network disconnection and house load operation.
Technical University of Catalonia
Contribution to WP2

• More general offer
  – Simulating thermal-hydraulic phenomenology with system codes. RELAP5 and TRACE training course: 1 week (30h - 6h/day) and could be extended to 2 weeks. The course is held at UPC-Barcelona

• Role of E-learning and MOOCs
  – No E-learning and MOOC courses provided

• In-kind offer to ANNETTE of existing courses
  – Monte Carlo Simulation of Radiation Transport. 4.5 ECTS. Laboratory classes 40h30min + Self study 72h.
UCL
Contribution to WP2

• Selected proposal by the Coordinator
  – Existing NTH (5ECTS) course from BNEN is 100% suited for CPD. The BNEN version cannot be adapted without BNEN agreement. Doing a second “CPD version” (5ECTS) would cost more than 2pm.
  – The BNEN version could be offered as is by making available some seats for the “ANNETTE master” (discussions with BNEN)
  – CEA is also proposing a NTH module (6ECTS) and has 10pm in this WP
  – Specific module(s) in the summer school (as in our last discussion for the proposal) or in the larger NTH course at the master scale (SBL/LBL e.g. two phase choked flows with hands-on/case studies over an in-house software)
UCL
Contribution to WP2

• More general offer
  – Participation to the survey of stakeholder needs in Belgium (to be coordinated with SCK)
  – Participate in the setup of the whole curriculum of the ANNETTE EU master after master (LO, program)
• Role of E-learning and MOOCs
  – Possible to organize/implement the hands-on related to the course (Leaks calculation during a LOCA) on the web via an interactive applet: to be investigated...
  – If ok then our participation in the general activities (survey, etc..) will be reduced.
Contribution to WP2

• In-kind offer to ANNETTE of existing courses
  – BNEN courses (NTH, and others ?) to be discussed within BNEN if required
  – BNEN curriculum: [Here](#)
The University of Manchester
Contribution to WP2

• Selected proposal by the Coordinator
  – Nuclear Power Plant Management
  – Managing Nuclear Installation Safety

• More general offer
  – Many courses covering all aspects of the nuclear fuel cycle, reactor physics, radiological protection, policy and regulation

• Role of E-learning and MOOCs
  – Ten one week courses are available in E-learning format

• In-kind offer to ANNETTE of existing courses
  – Help with arranging or running the Summer School
UCLAN
Contribution to WP2

In-kind offer to ANNETTE of existing courses to be drawn from nuclear safety, security and safeguards.

These courses are part of UCLan’s 15 under graduate and post graduate nuclear education and training portfolio.
INSTN

Contribution to WP2

• ??
• Selected proposal by the Coordinator

Provision of **Master courses** in the section related to the geological disposal (GD) in collaboration with PETRUS partners:

  o THM modeling of near and far field behaviour in GD.
  o Hydrogeological modelling in fracture media.
  o Reactive groundwater transport modelling.
  o Uncertainty and sensitivity analysis.

• **More general offer**

**Summer school**: We can adapt one or 2 above lectures to the summer school format. Lectures for a larger audience can also be proposed, for instance about nuclear safety culture.
• Role of E-learning and MOOCs

Both synchronous and asynchronous E-Learning methods can be proposed. MOOCs can be developed (Miriadax and EDX).

• In-kind offer to ANNETTE of existing courses

1. Nuclear waste management course (6 ECTS)
2. Radiological protection course (3 ECTS)
3. Nuclear technology course (3 ECTS)
What about CIRTEN?

• At the time of the preparation of the proposal, CIRTEN was providing the President who was supposed to mainly coordinate... it was enough...: “the shoemakers’ shoes are always the worst ones...” (Italian proverb)

• However, now, with due calm, an in-kind proposal can be made

• I will consult colleagues downstream the KoM to decide and let you know; however, the UniPi Unit...
• In-kind offer:
The Course in
“Single and Two-Phase Thermal-hydraulics” (6 ECTS)
Prepared long ago and run only once in compact form
in two weeks for EMSNE students

Material already available at
http://www.dimnp.unipi.it/walter-ambrosini/teamat.htm

To be renewed ... e-learning certainly possible,
MOOC to be evaluated (difficult)
THE CONCEPT OF Second Level Master

• We will have to set up a “second level master”, an international one to be specific
• The concept is active in Italy and, I am confident, in other Countries
• We need anyway a “multipole” accreditation scheme
  – Selected Universities will provide the final title
  – Collection of courses to fill a “passport”

• All these aspects will be discussed in due time: INSTN and UniPi already offered to consider possibly releasing the final title

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NEXT ACTIONS

• We have up to month 7 to reconsider and update our offer
• Then we will have to start interacting with stakeholders to present it and receive suggestions
HINTS FOR DISCUSSION

• How do we find the offer? Is it rich enough?

• How much are we ready to adapt it to match stakeholders’ views?

• How do we see the role of e-learning and MOOCs?
Thanks

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