Pool of Course Lecturers

Y. Aregbe
Responsible for analytical methods for nuclear material measurements at European Commission Joint Research Centre in Geel.

J. Baute
Joined IAEA in 1994 and became director of Iraq’s Nuclear Verification Office. Presently he is director of the IAEA Safeguards Information Management Directorate.

K. Abbas
Nuclear Physicist, joined JRC Karlsruhe in 1995, currently in charge of R&D in Nuclear Security, Safeguards and Nuclear Decommissioning and Waste management in JRC Ispra. He is also in charge of Safeguards trainings.

V. Berthou
Joined the JRC in 2002 as Research Engineer in Karlsruhe, Germany. In 2004 she joined the Nuclear Security Unit in Ispra, Italy, where she has been involved with all aspects of international training courses.

C. Crawford
Is a Senior Program Manager at Oak Ridge National Lab. and was Technical Group Manager at the Pacific Northwest National Lab. He has over 23 years’ experience in nuclear safeguards, security and non-proliferation.

M. De Cort
For more than 20 years, he has been working as a Scientific Officer with the Radioactivity Environmental Monitoring (REM) group at JRC Ispra.

N. Edmonds
Operations Support and Technical Manager in the Safeguards Department at Sellafield. He was Senior Nuclear Material Accountant for Magnox and Waste facilities.

P. Funk
Is since more than 10 years involved in French and International safeguards as leader of C/S lab at IRSN.

W. Janssens
Is head of the Nuclear Security and Safeguards Department at the European Commission Joint Research, including the unit Nuclear Security in Ispra and the unit Nuclear Safeguards and Forensics in Karlsruhe. .

O. Jankowitsch
Ex head of the IAEA Office of External Relations and Policy Co-ordination, and formerly working at the Office of the IAEA Director General.

T. Jonter
Is heading the Department of Economic History at the Stockholm University, leading educational programs on Nuclear Non-proliferation at different Universities in former Soviet Union.

G. Maenhout
Is currently professor at the University Ghent in Belgium, teaching nuclear reactor theory, safety and safeguards. Before she was leading the Process Monitoring Team in the nuclear safeguards unit at the European Commission JRC in Ispra.

Q. Michel
Professor in European Studies and President of the Department of Political Science of Liège University.

P. Peerani
Is currently Head of Unit of the Nuclear Decommissioning and Waste Management at the European Commission JRC in Ispra. Before he was leading for over 10 years the group on Non Destructive Analysis for nuclear security and safeguards.

J.P. Robin
Analyst of facilities, particularly nuclear related installations, exploring all types of imagery sensors at the Non-Proliferation Section of the European Union Satellite Centre in Madrid (Spain).

L. Rockwood
Is the Executive Director of The Vienna Centre for Disarmament and Non-Proliferation (VCDNP). She worked for almost 30 years at IAEA, focusing primarily on the negotiation, interpretation and implementation of safeguards.

P. Schwalbach
Joined the European Commission as EURATOM inspector in 1992 and is heading the logistic support for nuclear material verification.

M. Tarvainen
Senior Safeguards Technology Expert, Office for Verification in Iran, Department of Safeguards, IAEA.

L. Van Den Durpel
Expert in Nuclear fuel Cycle in Strategic Analysis and Technology Prospective. He is Managing Director of Nuclear-21.Net (Belgium).

M. Wallenius
Works on destructive assay measurements and is responsible for nuclear forensics at JRC Karlsruhe.

B. Pedersen
Joined the JRC more than 25 years ago, he is currently responsible for the activities in the Neutron Laboratory home to the pulsed neutron interrogation test facility (PUNITA).

F. Sevini
Is leading the Strategic Export Control team at the JRC Ispra and is currently the ESARDA Secretary.
**Origin of the course**

The knowledge retention problem in the nuclear field was acknowledged by the OECD in 2000. The United Nations study on disarmament and non-proliferation education (2002) made detailed recommendations for urgently required improvements. ESARDA, the European Safeguards Research and Development Association reacted to these shortcomings with a strategy to tackle the problem and created a Working Group on Training and Knowledge Management (ESARDA WG TKM). The final objective of the ESARDA WG TKM is the setup of academic course modules to an internationally recognised reference standard. This project is in line with the movement of establishing a European curriculum for Nuclear Engineering. Teaching in the Nuclear Safeguards field is indeed strongly influenced by national history so the objective of the course is to provide homogeneous material in Nuclear Safeguards and Non-Proliferation matters at the European and international level.

**Learning objectives**

This compact course is open to masters degree students, in particular nuclear engineering students, but also to young professionals and International Relations/ law students. It aims at complementing nuclear engineering studies by including nuclear safeguards in the academic curriculum. The basic aim of the course is to stimulate students’ interests in safeguards. The course addresses aspects of the efforts to create a global nuclear nonproliferation system and how this system works in practice: the Treaty on Nonproliferation of Nuclear Weapons (NPT), safeguards technology, and export control. Also regional settings, such as Euratom Treaty, are presented and discussed. The course deals in particular with technical aspects and application of safeguards; i.e. how to implement the safeguards principles and methodology within the different nuclear facilities. Therefore the course will create an overview on inspections techniques, ranging from neutron/ gamma detectors, to design information verification, to environmental sampling, etc.

**Course content**

**Introduction:** The evolution of the Non Proliferation Treaty -regime, safeguards, international control regimes in theory and practice, and present trends in the nuclear nonproliferation efforts.

**What is safeguarded:** Definition of nuclear material that is subject to nuclear safeguards and related safeguards goals (significant quantity, timeliness and detection probabilities).

**Where is it found:** Description of the nuclear fuel cycle from mining to final repository, focussing on enrichment in the front-end and reprocessing in the back-end.

**Which legal protection means exist:** Overview on international and regional Non-Proliferation Treaties and established Institutions and Organisations.

**What is the methodology to verify:** Nuclear material accountancy principles and statistics of auditing.

**How are inspections performed:** Overview on inspector tools and their use to verify the nuclear activities as declared under the safeguards agreements (Non Destructive Assay, Monitoring, Containment/ Surveillance); additional safeguards measures under the Additional Protocol (complementary access, satellite imagery, environmental sampling) and how they are applied in field (storage facility, process facility, enrichment facility, research institute, spent fuel transfer).

**How to control Import/ Export:** Guidelines of the Nuclear Suppliers Group, trigger list and dual-use list. Means to combat illicit trafficking, inclusive nuclear forensics.

**What additional information offers:** Collection of open source data and demonstration of some case studies (Iraq, 1993).

**Practical organisation**

The course features a full five-days program with 1h lectures by experts in the field of nuclear safeguards, visits to five safeguards laboratories and some classroom exercises.

The course material, consisting of a syllabus, a complete set of presentations and literature, will be provided to the participants. It is recommended that the students prepare themselves with the reading material on the website.

For this limited enrolment course early registration is recommended. A numerus clausus of 60 is introduced. On the website https://esarda.jrc.ec.europa.eu/ you can find the programme and the registration form. The registration deadline is 25th January 2018. University students can apply for accommodation free of charge, but only a limited number of places per university are available. Travel costs are not reimbursed by the JRC.

There is no course fee; lunches are offered free of charges.

All participants are encouraged to make an essay on a given topic selected from the list, which is handed out at the end of the course. Up to 2 best essays can be selected for being published in the ESARDA Bulletin or for being presented in the poster session at the next ESARDA Symposium.

Students can include this course, recognised by BNEN/ENEN for 3 ECTS points, in their academic curriculum. To be quoted for this course an additional Take-Home-Exam is foreseen.

**Venue:** JRC Ispra, Building 58C, Auditorium

**Schedule:** From Monday, April 9th 2018 at 8:30 till Friday, April 13th, 2018 at 17:00

For further info: JRC-NUSAF-SECRETARIAT@ec.europa.eu