

## AGA 5: Nuclear Verification and Detection

Time: Friday 10:00–13:00

Location: MENSA Dül

**Invited Talk** AGA 5.1 Fri 10:00 MENSA Dül  
**The UK-Norway initiative for verification of nuclear warhead dismantlement – Lessons Learned** — ●STEINAR HØIBRÅTEN — Norwegian Defence Research Establishment

Since 2007, the United Kingdom and Norway has been cooperating on a technical level about the verification of nuclear warhead dismantlement. This is the first ever practical cooperation in this field between a nuclear weapons state and a non-nuclear weapons state. Many obstacles occur in such a verification process. The inspectors must see enough to be confident that the warhead in question is actually dismantled. At the same time, both parties must observe the restrictions of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) which prohibits the transfer of nuclear weapons design information from a nuclear weapons state to a non-nuclear weapons state. In addition, nuclear weapons and nuclear weapons facilities are highly sensitive from a national security point of view. The two countries carried out a joint exercise in Norway in June 2009 involving the dismantlement of a mock nuclear weapon. The presentation is mainly based on our experiences from that exercise.

**Invited Talk** AGA 5.2 Fri 11:00 MENSA Dül  
**Nuclear Safeguards R & D Structure in Germany: Coordinating the German Support Programme to the IAEA** — ●IRMGARD NIEMEYER, MARTIN DÜRR, and BERND RICHTER — Forschungszentrum Jülich GmbH, Institut für Energie- und Klimaforschung, IEK-6: Sicherheitsforschung und Reaktortechnik

Nuclear safeguards are measures by which the International Atomic Energy Agency (IAEA) can verify that a State is in compliance with its international commitments not to use nuclear programmes for nuclear-weapons purposes. Being an UN Organisation, the IAEA does not have the resources to perform its own R&D programme and therefore relies on its Member States to be supported with the latest technologies and methodologies. In 1978, the IAEA and the German Government agreed upon the "Joint Programme on the Technical Development and Further Improvement of IAEA Safeguards". Up till now, the programme comprised more than 150 tasks, providing not only R&D, but also training of IAEA staff, consultancy support, and the delegation of 17 cost-free experts to the IAEA. The R&D support covers a wide variety of issues, such as measurement methods and techniques, safeguards data, containment and surveillance techniques, safeguards approaches and concepts for future technologies. Since summer 1985, Forschungszentrum Juelich has coordinated the programme implementation in close cooperation with the German Government. The pre-

sentation highlights past and ongoing safeguards R&D activities and discusses new challenges, e.g. the detection of undeclared nuclear materials and activities, state-specific safeguards approaches and disarmament efforts.

AGA 5.3 Fri 12:00 MENSA Dül  
**Acoustic-Seismic Monitoring of an Underground Final Repository - a Measurement Project** — ●JÜRGEN ALTMANN — Experimentelle Physik III, TU Dortmund

When spent fuel from nuclear power plants is deposited without reprocessing, the produced plutonium - which could be used for nuclear weapons - is still contained in it. Thus, safeguards of the International Atomic Energy Agency (IAEA) are needed for final repositories to detect potential access, during and after the emplacement phase. To find out if acoustic and seismic methods can be used to detect undeclared activities in an underground repository in salt, the German Support Programme for the IAEA has tasked us to do measurements in the exploratory mine in Gorleben, a potential site. To gain the source properties we record sound and vibration at several positions underground and at the surface while various mining activities are carried out singly and in parallel. The evaluations will investigate source detection, localisation and recognition.

AGA 5.4 Fri 12:30 MENSA Dül  
**Simulation of portal monitors for the detection of illicit trafficking of anthropogenic radioactivity** — ●ALEXANDER RAMSEGER — ZNF, Universität Hamburg, Deutschland

The estimate the room for improvement of radiation portal monitors (RPM), simulations with MCNP were conducted after measurements under field conditions. The best working detection conditions were determined studying the application of sodium-iodide and plastic scintillators in an RPM. In the scenario certain radionuclides (e.g. Cs-137) were located in cargo containers. The containers were inspected with an RPM. The radiation of the nuclides was attenuated by different types of cargo (3) filled in the containers. These cargo types were derived from statistics of US-American and German ports. Every cargo type is related to a certain amount of cargo containers imported and exported. The radiation background was simulated as well to determine the minimum detectable activities. The room for improvement was evaluated regarding the measurement time and the number of used detectors in relation to a certain amount of sufficiently inspected containers.