European
ALARA
Network

ALARA NEWS AND ALARA INFORMATION IN EAN MEMBER COUNTRIES

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This document summarizes the main events dealing with ALARA in EAN Member countries discussed at the occasion of the December 2009 Steering Group meeting.

FRANCE - ASN

MEDICAL, INDUSTRIAL AND RESEARCH FACILITIES

International conference "Modern Radiotherapy: Advances and Challenges in Radiation Protection of Patients" - Versailles, France, 2 - 4 December 2009

The first international conference on radiation protection of patients in the field of radiotherapy has been held at Versailles, from 2 to 4 December 2009. ASN has organised this conference with the support from the World Health Organization (WHO), the International Atomic Energy Agency (IAEA), the European Commission (EC) and the participation of many organizations, professional and patient associations.

The following topics have been presented:

- Major advances in the field of new technologies used in external beam radiotherapy and brachytherapy;
- The state of the art in scientific and medical knowledge on side effects and possible complications associated with radiation and radiosensitivity of individual patients;
- The main lessons learnt from experience feedback of accidents and preventive actions to reduce risks.

The conference brought together over 330 delegates representing 34 different countries, including 50 international speakers. Nearly 70 posters were exposed from all over the world. The conference has allowed for all professionals and organizations involved in the field of radiation safety, particularly health professionals, patient organizations, representative authorities and manufactures to meet.

Andre-Claude Lacoste, ASN Chairman and Professor Jean-Marc Cosset, radiation oncologist at the Curie Institute, member of the International Commission on Radiological Protection (ICRP) and Chairman of the Scientific Committee of the Conference concluded the conference by stressing on the following items:

- the essential place occupied by radiotherapy in the treatment and cure of cancer has been reaffirmed;
- technical developments in this field bring new benefits but they also generate new risks. Operator training should be strengthened and the first uses of these new techniques should be evaluated by independent professionals, according to terms to be defined at international level;
- efforts at national and international levels should be intensified in recording and analysing side effects and complications of treatments. Systems for reporting significant events must be developed for purposes of analysis and feedback;
- safety culture in radiotherapy centres should continue to progress through the implementation of quality assurance and risk analysis by trained professionals in adequate numbers;

- greater involvement of authorities is necessary to promote actions in the areas of quality assurance, risk analysis of good clinical practices and clinical audits;
- coordination of research programs is essential in order to have available in the middle term simple and faster radiosensitivity test;
- involvement of patients and their associations is desirable in the areas of quality assurance and safety of treatments, risk management and communication.

To ensure the wider dissemination, presentations, posters and summaries of the conference will be available in early 2010 on the website of the ASN (www.asn.fr).

ASN will continue its international consultations with IAEA, WHO and the EC to develop new initiatives and research to improve knowledge and enhance the safety of care in radiotherapy.

During the closing of the conference, the ASN Chairman expressed the interest in organizing a new international conference on radiation protection of patients within two years. Clearly, the ASN is ready to contribute

Conference website: www.conference-radiotherapy-asn.com

Unintended exposure of a worker during a welding test using gamma radiography

On the 29 September 2009 a radiographer of the ABC Company (HORUS holding) has been over-exposed during a welding test using gamma radiography at the Flamanville NPP owned by EDF. Through violation of the working procedures, the worker entered the controlled area and remained in during several seconds while the high activity source was not yet in its safe store position.

The worker received a dose of 5 mSv due to this incident. The medical officer in charge of monitoring the worker was informed. He did not consider it necessary to conduct a medical examination after the incident.

This accidental exposure has been caused by the non-compliance with essential radiation protection procedures. Based on a misinterpretation of the actions performed by the radiographer operating the radioactive source, the exposed worker, who was observing from the distance, believed the exposure was completed. He then entered the controlled area while the radiation source was still exposed without waiting for the formal confirmation of the end of operations and without any survey meter to check the end of the exposure.

A joint inspection by ASN and the Labour Ministry was carried out on 29 October 2009. Deviations from radiation protection approved standards were confirmed. The corrective actions implemented by ABC and Horus were considered as satisfactory. ASN will ensure the follow-up of the implementation of these actions.

ASN has rated this incident at level 2 on INES (October 2008 version) due to a generalised non respect of the safety rules to access the controlled area which has led to a significant unintended exposure of a worker.

The device used is a gamma radiographer containing a high activity radioactive source of Ir-192 (1,73 TBq).

Suspension of radiotherapy department authorizations

Since January 2008, as the result of the departure of their only physicist, ASN has suspended the authorization of four radiotherapy centres pending the appointment of a new physicist in each department. This decision is in conformance with Article 6 of the Decree of 19 November 2004 requiring physicist presence during treatments. Vacancies in these radiotherapy centres are a direct consequence of qualified physicist shortage in France.

At present, ASN has lifted the suspensions for two of these centres.

ASN takes position on the safety of radiotherapy treatment using beams of small dimensions (radiosurgery)

On 25 June 2009, the ASN Commission has taken a position on:

- the safety of radiotherapy treatment using small beams (mini-beam) for local treatment of small lesions, usually intracranial;
- the precision of the procedures for dosimetric characterization of these beams.

In response to the radiation accident in Toulouse and on the basis of a subsequent report from IRSN, ASN has requested the opinion of the ASN Advisory Committee gathering experts in radiation protection for medical and medico-legal applications of ionizing radiation (GPMED).

On the basis of the conclusions of the GPMED (24 March 2009), ASN has decided not to restrict the use of mini-beam during stereotactic radiotherapy treatments. Nevertheless, in order to ultimately improve the precision of beam characterization procedures, ASN has reported to IAEA the urgency of publishing international calibration protocols for mini-beams. In parallel, ASN has asked the Henri Becquerel National Laboratory (national radiation metrology laboratory) to incorporate into its priorities the field of very narrow beams. Pending the results of this work, ASN and AFSSAPS will send to radiotherapy centres a series of recommendations on good practices for dosimetric measurements under stereotactic irradiation conditions.

Quarterly report of ASN/SFRO level 1 radiotherapy events reported during third quarter 2009

Since 1 July 2008, events classified as level 1 on the ASN/SFRO[1] severity scale are summarized in a general quarterly report that ASN (French Nuclear Safety Authority) publishes on its website.

Between 1 July and 30 September 2009, 9 events were classified as level 1 on the ASN/SFRO scale. These events, not expected to have health consequences for the patients, are nonetheless analysed for lessons learnt (particularly in terms of organisation) and to ensure they do not reoccur.

- All events reported for this period only concerned one patient,
- 5 cases involved an irregularity in the patient's positioning,
- 1 reports involved a beam shaping error,

1 SFRO: French society of radiation oncology

- 3 cases involved the delivery of an inappropriate dosage due to a wrong distance between patient and table and due to a wrong activity source considered in the calculations

Level 1 events are the subject of ASN investigations, either as part of specific enquiries, or during the annual inspection conducted by ASN in all radiotherapy centres. ASN systematically examines the corrective measures proposed after the centre's analysis of the event.

Corrective measures for the period in question have been mainly focused on the formalisation and precision of procedures mainly for verification and patient's positioning control.

SAFETY AND AVAILABILITY OF RADIOPHARMACEUTICAL PRODUCTION FACILITIES

ASN Commission position on isotope production shortage

In a position paper released on 16 September 2009, ASN Commission has communicated its position on the shortage of medical radioisotopes, indicating that the operation of old nuclear reactors for medical radioisotopes production is not the solution to the shortage of medical radioisotopes. Furthermore, the operation of these reactors would imperil the safety of these facilities.

ASN Commissioners instead propose international discussions among concerned countries with the aim of optimising the use of technetium-99m and the need to enhance and implement alternative production methods and other diagnostic methods such as medical imagery.

ASN also proposes an "information exchange network" between national safety authorities on radioisotopes produced in nuclear reactors. This could help mitigate supply problems because of better coordination of maintenance outages and information on deficiencies.

WASTE MANAGEMENT

Sitting for long-lived low-level waste disposal

In June 2008, the French government tasked ANDRA (French Radioactive Waste Management Agency) with launching an extensive survey in order to find a site dedicated to long-lived low-level waste disposal. Waste to be disposed of, are mainly radium-bearing waste and graphite waste, coming from the old gas cooled reactor dismantling.

On 15 January 2009, based on information proposed by ANDRA, ASN has conveyed its opinion on selected locations to the Minister of Energy (on the basis of its report on general safety orientations for a future site dedicated to long-lived low-level waste disposal, from sitting and facility design to decommissioning and following monitoring).

In June 2009, the French government has selected two villages where in-depth investigations could be conducted in 2009-10: Auxon and Pars-lès-Chavanges, both of them located in the Aube District. The government has also called for a public debate to be held before the selection of the final disposal site in 2011.

In July 2009, both villages have successively relinquished due to a hard harassment by lobby groups. The major of Auxon has even resigned from his post.

DECOMMISSIONING

Underestimation of amount of Pu deposits at CEA Cadarache plant

On 6 October 2009, the Commissariat à l'Energie Atomique (CEA) notified ASN an underestimation of amount of plutonium deposits at the nuclear facility dealing with Plutonium technology and so-called "Atelier de Technologie du Plutonium" ATPu located in the CEA Cadarache plant. The ATPu, a facility currently being dismantled, is operated by AREVA NC and the license holder of this facility is the CEA. Initially estimated to about 8 kg, the amount of plutonium collected in the facility glove boxes during dismantling activities greatly exceeds this value and is currently reaching 22 kg. According to CEA, it could come to 39 kg.

Following this notification, ASN performed a comprehensive inspection at the ATPu facility on 9 October 2009. This inspection confirmed that the CEA has been aware of this incident since June 2009.

On 14 October 2009, the ASN Commission decided to suspend the ATPu facility dismantling activities, pending the verification of fissile material accountability (ASN Commission decision No. 2009-160 of 14 October 2009).

ASN has sent a record to the public prosecutor for failure to observe the terms of incident notification, as prescribed by regulations.

ASN considers that the failure to detect this underestimation of fissile material amounts during dismantling activities and the late notification of this incident to ASN have revealed weaknesses in the safety culture of both the licensee and the operator. Consequently, ASN has decided to rate this incident at level 2 on the INES scale.

The ATPu facility had been operated for 40 years and its main activity had been the production of MOX fuel. The decree of 6 March 2009 authorized the permanent shutdown of this facility and its immediate dismantling.

GERMANY - BfS

Bundesamt für Strahlenschutz

Principles for retrospective estimation of the radiation exposure of individuals of the population according to Article 45 of the Directive 96/29/Euratom

For better comparison of public exposures on a European level, Art. 45 Directive 96/29/Euratom requires to estimate the radiation exposure of the population as realistically as possible. Examples are exposures from authorized releases of nuclear installations or from nuclear medicine facilities.

For this purpose, BfS has developed a concept for realistic retrospective estimation of the radiation exposure of the population. A graded approach is proposed where radioecological models with different levels of conservativity and complexity are applied, requiring different levels of effort for data collection.

Use of finger ring dosimeters LPS-TLD-TD 08 and MPA-BKTD-01 approved as official partial body dosimeters

Both dosimeters, identical in construction, were developed for mixed photon and beta radiation fields. They were type-approved and have successfully participated in PTB intercomparisons for partial body dosimeters in 2008 and 2009.

Securing miscellaneous radioactive substances

The European Commission has adopted a policy package on chemical, biological, radiological and nuclear (CBRN) security:
http://eumonitor.net/modules.php?op=modload&name=News&file=article&sid=130823

The overall goal of the proposed policy on CBRN is to enhance the protection of the citizens of the European Union from incidents involving chemical, biological, radiological and nuclear materials. In order to achieve this goal, the CBRN Action Plan, which is the core of the package, sets out concrete measures which could be taken by various stakeholders (including the EU, Member States and industry) to address the problem.

The Working Group R/N is addressing a unified approach within EU countries with regard to the security of miscellaneous radioactive substances which should be categorized depending on their suitability for misuse.

In Germany, requirements are being developed with regard to the security of miscellaneous radioactive substances taking into consideration the recommendations of the CBRN Action Plan as well as the IAEA Nuclear Security Series No.11 on the Security of Radioactive Sources.

I-131 in waste incinerating plants

I-131 contaminated waste has been detected by the entry control of waste incinerating plants. The authorities found incontinence material (diapers etc.) with excretions of individuals after nuclear medicine treatment. Similar events happened before, where I-131 contaminated cat litter was detected.

Estimations showed that radiation doses resulting from incineration of 1 GBq I-131 are insignificant based on conservative assumptions. It was therefore concluded that - provided a radiation protection authority has clearly identified radionuclide and activity - no further radiation protection measures are required.

Radionuclide therapy by selective intraarterial radiotherapy (SIRT) and intravasal irradiation with unsealed radionuclides – Recommendations of the German Radiation Protection Commission (SSK)

SSK is providing detailed recommendations for the protection of patients and medical staff for SIRT and intravasal irradiation. With regard to necessary individual therapy planning and complex requirements for radiation protection, both applications should not be carried out as ambulant treatment. Therapy concept and treatment plan have to be documented.

International WHO Radon Handbook

As a result of the international Radon project (BfS has been involved in these activities), WHO has issued in September 2009 a Radon Handbook requesting countries to reduce the individual Radon risks (Radon mitigation strategies in existing buildings) and take precautionary actions on the long term (Radon prevention strategies in new constructions):
http://whqlibdoc.who.int/publications/2009/9789241547673_eng.pdf

WHO proposes a reference level of 100 Bq/m^3 to minimize health hazards due to indoor radon exposure. However, if this level cannot be reached under the prevailing country-specific conditions, the chosen reference level should not exceed 300 Bq/m^3 which represents approximately 10 mSv per year according to recent calculations by the ICRP.

As a consequence, the German Radon Handbook and the BMU bulletins have to be updated. The Federal States (Bundesländer) are requested to report to BMU how the WHO recommendations for the protection of the population could be implemented.

Physical and technical quality assurance in radiotherapy - Proposal for assessing the entire treatment system

A working group of SSK has looked into the problem of quality assurance along the entire therapy chain in radiotherapy: how can we make sure that single components of radiotherapy which were further developed in recent years can jointly reach a high level of precision? Deficits were discovered, such as:

- Components are often checked separately.
- Many imaging procedures are not based on Radiation Protection and X-Ray Ordinances and are checked only on the basis of the Medical Devices Act.
- There are no binding guidelines for interfaces and data transfer protocols.

Improvements could be:

- Introduction of a new guideline “Quality Assurance in Radiotherapy”, in which requirements are specified addressing the entire system of a radiotherapy facility.
- Modifications of the Radiation Protection Ordinance: the term irradiation device has to include also accessory equipment and attached component parts including software which are then also subject to expert assessment and acceptance tests.

Lead-free and low-lead protective clothing

Lead-free and low-lead aprons are used more and more by medical staff because of their lower weight compared to conventional lead aprons. The protective effect is expressed in terms of the lead equivalent value.

In January 2009, a test standard (DIN 6857-1) has been introduced for the determination of the shielding characteristics of lead-free and low-lead protective clothing which allows for correct comparison. This solves the problem of underestimating the protection level under certain circumstances by a factor of 2. It was decided that requirements for the protective effect of individual protective clothing have to be established in one of the guidelines specifying the requirements of the X-Ray Ordinance.

Application of electronic personal dosimeters in the medical area

§ 31a of the X-Ray Ordinance requires the compliance with the dose limits for women of childbearing potential indicated in the Table below.

The compliance with these weekly dose values cannot be reliably verified at this time. It is known since years that electronic personal dosimeters (EPD) used for this purpose do not provide correct readings in pulsed radiation fields as commonly used in medical sector and also for some technical applications. In case there are no alternative dosimeters available (e.g. radiophotoluminescence dosimeter, thermoluminescence dosimeter), pregnant women and individuals under 18 years are not permitted to enter the controlled area.

It is proposed that all monitored individuals should wear an additional, directly readable dosimeter.

Radiation exposed individual	**Dose limit specified in § 31a of the X-Ray Ordinance**	**Corresponding weekly dose value**
Women of childbearing potential (uterus dose)	2 mSv/month	500 µSv/week
Unborn child	1 mSv from the date of reporting pregnancy until the end of pregnancy	Ca. 30-40 µSv/week Arbeitswöchentliche Dosisermittlung nach § 35 Abs. 6 S. 2 RöV vorgeschrieben.
Adolescent under 18 years	1 mSv per calendar year	20 µSv/week

GREECE - GAEC

1. Participation of the GAEC in an IAEA's international survey

The Greek Atomic Energy Commission (GAEC) participated in an international survey performed under the IAEA's regional project RER9093 *"Strengthening Radiological Protection of Patients and Medical Exposure Control"* concerning the doses received by patients during interventional radiology procedures.

The results of this survey are presented in the following publication: *Tsapaki Virginia et al. "Radiation exposure to patients during interventional procedures in 20 countries: initial IAEA project results", American journal of roentgenology 2009, Vol. 193(2), pp. 559-569.*

2. Seminar on Radiation Protection and Nuclear Safety, Nicosia, Cyprus, 28 November 2009

The Department of Labor Inspections of the Ministry of Labor and Social Insurance of the Republic of Cyprus in cooperation with the GAEC organized a seminar on "Radiation Protection and Nuclear Safety" (Nicosia, Cyprus, 28 November 2009). The topics presented in the seminar concerned:

- The radiation protection and nuclear safety system both in Cyprus and in Greece

- Recent developments in radiation protection
- Activities and research concerning ionizing radiations
- Nuclear safety and nuclear energy

IRELAND - RPII

Radiological Protection Institute of Ireland
An Institiúid Éireannach um Chosaint Raideolaíoch

1. Iodine Holding Tanks

Following a detailed review by the RPII of iodine ablation practices in Ireland a national decision has now been taken on the requirement to provide delay and decay storage tanks for patient excreta from iodine ablation suites:

1. In the case of existing iodine ablation facilities, licensees will not be required to retro-fit iodine holding tanks.
2. Licensees with existing ablation facilities will be required to undertake both on and off site monitoring to validate the assumptions and calculations used in their risk assessments when first applying for a licence for ablation therapies.
3. Licence applications for new ablation facilities will continue to be assessed on a case by case basis to determine whether holding tanks are required. Each licence application must be supported by a risk assessment which estimates the likely doses that would be received by critical groups (hospital plumbers, sewer pipe workers, sewage treatment plant workers, public etc) as a result of the discharges of excreta from patients having undergone ablation therapies.

2. RPA register

The RPII has now set up a register for Radiation Protection Advisers (RPA) for individuals seeking approval to act as RPAs to licensees in the industrial, educational and research sectors. Once the register has been sufficiently populated the RPII will require particular categories of licensees to appoint and consult with an approved RPA. Categories of licensees which will be required to appoint an RPA include those working in the NDT and industrial irradiation sectors.

3. Design Code of Practice

The RPII has published a new Code of Practice on the Design of Diagnostic Medical Facilities where Ionising Radiation is used. This Code will assist professionals who are involved in the design of diagnostic medical facilities. The Code provides practical advice on good radiation protection standards which will ensure the safety of workers and members of the public, and the delivery of a safe service to patients.

The Code includes a brief review of the current legislative framework and its specific impact on the management of building projects, a presentation of the main types of radiological and nuclear medicine facilities, a treatment of the technical aspects of shielding calculations and a discussion of the practical aspects of implementing shielding solutions in a building context. The Code is intended to be used in consultation with the current literature, an experienced Radiation Protection Adviser and a multidisciplinary project team.

Copies of the Code may be obtained by contacting the RPII's Regulatory Services though the "Contact us" page or by downloading it from “publications” on the RPII’s website:

http://www.rpii.ie/Licensing/Regulation-and-Guidance/Regulation-and-guideance-documents.aspx

ITALY - ISS

Pre-investigations made by the Tuscan Environmental Protection Agency on geothermal energy plants within its Administrative District highlighted that concentrations of long lived radon decay products in residues could be higher than 1000 Bq/kg. This information, supported by the data reported in the IAEA document *Technical Report Series 49 - Extent of Environmental Contamination by Naturally Occurring Radioactive Material (NORM) and Technological Options for Mitigation*, convinced the Agency that these plants could be considered NORM industries and necessitate deeper analyses and investigations.

The Italian Decree 241/2000 transposing *Directive 96/29/Euratom, laying down basic safety standards for the protection of the health of workers and the general public against the danger arising from ionizing radiation*, introduced for the first time in Italian legislation some provisions on natural radioactivity, but geothermal energy plants are not listed among NORM industries.

Following the *2009 European Commission public consultation on proposal for new requirements on natural radiation sources in Basic Safety Standards Directive*, the Tuscan Environmental Protection Agency issued an expert opinion, proposing to include these plants among NORM industries. The proposal, supported also by the official opinion of the *Istituto Superiore di Sanità*, seems to have been positively considered by the art.31 group of experts.

It should be noted that, even if geothermal energy production in Italy is limited to Tuscany, Italy is the second producing country in the world, second to USA. Other European Member States producing countries are Hungary, Poland and Bulgaria.

A decree of last February transposing *Directive 2006/117/Euratom on the supervision and control of shipment of radioactive waste and spent fuel,* and amending Decree 241/2000, introduces new provisions regarding radiometric surveillance on metal products or semi-finished products. Radiometric surveillance was already required in the 2000 decree, but it concerned only foundries of scrap metal. The recent alarms about cobalt 60-contaminated, semi-finished metal products circulating in Europe convinced the Italian legislator to introduce the obligation of radiometric surveillance by both industrial and commercial undertakings that import, collect, dispose or melt scrap metal and/or import semi-finished metal products. Moreover, the carrier is now obliged to report to the competent authorities on any anomalous radioactivity content in the metals transported s/he comes to know of.

NORWAY - NRPA

Statens strålevern
Norwegian Radiation Protection Authority

From the regulatory side, NRPA has in 2009 enforced stricter security requirements regarding IAEA Class 2 sources in hospitals.

NRPA has initiated a national network between medical physicists working with ALARA and optimization in medical diagnostics in public and private hospitals.

In the medical sector, NRPA has focused on reporting of reference diagnostic doses in 2009 from the hospitals. The reports will give a basis for a revised set of national reference doses in diagnostic. Many hospitals have taken measures to work further to better optimise medical procedures to decrease their local patient doses. This shows that the ALARA instrument "reference doses" works in practice.

SPAIN - CSN

CSN CONSEJO DE SEGURIDAD NUCLEAR

- A new issue of the regulation about the use of X-ray equipments for Medical Diagnosis has been published on the 18th of July 2009. This regulation includes:
  - The use of X-ray diagnosis equipments including legal and veterinary uses,
  - Implementation of a Radiological Protection Program,
  - Personal accreditation on radiological protection,
  - Authorization of Supplying and Technical Assistance Companies,
  - Radiological Protection Services and Radiological Protection Units that work in Medical X-ray facilities.
- Organization with IAEA of a training course for regulatory staff from North Africa countries (Algeria, Egypt, Libya, Morocco and Tunisia) on regulatory system, procedures for notification, authorization, inspection and enforcement. The training activities included technical visits to medical and industrial facilities.
- In the framework of the existing cooperation agreement between CSN and the French Nuclear Safety Authority (ASN) a technical meeting was held in Madrid last November to review the activities of the two last years. Among these activities it is planned to carry out joint inspections in France and in Spain. After the meeting was signed a new agreement for others two years.
- Nowadays CSN is preparing for signature an agreement with the Health Ministry in relation with the radiological protection of patients, established as a new function of CSN: “collaborate with competent authorities in issues related with radiological protection of people subjected to medical diagnosis or treatments procedures with ionising radiation”.
- Participation in the International Conference on Modern Radiotherapy: advances and challenges in radiation protection of patients. An oral communication was presented about “Methods of risk analysis applied to Radiotherapy”. This project takes part of AIEA project inside the Ibero-American FORUM and had been coordinated by CSN. Two posters were presented about ”The experience in the use of risk matrix to assess the safety

of a Radiotherapy Department" and "Application of proactive safety methods to a groups of Radiotherapy Facilities".

- The FORUM concerning Radiological Protection Units (UTPR) has finished its first document about the elaboration of a model of contract in order to establish the relationship between the Radiological Protection Units and the facilities and to define the functions and liability of each part. This document will have to be approved by the FORUM and is in according of the new Regulation about X-ray.
- CSN takes part in a "Permanent Group of Experts" of France Nuclear Safety Authority (ASN), group of medicine, and working group about Interventional Radiology. This group holds several meetings every year in Paris
- Participation in the INES Advisory Committee Meeting, IAEA (Vienna).

SWEDEN - SSM

Strål säkerhets myndigheten
Swedish Radiation Safety Authority

1. An inquiry, appointed by the Swedish Government to review the legislation in the area of nuclear technology and radiation protection, has drafted proposals for new legislation that will make controlled generational shifts possible in the Swedish stock of nuclear power facilities. The proposals include the abolishment of the Nuclear Power Phase-Out Act (1997:1320) and removal of the ban in the Nuclear Activities Act (1984:3) on the construction of new nuclear power reactors. A precondition for obtaining permission to construct new reactors in Sweden, according to the proposals, is that the new reactor replaces one of the older reactors and that the older reactor is permanently shut down. The new nuclear power reactors may only be constructed on one of the sites where present reactors that are in operation are located.

The Inquiry also proposes that the requirement for any party, who has a permit to own or operate a nuclear facility to conduct a regular overall assessment of safety, is to be moved from the Swedish Radiation Safety Authority's (SSM) regulations to the Nuclear Activities Act. The assessment is still to be scrutinized by the Swedish Radiation Safety Authority.

Furthermore the Inquiry proposes that an operator of a nuclear facility in Sweden will be obliged to have liability insurance or some other financial security that corresponds to EUR 700 million that will always cover the liability to pay compensation under the 2004 Protocol amending the Paris Convention. Under the Inquiry's proposal, an operator of a nuclear power reactor that is in operation in order to extract nuclear energy shall be obliged to ensure that funds corresponding to EUR 500 million over and above EUR 700 million, or a total of EUR 1 200 million, are available for every accident so as to compensate injured parties who are entitled to damages. If radiological damage occurs outside Sweden, the operator's liability to pay compensation shall however be limited to the amount of liability that applies in the other state in relation to Sweden. (http://regeringen.se/content/1/c6/13/45/58/bca146e2.pdf)

2. A Nuclear Fuel Factory in Sweden has informed the Swedish Radiation Safety Authority (SSM) that some workers may have got internal doses higher than earlier suspected. For some of the workers the dose may be close to or even exceed the regulated dose limit. SSM has asked the Nuclear Fuel Factory to make an assessment of individual doses of all who cannot be excluded to have obtained a committed effective dose of 5 mSv or more. Furthermore, every second month, the Authority shall get reports about the progress in preventing internal contamination.

SWITZERLAND - SFOPH

Medical Physicist

The Radiation Protection Ordinance lays out requirements for medical physicists duties and responsibilities within radiation oncology departments (such as quality assurance of linear accelerators, check of dose applied to patients, ...).

As the Radiation Protection Ordinance was revised in 2008, a new article was introduced. It extends the role of medical physicist to radiology and nuclear medicine, whereby medical physicist is required as local expert to carry several tasks and duties in radiation protection.

A working group of the medical physicist society was created to address this issue in more details and has drawn up a list of recommendations which can be found in Report No. 20 ("Medical Physicist staffing for nuclear medicine and dose-intensive X-ray procedure"). It advises on the number of medical physicist positions for a given installation, such as CT, PET-CT, Spect-CT and interventional radiology in order to fulfill radiation protection tasks (protection of the patient and staff, resulting dose to the patient when using increasingly complex machine). As a number of small hospitals have fewer machines, it was suggested that a physicist could work for several hospitals in a defined area. The implementation of this recommendation should be enforced next year by the SFOPH.

Raproswiss

Raproswiss is a new project which was launched by the SFOPH, with the aim of developing a new system to manage licensing in the field of ionising radiation. This new system should be modern, efficient and user-friendly and allow an easy management of the 20'000 licenses concerned with the use of ionising radiation in Switzerland (similarly to initiatives like e-Government and e-Health). It should address the needs of all the stakeholders (Confederation, cantons, regulatory and survey body, industry and firms, hospitals, equipment manufacturer and health care professionals) whilst fulfilling confidentiality requirements.

It is foreseen that the majority of information exchange will be done through the internet, and should be easily adaptable to amendments in the radiation protection legal framework. This new system should be in operation towards the end of 2012.

Damex (Database of medical radiological examination)

Damex is a databank which will be used to manage diagnostic and other reference values for different types of installation (such as CT or accelerators) as well as values measured or collected during audits of regulatory bodies. An important goal of Damex is to evaluate the patient reference doses (which are currently based on European data) and try to reduce them in order to improve the radiation protection of patients. This could be done by reassessing the reference dose based on the data collected and reduction of those reference values.

Radon

<u>International situation</u>

1. WHO: The WHO recommends a level of 100 Bq/m^3 to minimise health hazards. If this level cannot be reached, the reference level should not exceed 300 Bq/m^3, which represents

approximately 10 mSv per year according to lung dose calculations by the International Commission on Radiation Protection (ICRP).

2. EU: The ICRP calculations will also be used to prepare new EU reference levels. The EU currently recommends 400 Bq/m^3 for existing buildings and 200 Bq/m^3 for new and remediated buildings. Consequently, the European standards are unlikely to differ much from the WHO recommendations.

Situation in Switzerland

1. Ordinance on radiological protection (OraP): The current legislation (based on the WHO recommendations of 1993) specifies compulsory remediation if the limit of 1000 Bq/m^3 is exceeded. In order to reduce the collective risk, the guide level of 400 Bq/m^3 has been adopted for new constructions and remediation programmes. The SFOPH already recommends remediation from a level of 400 Bq/m^3. Moreover, the Minergie Eco building standard specifies a level of 100 Bq/m^3.

2. Action plan radon: Taking the new WHO directives as a basis, in 2010 the SFOPH will propose a National Action Plan to the Federal Council for the strategy for the next ten years. The lowering of the limit to 300 Bq/m^3 and the question of remediation for buildings in which levels between 300 and 1000 Bq/m^3 have been measured will be the subject of in-depth discussions during the next revision of the Ordinance on Radiological Protection (ORaP).

3. Urgent preparatory work based on the new WHO recommendations has already started:

3.1. This primarily includes pilot measuring campaigns such as the "Untersuchung Radon Integral" project in the canton of Uri, the completion of the cantonal map of Fribourg and the measurement of all school buildings in Aargau.

3.2. Furthermore, a multi-sectoral approach has been adopted in conjunction with the Swiss Federal Office of Energy to take account of radon in the national energy-based building remediation programme.

3.3. Finally, the Universities of Applied Sciences and the Federal Institutes of Technology have joined forces to address this problem more intensively, on the one hand drawing up basic and further training programmes for building trades and, on the other, working at the legal level in collaboration with the Federal Office for Professional Education and Technology and the Swiss Society of Engineers and Architects (SIA).

UK - HPA

1. Following a period of public consultation, HPA has developed its advice on the application of the **new ICRP Publication 103 recommendations**. Overall, it is concluded that the new recommendations do not imply any major changes to the system of protection applied in the UK. The full report may be downloaded from:

   http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/1246519363993?p=1199451989432

   HPA has also published separately its response to the comments that were received on the draft report - an example of stakeholder engagement, which indicates where the HPA advice

was (and was not) modified as a result of comments received. This report may be downloaded from:

http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/1253114161563?p=1197637096018

2. The Advisory Group on Ionising Radiation, which advises HPA on the biological and medical effects of ionising radiation, has undertaken a comprehensive review of the effects of exposure to **radon**. The conclusions are significant, for example:

   "..the available evidence indicates a causal association between lung cancer and radon at the concentrations encountered indoors in ordinary homes…"

   and

   "Around 1100 radon-induced lung cancer deaths occur each year in the UK, the majority as a result of exposure at concentrations well below 200 Bq.m^{-3}, the current Action Level."

   The full report can be downloaded from:

   http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/1243838496225?p=1199451989432

3. During 2008 there were 38 accidents and incidents involving the **transport of radioactive materials** from, to, or within the UK. The number of events in 2008 was more than reported in recent years, and there has been an increase in the number of events (4 in 2008) involving the discovery of radioactive material in shipments containing material which was thought to be nonradioactive. A report containing descriptions of each event can be downloaded from:

   http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/1248766806606?p=1197637096018