
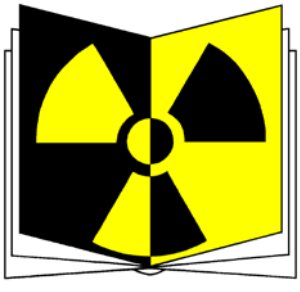


Association of **U**niversity **R**adiation **P**rotection **O**fficers

December 2014 # AURPO NEWSLETTER **Editor T.J.Moseley**

CONTENTS **Page No.**

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EDITOR'S INTRODUCTION

Welcome to the December edition of the Newsletter and a Happy Christmas and New Year to all our readers.

STC are working up a program for next September's conference. Likely topics for Tuesday afternoon will cover: special form sealed sources, XRF issues, role of appointed doctors, visiting other radiation employers and practical radiation shielding. For the Wednesday we are looking at: recent ICRP developments and biological effects, direct ion storage dosimetry, programmable electronic systems, ONR transport inspections, BSS update, safety of consumer laser products, RF and static magnetic fields and UV hazards. An outline program will be ready for the next newsletter. If members have ideas or topic areas that they feel we have overlooked, or they would like to see covered in future scientific meetings all ideas or suggestions will be gratefully received by Mike Sobanski at Cardiff (sobanski@cf.ac.uk)

Don't forget your emergency training and contact me to make use of our STS training monitors and simulated spillage material – hire for just £100 for up to 2 weeks.

PS Don't forget to renew your subscription –see reminder from Treasurer from page 28. You also need to contact Gillian to subscribe to Health Physics at the special members rate – see page 32.

Expect Spring edition of newsletter for just before Easter – contributions by end of March please.

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MEMBERSHIP NEWS

Welcome to the following new members of the Association who have joined since July:-

Jiteen Ahmed	Aston University	Pauline Johnson	Newcastle University
Kevin Attree	Kingston University	Mark Keeping	Imperial College
Robert Clements	University of Strathclyde	James Lynch	Rolls Royce
Steven Clipstone	Keele University	Christine Mills	Daresbury
Hannah Day	EDF Energy	Gwendolyn Mott	UCL
Marc Dino	RPS	Linda Murphy	HSENI
Sarah Dorling	Stephen Green Assoc.	Christopher Smith	Trinity College
Martyn Godwin	University of York		

Also joining us as an Affiliate Member is Veolia with their technical sales specialist (Chris Westwood) as their main point of contact.

NB Our new Membership Secretary is now Sonia Nuttall (somchairuk1@hotmail.co.uk)

PRESIDENT'S REPORT

Firstly I would like to say how proud I am to have been elected as President of AURPO.
Over the years since I joined the Association, I have found it extremely useful as a source of information and advice in the pursuit of my career in radiation protection and also a delightfully sociable organisation, comprised of friendly people; happy to pass on their advice and to recount their experiences. When I first joined, I found that the issues and challenges facing the University RPOs and RPAs were very often the same as those that I encountered in my daily work in a research laboratory with a wide range of work with ionising radiation. This has been a great help to me, and is the reason that I have always wanted to help with the running of what I regard as an invaluable organisation to those working in the non-nuclear field of radiation protection.
The down side of taking on this job now is that I am succeeding Sonia Nuttall, who as AURPO's longest standing President has presided over a most successful period in the Association's history. She can be proud of the achievement that is the well respected and friendly Association that she has encouraged and worked towards. Indeed a tough act to follow! I would like to thank Sonia for her tireless work, not only as President for nine years, but also as Treasurer for a number of years before that and for organising the 2014 Annual Conference in Nottingham. She will continue to serve on the Executive Committee as Membership Secretary.
I felt that the 2014 Conference was a great success, and the fact that it took place without the support of a local university that has been available for all of AURPO's previous events gives us confidence that, if no university is prepared to host the event, the commercial alternative is viable. To remember to name all the people to thank is impossible when so many people have made a contribution to the organisation that goes to provide the Scientific Programme, AGM, Exhibition, Social Event, Annual Dinner, all the documentation and the provision of accommodation. So I will just say thank you to **everybody** who contributed to the event, in the team which was led by our immediate Past President.
The Executive Committee met at the beginning of December and I can report that plans are well advanced for the 2015 Conference, which will be held in Eastbourne, in Sussex on the south coast. The committee also agreed to hold the 2016 Conference at Loughborough University; thanks to an offer to host the event from Julie Turner on behalf of Loughborough.
The survey following the 2014 Conference asked members whether they preferred our events to be held on Monday and Tuesday or on Tuesday and Wednesday. A significant majority of those who expressed a preference voted for Tuesday and Wednesday; so in 2016 we will be at Loughborough University on Tuesday 6th and Wednesday 7th September. (Fortunately the 2015 Conference had already been booked for Tuesday and Wednesday).
I am very pleased that we will be returning to a university based conference, and we are now looking to find a volunteer to host the event in 2017. If you have any inclination to do so, but are not sure what is involved, please get in touch with me, or any of the other Executive Committee members to find out what is needed.
I also attended the Scientific and Technical Committee (STC) in November, and they are working to put together an interesting and informative scientific programme for the conference. The STC is

also responsible for producing and maintaining the AURPO Guidance Documents; some of which are currently being updated.
You are probably aware that we have been experiencing difficulties with the AURPO website, due to a hacking attack 'injury' that it sustained just before the Nottingham conference. This means that the site has had to be completely rebuilt, with new software. It is now back up and running, but still needs some further work, so please be patient if you experience any problems with it. My thanks go to Dudley Ibbett, supported by Simon Willis and Julie Turner, for a great deal of work that has gone into restoring the website.
I hope that you enjoy reading this Newsletter and find it informative and helpful.
May I wish you Seasons Greetings and hope that many of you can enjoy the holiday with the immense feeling of relief and satisfaction of knowing that your RWA portfolio has been safely delivered to RPA2000.

Merry Christmas
John Makepeace, 5th Dec 2014

AURPO Annual Conference and AGM 2015

The next AURPO Conference will be held on
Tuesday 8th and Wednesday 9th September 2015
at the Eastbourne Meeting and Conference Centre.

This venue is part of the View Hotel, and further details can be found at:-
http://www.theviewhoteleastbourne.com/

The Scientific and Technical Committee is already working hard planning the Scientific Programme and inviting speakers.

We are expecting our usual high quality Exhibition by our Affiliate Members.

There will be a themed social event on Tuesday Evening, which promises to be great fun and the more formal Annual Dinner will be held on Wednesday evening.

The Annual General Meeting of the Association will be held following the scientific session on Tuesday afternoon.

Please put the dates in your diary, because this promises to be an event not to be missed!

This year's conference is being organised by the London & South East (L&SE) AURPO Regional Group, with Gillian Glazier acting as the Local Organiser.

AURPO 'Regulatory Update' Monday Sept 1st pm.

We are most grateful to Helen Odams (Open University) for providing this report.

Electromagnetic Fields (EMF) Directive, Working towards Transposition by Arwel Barrett, HSE.
EMF could affect a broad spectrum of staff even in the Higher Education Sector (HES) e.g.from communication systems, radio frequency, power lines and welding.
The EMF Directive came out in 2004 was adopted by the European Union in June 2013 and it is anticipated that it will become part of UK law by 1 July 2016. The majority of the requirements will be covered by existing legislation and any additional specific regulations will be kept to a minimum.
The Directive affects a wide range of sectors and industries with three main derogations namely MRI applications; military activity and industry (in general). The HSE is consulting with internal and external stakeholders and experts. The external stakeholders have formed a working group consisting of 8 industry sub-groups, the HES is part of the 'Cross Cutting' subgroup as it could potentially fall into a number of the other subgroups.
The guidance will recommend exposure levels based on modelling of how EMF react with body tissues, based on the theory that if the external levels are not exceeded then the internal levels would be acceptable, with safety margins built in to the recommendations, however this may be dependent on the application of the EMF.
Interested parties were encouraged to be involved with the consultation via the cross-cutting sub group or e-mail the HSE (Radiation.Policy.Team@hse.gsi.gov.uk)

Update on RWA Submissions and Assessment by David Sutton, RPA2000
Legislation requires 'qualified experts' to advise on work with Radiation,a role filled by RPA's, however, it has been recognised that there should also be a competence based expert to advise on radioactive waste management.
RPA2000 is a limited company set up with representation from AURPO, SRP and IPEM to ensure that members receive RPA accreditation. This was considered an ideal group to deal with the accreditation of RWAs, however to date there have been 783 grandfather right (GFR) applications received (GFR are a temporary recognition of an RPA to allow time for them to be able to put together a portfolio and to provide cover so that employers can comply with the EA requirement).
The main problem is that there are not enough assessors who will be able to deal with the numbers of applications – especially if they all come in towards the cut-off date so the EA are working with RPA2000 to tackle the issues by raising awareness to encourage: the early submission of portfolios; encourage early applications; recruit more assessors; provide more guidance on what is required as part of the portfolio and ensuring that applicants are not duplicating work required for RPA.
The RPA2000 has predicted that with the current number of assessors, the number of assessments that could be completed by the deadline of 30 June 2016 is 215 if they are submitted before 31 January 2014! The problem being that it is highly likely that a large number of RWA with GRF will not receive their certification in time and therefore will cease to be RWA's. The only potential solution to this problem is to assume that 50 certificates can be issued by June 2016 who could form a 'pool' of RWA's to provide cover, however, it would depend on their availability, ability to cover other areas and sectors so this may not be a viable solution to these issues.

Update on BSS Implementation by Rob Wellens, HSE.
The EU BSS Directive must be implemented by 6 February 2018 and will affect a number of pieces of current legislation e.g. IRR and REPPIR. *(It will not be implemented before the due date.)*
The Directive contains 119 articles and will require a vast amount of stakeholder consultation. An initial gap analysis indicates that UK legislation already covers the majority of the BSS requirements, DECC are responsible for its implementation and a UK cross government project board is working to minimise the impact of any changes and the HSE will be specifically looking at eye dose; licensing, IRR provisions in ACOP and/or regulations and leading relevant consultations with stakeholders.
An Occupational Exposures working group has been formed with a wide membership of Government, Industry, Professional Bodies and employee reps to provide advice on negotiations and impact assessments and ensure the involvement of key stakeholders in the process. Interested partied are encouraged to join in on working groups and or consultations.

Implications of the revised ICNIRP Limits and the new Laser Standards. Dr John O'Hagan, PHE
The Control of Artificial Optical Radiation at Work Regulations implemented in the UK in 2010 (from the Artificial Optical Radiation Directive) used exposure limits from the previous guidelines. In 2013, ICNIRP published revised guidelines on the exposure limits for laser radiation these were used for the new BS EN 60825-1 (2014) for a revision of accessible emission limits (AELs) and maximum permissible exposure levels (MPEs) for the laser product classification.
A new class of laser 1C has been introduced for where the laser radiation is intended to be applied in contact with the intended target (skin) and has safeguards that prevent leakage of laser radiation in excess of the AEL of Class 1, and it has to comply with the safety requirements in IEC vertical standards.
The pictorial labelling for laser products now clearly indicates classification of the laser, hazard warning and written instruction.

'Risk' September 2nd Tuesday AM

Notes on the morning session have been kindly provided by Julie Turner (Loughborough University).

Public and Societal Perception of Risk: Implications for Health and Safety – Professor Nick Pidgeon (Cardiff University)

Traditional linear approaches to the risk assessment process include risk identification, assessment and development of policy options. The risk assessment often will include judgements on whether it is an acceptable risk for the public. Formal 'risk' can be seen as probability x consequence. However, lay beliefs involve more than just risk and include such things as cultural, social amplification, trust and perceived benefits. It is often argued that people misperceive risk but when asked most people often know the formal risk but are driven by other risk factors. These drivers can include qualitative risks such as whether the risk is voluntary or not (*plane travel to go on holiday compared to living next to a nuclear power station for example*). Radiation risks are generally seen by the public not only as high unknown risk but also high 'dread' risk.

Judgement of risk has both powerful analytic and affective components. 'Affect' is the emotional, intuitive response and this often a powerful driver in viewing risk. The public are more likely to accept risk if they trust the organisation/person telling them about the risks. At Oldbury & Hinkley Point people who already trusted the existing nuclear operators were more likely to approve of a new nuclear build on site. Social amplification by the media can increase the 'affect' driver in the

public. The Po-239 poisoning in London 2006 had extensive media interest yet the risks to the public were extremely low. Media more likely to be amplify the risk if it involves questions of blame, secrets, human interest, conflicts and high profile people.

Failure of science communication often contributes to poor understanding of the risks and how they can be controlled. More knowledge does not automatically mean changed attitudes and behaviours. When giving information or training on risks it is therefore important to understand mental models of the public listening. Useful things to remember is to reinforce correct knowledge, correct misinterpretations and errors and fill gaps in knowledge. Consideration needs to be given as to how the messages are framed. It is important to integrate communication throughout the risk assessment process. More information can be found on the website: www.understanding-risk.org

Justification of Practices – New Nuclear Case Study – Owen Jenkins (ONR)

Justification decision is an assessment of potential health detriment from a practice involving radiation against the benefits of the practice. This is applied in the EU under Basic Safety Standards directive and in the UK by the Justification Regulations 2004. Decisions on new practices were not carried out in the UK before 2000. The legislation sets out the basis for a just decision but is not prescriptive about the process to be followed. It is the first step in a radiological protection regime. DECC (office of Nuclear Development) are responsible for the justification system in the UK.

In 2008 the Nuclear White Paper confirmed Justification as one of facilitative actions by government necessary for companies if they want to build new nuclear facilities. In 2009/10 there was a public consultation on proposed decision that 2 new build designs EPR (EDF Hinckley Point) and AP1000 (Sellafield) should be justified. The proposed decisions were in the form of a document detailing and balancing the benefits and detriments to each new build.
Some of these details include benefits like carbon reduction, security of supply and detriments included radiological health, radioactive waste, security and environmental detriment.
In 2010 the final decision was taken by the Secretary of State to justify EPR and AP1000. Under existing regulations these decisions take the form of statutory instruments approved by both Houses of Parliament. In 2011/12 the application for judicial review of the decision was submitted. The grounds of the applications were that they were wrong to say the justification is the initial process, decision not detailed enough and the Secretary of State was biased. Application was rejected by Court and Court of Appeal.

Ongoing applications include a proposal by Hitachi & Horizon to operate ABWR reactor in UK with an application from Nuclear Industry Association for justification of said reactor. During this year there will be a consultation process with the final decision likely in 2015.

Lab Risk Assessment – Dr Alan Muir – GSK
With a given good basic lab design , an employer can specify what work goes on in what category of laboratory – in essence the design features are part of the control measures supporting a basic risk assessment. Allows development of in-house generic risk assessments based on things like the number of ALI's that can be used in specific areas, disposal intakes and so forth. Lab design should be seen in a holistic manner and the impact on people and the environment should be assessed together. When working on risk assessments and /or lab design some factors such as access controls, emergency measures (resilience), minimisation of risk, disposals, decontamination

and decommissioning should be considered early on in the process. Other factors that can be easily missed are experience of staff and the perceived or direct risk to adjacent work areas.

When carrying out a risk assessment don't consider the radiation risks in isolation consider other risks alongside such as ergonomics, chemical and biological. Risk assessments should be a rudimentary concept – need to understand what work is to be undertaken and by whom. Ownership of the risk and work involved is important in the management of the risk assessment process. Risk assessments should be a 'live' document where checks and balances ensure they trigger checks and safety measures.

Alan wanted to thanks AURPO and members for all their support over the last 20 years. Alan is taking up a general EHS management role for GSK in Asia/Pacific based in Singapore from October/November 2014.

An Oxygen-15 Supply for PET – Safety and Environment Considerations – Graham Whish (Addenbrooke's Hospital)

Need for O-15 supply for PET in a hospital trust building from a cyclotron in a separate University building. The pipe to supply the O-15 has to travel 40m through low occupancy basement and under a restricted courtyard into the scanning room. Cyclotron generates O-15 gas which needs to be passed to the scanning room where it is turned into O-15 water and given intravenously to patients. The issues to be resolved initially were: Supply of pipe passing through occupied areas, continuous supply of gas in normal operation with no return of waste gas to University, release of radioactive gas to the environment and staff doses working on the PET/CT.

O-15 produced at 1.4 GBq/min and mixed with 190ml/min of 5% H_2 before being piped to scanning room. Concentration of O-15 gas in the pipe was calculated to be 2.1 $MBqml^{-1}$ (10 MBq per metre length of pipe). It was calculated that they needed 25 mm of lead shielding around the pipe and that expected dose rate on surface of would then be 1.8µSv/h. Maximum activity on hospital premises of O-15 would be 4.1 GBq so applied for 5 GBq holding limit on EA permit. As the gas enters the scanning room it goes into a HIDEX radiowater generator to convert the gas to water. In normal operation 80% activity leaves gas. 300 MBq/min of O-15 enters waste loop. This waste loop therefore needed to be designed to take a long transit, going through the courtyard and double backing. The waste loop needed to be 60m x 25mm ID giving a transit time of 45 minutes which means the O-15 would have undertaken 20 half-lives leaving an activity of 0.3 $kBqmin^{-1}$ leaving waste loop.

Assessment of environmental releases found that the dominate release was from inside the HIDEX system. The activity calculated from this leak was 10-200 $kBqmin^{-1}$. The Environment Agency gave permission to carry out dose assessments to examine where the main problem areas were. It was found that there is a seal within the HIDEX which unless it creates a good seal causes the majority of the leak. If there is a good seal the dose reduces to 0.65 MBq per patient. Dose assessments showed that the doses to all staff from O-15 water studies are very low and gaseous releases to environment were acceptable as long as there was a good seal on the HIDEX. Regular checks for gaseous leaks however are needed.

AURPO Conference 2014, 2nd September, PM.

Notes by N C Higbee (RPA PLUS)

Radium -An Historic Legacy: Ciaran McDonnell PHE (Centre for Radiation Chemical and Environmental Hazards)

Radium has been around a long time, isolated by Marie Currie. In the early days, it was used for luminising artefacts and for radium "quackery"! Industrial concentrated activities became available from ~ 1910 and were soon used for luminising aircraft instruments. Ciaran described "The dance of the radium isotopes". Radon 222 is the first daughter radionuclide of Ra -226, a mobile noble gas with a short half-life. If the chain is in secular, equilibrium then the dose rate can increase with time! The progeny contribute, greatly to the dose rate. Daughter radionuclides can quickly grow back in.

Ciaran showed fascinating slides of many examples of radium luminising legacies including; building contamination and burial sites, primary luminising sites, secondary locations and sites for the disposal of aircraft (for example, Delgety Bay). Ciaran outlined his approach to radium decontamination including the need for: taking site histories into account, good survey design, planning decontamination, agreeing the end point (risk based or EPR based?), verification and recording. The long radium half-life needs long term management. For surveying he recommended; portable NaI and HPGe based spectrometers, NaI and dual phosphor scintillators, DP6, LB1210B contamination monitors, dust sampling and Po-210 assaying.

Ciaran went on to give examples of surveys and studies in scientific institutions such as The Rutherford Building at the University of Manchester (J Chercher, D 'OBoyle and N Todd (2008); Prof Coggan's report (2010), "Risks from Radionuclides, Mercury and Asbestos" which found no plausible link with an apparent cancer cluster and HPA report RPD-EA-5-2010 (2010) which estimated up to 75 mSv committed effective dose to a hypothetical building occupant, over the period 1950-1989). At the Old Cavendish Laboratory (Est. 1870), AEARE Harwell performed decontamination there in 1958, an MRC RPS survey was conducted in 1966 and NRPB survey was conducted in 1976. In particular, the 3rd floor of the tower and Rutherford's room and radium cabinet were surveyed. Beta emissions were found on painted woodwork and traces of Ra-226 in dust but there were no gamma anomalies. In the James Clerk Maxwell Lecture Theatre kBq spots of fixed Ra-226 were found and traces of Ra-226 in dust samples. Finally, a survey of radium in shops, in London was undertaken but limited contamination was found. Ciaran raised the intriguing question, if only traces were found in the above examples, where did the bulk of radium go?

Ciaran concluded that: "Natural Radium and legacies of man-made radium 226 sources will be around for a long time yet. The 1600 year half-life is cruel". Historic contamination can be a hazard; risks need to be assessed and can and should be managed". The memory of people working with radium is very important, for example the contamination record at the Rutherford Laboratory proved most valuable.

Maintaining knowledge and records of contamination is a challenge.

Risks from Uranium / Thorium: Brian Heaton, Aberdeen Radiation Protection / Chairman of the Technical Committee.

Uranium and Thorium Guidance Note

The Guidance note to be re issue by end of the year. Brian's paper reviewed the risk for uranium and thorium both for chemical and radiation risks.

For biological effects, in the literature, reference is made to a LOAEL level (Lowest observable Adverse Effect Level) and a NOAEL level (No Observable Adverse Effect Level). The latest data set

on these has been published by the USA Agency for Toxic Substances and Disease Registry (ATSDR) in 2013 in a document entitled "Toxicological Profile for Uranium" which sets much more restrictive Minimal Risk Levels (MRLs) than those proposed previously. To derive the MRL for humans, the LOAEL from animal studies is divided by 10 because humans are deemed more sensitive and divided by 10 again to allow for the range of sensitivities in humans. (*Ed - One could argue this is an overly cautious approach*)

Uranium

Chemotoxic effects target kidney tubules. Looking at inhalation, it was found that soluble compounds are at least 5 times more toxic. Limited data was found for effects on the reproductive system. There is very limited data for effects of solubility for ingestion. Cancer in uranium miners appears due to radon progeny rather than uranium toxicity. The ATSDR (2013) could not find any animal experiments providing reliable information for either inhalation or ingestion causing cancer.

Thorium

Limited data, ATSDR published a report entitled the "Toxicological Profile for Thorium" in October 1990. Uptake of Thorium from the human gut is very small (~0.2%) but uptake through the lungs can be high, if soluble. Animal data related to chemical toxicity does not demonstrate any effects until intakes of several thousands of mg /kg of body weight are administered per day. Most evidence relates to the fate of Thorotrast patients (1928 to 1954). There were high incidences of liver cancer and leukaemia.

Comparison of Chemical and Radiological effects (for Uranium)

	MRL	**Committed Effective Dose (at MRL)**
Soluble Nat Uranium (no progeny)	0.096 mg [U] y^{-1}	0.001-0.008 mSv
Insoluble Nat Uranium (no progeny)	1.9 mg [U] y^{-1}	0.416 mSv
Soluble Depleted Uranium (no progeny)	0.096 mg [U] y^{-1}	0.8 10^{-6} to 0.5 10^{-5} mSv
Insoluble Depleted Uranium (no progeny)	1.9 mg [U] y^{-1}	2.6 10^{-4} mSv

Brian concluded that for many situations, depending on the constraint dose adopted, the chemical toxicity is going to be the limiting factor. We look forward to the publication of the Guidance Note which promises to be a very useful resource.

World Health Organisation (WHO) Fukushima Health Risk Assessment: Wei Zhang, PHE.

Wei asked, "what is the future for the people of Fukushima and for radiation workers?" The assessments will help local government to make preparations for future health needs. The WHO's health risk report was published on Feb 28, 2013 and can be freely downloaded from WHO's website.

After the tsunami engulfed the Fukushima Daiichi Nuclear Power Plant (FDNPP), hydrogen explosions released extensive contamination giving rise to external dose (gamma dose from cloud and ground) and internal dose (from inhalation and eating contaminated food and water).

Malignancies- leukaemia is often the first malignancy to show an excess incidence appearing 2-5 years after exposure. Solid cancer risk applies to most body organs with a latency of about 5 years. Radiation induced thyroid cancer can be detected in approximately 3-5 years after exposure. Breast cancer is the most common cancer in women worldwide.

Radiation related cancer risks for the 9 regions around the Fukushima nuclear power plant were Assessed. Lifetime Attributable Risk (LAR) was compared with lifetime base lines for each sex and age with some follow up studies. Life time doses appeared to be approximately 2 x first year dose. Risk assessments were estimated over an entire lifetime and calculated using the contribution of each year and by subtracting other causes of death. 5mSv was estimated for members of the public giving rise to 30mSv exposure used for lifetime contribution. Models were taken from those used for the A-bomb in Japan. For extrapolation of data from moderate to low doses, DDREF =1 was applied.
Wei presented detailed and interesting data in his slides. For solid cancers, leukaemia and female breast cancer, the attributed lifetime risk of cancers due to radiation were relatively small in comparison with the background cancer rates. In the case of solid cancers an exposure of 26mSv in one year olds gave similar results as the background risk; 41% will get solid cancer in their lifetime! For thyroid cancers, the attributed lifetime risk of cancers due to radiation appeared to be relatively higher in comparison with the background and appeared to be significant for 1 year old females. The leukaemia and thyroid cancer rates for those exposed at 1 year old appeared to be perhaps comparable to the background rates after 15 years of follow up.

Exposure for workers
Four scenarios studied:
1.) 12 persons with internal effective doses over 100 mSv due to I-131.
2.) 75 persons with effective external doses above 100 mSv.
3) Workers exposed between 10 and 100 mSv of which 80% of the dose was caused by external exposure and 20% by internal exposure.
4.) Workers exposed less than 10 mSv.

The lifetime risk for some cancers appeared to be somewhat elevated above baseline rates for some workers.

Summary
The attributed lifetime risk of cancers due to radiation appeared to be relatively small in comparison with the background cancer rates, apart from thyroid cancer. The leukaemia and thyroid cancer rates for those exposed at 1 year old appeared to be perhaps comparable to the background rates after 15 years of follow up. Health risks for radiation workers were assessed for four different scenarios. The lifetime risk for some cancers appeared to be somewhat elevated above baseline rates for some workers.

Transport Overseas: Sea, Air and Road.
Iain Davidson, Principal Inspector, Office for Nuclear Regulation (ONR)
Ian gave a much needed update into what has changed in the regulatory frame work and what is expected from us. RMTD (Dft) joined ONR (HSE) in October 2011. ONR is now a new Statutory Public Corporation.

ONR transport sub programmes in Transport Permissioning and Transport Compliance and Inspection (part of the Cross ONR Programme).
In the UK the regulations are covered mainly by “The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009” (SI 2009 No. 1348) and for international and UK regulations by the IAEA Safety Requirements No. TS-R-1 “Regulations for the Safe Transport of Radioactive Material” -2009 Edition (Note SSR-6 has now been published) which is based on the UN ‘Orange Book’. Ian reminded us that there is a duty of care to check what others are doing in the chain, for instance, if buying a type A or B package does it come with a Certificate of Acceptance? Do you check that the carrier has suitable emergency plans – do you collaborate?

IAEA Transport Safety Committee (TRANSSC)
The 2012/2014 cycle did not update SSR-6. Issues carried forward included; dual purpose casks, large objects and crush test for light and low density packages. The 2014/2015 cycle starts in June 2015. ONR will seek your proposals and announcements will be made at the next stakeholder event. Often changes take 5 year to become law!

Inspections and Findings.
ONR mounted a questionnaire for all users, the biggest sectors were medical, research and NDT.
Non compliances (from 216 inspections since 2009) were found against the following compliance areas (numbers of non compliances given in square brackets).

Contact details for ONR (for incident reporting); [110];
Emergency Procedures [89];
Security awareness and/or refresher training [77];
DGSA appointment (if necessary) [59];
Non-CA-approved packages (evidence of compliance) [43];
QA system for 'transport' [47];
Copies of Statutory Instrument/ADR etc [47];
Fire Extinguishers [44];
Instructions in writing regarding emergency response procedures [43]; and,
Correct package markings [42].

Other Issues
For countries that are non ADR signatories, ADR requires validation. Approvals required for package design (new) and for renewal. Type A packages / Excepted packages with spares that do not meet the design specification and the problem of Type A packages / Excepted packages that become orphaned.

Important Contact details
- Incidents: 0207 556 3475 (office hours)
- Incidents: 0151 922 9235 (out of hours)
- Incidents: onr.incidents@onr.gsi.gov.uk
- ONR website: www.onr.gsi.gov.uk
- General enquiries: class7@onr.gsi.gov.uk

Latest position regarding the revision of radiation protection directives including BSS and outside workers directives can be found at –

http://www.hse.gov.uk/aboutus/europe/euronews/dossiers/radiationprotect.htm

When do I need to notify HSE?

If you intend to start work with ionising radiation for the first time you need to let HSE know **at least 28 days before** you start work. This is a requirement of the Ionising Radiations Regulations 1999 (IRR99). The Regulations may also require additional notifications for certain occurrences and work practices, such as carrying out site radiography.

Starting work with ionising radiation for the first time

If your work falls into any of the categories below, please click on the link to find out what you need to notify and to take you to the reporting form.

- If you are going to start work with ionising radiation for the first time, you are required to notify HSE at least 28 days before commencing work, unless your work falls into an exempt category. Details of the work that you do not need to tell HSE about can be found here (see Work not required to be notified).

Use form IRR6 - Notification of ionising radiation activities to notify HSE that you intend to start work with ionising radiation

Notifying changes to a previous notification

- Radiation employers need to inform HSE when the details of a previous notification are no longer correct, such as when:
    - the employer's details or those of their premises change
    - the source category changes
    - the source is to be used at a different premises

For example, if an original notification covered the use of an X-ray set but you decide to start using radioactive materials, you would need to notify this change to HSE.

Changes to a previous notification - use form IRR6 - Notification of ionising radiation activities

- Planning to undertake site radiography Site radiography contractors need to give HSE at least seven days advance notification of the proposed work. For further information on site radiography, click her to visit the industrial radiography web pages.

Site radiography, use form IRR3 - Notification of intention to carry out site radiography

Other notifications required under IRR99

Other reasons you may need to notify HSE under the IRR99 include:

- Nursing homes etc, when a patient has been given a radioactive medicinal product and are staying in, for example, a nursing home it is sufficient if notification is made by the nursing home as soon as practicable before the first instance of a patient arriving there.
- applications for individual prior authorisation to use electrical equipment intended to produce X-rays or use accelerators (other than electron microscopes) (see regulation 5)
- where a radiation employer suspects or has been informed that an overexposure has occurred (see regulation 25)
- notifications of certain occurrences such as losses, spillages or releases of certain quantities of radioactive substances (see regulation 30)
- where an employer suspects or has been informed that a person, while undergoing a medical exposure, was exposed to ionising radiation to a much greater extent than intended, as the result of a malfunction or defect in radiation equipment (see regulation 32(6))
- If you need to notify HSE or gain authorisation for any of these reasons please e-mail: irrnot@hse.gsi.gov.uk

(*The above are extracts from the HSE's website on work with ionising radiations – check out* - http://www.hse.gov.uk/radiation/ionising/index.htm *for further information)*

Site radiography – changes to the way of notifying HSE

As you are probably aware the Health & Safety Executive [HSE] has been reviewing the way the site radiography industry is inspected and a new approach has been developed which targets companies suspected of being poor performers.

As part of the review we also looked at the 7 day notification of site radiography jobs; this included consultation with the industry. The result is that, in line with the wishes of the industry, we are keeping the 7 day notification system at least whilst the current regulations remain in place.

In order to update the method of working the way you notify HSE is being changed. This will still be web based and will require you to provide less information. Companies who have submitted 7 day notifications in the past will be invited to join a web based community. Once you have joined the community you will be able to notify us of your work 7 days in advance or apply for a waiver.

Guidance is available on issues surrounding the new system. Invitations to join the community were sent out in September and the new system should have gone live on 1st October 2014. After that date notification for site radiography will only be via the community site.

Prosecution of Rolls Royce

This was a joint HSE/EA prosecution. Rolls Royce Marine Power Operations Ltd has been fined £200,000 and ordered to pay costs of £176,500 following the loss of a radioactive source at its plant in Derby.

The company, a subsidiary of Rolls Royce plc, which manufactures components for nuclear submarines, uses radioactive sources (containing Ytterbium -169) in their industrial radiography work to test that welds are perfect.

Significant failings had led to a radioactive source (a capsule which was the size of a small screw) being lost for approximately five hours at the Sinfin Lane site on 3 March 2011. This resulted in a number of workers at the site being exposed to high levels of gamma radiation, in some cases many times in excess of relevant legal dose limits. It prompted a joint investigation by the Health and Safety Executive (HSE) and Environment Agency, who jointly prosecuted the company, after serious concerns were identified.

The court was told that at around 5am on the day of the incident the source was being used in a purpose-built radiography enclosure. During the work the source capsule became detached from its holder, was lost out of the end of the guide tube being used and ended up inside the component being tested. The loss of the source was not detected by the safety features of the radiography enclosure or by the radiographer in charge of the work.

The loss of the radioactive source was discovered when welders working on the component in the clean room spotted the capsule and removed it for examination, **passing it amongst themselves**. The radiographers returned for their next shift at this point and after some initial confusion, which involved some of them directly handling the capsule, they correctly identified the object as a radioactive source. The room was cleared, the radioactive source recovered and the area made safe.

The subsequent investigation by the Health and Safety Executive (HSE) and the Environment Agency found the workers' hand exposure to radiation was considerably in excess of the annual permitted dose of 500 millisieverts. In some cases it exceeded 16 Sv.

The investigation also found that the company failed to ensure that a suitable and sufficient risk assessment was in place for the gamma radiography work carried out on site. Inadequate procedures together with deficiencies in training led to Rolls Royce Marine Power Operations Ltd failing to ensure that robust and effective controls were in place to manage the risk of using high activity radioactive sources. Additionally, the capability of the radiation monitoring equipment was not well understood and failed to detect where the radioactive source was at all times which is an essential requirement when carrying out radiography work.

Rolls Royce Marine Power Operations Ltd, of Moor Lane, Derby, pleaded guilty to breaching Sections 2(1) and 3(1) of the Health and Safety at Work etc Act 1974, Regulation 3(1)(a) of the Management of Health and Safety at Work Regulations 1999, Regulation 11 of the Ionising

Radiation Regulations 1999 and three counts of breaching Regulation 38(2) of the Environmental Permitting Regulations 2010.

Speaking after the hearing, David Orr, HSE's specialist inspector of radiation, said:

"Industrial radiography carries a greater risk of radiation exposure compared to other industrial uses of radioactive sources by nature of the very high activity sources used. HSE expects companies carrying out such work to have robust safety systems and procedures in place to protect employees during normal work and following a radiation accident such as the detachment of the radioactive source.

"Gamma radiation emitted by this type of radioactive source is harmful to human health. Rolls Royce is fully aware of the danger it poses and has a clear duty to protect staff from harm. However the company failed its duty of care on this occasion, losing control of the source without realising it.

"There was no effective surveillance of it for five hours and the exposure of workers to radiation, including some who were not involved in the industrial radiography work, was considerably in excess of the annual permitted dose."

Mark Haslam, Area Environment Manager for the Environment Agency, said

"Our overriding aim in regulating the use of radioactive materials is to ensure their safe management and control to protect the public and the wider environment from the harmful effects of radiation. For us, the most important thing is that the company has learnt the lessons from this and put improvements in place to ensure this does not happen again."

EA, DEFRA & DECC MATTERS

The 43rd SULG meeting was held on 4th December. The following are of interest

EA MATTERS

EA Environment and Business Update

Deputy Director
A new future Deputy Director and Head of Radioactive Substances Regulation has been announced, Joanne (Jo Nettleton) will replace Joe McHugh. She has wide regulatory experience of both nuclear and non-nuclear radioactive substances regulation and will join the EA at the end of January 2015, with a handover period of ~ 1 month. Time will tell what influence she has on EA RSR strategy and direction but her background and experience are very appropriate and the view of the EA team was very positive.

Radioactive Waste /advisors
The RWA Approval board met to consider whether under the revised BSS Directive re qualified experts a combined system can be derived for recognition of RPAs, RWAs and Medical Physics Experts. SRP has received 30 applications for RWA re-approval from those with grandfather rights.

Smarter Environmental Regulation Review (SERR)
A key strand of SERR is the Smarter Guidance project. This aims to reduce and simplify the amount of environmental guidance and ensure that customers understand how to comply with the law. Guidance will be published on GOV.UK.

Regarding the Defra consultation on Smarter Guidance for the Environmental Permitting Regulations earlier this year it is at present not known how Defra intends to act on the responses received. The EA have not been asked to make any changes to the existing suite of RSR guidance, of which the non-nuclear content can be found at:

Radioactive substances regulation for non-nuclear sites – GOV.UK

Current thinking is that any review or revision of material won't be before the 2015/16 financial year. DEFA and DECC have been in discussion as to how the Smarter Guidance project will affect RSR EPR Guidance.

The Zero Based Review of data and reporting obligations is another strand of SERR, also known as Smarter Data. The EA is seeking to consolidate the multi-part non-nuclear EPR applications forms into a single 'smart' form incorporating guidance to facilitate completion. This work should be completed by June 2016, subject to funding.

Non-nuclear RSR Area Teams – Operational Update
The recent Roll Royce prosecution was highlighted where an industrial radiography (HASS) source was effectively lost for 5 hours. This case has been well publicised and resulted in a joint HSE/EA prosecution, with breaches of HASAWA, MHSWR, IRR99 and EPR10 and a large fine. The EPR permit breaches included breakdown of management systems, training, operating procedures and failure to have 'measures to prevent loss'. (*see article on page 14 for further details*)

An Environmental Management System (EMS) workshop has been developed to answer operators requests to demonstrate compliance with the permit management system, emphasising key

aspects of proportionality. It is proposed that a number of these will be run in the future, the workshop having been trialled at a customer liaison meeting.

Under the Strategic Review Response Programme (SRPP) the new two tier EA organisation was implemented on Nov 1st (National and 16 areas), with 6 area-based non-nuclear teams covering these areas.

Enforcement Undertakings

Sara Spillett (Defra) discussed the proposed introduction of Enforcement Undertakings (EU, a civil sanction) for environmental permitting. A lot of work has gone into preparing the groundwork for this under EPR but it still awaits final ministerial approval. To date EU has been mainly applied to packaging waste offences. The idea originates from the Regulatory Enforcement and Sanctions Act 2008 (RESA) changing regulators powers in responding to breaches of the law. If in the case of EPR2010 a regulatory offence has been committed the operator may be able to avoid prosecution by promising remediation/compensation and a monetary payment ie a voluntary fine. If an EU is accepted then prosecution cannot follow. An EU would not however always be an option if the offence is serious but it does potentially offer a 'third way'. There was some discussion as to the fact that EUs would be on the public register in the same way as a prosecution. However Mike Nettleton from HSE pointed out that under the FOI act journalists are able to find out a lot of information so that not being on a public register doesn't guarantee anonymity. Interestingly the HSE could potentially also adopt the EU approach, but has not yet chosen to do so.

Treatment of VLLW

This was not covered at this meeting but the definition and treatment of VLLW will be discussed at the next SULG meeting.

ONR Safeguards

Small holders of nuclear materials (SHNM) have repeatedly raised concerns through AURPO and SULG over the disproportionate regulatory burden imposed by Euratom safeguards in reporting often very small nuclear material inventories largely used for non-nuclear applications eg electron microscopy. This matter has been raised by ONR Safeguards with Euratom several times but with little progress. In early 2013 a formal request was submitted by ONR Safeguards to Euratom for a more proportionate safeguards burden on UK SHNM, but maintaining the provision of data to Euratom in order for them to be confident there is no diversion of nuclear material.

A meeting between ONR Safeguards and Euratom inspection and accountancy sections in September 2013 resulted in the agreement to set up a National Location Outside Facilities (NLOF – an IAEA term similar to SHNM). The NLOF will comprise a number of UK SHNM within a single Material Balance Area, where any transfers within the LOF without change of ownership won't require reporting. The requirement for reporting to Euratom of transfers into and out of the NLOF will be determined by ONR Safeguards. The main advantage is that ONR Safeguards process the operators' supplied information and submit the reports to Euratom, removing a considerable administrative burden. The operator will only need to supply information to ONR Safeguards by e mail or Excel spreadsheets (ONR Safeguards will compile verify and submit the formal reports). The NLOF has been trialled with 26 organisations using DU shielding, but the plan is to incorporate 36 more organisations including Universities and research organisations with more complex inventories before the end of 2014.

It was emphasised that for inclusion and continuation in the LOF organisations will have to demonstrate robust Nuclear Material Accountancy and control (NMAC) systems. ONR Safeguards will host the annual Physical Inventory Verification and this gives Euratom the opportunity to inspect the NMAC systems and physical holdings of a few organisations. Thus while there is no room for stepping back from maintaining current control of nuclear materials, nevertheless the overall feeling is that this does represent positive progress by removing a not inconsiderable administrative/bureaucratic burden from many universities and research establishments (there was no success in requests by ONR Safeguards to introduce *de minimus* levels).

Implementation of the revised Basic Safety Standards Directive

The BSSD brings together 5 Directives covering

- Basic Safety Standards
- Medical Exposures
- High Activity Sealed Sources
- Outside Workers
- Public Information

The main changes relating to public protection include the use of a graded approach, closer alignment with ICRP and IAEA standards, a revised definition of high activity sealed sources (HASS) and the use of IAEA 'D-values', an increased emphasis on managing orphan sources and the use of reference levels for contaminated land. DECC is leading the implementation project for which the transposition date is February 6th 2018.
A Public exposure working group consisting of DECC, devolved administrations, other government departments, regulators (EA, SEPA, NRW, HSE, ONR) and PHE are considering potential changes to the UK approach, but the UK government and devolved administrations will consult on the available options if any such changes are required.
An example of work currently underway is the impacts of introducing IAEA D values, which will result in some sources being removed as HASS but conversely other sources now being included as HASS.
DECC wanted SULG's views on how it should be involved in the implementation process. Available options would be update presentations, invitations to consultation events and giving consultation material direct to SULG members, with SULG acting as a point of contact for the non-nuclear community. A combined approach was thought appropriate, with any issues from members fed back to Amber Bannon to pass on to DECC.
Incidentally with reference to the government favouring of Smart Guidance this will likely mean that 'IRR 18' may have accompanying 'Codes of Practice' but these will not be '**Approved** Codes of Practice'

Small User/Members Issues

Exemption of EPR2010 exempt wastes from transport regulations; this issue is still ongoing as David Rowe has retired from ONR and nobody from his section was present at the meeting. This also means that reports of 'heavy handed' ONR inspections disproportionate to risk could not be discussed

Discussion on the extension of the safe working life of sealed sources centred on the statement in the EA How to Comply Guidance on sealed sources that a source is 'presumed' to be disused after

2 working lives. In many cases this does not apply as many such sources are still in use after this period. It was agreed that as long as regular leak tests supported the continuing integrity of the source the regulator wouldn't find this a problem.

Problems associated with the incorporation of all EA RSR documentation and guidance under the GOV.UK website was raised by Richard Harrison. As described on the first page of this report the lack of any revision to the RSR documentation until at least the 2015/16 financial year and the unknown outcome of the DEFRA consultation have led to the current unsatisfactory position where all the documentation is 'lumped' in one site with no indications as to which contents may be or will become outdated. The irony remains that all relevant documents are much easier to find under GOV.UK than they were under the EA website.

Mike Lockyer, UCL

Ed – Transport Matters

It is a pity there was no ONR Transport representation at this SULG meeting. There have been anecdotal reports of heavy –handed inspections from ONR that have been out of proportion to the risk from the transport operations involved. If you have been involved in an inspection in the last 12 months it would be most useful to get a report from you so that we can consider whether the ONR approach has been fair and whether collectively we need to make representations to them or review our transport guidance.

Merger in Ireland of EPA and RPII

On 1 August 2014 the Environmental Protection Agency (EPA) and the Radiological Protection Institute of Ireland (RPII) merged. The functions and staff of the RPII were transferred to the EPA through the creation of a fifth office within the existing EPA structure. This office is now known as the Office of Radiological Protection.

NEWS FROM PHE (HPA- Radiation Protection Division)

PHE-CRCE-011

Results of the 2013 PHE Inter-comparison of Passive Radon Detectors

This report considers the results for the inter-comparison carried out in 2013, for which a total of 25 laboratories from 12 countries submitted 31 sets of detectors. Analysis of the results allows each exposure group in each set to be classified from A (best) to F (worst).

PHE-CRCE-012

Evaluation of a Detector System for Measurement of Low Energy Photon Emitting Radionuclides in the Body

Calibrations have been completed for measurements of lead-210 and americium-241 in the skull and americium-241 and plutonium-239 in the lungs and liver. The calibrations are suitable for a wide range of subject sizes. The limits of detection for measurements of these radionuclides in the body have also been determined.

This development of the high resolution body monitoring system will provide Public Health England with improved, state-of-the-art capabilities for assessing intakes of radionuclides in the environment and in the workplace. This body monitoring system will also be a major resource for the response to any incident involving the release of alpha emitting low energy photon emitters (such as americium-241, plutonium-238 and plutonium-239) into the environment, which could arise from malevolent use incidents, or accidents involving transport of nuclear weapons or an installation with the potential to release such radionuclides.

PHE-CRCE-013

Doses from Computed Tomography (CT) Examinations in the UK – 2011 Review

A third national computed tomography (CT) survey for the UK has provided a useful snapshot of patient doses for 2011. Scan details for some 47,000 individual patients (rather than standard protocols as principally studied for the previous national surveys) relating to 13 common types of CT examination on adults, and also head examinations on children, were collected by electronic questionnaires voluntarily submitted by CT centres for a widely distributed sample of 182 scanners. This represented nearly a third of all UK scanners, all of which now include multi-detector-row (MDCT) technology.

PHE-CRCE-015

Radiological Impact of Routine Discharges from UK Civil Nuclear Licensed Sites During the 2000s

This report presents an assessment of the radiological impact of routine atmospheric and liquid discharges from UK civil nuclear licensed sites. It updates the previous report, NRPB-R312, in considering discharges in the mid-2000s and using the most recent assessment methodology.

Calculations of collective effective doses integrated to 500 and 100,000 years, typical annual individual doses and per caput-doses were performed for discharges in the mid-1990s and mid-2000s using the updated PC-CREAM 08® software program, which implements the EC methodology for assessing doses from routine releases from nuclear installations.

The AGNIR publishes comprehensive review reports and monitors emerging evidence on the topics detailed below.

Radiofrequency electromagnetic fields

The number and variety of transmitters producing radiofrequency electromagnetic fields, or radio waves, have increased greatly over the past few decades. Mobile phones, in particular, can transmit for prolonged periods in immediate proximity to the body, such that many people are now exposed to much higher levels of radiofrequency energy than previously.

The Independent Expert Group on Mobile Phones (IEGMP) drew attention to concerns on this topic in its 2000 report and called for more research. Similar calls were raised in other countries around the same time, and also within Europe and through the World Health Organization (WHO). The result has been a substantial programme of research supported by governments, industry and the European Union (EU). In the UK, research was initially coordinated under Mobile Telecommunications and Health Research (MTHR) programme.

The IEGMP recommended that a further review be carried out within 3 years of its own report and the AGNIR delivered this in 2003. In addition, a review focussing on the TETRA radio system used by the emergency services was published in 2001. At the time of these reports, many studies were still in progress and, in particular, epidemiological research of mobile phone users was at an early stage.

The quantity and quality of research had increased when AGNIR published its most recent report on radiofrequency (RF) fields in April 2012. The overall conclusion was although a substantial amount of research has been conducted in this area there is no convincing evidence that RF field exposure below guideline levels causes health effects in adults or children. The guideline levels mentioned are those of the International Commission on Non-ionizing Radiation Protection (ICNIRP), which are adopted in the UK.

The MTHR programme and its management committee came to an end in 2012 and research commissioning is now undertaken by the Department of Health's Policy Research Programme, which is supporting several studies. AGNIR identifies research priorities for the Department of Health and the present recommendations are those in the 2012 report.

Static magnetic fields

Static magnetic fields are used in certain industries; high-energy physics research facilities and particularly in medicine where magnetic resonance imaging (MRI) provides exceptionally clear images of tissue that can lead to more precise diagnosis of disease or injury. There have been rapid advances in the applications of static fields; in addition, there have been progressive increases in the strength of the fields used. In particular, in MRI, it is expected that exposures of several tesla (T) may become more common, while partial body exposure can be even higher.

The AGNIR published its report on static magnetic fields in May 2008. It concluded the fields used in medical MRI are high enough to produce symptoms in some people, but the symptoms tend to disappear soon after exposure. The available evidence did not indicate any long term health effects of such exposures, but the data were sparse and the group considered more studies were required. A pressing need was identified for a well-conducted cohort study of mortality and cancer incidence in workers with high occupational exposures

to static magnetic fields from MRI.

Power frequency electromagnetic fields

Power frequency electric and magnetic fields are produced wherever electricity is generated, transmitted or used. Electrical systems in the UK use alternating current at a frequency of 50 hertz. In general, stronger magnetic fields are produced with high currents and stronger electric fields are produced with high voltages. Concerns about the health implications of exposure to power frequency electromagnetic fields were focused when a 1979 study suggested a relationship between cancer deaths in children and the current levels suggested by transmission line configurations near their homes.

The first AGNIR report was published in 1992 and addressed the question of whether there could be a relationship between exposure to power frequency fields and the risk of cancer. In the absence of unambiguous experimental evidence, epidemiological findings at that time were regarded as only sufficient to justify hypothesis formation for testing through further research.

More research was undertaken, including improved studies of cancers in relation to magnetic field exposures, and in 2001, the AGNIR published another report on electromagnetic fields and the risk of cancer. The report concluded that laboratory experiments had provided no good evidence that extremely low frequency electromagnetic fields (EMFs) are capable of producing cancer, nor do human epidemiological studies suggest that they cause cancer in general. There is, however, some epidemiological evidence that prolonged exposure to higher levels of power frequency magnetic fields is associated with a small raised risk of leukaemia in children.

Other AGNIR reviews relevant to power frequency fields are a 2006 report addressing whether fields can influence breast cancer by affecting the hormone melatonin, a 2004 report addressing whether health effects could occur as a result of fields from power lines influencing pollution particles in the air and a 2001 report examining the evidence for neurodegenerative effects in relation to exposure.

Ultraviolet radiation

Ultraviolet radiation is present in natural sunlight and it is also produced by a variety of artificial sources either deliberately, by sunbeds for example, or adventitiously, by certain types of lighting. It is accepted that exposure to ultraviolet radiation is a cause of cancer, but there are also other biological effects, including beneficial ones such as the photochemical synthesis of vitamin D in the skin.

The first AGNIR review of UVR and health was published in 1995. The report concluded that personal behaviour in relation to sun exposure was an important risk factor, particularly so where skin cancer is concerned. Increases in skin cancer risk over 50 years leading up to the report were suggested as linked to increased leisure time and recreation time in the sun, lighter clothes and exposure of larger areas of the skin.

In 2002, the AGNIR published another comprehensive review of experimental and epidemiological studies relevant to an assessment of the health effects of ultraviolet radiation (UVR). An executive summary was published separately and a poster produced: ‘Sunsense: protecting yourself from UVR’.

In 2012 AGNIR considered the need for another review of UVR and health. It concluded that insufficient new findings had been published to need a new full review document in the near future, but there had been considerable new findings on vitamin D. The AGNIR therefore began work on a review of ultraviolet radiation in relation to vitamin D synthesis which is in progress.

Problems with a Bruker XRF Handheld Analyser

The University of Edinburgh have reported problems with a handheld X-ray Fluorescence Analyser that might be of interest to other readers. The analyser uses x-ray fluorescence induced by x rays to identify the presence of elements in materials. It is a Bruker Tracer III-SD, manufactured in February 2011, and was purchased in early 2013. It is understood to be an ex-demo model. During an initial radiation survey, when the device was being operated from a separate conventional laptop computer, it exhibited the following unsafe conditions:

1) The x-ray tube, once energised, could not sometimes be switched off at the laptop, and had to be de-energised using the key-operated switch.

2) The x-ray tube sometimes turned on without being instructed to do so.

3) In use on the bench, the x-ray tube sometimes did not switch off when the sample chamber was removed.

4) X rays could not be produced if material was not in front of the aperture, but once being generated sometimes continued to do so when the material was moved away.

5) When the x-ray tube did switch off, having been removed from the material, it switched back on if moved back to the material, without any manual intervention.

The dose rate in the main beam at 10 cm from the aperture of this device was measured as 870 mGy/h.

It has been assumed that these conditions arose from malfunction in the software control, including that controlling the infra-red proximity sensor. However, it remains unclear whether this was a fault of this particular device, a fault in the model, inadequately written but correctly functioning software, or something else. Following correspondence with the HSE, the device was confiscated, and measurements undertaken by third parties on the HSE's behalf. The device was eventually returned, but with the condition that it could only be used in the laptop mode on a bench. Since it was purchased primarily to use in the field, this has rendered the device of little use. It is understood that the HSE are communicating with the manufacturers about the unsafe conditions."

C. S. Farmery
Radiation Protection Adviser,
University of Edinburgh

9th December 2014

Ed – Many thanks for this Colin – Have any others experienced problems with hand-held XRF, in particular the software controls when in hand-held mode?

Make sure you do through checks of the safety features during your annual radiation survey.

BOOKS AND PUBLICATIONS

New and revised standards

IEC 60825-1 ed3.0 (2014-05)
Safety of laser products - Part 1: Equipment classification and requirements
ICS code 13.110, 31.260 TC 76 CHF 310.-

ICRP

http://www.icrp.org/

Radiological Protection in Security Screening

ICRP Publication 125 Ann. ICRP 43(2), 2014
D.A. Cool , E. Lazo , P. Tattersall, G. Simeonov, S. Niu

Abstract - The use of technologies to provide security screening for individuals and objects has been increasing rapidly, in keeping with the significant increase in security concerns worldwide. Within the spectrum of technologies, the use of ionising radiation to provide backscatter and transmission screening capabilities has also increased. The Commission has previously made a number of statements related to the general topic of deliberate exposures of individuals in non-medical settings.
This report provides advice on how the radiological protection principles recommended by the Commission should be applied within the context of security screening.
More specifically, the principles of justification, optimisation of protection, and dose limitation for planned exposure situations are directly applicable to the use of ionising radiation in security screening. In addition, several specific topics are considered in this report, including the situation in which individuals may be exposed because they are concealed ('stowaways') in a cargo container or conveyance that may be subject to screening. The Commission continues to recommend that careful justification of screening should be considered before decisions are made to employ the technology. If a decision is made that its use is justified, the framework for protection as a planned exposure situation should be employed, including optimisation of protection with the use of dose constraints and the appropriate provisions for authorisation and inspection.

Radiological Protection against Radon Exposure

ICRP Publication 126 Ann. ICRP 43(3), 2014
J-F. Lecomte, S. Solomon, J. Takala, T. Jung, P. Strand, C. Murith, S. Kiselev, W. Zhuo, F. Shannoun, A. Janssens

Abstract - In this report, the Commission provides updated guidance on radiological protection against radon exposure. The report has been developed considering the latest ICRP recommendations for the system of radiological protection, all available scientific knowledge about the risks of radon, and the experience gained by many organisations and countries in the control of radon exposure. The report describes the characteristics of radon exposure, covering sources and transfer mechanisms, the health risks associated with radon, and the challenges of managing radon exposure.
The Commission recommends an integrated approach for controlling radon exposure, relying as far as possible on the management of buildings or locations in which radon exposure occurs, whatever the use of the building. This approach is based on the optimisation principle, and is graded reflecting the responsibilities of key stakeholders, notably in workplaces, and the intent of the national authorities to control radon exposure. The report also provides recommendations on managing radon exposure when workers' exposures are considered as occupational, and the appropriate requirements of the Commission should be applied.

ICNIRP

http://www.icnirp.org
Check their website for latest publications and documents out for consultation.

Health Physics 2014

September issue includes:

Clinical Data from One Year Follow-up of Victims of the Radiation Accident with 60Co in Bulgaria
Djounova, J.; Guleva, I.; Negoicheva, K.; Mileva, I.; Panova, D.; Rupova, I.*
Comment on ICNIRP Guidelines for Limiting Exposure to Electric Fields Induced by Movement of the Human Body in a Static Magnetic Field and by Time-varying Magnetic Fields Below 1...

Gowland, Penny; Glover, Paul

Response by ICNIRP to the Comments of Gowland and Glover

Ziegelberger, Gunde

October issue includes:

Damage Threshold from Large Retinal Spot Size Repetitive-pulse Laser Exposures

Lund, Brian J.; Lund, David J.; Edsall, Peter R.

Nuclear Medicine Practices in the 1950s through the Mid-1970s and Occupational Radiation Doses to Technologists from Diagnostic Radioisotope Procedures

Drozdovitch, Vladimir; Brill, Aaron B.; Mettler, Fred A. Jr

November issue includes:

Scientific Foundation of Regulating Ionizing Radiation: Application of Metrics for Evaluation of Regulatory Science Information

Moghissi, A. Alan; Gerraa, Vikrham Kumar; McBride, Dennis K.;

December issue includes:

Assessment of Radio Frequency Exposures in Schools, Homes, and Public Places in Belgium

Verloock, Leen; Joseph, Wout; Goeminne, Francis;

Cataract after Repeated Daily in Vivo Exposure to Ultraviolet Radiation

Galichanin, Konstantin; Löfgren, Stefan; Söderberg, Per

IAEA Safety Standards

Decommissioning of Facilities
IAEA Safety Standards Series No. GSR Part 6
Decommissioning is the last step in the lifetime management of a facility. It must also be considered during the design, construction, commissioning and operation of facilities. This publication establishes requirements for the safe decommissioning of a broad range of facilities: nuclear power plants, research reactors, nuclear fuel cycle facilities, facilities for processing naturally occurring radioactive material, former military sites, and relevant medical, industrial and research facilities. It addresses all the aspects of decommissioning that are required to ensure safety, aspects such as roles and responsibilities, strategy and planning for decommissioning, conduct of decommissioning actions and termination of the authorization for decommissioning. It is intended for use by those involved in policy development, regulatory control and implementation of decommissioning.
STI/PUB/1652; 23 pp., 2 figs; 2014; ISBN 978-92-0-102614-9, English, 25.00 Euro
Electronic version can be found:
http://www-pub.iaea.org/books/IAEABooks/10676/Decommissioning-of-Facilities-General-Safety-Requirements-Part-6

Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (2012 Edition)
IAEA Safety Standards Series No. SSG-26
This Safety Guide provides recommendations and guidance on achieving and demonstrating compliance with IAEA Safety Standards Series No. SSR-6, Regulations for the Safe Transport of Radioactive Material (2012 Edition), which establishes the requirements to be applied to the national and international transport of radioactive material. Transport is deemed to comprise all operations and conditions associated with and involved in the movement of radioactive material, including the design, fabrication and maintenance of packaging, and the preparation, consigning, handling, carriage, storage in transit and receipt at the final destination of packages. This publication supersedes IAEA Safety Standards Series No. TS-G-1.1 Rev. 1, which was issued in 2008.
STI/PUB/1586; 450 pp., 17 figs; 2014; ISBN 978-92-0-136910-9, English, 70.00 Euro
Electronic version can be found:
http://www-pub.iaea.org/books/IAEABooks/8952/Advisory-Material-for-the-IAEA-Regulations-for-the-Safe-Transport-of-Radioactive-Material-2012-Edition

Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards
IAEA Safety Standards Series No. GSR Part 3
This publication is the new edition of the International Basic Safety Standards. The edition is co-sponsored by seven other international organizations — European Commission (EC/Euratom), FAO, ILO, OECD/NEA, PAHO, UNEP and WHO. It replaces the interim edition that was published in November 2011 and the previous edition of the International Basic Safety Standards which was published in 1996. It has been extensively revised and updated to take account of the latest finding of the United Nations Scientific Committee on the Effects of Atomic Radiation, and the latest recommendations of the International Commission on Radiological Protection. The publication details the requirements for the protection of people and the environment from harmful effects of ionizing radiation and for the safety of radiation sources. All circumstances of radiation exposure are considered.
STI/PUB/1578, 436 pp., 2 figs; 2014; ISBN: 978-92-0-135310-8, English, 68.00 Euro
Electronic version can be found:
http://www-pub.iaea.org/books/IAEABooks/8930/Radiation-Protection-and-Safety-of-Radiation-Sources-International-Basic-Safety-Standards

Management of Disused Sealed Radioactive Sources
IAEA Nuclear Energy Series No. NW-T-1.3
This publication summarizes the reviewed information distributed in previous IAEA publications and provides an up to date, overall picture of the management of disused sealed radioactive sources (DSRS) based upon the current status and trends in this field. It incorporates the most recent experience in source management, including newly developed techniques used for DSRS conditioning and storage. Problems encountered and lessons learned are also highlighted in the publication in order to help avoid the mistakes commonly made in the past in managing disused sources.
STI/PUB/1657, 165 pp.; 102 figs; 2014; ISBN: 978-92-0-103214-0, English, 46.00 Euro

Electronic version can be found:
http://www-pub.iaea.org/books/IAEABooks/10582/Management-of-Disused-Sealed-Radioactive-Sources

TRAINING COURSES

ICR Radiation Protection Training Course

This annual course for Medical Physicists intending to progress towards RPA certification will be run again on Monday 13th to Friday 17th April 2015.

Details of the course, and a link to the registration form (which is also included with the latest circulated copy of Scope), can be found here:

http://www.icr.ac.uk/studying-at-the-icr/opportunities-for-clinicians/radiotherapy-and-imaging-training-courses/radiation-protection-training-course

Please note, fees for the course have again been held at last year's prices.

Jim Thurston,
Head of Radiation Protection and Dosimetry,
Royal Marsden Hospital,

Radiation Protection Training at PHE Leeds

If you are looking for radiation safety training, you may wish to know that details of our 2015 courses are now are now available on-line; click *here* for further details. We have two new courses in our schedule for next year: *"The Transport of Radioactive Material"* and *"Radiation Awareness – NORM"*. Click on the titles to go straight to our website for further details.
Our courses are designed to help employers meet their obligations under The Ionising Radiations Regulations 1999 and the various Radioactive Substances Regulations (EPR in England / Wales, and RSA in Scotland). We offer courses for managers, a range of courses for Radiation Protection Supervisors, and various awareness courses for others 'engaged in work' with radiation. If you would like to know more about the regulatory requirements, please call or email and any of our RPAs will be happy to advise.

Anne Cann, CRCE Leeds Training Administrator,
0113 267 9041 anne.cann@phe.gov.uk

Association of UNIVERSITY RADIATION PROTECTION OFFICERS

AURPO Membership Subscription Form 2014 - 15

The annual subscription of £35 (£10 for retired members) to the Association is due on the 1st July 2014. Members who attend the Annual Conference in September may pay the subscription fee at the time of registration.

Please fill in the form below. If paying by cheque make it payable to AURPO, and send it to me at the address below with a covering note. If paying by other way, *regardless of the method*, or not renewing your membership, please complete the form and **e-mail it back to me**, **copying it to** membership@aurpo.org.uk.

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Please note that it is now a condition of membership that all subscriptions must be paid by **30th September**, but unless paying via the Conference, please pay as early as possible, any time from now on.

Thank you
Gillian Glazier
Honorary Treasurer

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AURPO Affiliate Subscription Form 2014 - 15

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Please fill in the form below. If paying by cheque make it payable to AURPO send it to me at the address below.

Regardless of the method of payment, or you not renewing your affiliateship, please complete the form and **e-mail it back to myself and copy Sonia Nuttall** membership@aurpo.org.uk

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