Regulating Radiological Protection Aspects of Great Britain's Nuclear Industry

Charles Temple, HM Superintending Inspector of Nuclear Installations

Office for Nuclear Regulation, Redgrave Court, Bootle, Merseyside L20 7HS, United Kingdom

Nuclear safety and security of Great Britain's nuclear industry is regulated by the Office for Nuclear Regulation (ONR), an agency of the Health and Safety Executive (HSE). ONR seeks to secure the protection of people and society from the hazards of the nuclear industry, by ensuring compliance with relevant legislation and by influencing the nuclear industry to create an excellent health, safety and security culture. This poster gives examples of our work with respect to radiological protection

Protection of Workers

1. ONR specialists regularly assess nuclear licensees' arrangements for compliance with the Ionising Radiations Regulations 1999 (IRR 99). A key focus is to ensure that doses are kept as low as reasonably practicable (ALARP).
2. During the period 2005– 2007 ONR carried out a structured in-depth review of such arrangements across 20 UK nuclear licensed sites including civil nuclear reactors, nuclear chemical facilities and defence facilities.
3. We found very few areas that were below standard and these were subsequently addressed. Overall we found a wide range of good practices including:
   - Management commitment to ALARP practices and RP training (general and task-specific).
   - Dose Reduction Working Groups involving relevant stakeholders.
   - Work planning and scheduling techniques involving ALARP checksheets.
   - Protection using an appropriate hierarchy of control measures
   - Management using dose budgets and challenging targets for specific tasks.
   - Thorough investigation of actual and potential radiological events.
4. Overall we concluded that the management of occupational exposures at these UK nuclear licensed sites was generally adequate and, for many aspects, good.

Protection of the Public

1. ONR regulates licensees' arrangements for ensuring that public radiation exposures resulting from direct radiation from their operations are restricted, so far as is reasonably practicable.
2. We work with the environment agencies to provide an open check of the public's exposure to radiation as a result of activities on these sites. Assessed doses are summarised in annual reports 'Radioactivity in Food and the Environment' (RIFE): www.food.gov.uk/science/surveillance/radiosurv/rife/
3. Results from the monitoring programme support the UK in meeting its international treaty obligations
4. All doses related to nuclear licensed sites were well within the statutory limit of 1 mSv/y in 2010.
5. For further details see poster 'The Importance of Effective Communication of Radiological Protection Information to the Public and the Media' by S Walker.

Safety Case Assessment

1. ONR (as an agency of HSE) is responsible for regulating the safety of nuclear installations in Great Britain. This includes granting nuclear site licences with appropriate conditions and granting permissions.
2. Under nuclear site licence conditions, licensees must have an adequate nuclear safety case to provide them with the information required to enable safe management of their facilities and activities.
3. ONR's inspectors use 'Safety Assessment Principles' (SAPs) and supporting 'Technical Assessment Guides' (TAGs) to guide regulatory decisions in the nuclear permissioning process by providing inspectors with a framework for making consistent regulatory judgements on nuclear safety cases.
4. Such judgements are underpinned by the legal requirement on nuclear site licensees to reduce risks ALARP.
5. SAPs and TAGs cover a range of disciplines including Engineering, Fault Analysis, Accident Management, Emergency Preparedness, Leadership and Management for Safety, Contaminated Land and **Radiological Protection**.

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Securing the protection of people and society from the hazards of the nuclear industry

Nuclear New Build

1. ONR is undertaking Generic Design Assessment (GDA) to prepare for potential new nuclear build. RP assessments have been completed for the EDF and AREVA UK EPR™ and the Westinghouse AP1000® reactor designs.
2. We have examined submitted safety documentation covering topics including the minimisation of radiation sources, effectiveness of measures to control radioactive contamination and the adequacy of radiation shielding and of measures intended to restrict the exposure of workers during accidents.
3. We concluded that both designs ensure that engineered features would restrict worker doses to ALARP levels during normal operation. Predicted doses to members of the public are very low.
4. Our Assessment Findings have been published in summary reports which highlight areas requiring further information / assessment and two GDA Issues, one associated with each design, which will require resolution.
5. For details see paper 'Radiological Protection Aspects of the Generic Design Assessment of Potential New Nuclear Reactors in the UK' by S McCready-Shea and G Ingham.

RP Safety Assessment Principles

1. There are six SAPs specific to RP in the areas of:
   - Protection in normal operation.
   - Protection in accident conditions (including prevention and mitigation).
   - Provision of designated areas.
   - Protection of those entering contaminated areas.
   - Provisions for decontamination.
   - The use of shielding for restricting dose.
2. These RP SAPs link with the Ionising Radiations Regulations 1999 (IRR 99).
3. RP is also essential in judging adequacy in other disciplines including:
   - Engineering Design (eg ensuring design is commensurate with ALARP doses for workers and members of the public).
   - Fault Studies (eg ensuring that dose consequences have been properly derived for specific fault sequences).
   - Assessing licensees' cases for assessment and remediation of contaminated land in relation to delicensing submissions.

Delicensing

1. In the UK, sites rather than specific facilities are licensed by ONR (on behalf of HSE) for the purpose of carrying out certain operations.
2. Over the last few years, applications for nuclear sites (or parts of sites) to be delicensed have been increasing as sites are no longer needed for licensable activities.
3. The relevant law requires that, in most circumstances, the licensee's period of responsibility continues until, in the opinion of ONR, there has 'ceased to be any danger from ionising radiations from anything on the site'.
4. HSE has, following public consultation, published its criteria for delicensing such sites. These are related to an additional risk of death to an individual of one in a million per year, which HSE/ONR considers is 'broadly acceptable' to society.
5. This approach has enabled successful delicensing of a number of areas.
6. For details see paper 'The Delicensing of Nuclear Licensed Sites in the UK' by P Stephen, E Nattress, S McCready-Shea, S Johnson and N Barnes.

Dosimetry (with HSE)

1. Under the Ionising Radiations Regulations 1999 (IRR 99) employers are required to engage approved dosimetry services to undertake dose assessments for certain employees and to maintain dose records.
2. Dosimetry services are currently approved by HSE or, for those providing services to the nuclear industry, ONR, for:
   a) the assessment of doses arising from external radiation, intakes of specified classes of radionuclides and doses following an accident; or
   b) co-ordination and record-keeping of individual dose assessments.
3. HSE's Requirements for Approval (RADS) and guidance is available. Approval involves assessment against RADS, an inspection visit and a successful performance test (where appropriate).
4. Approval attracts a fee and is required to be renewed every 5y (assessment) or 7y (Co-ordination and Record Keeping).
5. For details see poster on 'Approval of Dosimetry Services' by M Nettleton and A Mayor.

Emergency Response

1. The UK has established arrangements for responding to nuclear emergencies.
2. ONR has a regulatory role in these arrangements – both on and off the nuclear site - and also a national support and response role.
3. We are currently supporting the UK's Department for Energy and Climate Change (DECC) and working with the UK environment agencies, Local Authorities and many other agencies, through the Nuclear Emergency Planning Liaison Group (NEPLG), in helping to develop a National Strategic Framework. The aim is to improve the UK's preparedness and response arrangements in response to a nuclear emergency and ensure that lessons are learned from the Fukushima accident.
4. Areas of interest include: integrating arrangements for safety / security; the extendability of existing detailed emergency response arrangements in the very unlikely event of severe nuclear accidents; emergency dose limits; radiological monitoring capability and recovery planning.
5. For details see papers 'Learning from Experience at Fukushima: A UK Regulatory perspective on Emergency Preparedness' by C Attwood, S Little and I Watson and 'Japanese Earthquake and Tsunami: Implications for the UK Nuclear Industry' by C Temple and M Weightman.

email: onrenquires@hse.gsi.gov.uk

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