Recent developments in the regulation of UK nuclear sites in the final stages of decommissioning & clean-up

WENRA WGWD Workshop on Regulatory Aspects of Decommissioning (Berlin, 7 November 2019)

Simon Morgan, Principal Inspector of Nuclear Safety
UK nuclear licensed sites

- Power reactors (14 AGRs, 1 PWR & 26 defuelled Magnox reactors)
- Defence facilities (7 sites)
- Research (3 legacy research establishments & 1 research reactor)
- Fuel cycle (2 sites)
- Pharmaceutical manufacture (2 sites)
- Reprocessing and waste (4 sites)
- Previously delicensed (12 sites)
UK Parliament

UK Government

Office for Nuclear Regulation (ONR)

Environment Agency

Scottish Government

Welsh Government

Scottish Environment Protection Agency (SEPA)

Natural Resources Wales (NRW)

Nuclear Decommissioning Authority (NDA)

37 Licensed sites / operators
(17 of which operate under contract or are subsidiary to NDA)
**Nuclear licensed sites**
Nuclear safety
Conventional health & safety
Radiological protection
Nuclear security
Nuclear safeguards

**Office for Nuclear Regulation**

Nuclear Installations Act 1965
Health and Safety at Work etc. Act 1974
Nuclear Industries Security Regulations 2003
Control of Major Accident Hazards Regulations 2015
Ionising Radiations Regulations 2017
Nuclear Safeguards Act 2018

**Nuclear & non-nuclear industrial sites**
Radiological environmental protection
Conventional environmental protection

**Environment Agency**

Control of Major Accident Hazards Regulations 2015
Environmental Permitting (England and Wales) Regulations 2016

**Non-nuclear industrial sites**
Conventional health & safety
Radiological protection

**SEPA**

Water Environment (Controlled Activities) (Scotland) Regulations 2011
Pollution Prevention and Control (Scotland) Regulations 2012
Control of Major Accident Hazards Regulations 2015
Environmental Authorisations (Scotland) Regulations 2018

**HSE**

Health and Safety at Work etc. Act 1974
Control of Major Accident Hazards Regulations 2015
Ionising Radiations Regulations 2017
Legislative & regulatory developments
Nuclear Installations (Licensing and Insurance) Act, 1959

ARRANGEMENT OF SECTIONS

1. Licensing of sites for nuclear installations.
2. Revocation and surrender of licences.
3. Supplementary provisions as to licensing of sites.
4. Licensee's liability.
5. Provision of cover for licensee's liability.
6. Dangerous occurrences in connection with licensed sites.
7. Inspectors.
8. Offences—general.
10. Interpretation.
11. Expenses.
13. Channel Islands and Isle of Man.
14. Short title and commencement.

Schedule—Inquiries into occurrences in connection with licensed sites.

Nuclear Installations (Amendment) Act 1965

ARRANGEMENT OF SECTIONS

1. Duty of operator of nuclear installation.
2. Duty of certain foreign operators.
3. Duty of other persons causing nuclear matter to be carried.
4. Right to compensation for injury or damage caused by breach of duty.
5. Exclusion, extension or reduction of compensation in certain cases.
6. Satisfaction of claims by virtue of s. 1 or 2.
7. Jurisdiction, shared liability and foreign judgments.
8. General cover for compensation by virtue of s. 1 or 2.
9. Special cover for licensee's liability.
10. Supplementary provisions with respect to cover for liability by virtue of s. 1 or 2 in respect of carriage.
11. Clear site licences.
13. Interpretation.
15. Channel Islands, Isle of Man, etc.

Schedule—Essential repeals and amendment, and commencement.

Notes:
2. Enactments repealed.

Nuclear Installations Act 1965

CHAPTER 57

LONDON STATIONERY OFFICE

Printed 1981

Price 40p net
Delicensing

• Criterion for delicensing nuclear sites (May 2005):
  “A demonstration that any residual radioactivity, above background radioactivity, which remains on the site, which may or may not have arisen from licensable activities, will lead to a risk of death to an individual using the site for any reasonably foreseeable purpose, of no greater than 1 in a million per year”

• Delicensing guidance (August 2008)
Typical lifecycle:

- Design and Construction
- Commissioning and Operation
- Defueling and Transition from Operations to Decommissioning
- Decommissioning including Possible Quiescent Period
- Final Stages of Decommissioning and Clean-up

Nature of risk:

- Nuclear
- Radiological
- Conventional
Proportionate Regulatory Control of their Site End State

Preferred Option

Version 1.0
02 December 2015

OFFICIAL
OFFICIAL
OFFICIAL

DISCUSSION

CONSULTATION ON AMENDING THE FRAMEWORK FOR THE FINAL STAGES OF NUCLEAR DECOMMISSIONING AND CLEAN-UP
Government response to consultation

November 2016

March 2017

October 2018
A) Disposal by transfer

B) Dedicated radioactive waste disposal facility *

C) Radioactive waste disposed of in-situ

D) Radioactive waste disposed of in-situ with engineered closure

E) Radioactive waste disposal for filling an existing structure

F) Radioactive waste disposal for void filling

G) Radioactive waste disposal for screening bund

H) In-situ contamination (not waste unless dug up)

Key:
- Containment structure
- Engineered closure
- Existing structure
- Disposal of radioactive waste in dedicated facility
- Disposal of radioactive waste for a purpose

* A dedicated radioactive waste disposal facility may be constructed in a new or existing structure

Richard McLeod 18/09/2015 Version 2.3
Disposal of radioactive waste

- Removal
- Deposit
- Destruction
- Discharge
  - into water
  - into air
  - into a sewer or drain or otherwise
- Burial
  - underground
  - otherwise

Release from Radioactive Substances Regulation (RSR)

- Five principles
- 15 requirements (technical & managerial)
- Waste management plan
- Site-wide environmental safety case
- Risk guidance level: $10^{-6}$ per year
- Inadvertent human intrusion dose guidance level: 3mSv per year, 20 mSv in total
- Release from RSR when operator demonstrates:
  - all disposals of radioactive waste have ceased
  - the site reference state has been achieved
R1 Requirement 1: Optimisation of waste management options

R13 Requirement 13: Optimisation of on-site disposals

*R1: Waste management options*
- Landfill
- Off-site treatment
- Recycling

R13: On-site disposal
- Decontaminate?
- Immobilise in grout?
- Engineering design?
- Emplacement method?

*Management options shown here are not exhaustive and are for illustration purposes only*
Key messages
Any questions?