Office for Nuclear Regulation

DSG(2016)C029

ONR Transport Safety

Dounreay Stakeholder Group September 2016

Iain Davidson

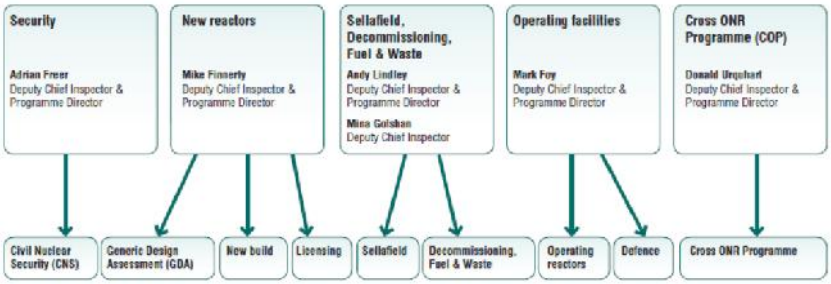
Transport Assessment
Professional Lead

Presentation will cover:

- Transport Safety Regulatory Framework including tests necessary.
- How ONR assesses Transport safety cases and conducts Transport Interventions.
- Transport Safety Studies.

Office for Nuclear Regulation

ONR Operational Programmes



Office for Nuclear Regulation

Who Are Transport?

Cross-ONR Programme Director (Donald Urquhart)

Other sub-programmes

Transport (Steve Vinton)

WS1 **Jon Hursthouse** Permissioning

WS2 **Iain Davidson** Nuclear

WS3 **Anna Mayor** Non-Nuclear

Office for Nuclear Regulation

Competent Authorities

- ONR is one Competent Authority
  - Civil carriage (by land) of Class 7 goods
  - i.e. Road and Rail in GB (inland waterway is complicated)
- Other GB / UK Class 7 Competent Authorities exist!
  - SoS Transport (Maritime and Coastguard Agency)
  - Civil Aviation Authority
  - SoS Defence
  - DoE Northern Ireland
- As do other Dangerous Goods Competent Authorities
  - Department for Transport
  - Health and Safety Executive

Office for Nuclear Regulation

Transport Regulations Codification – why?

- Transport is an international business
- Common standards adopted to enable international trade whilst maintaining internationally agreed standards of safety
- Graded approach to safety
- Generally prescriptive

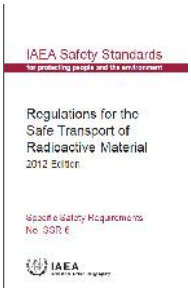
Office for Nuclear Regulation

IAEA SSR-6

National, Modal and International Regulations are based on:

IAEA Specific Safety Requirements No. SSR-6

Regulations for the Safe Transport of Radioactive Material 2012 Edition



Office for Nuclear Regulation

Basic Safety Requirements

- Containment of the radioactive contents
- Control of external radiation levels
- Prevention of criticality
- Prevention of damage caused by heat

Office for Nuclear Regulation

Class 7 Transport Sectors
1 Billion safe moves!

5% Nuclear Fuel Cycle & Others

Industrial

Medical

Scope of ONR Work

Carrier

A Thousand (or more) Potential Duty Holders

Office for Nuclear Regulation

Medical – generally non-CA aproved

- SFRAM – approved by CAs – teletherapy and sterilisation (Co-60).
- Brachytherapy – Ir-192 wire implants
- Therapeutic (pain relief):
  - Sr-89; Sm-153; and Re-156 for bone cancer
- Radioisotopes ‘tracers’ for diagnostics:
  - Tc-99 – 80% of all Nuc medicine procedures (30m/y)
  - I-131 - thyroid disease
  - F-18 – PET scan ($t_{1/2}$ is 2 hours!)

Etc (200 radioisotopes used!)

Come from reactors in Canada, Netherlands, Belgium, France, South Africa, Australia etc.

Office for Nuclear Regulation

What is Transport?

For the purposes of the IAEA Transport Regulations (SSR-6 para 106),

TRANSPORT
comprises all operations and conditions associated with, and involved in, the movement of radioactive materials. These include the

DESIGN, MANUFACTURE, MAINTENANCE AND REPAIR OF PACKAGING
and the

PREPARATION, LOADING, CONSIGNING, CARRIAGE INCLUDING IN-TRANSIT STORAGE), UNLOADING AND RECEIPT AT FINAL DESTINATION OF LOADS OF RADIOACTIVE MATERIAL AND PACKAGES.

Also known as 'Carriage' in some regulatory texts

Office for Nuclear Regulation

Other Relevant Documents

Transport Specific:

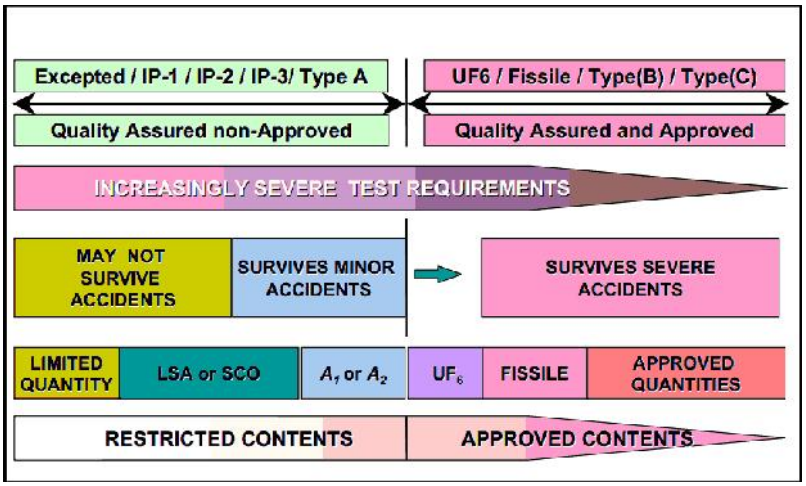
- IAEA TS-G-1.1 (Advisory Material)
- IAEA TS-G-1.2 (Emergency Response)
- IAEA TS-G-1.3 (Radiation Protection Programmes)
- IAEA TS-G-1.4 (Management Systems)
- IAEA TS-G-1.5 (Compliance Assurance)
- IAEA TS-G-1.6 (Schedules of Provisions)
- DETR/RMTD/0003 (Applicant's Guide)
  - drawing its pension – needs updating

Generic:

- IAEA SF-1 (Safety Fundamentals)
- IAEA GSR Part 1 (Governmental, Legal & Regulatory Framework for safety)
- IAEA GS-R-3 (Management Systems) (under review)
- IAEA GSR Part 3 (BSS)

Office for Nuclear Regulation

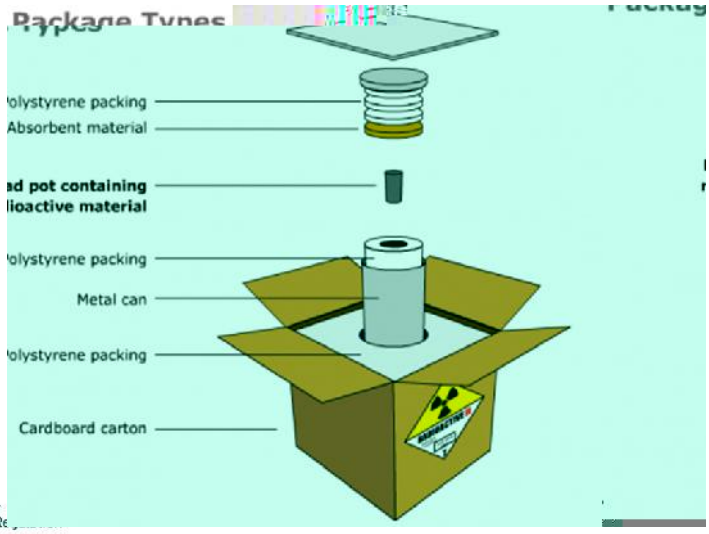
Fundamental Safety Approach



Graded approach linking contents hazard potential to required package integrity and required regulatory approval

Office for Nuclear Regulation

Typical Excepted/Type A



Office for Nuclear Re

TYPE A Fissile

New Fuel – AGR GB/3575

The fuel elements of an AGR are comprised of 36 pins containing small pellets containing uranium built into a graphite sleeve. Seven or eight fuel elements are fixed together vertically by a tie bar which passes through the centre of the elements to form a fuel stringer. A plug unit is attached to the top of the stringer to form a complete fuel assembly. An assembly is placed into each of the standpipes, so that the fuel elements are positioned within the graphite core's fuel channels and are then sealed in by the plug unit.

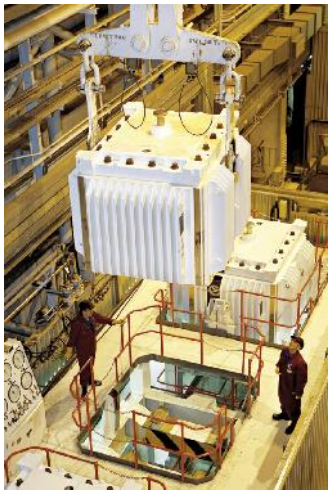
http://www.innuserv.com/

http://www.westinghousenuclear.com/springfields/Products

Office for Nuclear Regulation

TYPE B Fissile

The Stations – EDFE NGL - AGR



http://www.sellafieldsites.com/solution/spent-fuel-management/ongoing-receipt-of-agr-fuel/

Office for Nuclear Regulation

Type B Fissile

http://www.innuserv.com/unique-capabilities/#Transport

Office for Nuclear Regulation

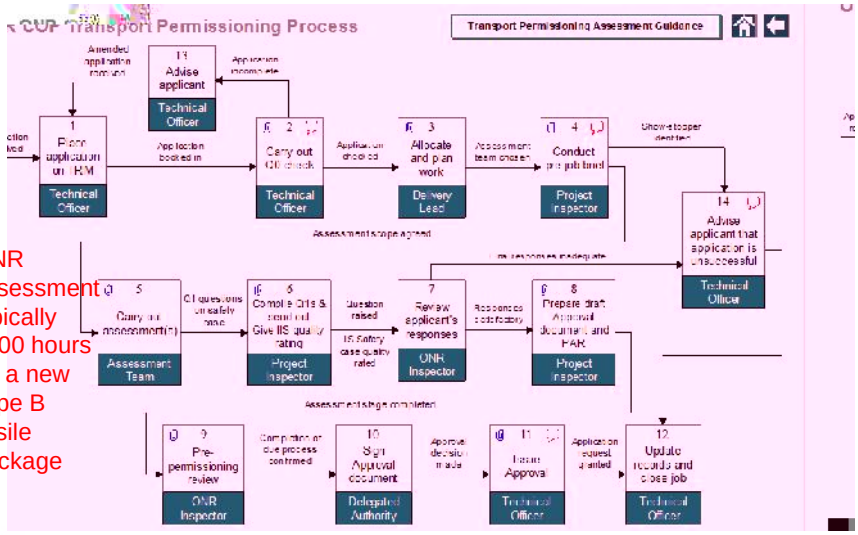
What are ACT?

- 9m drop test
- Penetration test – 1m drop on 0.2m bar
- Thermal test – 800°C all engulfing fire, 30mins
- Water immersion test – 200m for high activity packages.

- Packages must continue to remain essentially leak-tight, provide significant shielding and avoid going critical.

Office for Nuclear Regulation

Permissioning Process - 1



ONR assessment typically 1000 hours for a new Type B fissile package

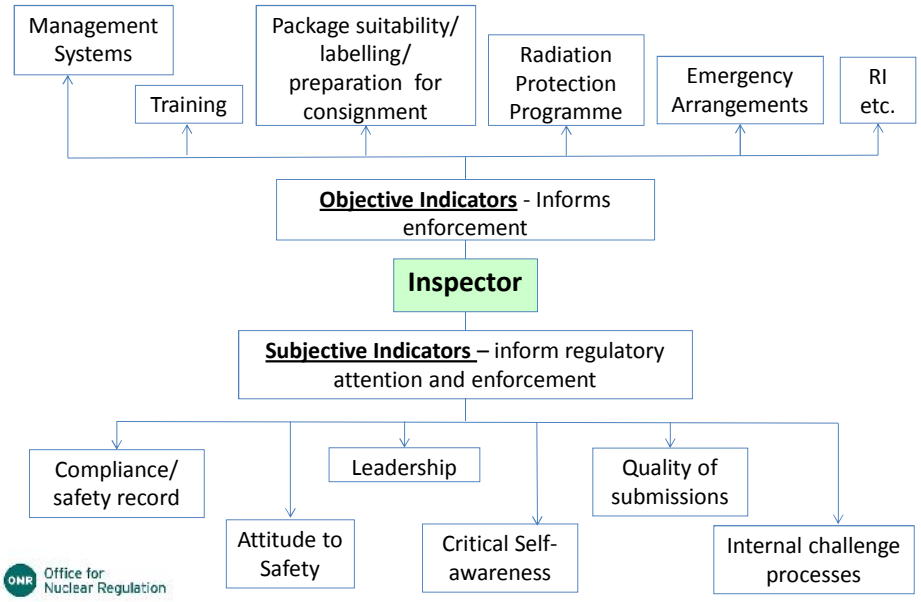
Office for Nuclear Regulation

Inspection and Enforcement

- **Purpose** - Hold duty holders to account on behalf of workers and the public
- **Focus** – Duty holders must comply with the law, but we need to focus on what can 'hurt' people – targeting and proportionality
- **Standards** – CDG/ADR/RID etc. – we only require what the law requires
- **Inspections** – Informed by our judgement of risk and compliance - inspect and intervene accordingly (targeting)
- **Enforcement** – We want duty holders to comply, but will enforce if needs be – nature of enforcement reflecting compliance risk gap, and mitigating/ aggravating factors

Office for Nuclear Regulation

What Are We Interested In?



Safety Studies

- ONR Events report 2001 to 2015
- Looks at type of incidents.
- http://www.onr.org.uk/documents/2016/events-reported.pdf
- Ministerial Reporting
- http://www.onr.org.uk/quarterly-stat/index.htm
  - PHE/HPA/NRPB reports for Road, Rail, Sea and Air
  - Look at doses.
  - http://www.onr.org.uk/transport/guidance.htm

Office for Nuclear Regulation

NRPB 2005. Survey into the radiological impact of the normal transport of radioactive material in the UK by road and rail.

Abstract:

- Half a million UK packages/year
- Most for industrial, research and medical use.
- Dose to most Transport workers <1mSv/y
- Doses to public at least an order of magnitude smaller <20microSv/y

Office for Nuclear Regulation