UK Transport – ONR
Update and Operational Experience
TRANSSC 32 June 2016

Iain Davidson
Transport Assessment Professional Lead
Talk Outline

• ONR updates
• Regulatory Framework
• Transport Strategy
• What’s moving/ sectors/ findings
  – Nuclear Fuel Cycle
  – Non-nuclear – industrial (NDT, oil/gas, minerals); medical; research; agriculture etc.
ONR (Office for Nuclear Regulation)

The Office for Nuclear Regulation's mission is to provide efficient and effective regulation of the nuclear industry, holding it to account on behalf of the public (500 staff – 350 Inspectors).

ONR independently regulates nuclear safety and security at 37 nuclear licensed sites in the UK. We also regulate transport and ensure that safeguards obligations for the UK are met. Our duty is to ensure that the nuclear industry controls its hazards effectively, has a culture of continuous improvement and maintains high standards.
New Model
Model at End of Year
Transport etc embedded in Programs

Security
Adrian Freer
Deputy Chief Inspector & Programme Director

New reactors
Mike Finnerty
Deputy Chief Inspector & Programme Director

Sellafield,
Decommissioning,
Fuel & Waste
Andy Lindley
Deputy Chief Inspector & Programme Director
Mina Golshan
Deputy Chief Inspector

Operating facilities
Mark Foy
Deputy Chief Inspector & Programme Director

Civil Nuclear Security (CNS)
Generic Design Assessment (GDA)
New build
Licensing
Sellafield
Decommissioning, Fuel & Waste
Operating reactors
Defence
The Legal Position

- Varies contingent upon mode of transport
- United Nations Orange Book incorporate IAEA requirements
- Modal texts incorporate UNOB requirements and supplement with mode-specific requirements
- European Directives require transposition into UK and GB Law
- Modal texts implemented through Statutory Instruments
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
CDG 2009

• Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009
  – Identifies ONR as the Competent Authority for road, rail and inland waterway for the civil carriage of Class 7 goods only, whereby it is an RSP of The Energy Act 2013
  – Places duties on duty-holders to comply with CDG2009 (including relevant provisions contained in ADR, RID (and ADN)). Extra regs for Emergencies.
Other legislation

- ONR perform certain Class 7 competent authority functions under other legislation:
  - Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations 1997
  - Carriage of Dangerous Goods and Use of Transportable Pressure Equipment (Northern Ireland) Regulations 2010
  - Air Navigation (Dangerous Goods) Regulations 2002
Transport sub-programme
Regulated Nuclear sites

Approx 20 planned Compliance/Management System inspections/year

Approx 10 reactive inspections


Approx 20 Type B/B(F)/A(F) package approvals

One Special Arrangement in 2015/16
Non-Nuclear sites

- 3000 to 4000 duty holders in Industrial, Medical and Carrier (IMC) sectors (farmers!) Clusters in e.g. oil industry (Aberdeen).
- Approx 100 inspections (safety/security)
- Approx 15 Type B(U)/SFRAM applications
Locations of small users of Radioactive material in Great Britain
November 2006
Transport Strategy

• Long-term strategy and 5-year plans exist.
• Key elements of strategy:
  – Treating fuel cycle as a system
  – Leveraging internal regulators/other regulators
  – Focus on safety rather than administrative compliance
  – 5y, 10y 20y horizon scanning – reg changes?
  – Duty-holder Compliance Maps
  – Measuring our own effectiveness
  – Integration – TP/wider ONR
  – Intel analysis - Education/Dissemination/Stakeholder engagement
  – Better risk models to target inspections etc.
## Overview

<table>
<thead>
<tr>
<th>NFC (5%)</th>
<th>Industrial</th>
<th>Medical</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In</strong></td>
<td>Yellowcake ($U_3O_8$, $UO_2$ and $UO_3$), Historically, spent fuel (Japan, Europe)</td>
<td>Co-60 (radiography) Se-75, Ir-192, Yt-169 (NDT), Sc-46 (quantify yields) Cs-137 (fill height)</td>
</tr>
<tr>
<td><strong>Out</strong></td>
<td>VRR (French packages)</td>
<td>As above</td>
</tr>
<tr>
<td><strong>Around</strong></td>
<td>UF₆, AGR Fuel new/used, Mx Fuel used, PIE material, ‘Exotics’, Graphite, Laundry, Waste (Drigg) etc.</td>
<td>As Above Am-241</td>
</tr>
</tbody>
</table>
Nuclear Facilities in GB

• Uranium recovery to extract (or mine) uranium ore, and concentrate (or mill) the ore to produce "yellowcake"

• URENCO Capenhurst (CNS) - Conversion of yellowcake into uranium hexafluoride (UF6)

• URENCO Capenhurst (CNS) - Enrichment to increase the concentration of uranium-235 in UF6

• Westinghouse (UKAEA Springfields Nuclear Fuels) - Fuel fabrication to convert enriched UF6 into fuel for nuclear reactors. Also recovery and UF6 production and consignment.

• EDFE NGL/ Magnox/ Test Reactors - Use of the fuel in reactors (nuclear power, research, or naval propulsion)

• Stations/Sellafield/Test Facilities - Interim storage of spent nuclear fuel

• Sellafield/ Westinghouse - Reprocessing (or recycling) of high-level waste

• Final disposition (disposal) of high-level waste
Yellowcake/UO3
200litre IP2 drums in standard 6m containers from Canada

RWMD report
Transport Safety Review and Scoping Study 2014
Hex (UF6) Packages

e.g. 48Y and 30B (enriched)

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
The Stations – EDFE NGL - AGR

Copyright © Sellafield Ltd
Legacy Fuel Moves

http://www.innuserv.com/unique-capabilities/#Transport
The Global Threat Reduction Programme (GTRP) is part of our counter-proliferation strategy. It provides the UK’s contribution to the G8’s Global Partnership Against the Spread of Weapons and Materials of Mass Destruction - a multilateral initiative to prevent terrorists and other proliferators from acquiring WMD.

We are working on GTRP programmes that aim to:

• improve the security of fissile materials (i.e. plutonium and highly enriched uranium)

• reduce the number of sites containing nuclear and radiological material

• reduce the risks in the proliferation of biological expertise and materials

• prevent terrorists acquiring proliferation-relevant information and expertise
HLW - VRR / MOX Japan

http://www.innuserv.com/about-us/
http://www.pntl.co.uk/category/image-library/
Legacy/Decommissioning – Berkeley
Boilers 15@310Te – Magnox 1962/1989

Industrial- Techops 880 (Ir-192)

Nuclear Density Gauges

http://www.troxlerlabs.com/Products
Type A
USA SFRAM Cs-137/Am-241
Medical – Generally non-CA approved

- 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.
Others

- Research (Universities)
- Agriculture (grain mass flow and moisture content)
- Consumer goods
  - Smoke detectors
  - Tritium light sources
  - Marbles!
The End

• Nuclear and large/diverse Non-Nuclear.
• 100s of radionuclides and packages.
• Over 1 billion ‘safe’ consignments since the IAEA regulations started in 1961.
• Questions?