Health and Safety Executive

The Work of UK HM Nuclear Installations Inspectorate and Future directions

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Technology Innovation and International Partnership Workshop on DOE Used Nuclear Fuel & High Level Waste

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- Brief History of NII - why it exists, who pays for it?
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- Future Challenges in Regulation
- Any Questions?

WHAT IS HSE ?

- UK Government Agency
- Statutory body, set up under Health & Safety at Work etc Act 1974
- With statutory functions, responsibilities & powers

THE CHALLENGE

- HSE's Nuclear Directorate regulates the construction, commissioning, operation and decommissioning of nuclear facilities in Great Britain
- Nuclear Directorate includes:
  - HM Nuclear Installations Inspectorate
  - Office of Civil Nuclear Security
  - UK Nuclear Safeguards Office

Other Significant Regulators

- Conventional safety – HSE's Field Operations Directorate
- Hazardous chemicals – HSE's Hazardous Industries Directorate
- Disposals of radioactive wastes and chemical discharges – Environment Agency Scottish Environment Protection Agency
- Department for Transport

WHAT DOES NII DO ?

- Regulates safety & health at work (nuclear aspects) in Great Britain
- Regulates nuclear industry activities for public safety
- Regulates radioactive waste management
- Inspects work activities & promotes good practice at nuclear licensed sites
- Represents UK at international fora (IAEA, OECD/NEA, WENRA, etc)

Nuclear Installations Inspectorate (NII) Responsibilities

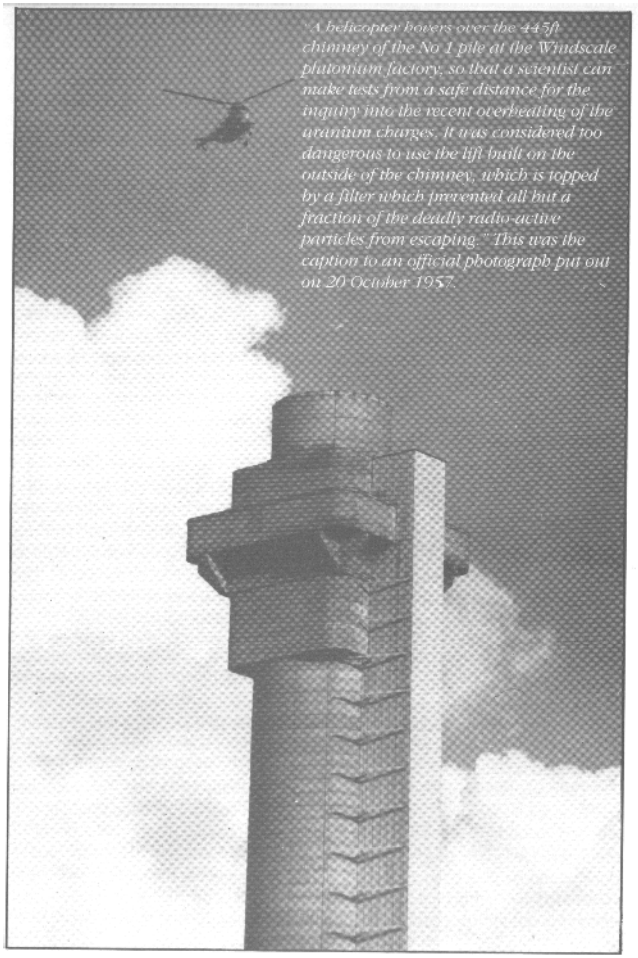
- **Under Nuclear Installations Act 1965**
- Ensuring licensees develop appropriate standards of nuclear safety and security throughout UK by the granting of site licences.
- Enforces those licences
- Inspectors are law enforcement officers
- Independent of Licensees and Government
- Responsible for the regulation of the management of nuclear matter on Nuclear sites which includes radioactive waste
- **Under HSAWA 1974**
- Responsible for Regulation of Nuclear Aspects of Health and Safety

UK Environment Agency Responsibilities

- Under the radiological substances act 1993 (RSA93) responsible for authorising the *disposal* of radioactive waste on all sites
- On *non – nuclear* sites responsible for the regulation of management of radioactive substances
- Also responsible for non-radioactive waste regulation
- Creates an area of regulatory overlap as the acceptability for disposal requires knowledge of the management of the waste and the source that is creating the waste (Spent Nuclear Fuel)

- *Joint Working!*

Why was NII formed?



The caption to the official photograph put out on 20 October 1957

"A helicopter hovers over the 445ft chimney of the No.1 pile at the Windscale …., so that a scientist can make tests from a safe distance for the enquiry into the recent overheating of the uranium charges. It was considered too dangerous to use the lift built on the outside of the chimney, which is topped by a filter which prevented all but a fraction of the deadly radio-active particles from escaping."

The Beginning

- The Pile fire, the melting fuel and the release of radioactivity across northern England and Europe was the worst nuclear accident in our country's history
- NIA 1960 introduced to regulate the emerging nuclear power programme (insurance driven) but excluded Windscale and UKAEA
- a licensing and insurance act it gave considerable powers to the minister to regulate the nuclear industry, to appoint inspectors and recover costs.
- The Inspectorate of Nuclear Installations was born.

The Definition

- In 1965 the NIA was amended and underpins nuclear safety regulation to this day
- Prevents **anyone** from operating a **prescribed** nuclear installation without a licence.
- i.e. Permission is required to carry out activities
- Conditions could be attached to that licence
- At that time the minister could write and enforce nuclear law but he delegated to the Chief Inspector
- Later modifications passed the ministers powers to the HSE who delegate these to the Chief Inspector

The Expansion

• Magnox Reactors	• 1960
• Magnox and AGR Reactors	• 1965
• Magnox, AGR, BNFL, Amersham, RR	• 1970
• Magnox, AGR, BNFL, Amersham, RR, SGHWR, CFBR and PWR	• 1974
• Government created HSC/HSE and NII became independent of the dept responsible for promoting the nuclear industry (Now DECC)	• 1975 INDEPENDENCE !!

Health and Safety at Work Act 1975

- UK's Primary Health and Safety legislation
- Sets down standards and measures to protect workers and public from the hazards of carrying out work
- Goal setting and not prescriptive
- Linked to the NIA65
- All inspectors appointed under Section 19 HASAWA and have powers under section 20
- Section 20 powers include right of entry and prosecution

Increasing Public Profile

- *Windscale Inquiry*
- Thorp
- Sizewell B (PWR)
- Sellafield Audit
- Chernobyl

- *1978 – Spent Fuel Reprocessing*
- 1979
- 1979
- 1986
- 1986

Further Highlights

- Royal Dockyards
- Hinkley Point C Enquiry
- UKAEA - Harwell, Winfrith, Dounreay
- The standard licence
- Aldermaston/Burghfield

- 1987 more people!
- 1989
- 1990

- 1990 (35 conditions)
- 1996 nuclear weapons sites

Post Millennia

- Licence Condition 36 - management of change
- NDA and Energy Act
- New Build and Security
- Stone Review
- Nuclear Statutory Corporation Consultation

- 2000
- 2002/3 reorganisation
- 2007 New Divisions for prelicensing and security
- 2008 Review of regulation and potentially creation of a statutory corporation
- Office for Nuclear Regulation (ONR) - 2010/11- transition

Current Structure of NII

Mike Weightman
SCS
HM Chief Inspector of Nuclear Installations Inspectorate and Director of Nuclear Directorate

Paul Brown
Interim Chief Operating Officer
Division 4
Operational Strategies & Corporate Services

Robbie Gray
SCS
ND Transition - Head of Transformation

Colin Patchett
SCS T/P
Division 1
Civil Nuclear Power Regulation

Andy Hall
SCS
Division 2 Nuclear Chemical & Research Site Regulations (Including UK Safeguards Office)

David Senior
SCS T/P
Division 3 Defence Nuclear Facilities Regulation

Roger Brunt
SCS
Division 5
Office for Civil Nuclear Security

Les Philpott
SCS
Division 7
Nuclear Policy and International Relations

Kevin Allars*
SCS
Director for Generic Design Assessment
***Reports to Kevin Myers**

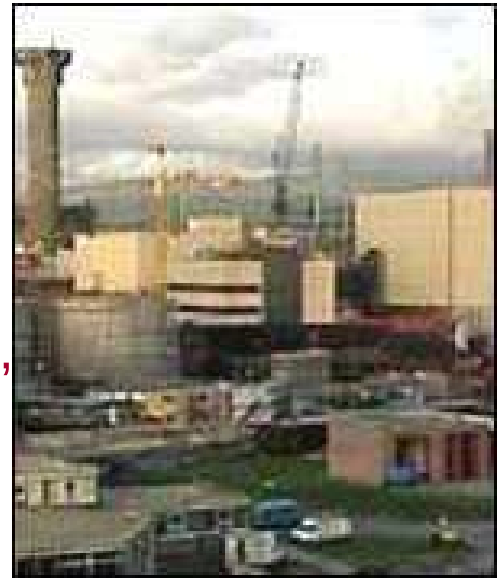
Len Creswell
SCS
Division 6 Nuclear Reactor Generic Design Assessment

Nuclear Sites

- Until recently 42 with 2 of these multi-plant sites
- Also now have Studsvik, Cumbria
- (In Future)
- the Deep Geological repository -> 2040
- Government indicates possibly 10 new reactor sites -> first 2018-20
- 165 inspectors (should be 192)
- With new reactors complement should be 230+
- Could not enforce proscriptively

Sites NII regulates

- conversion & fuel fabrication – Springfields, Derby
- enrichment - Capenhurst, Urenco,
- Reprocessing and MOx – Sellafield
- weapons - Aldermaston, Burghfield
- reactors – new, operating and decommissioning
- naval - Devonport, Rosyth, Barrow, Vulcan, Faslane, Coulport, Z-berths
- isotopes - Amersham
- research - Harwell, Winfrith, Dounreay, Ascot
- waste - LLWR (Drigg), Studsvik



ND/NII Role in National and International Scene

- Assistance in the formulation of national safety policy
- Liaison with other national regulators
- IAEA
  OECD NEA
  EU
- International Standards- nuclear safety standards codes

Inspectors - professional experience

- Specialists
- Chartered status (or equivalent)
- Significant experience in high hazard industry
- Wide range of disciplines

Inspectors - personal skills

- Good communicators with good interpersonal skills
- Authoritative
- Assertive
- Independent
- Able to apply discretion
- Appreciation of the work of other disciplines
- Good level of knowledge of nuclear field
- Patient?

Locations

- Bootle, Near Liverpool, Merseyside

- Cheltenham
- London

Organisations we deal with

- Nuclear site licensees
- Site owners – Nuclear Decommissioning Authority, Ministry of Defence
- Contractors - design, equipment suppliers, maintenance
- Other regulators
- NGOs
- Local authorities, government, international bodies, foreign regulators

Safety Cases

- Licensee's are responsible for Safety
- Basic demonstration of safety of an operation is established in an adequate safety case (LC23)
- Licensee's Work requires permissions
- Could be 100's safety cases per year
- NII samples to determine adequacy
- Sample based on hazard and risk

Standards Setting

- 3 primary documents
  Tolerability of Risk, Reducing Risks Protecting People (Outline the expectations of the regulator)
- Safety Assessment Principles - provide guidance to inspectors of the standards that licensee's should endeavour to meet
- Principles apply to all wastes and nuclear matter
- Decisions based on inspectors judgement and adequacy of the licensee's case

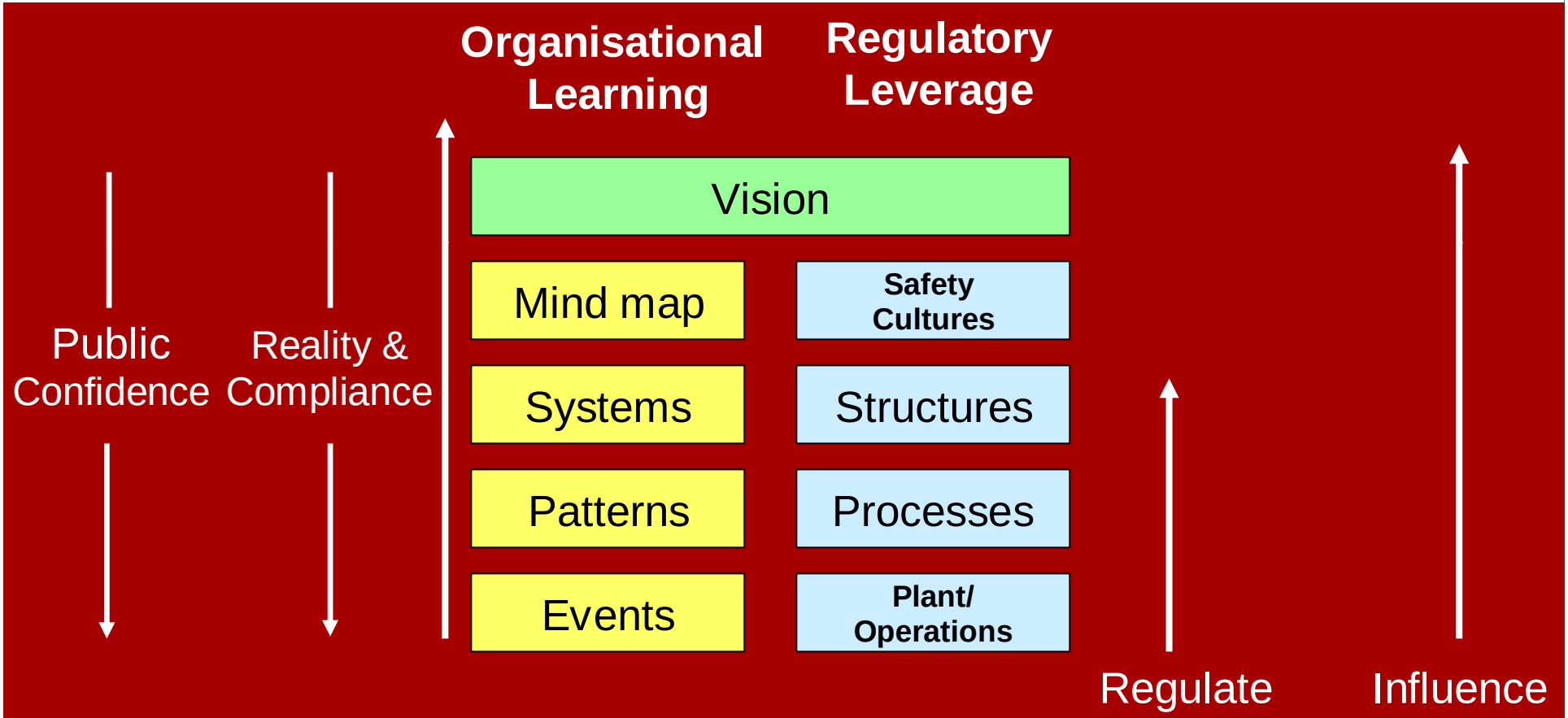
NII's Enforcement Powers

- Advice
- Letters - one or more safety problems
- Formal interview with senior staff
  - repeated safety problems
- Direction to shut down operation or review safety case
  - inadequate safety case
- Prosecution, Prohibition Notice or Improvement Notice - broken the law

Preferred Enforcement Method

- Using leverage model to influence the Corporate Body to change behaviours and mindset thus avoiding the need to carry out enforcement which is costly for all

Leverage through influence



TARGETED INTERVENTION STRATEGIES - DYNAMIC RESPONSE TO CHANGING ENVIRONMENT

Significant Future Challenges relevant to Workshop

- Life of reprocessing plants
- Multiplicity of Fuel types, packaging and processing
- Storage Capacity for Spent Fuels
- Radioactive waste disposal sites
- New Build Guaranteed costs for disposal
- Location of storage (security)
- Plutonium Strategy
- Organisation Resilience and Skills

Life of reprocessing plants

- Both plants in UK ageing (1960s and 1980s technology) against original design lives
- Magnox throughput and need has a limit
- Thorp has limited payload
- Government policy – Disposition of spent fuel is Owner's decision, magnox reprocess but need to investigate contingencies
- Safety cases for alternative fuel management approaches are being worked upon
- Evidence based regulator requires adequate evidence within cases to justify new approach

Multiplicity of Fuel types, packaging and processing

- Magnox – Commercial reactive metal based fuel
- AGR – Commercial Stainless Steel clad, enriched oxide
- PWR – Commercial Zircaloy clad enriched oxide
- Many research reactor types including fast reactor
- Each has individual issues in storage, No single safety case approach possible for packaging the fuel
- Significant need for close regulatory interaction
- Significant resource challenge

Storage Capacity for Spent Fuels

- Limited Storage capacity available on UK reactor sites for Spent fuel inventory
- UK nuclear infrastructure has led to the pressure being focussed on one site for a solution
- Site with the highest hazard in Europe
- Vulnerable routes that safely manage the spent fuel
- Long term storage option requires evidential underpinning
- Significant coordinated multi-regulatory involvement required

Reprocessing?

- Decision to reprocess or not is not the regulators
- Government Policy is not against reprocessing - will consider applications from potential operators
- Evidence based regulator requires evidence that demonstrates Safety
- Recent Revision of Guidance for Applicants http://www.hse.gov.uk/nuclear/notesforapplicants.pdf

Radioactive waste disposal sites

- No disposal route for Spent Nuclear Fuel although High Level Waste (HLW) has planned route in 2075
- Limited Capacity for LLW, Policy and regulation looking to reduce generation and open vLLW routes
- International European Conventions driving to have licensed sites but low risk approach would oppose this – regulatory resource input
- Higher Activity Waste (HAW) disposal not until 2040 – manage on site
- HAW – Simplistically ILW plus material that cannot go to LLWR

Radioactive waste disposal Criteria

- As a staged approach UK NIREX developed Letters of Compliance in the 1980s for preparing HAW for disposal
- Letters of Compliance available for some HAW
- LoC's are simplistically a contract that the waste package (if managed properly during its lifetime) will probably be disposable in a geological repository
- LoC's are not Conditions for Acceptance (CFA) and are not a regulatory tool
- Some of the information within LoC's are of interest to regulator
- More Information: http://www.hse.gov.uk/nuclear/wastemanage.htm

New Build Guaranteed Costs for Disposal

- New build Requesting Parties require costings
- Costings based on adequate design of disposal facility
- Regulators have influence on these via expectation good design and management meets the SAPs
- Regulatory Interaction required

Location of storage (security)

- Question is should all fuel be centralised in one place
- How secure must that facility be
- How to protect the spent fuel
- Work of the Nuclear Directorate OCNS

Plutonium Strategy

- UK has largest Separated Civil Plutonium Stockpile
- Could be considered waste or resource
- Current strategy is long term storage
- Any option requires safety case
- Government to consult public in the Autumn
- Regulatory resource required
- Early intervention may result in long term gains

Organisation Resilience and Skills

- Nuclear Renaissance
- Ageing Workforce
- No investment in Nuclear skills for over a decade
- Regulator Draws mature professionals from the Industry
- Skewed aged profile
- ND is developing skills internally, widening the catchment, looking to retain beyond retirement and transforming the way we work

Questions