Office for Nuclear Regulation

Welcome
ONR NGO Forum meeting
Doubletree by Hilton, London
7 November 2019

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ONR NGO Forum meeting 7 November 2019

Chief Nuclear Inspector's Update

Mark Foy

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Enforcement News

- **In April** following a prosecution brought by ONR, Sellafield Ltd were fined £380,000 for safety breaches relating to equipment used for the processing of plutonium.
- **In April** we issued Sellafield Ltd with an Improvement Notice following an incident at the Waste Vitrification Plant on 7 February 2019.
- **In June** we served two Improvement Notices on AWE relating to the way the company undertakes risk assessments for organisational change which may affect safety.
- **In July** we brought a successful prosecution against DRDL following an incident at the site on 19 September 2018. DRDL fined £666,667 and ordered to pay costs of £27,611.8.
- **In September** we agreed to extend the deadline for compliance against two Improvement Notices served on Heysham 1 following an incident last November. Originally due to be complied with on 16 September, 2019, now extended to 16 December, 2019

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Other regulatory news

- In April we launched a consultation on the Approved Code of Practice (ACOP) which we developed to assist dutyholder compliance with the new Radiation (Emergency Preparedness and Public Information) Regulations 2019 (REPPIR).

- In September along with the HSE we published the new ACOP. Thank you to those who took part in the consultation exercise.

- In August we permissioned the restart of HNB Reactor 4

- Publication of Chief Nuclear Inspector's report (October 2019)

- IRRS mission (October 2019)

- General update on AWE

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Thank you for listening - Questions

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Refreshment Break

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Regulation of Ageing Operating Reactors

Donald Urquhart

Deputy Chief Nuclear Inspector,

Director of Operating Facilities Division

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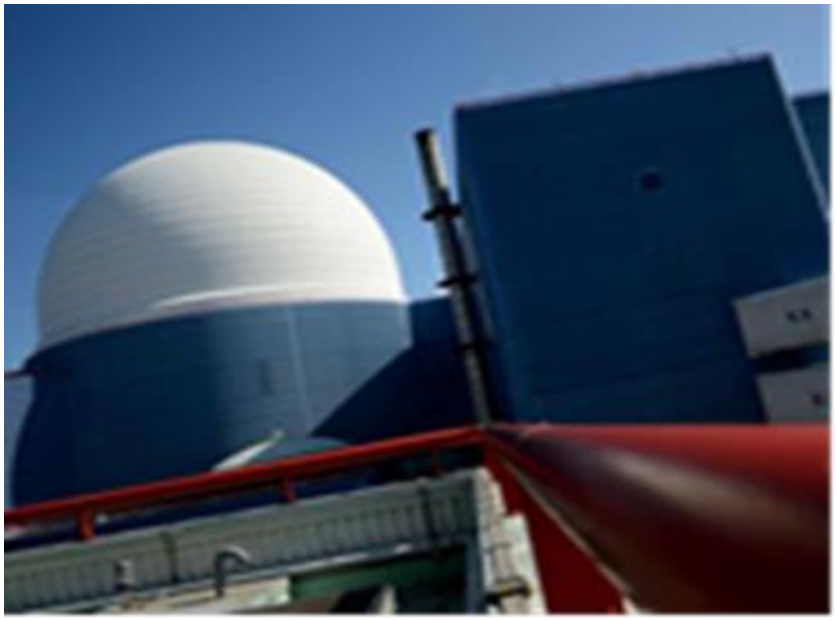
Management of Ageing

- Every UK nuclear plant/ facility needs a valid Safety Case (justifying its operation) for it to be allowed to operate, addressing:
  - EIMT (Examinations, Inspection, Maintenance, and Testing)
  - Arrangements for management of ageing effects.
  - Arrangements proportionate to nuclear safety significance of the component.



- Safety case assessed against ONR's Safety Assessment Principles (SAPs) **and** legal obligation to reduce risks So Far As Is Reasonably Practicable (SFAIRP).

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Management of Ageing

- 5 Principles specifically address Ageing and Degradation; i.e.
  - Safe Working Life
  - Lifetime Margins
  - Periodic measurement of material properties
  - Periodic measurement of parameters
  - Obsolescence

- Components of safety significance are subject to stringent and highly controlled Ageing Management Programmes (AMPs).
- As the nuclear safety significance reduces, the burden upon the licensee also reduces – proportionality!

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ONR Ageing Management Inspections

- ONR conducts regular Inspections (LC28) of plant EIMT (Examinations, Inspection, Maintenance, and Testing)
- ONR has enforcement powers to ensure effective ageing/ degradation management
- Reactors undergo a triennial ‘statutory outage’ to EIMT (Examinations, Inspection, Maintenance, and Testing) components that cannot be tested during power generation

- Close scrutiny and oversight by ONR
- ONR conducts regular, targeted ‘ageing management’ inspections
- Through these, we ensure that plant is being maintained so that it will perform its safety function throughout the life of the safety case.

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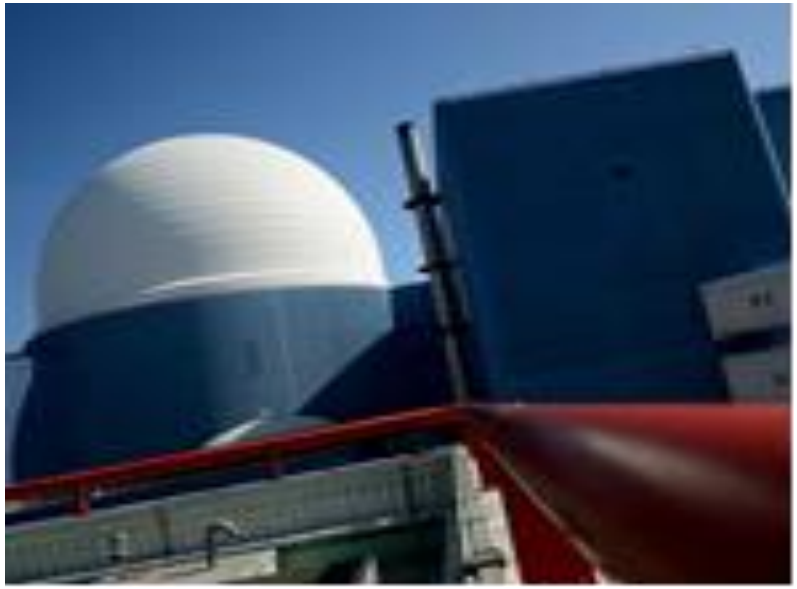
Topical Peer Review (TPR)

- From 2017, the **EU Nuclear Safety Directive** requires member states to undertake a topical peer review (TPR) every six years.
- First TPR addressed ageing management of nuclear power plants and research reactors.

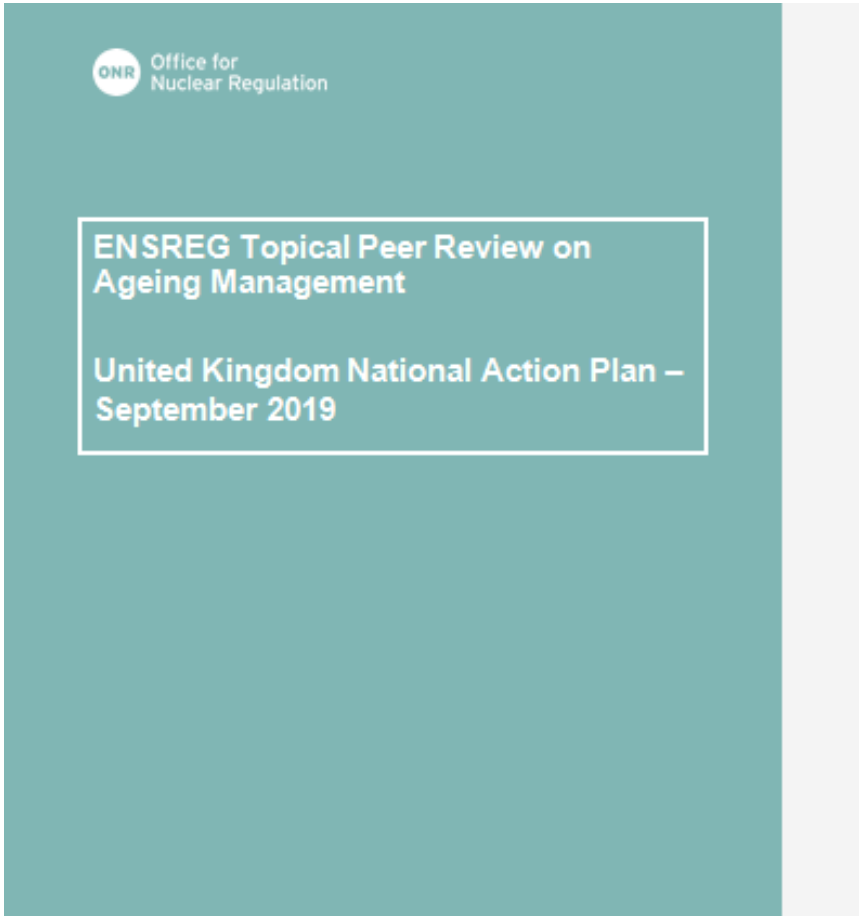


- The UK TPR addressed:
  - All 14 AGRs
  - The Sizewell B PWR
  - The two Hinkley Point C EPRs under construction

  (Not: UK has no research reactors within the scope of the TPR).

Topical Peer Review (TPR)

- UK has produced a self-assessment of ageing management (i.e. National Assessment Report):
  - UK's operating reactors, and those under construction, had acceptable ageing management programmes appropriate to their lifecycle stage.
  - Some secondary, but beneficial, improvements identified and agreed.



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Topical Peer Review (TPR)

- UK participated in international peer review of National Assessment Reports and a TPR workshop.
- This identified additional findings to be addressed by the participants, including the UK.

- Licensees responded to the findings, incorporated into the United Kingdom National Action Plan.
- TPR Workshop lead to identification of nine further actions, none of which revealed a significant shortfall in ageing management, but are beneficial so accepted.

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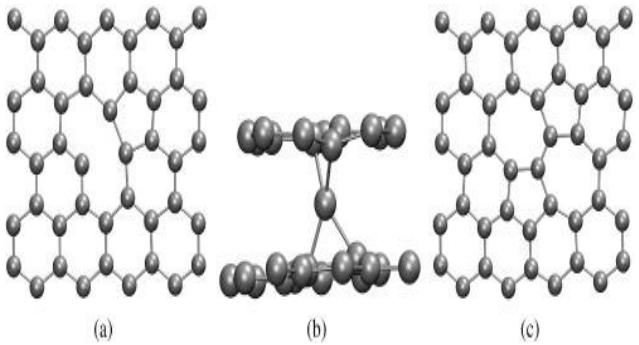
Graphite Ageing and Degradation

Irradiation in CO_2 atmosphere gradually ages AGR nuclear graphite core in a number of ways:

- **Weight loss** – slowly reduces moderation and strength – monitored by sampling.
- **Shrinkage and swelling** - induces internal stresses in graphite core components
- **Material property changes** - strength, modulus – monitored by sampling



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Ageing of AGR Cores - expected phenomenon

- Late ‘in life’ stresses - peak at keyways leading to fuel brick cracking – Keyway Root Cracking.
- Bricks slowly weaken through oxidation, with gradual changes in properties.

- ONR requires that safety case to demonstrate safety of such ageing effects to ensure:
  - Free movement of fuel and control rods.
  - Cooling of fuel.
  - Moderation of the reactor.

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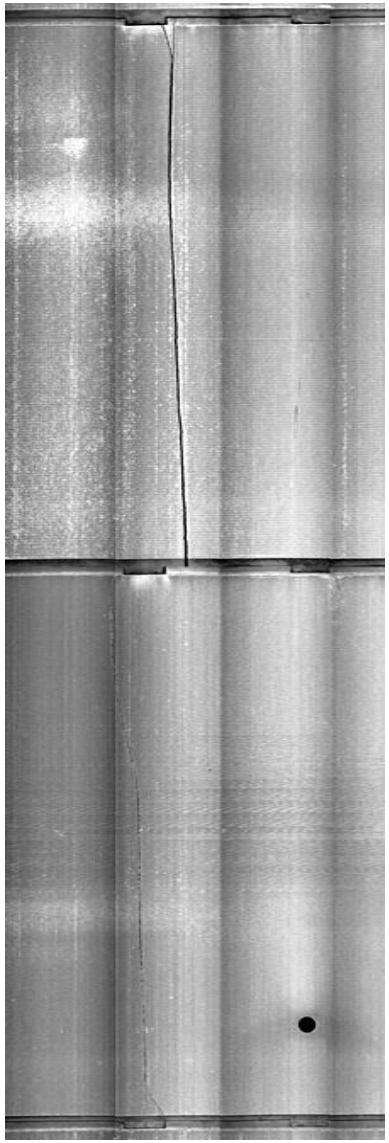
Implications of Degradation

- Keyway root cracking identified at Hunterston B and Hinkley Point B.
- This is expected but happened earlier than predicted with unexpected induced cracking.
- EDF NGL has conducted analyses using whole core models to determine the effects of ageing and degradation on safety performance.
- Studies, underpinning experiments, and large safety margins form the basis of graphite safety cases.



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Status of Hunterston B and Hinkley Point B Reactors

- Hunterston B Reactor 3 – shutdown since March 2018
- ONR is assessing safety case to determine whether permission to restart is appropriate
- Hunterston B Reactor 4 – permitted to restart (20th August) to operate up to 16.025 TWd.

- This allows operation up to a core state similar to that of Reactor 3.
- Hinkley Point B reactors lag behind Hunterston B Reactor 3 and are all operating within their extant safety case.

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ONR's Graphite Strategy

- ONR is seeking a 'bounding case' for the graphite cores – identifying demonstrable safe 'End of Generation' state.
- EDF NGL is developing 'End of Generation' safety cases for the oldest AGR cores.
- These will define the factors dictating the lifetime of all the AGR cores.
- Frequency and scope of inspection by licensee has increased.
- ONR will assess these cases rigorously and monitor developments from core inspection. Operation will only be allowed where evidence and safety margins demonstrate that it is safe to do so.

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DNB Corrosion Intervention

- Heysham 1 CO_2 release in March 2015 - fleet-wide review of corrosion of concealed pipework.
- EDF sites responded well except for Dungeness B (enforcement action ensued).

Whilst progress made at Dungeness B, it fell significantly short of ONRs expectations in that:

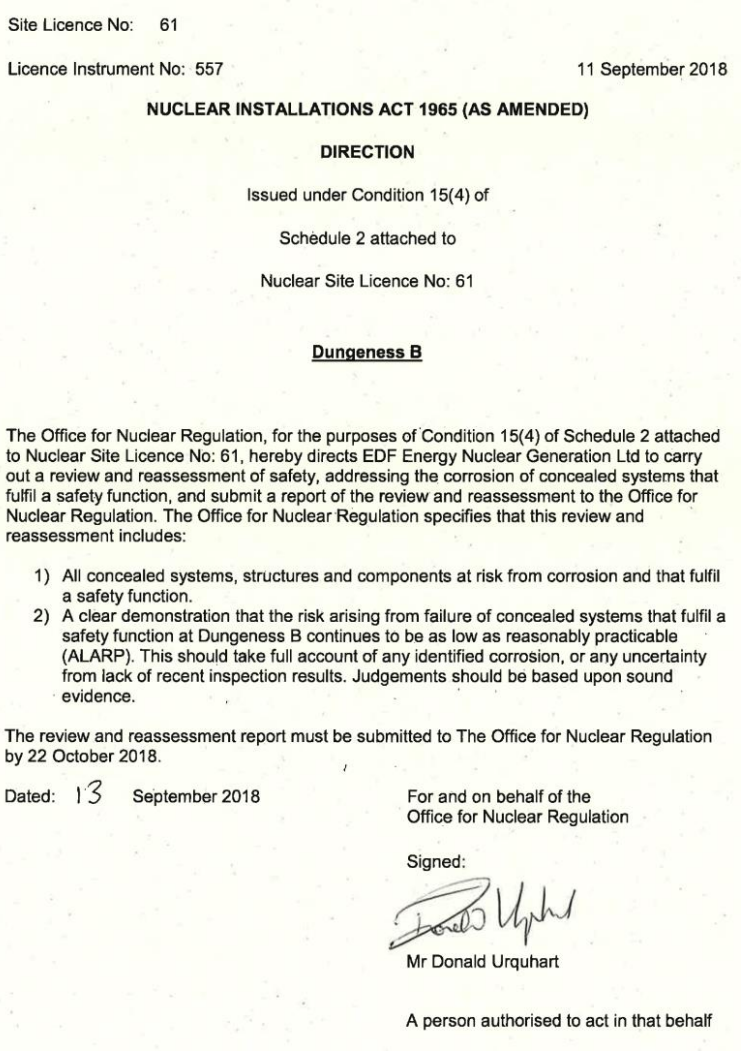
- Insufficient progress made to close out previous enforcements;
- Inadequate plan to inspect high priority trenches containing nuclear safety significant plant;
- Inadequate maintenance regimes for carbon dioxide plant.

DNB Corrosion - ONR Decision Making

- ONR issued a '**Direction**' compelling EDF to review and reassess safety in this respect, and to submit a report to ONR.

Accompanying letter required:

- EDF to demonstrate that it fully understands the condition of concealed systems; and
- Provide a detailed remediation plan, prioritised by risk to nuclear safety.



Site Licence No: 61

Licence Instrument No: 557 11 September 2018

NUCLEAR INSTALLATIONS ACT 1965 (AS AMENDED)

DIRECTION

Issued under Condition 15(4) of

Schedule 2 attached to

Nuclear Site Licence No: 61

Dungeness B

The Office for Nuclear Regulation, for the purposes of Condition 15(4) of Schedule 2 attached to Nuclear Site Licence No: 61, hereby directs EDF Energy Nuclear Generation Ltd to carry out a review and reassessment of safety, addressing the corrosion of concealed systems that fulfil a safety function, and submit a report of the review and reassessment to the Office for Nuclear Regulation. The Office for Nuclear Regulation specifies that this review and reassessment includes:

1) All concealed systems, structures and components at risk from corrosion and that fulfil a safety function.
2) A clear demonstration that the risk arising from failure of concealed systems that fulfil a safety function at Dungeness B continues to be as low as reasonably practicable (ALARP). This should take full account of any identified corrosion, or any uncertainty from lack of recent inspection results. Judgements should be based upon sound evidence.

The review and reassessment report must be submitted to The Office for Nuclear Regulation by 22 October 2018.

Dated: 13 September 2018

For and on behalf of the Office for Nuclear Regulation

Signed:

Mr Donald Urquhart

A person authorised to act in that behalf

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DNB Corrosion - EDF NGL Response

- EDF NGL responded actively - support from across its fleet and contractors.
- All high priority trenches opened for inspection, and plant walk-downs repeated.
- Historic inspection records reviewed, substantial further inspections conducted, and system condition reports prepared and provided to ONR.
- ONR has confirming Direction can be closed provided that repairs completed prior to return to service of either reactor.

Completed remediation on gas circulator fire pipework

New essential cooling water pipework, reactor 22, 22B supply line

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DNB Corrosion – Current Status

- Dungeness B reactors - shutdown pending completion of corrosion upgrades.
- Many £10's of millions since September 2018, with work continuing into 2020.
- Many 100's of metres of pipework replaced.
- DNB placed into 'enhanced' regulatory attention - safety improvement plan being developed to address issues related to plant, people and culture, and processes.
- The Direction was highly effective - its impact continues to be felt.

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Thank you for listening - Questions

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Lunch

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Overview of ONR's regulation of Sellafield

Matt Worsley

Principal Inspector,

Sellafield Project Delivery Sub-Division

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Sellafield context and challenges

- Large and complex site – operations critical to other parts of the industry
- Large radioactive inventory
- Ageing facilities
- Change of mission from reprocessing to decommissioning
- New facilities needed to support this mission

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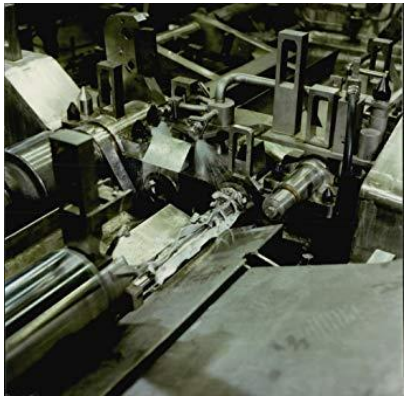
Sellafield: the key hazards

- Legacy facilities – particularly the magnox storage ponds and two silos – mixture of intermediate level waste
- Special nuclear materials management – primarily plutonium oxide powders in modern and legacy storage cans
- Reprocessing and storage – highly active liquor and vitrified product

Legacy silo

Legacy pond



Magnox reprocessing

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ONR Sellafield strategy

- Sellafield is ONR's top priority due to the hazard presented by ageing and degraded facilities that require urgent remediation
- However, the rest of site needs to remain safe and secure, now and in future
- New 2014 strategy (reviewed April 2019):
  - to focus on stimulating **accelerated hazard and risk reduction**
  - whilst ensuring that the **licensee is complying with its statutory obligations**
  - and retaining **stakeholder confidence that our regulation is risk-informed, proportionate and effective**

First Generation Magnox Reprocessing Plant stack – height reduced 2017-18

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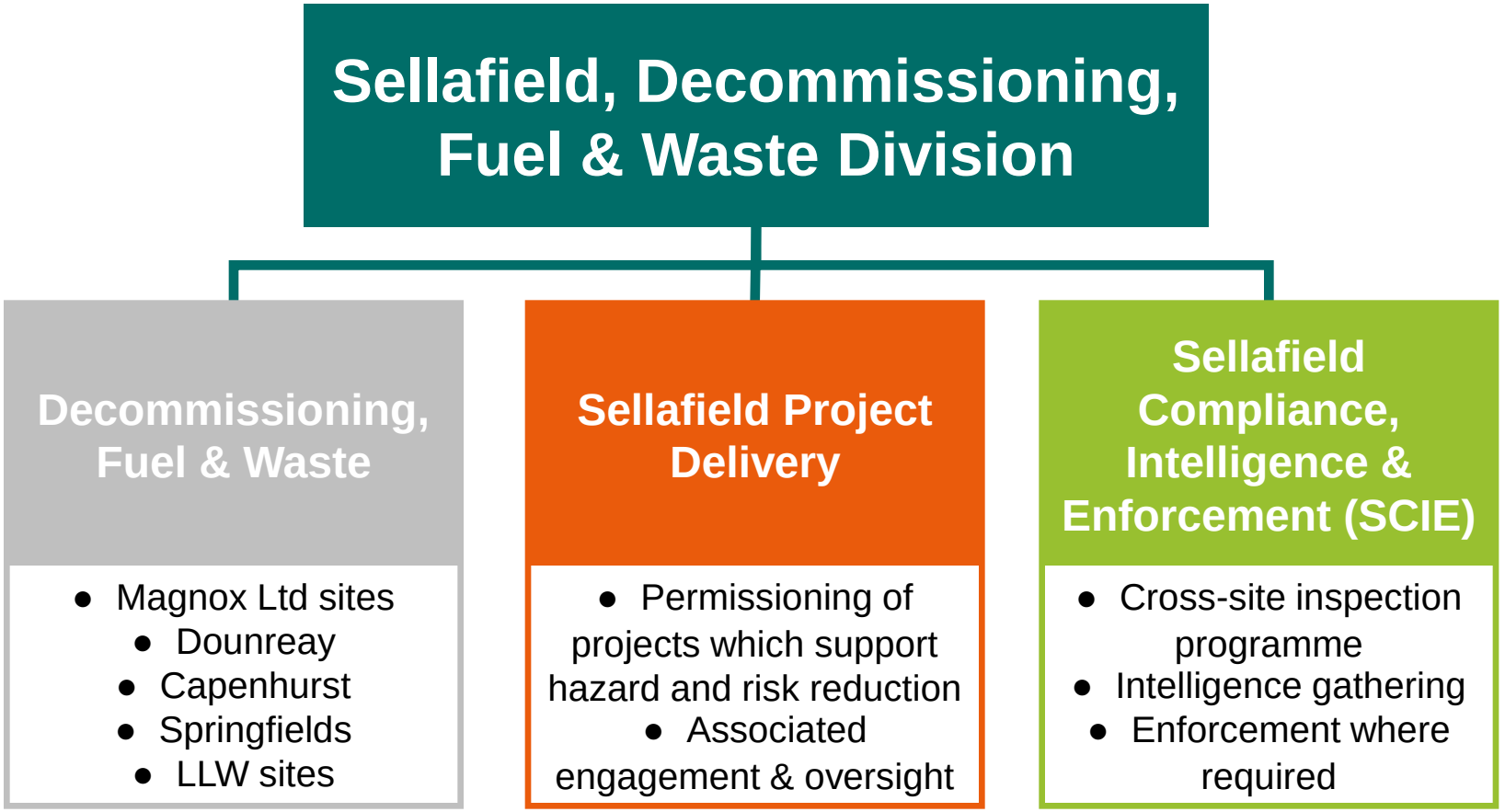
ONR SDFW Division organisation



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Project Delivery: how we regulate

- We influence SL in delivering safe, secure, effective and timely plans to achieve hazard and risk reduction
- We work constructively to make regulatory expectations clear whilst maintaining appropriate regulatory independence
- We engage with other stakeholders: the 'G6' Stakeholder Group was driven by ONR to support this via:
  - fostering alignment & co-operation;
  - agreeing & communicating priorities;
  - removing distractions and barriers

- Assessing safety cases and giving permission, once we are satisfied, for hazard and risk reduction activities

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Project Delivery: activities and progress

- Hazard & risk reduction progress:
  - **Significant progress towards waste retrieval from the two legacy silos**
  - **Major improvements to the facilities at Special Nuclear Materials (North)**
  - Pile Fuel Storage Pond – all bulk legacy fuel now removed
  - First Generation Magnox Storage Pond – radioactive sludge removal continuing
  - Removal of the First Generation Magnox Reprocessing Plant stack
  - Progress in Finishing Line 3 removal
  - Progress in disposal of legacy waste from the Analytical Services facility

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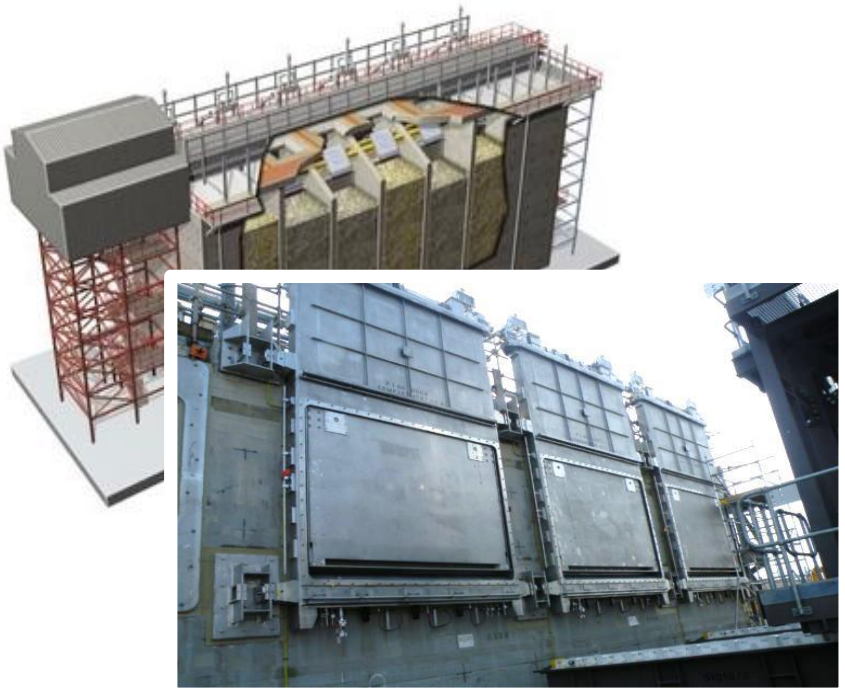
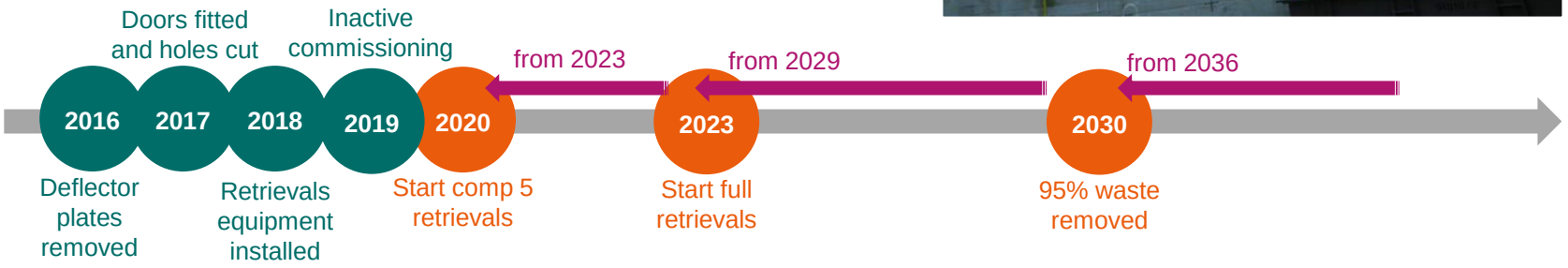
Project Delivery: Pile Fuel Cladding Silo

- Legacy dry solid waste silo containing ~3000 m^3 ILW (a large portion is flammable)
- Significant progress towards retrievals with this expected to start in 2020
- Balance elevated short-term risk against long-term hazard elimination





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Project Delivery: Magnox Swarf Storage Silo

- Legacy wet silo containing solid, sludge and liquid waste
- Challenging waste to manage and to retrieve
- Complex series of projects – challenging timescales but progress is being achieved…

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Project Delivery: Special Nuclear Materials

- Sellafield holds a significant amount of civil special nuclear material
- ONR's regulatory focus has been on ensuring the safe and secure undertaking of the following:
  - Consolidation of all UK SNM stocks to Sellafield (govt. policy)
  - Progress towards the re-packaging and re-treatment of SNM packages for continued interim storage
  - Development of options for the reuse and/or long-term immobilisation of SNM stocks

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Compliance, Intelligence and Enforcement: how we regulate

- We undertake a programme of targeted inspections to monitor compliance with the law:
  - Licence Condition Compliance Inspections
  - Systems-Based Inspections
  - Assessment of emergency exercise performance
- We carry-out planned and reactive inspections. These can be notified in advance or unannounced
- We investigate incidents, respond to intelligence and engage with the local community group and worker reps
- We take proportionate enforcement action where required to restore legal compliance

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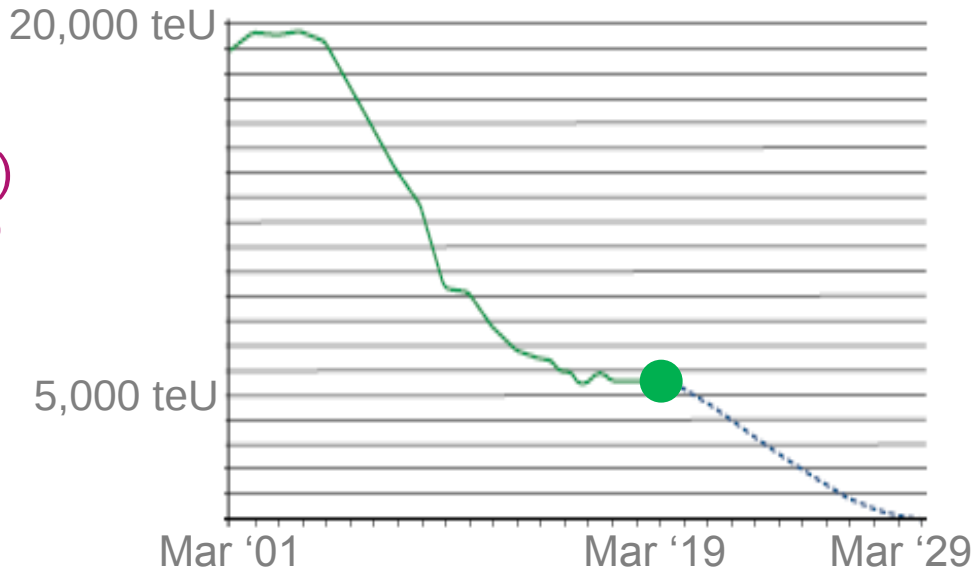
Compliance, Intelligence and Enforcement: activities and progress

- Reprocessing facilities:
  - Reprocessing has stopped at THORP – focus now on long-term storage of oxide fuel
  - Magnox Reprocessing plant is entering the final year of operation
- High Level Waste facilities:
  - New evaporator (Evap D) to increase throughput to vitrification
  - Since 2001, highly active liquor stocks reduced by 70%



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Compliance, Intelligence and Enforcement: activities and progress

- Corporate:
  - Sellafield has begun a programme of organisational change to prepare for the change in mission from operations to decommissioning – ONR has overseen and permissioned in line with Licence Condition 36 (Organisational Capability)
- Emergency preparedness:
  - Last annual off-site safety demonstration exercise was held in April 2019 and judged to be adequate
- Incidents:
  - We are seeing an overall decline in the number of significant incidents and we are satisfied with the level of reporting
  - Four INES 1 events were reported from Jan 18 – Mar 19. There have been no further INES 1 events since Apr 19

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Compliance, Intelligence and Enforcement: enforcement action

- Recent formal enforcement action includes:
  - In April, SL pleaded guilty to breaches of health and safety legislation in relation to an incident in 2017 in which a glovebox operator sustained a puncture wound and received a dose above the legal limit
  - An Improvement Notice was issued following a failure by SL to adequately follow procedures which resulted in a vitrified waste container being decontaminated without the lid being welded.
- We verify that any enforcement action leads to appropriate improvements: e.g. we have recently confirmed that SL has complied with an Improvement Notice served in January 2018 in relation to a high voltage cable strike

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Summary

- Sellafield remains a top priority and this will continue
- We have a clear regulatory strategy:
  - to focus on stimulating **accelerated hazard and risk reduction**
  - whilst ensuring that the **licensee is complying with its statutory obligations**
  - and retaining **stakeholder confidence that our regulation is risk-informed, proportionate and effective**
- Our strategy is working:
  - there has been significant hazard and risk reduction progress to date – but there is much that remains
  - the licensee continues to maintain and improve its safety and security performance

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Thank you for listening - Questions

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Refreshment Break

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ONR's relationship with the Defence Nuclear Safety Regulator

Mark Foy & Donald Urquhart

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Overview

- Regulation of Sites Used for Defence Purposes
- Relationship between ONR and MOD
- Roles and Responsibilities
- Priorities
- Review of Defence Vires

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Regulation of Sites Used for Defence Purposes

- ONR - **Statutory Regulator,** Enforcing nuclear, conventional and fire safety on GB Nuclear Sites.
- Crown (MOD) - exempt from specific legal requirements, including sites under crown control to hold nuclear site licence.
- Where legal exemptions apply, MOD policy is to deliver similar outcomes to that required by UK legislation.
- MOD **'Authorisation'** aims to be similar to ONR **'Licensing'**.
- DNSR - a non-Statutory regulator, delivering the MOD Assurance function.
- ONR remains the statutory regulator for conventional, fire and radiological safety etc. even on 'Authorised' sites.

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Relationship between ONR and MOD

- ONR works cooperatively with DNSR as the internal MOD Regulator.
- General Agreement and Letter of Understanding set out **Regulatory Responsibilities** and **Expectations.**
- Aims to deliver **Efficient** and **Effective Regulation** with minimal duplication
- ONR and DNSR both attend senior level engagements with duty-holders (A6, D6, Senior User Groups [SUG]).
- Continuous inter-regulatory engagement through annual conference, site activities, and regular meetings to discuss ONR's **Regulatory Priorities**.

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Roles and Responsibilities (I)

- ONR **Statutory Purposes -** Nuclear safety/ security, conventional health and safety, transport safety, and safeguards.

BUT…on Crown operated (**Non-Licensed)** sites:

- Nuclear Safety – **assured** by DNSR through AC's.
- Security – **regulated** by MOD Security Regulator.
- Safeguards – not applicable to defence materials.
- Transport - **regulated** by DNSR
- However, ONR - **Enforcing Authority** for HSWA'74 (+RSPs) & Fire Safety.

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Roles and Responsibilities (II)

- **GB Nuclear Sites (Licensed)**
  - ONR – **Statutory Regulator** for nuclear, radiological, conventional and fire safety etc.
  - DNSR – assurance to SoS and advice to ONR.

- **Authorised Sites (Crown)**
  - ONR – **Statutory Regulator** for conventional, radiological and fire safety (but not nuclear safety)
  - DNSR – assurance to SoS that equivalent nuclear safety outcomes are achieved.

- **Nuclear Warship Sites/ Operational Berths**
  - HSE – **Statutory Regulator** for conventional and fire safety.
  - ONR – **Statutory Regulator** for radiological safety.
  - DNSR - assurance to SoS that equivalent nuclear safety outcomes are achieved.

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Regulatory Priorities

- Oversight of underperforming sites to ensure their return to **'Routine Regulatory Attention'**.
- Delivery of interventions to assure ongoing **compliance with the law**.
- Delivery of an **Enabling Regulatory Approach** to secure the safe delivery of strategic facilities.
- In all cases, regulatory effort targeted proportionately to level of **Risk/ Hazards** in a transparent manner.

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Defence Vires Review

- To provide assurance that:
  - ONR is fully discharging its **Statutory Purposes**
  - ONR is acting within its **Legal Powers**
  - ONR's **Regulatory approach** is demonstrably underpinned by a clear **Line of Sight to Law**:
  - ONR and DNSR are delivering **efficient** regulation (i.e. avoiding duplication and unnecessary regulatory burden where possible).

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Future Developments in Defence Regulation

- **Strategic Engagement Fora –** (e.g A6, D6, SUG, Dreadnought Enterprise etc.) to better align MoD, licensees and ONR to influence safety at a strategic level.
- **Capital Projects** – To influence safe design for new weapons and propulsion facilities and capability at the design stage and through construction and commissioning.
- **Improved Guidance** – To reflect any issues identified during the Vires review.
- **Enhanced arrangements –** for how ONR and DNSR work collaboratively to deliver Efficient and Effective Regulation of Defence Activities.

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Thank you for listening - Questions

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Summary & Close