

IOP Nuclear Industry Group

Housekeeping

- No fire alarms are planned tonight so if the alarm sounds please exit the building quickly via the nearest fire exit. i.e Exit the Mulberry suite and take your first right and follow signs for the fire exit.
- I can validate your car park passes after the event if you have parked in the carpark.
- We will make the slides of this evening's presentation accessible on the Group webpage.

The Chatham House Rule

The Chatham House Rule originated at Chatham House with the aim of providing anonymity to speakers and to encourage openness and the sharing of information. It is now used throughout the world as an aid to free discussion.

The Chatham House Rule reads as follows:

- *When a meeting, or part thereof, is held under the Chatham House Rule, participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed.*

So we ask that during the Q&A session, that *if you wish to ask a question*, you:

- **Do not begin by stating your own name / affiliation**
- Please respect your fellow audience members by not using their name/affiliation if you wish to quote from this evenings QandA.

Regulatory Challenges for Nuclear New Build

Mike Finnerty, Deputy Chief Inspector and Programme
Director, New Reactors Programme

Introduction

3 Phases of Regulation of Nuclear New Build

- Generic Design Assessment (GDA)
- Licensing
- Construction

Challenges faced by ONR

Resources

- New designs, including EPR, ABWR and AP1000...
- Further designs through GDA process – Chinese HPR1000
- Small modular reactors – potential for novel technology

Priorities

- Currently no hazard
- Balance against other priorities, e.g. hazard and risk reduction at Sellafield

Enabling Approach

- Important we carry out activities in a way that enables those we regulate to both comply and grow (UK Regulators' Code)
- Designs safe and secure
- Retain public confidence

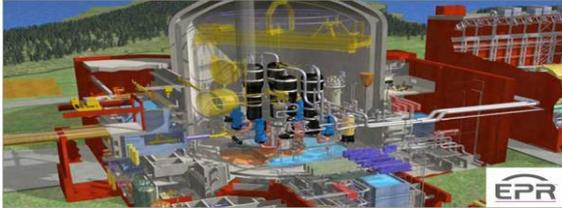
3 elements of new build

GDA

Licensing

Construction

EDF/Areva



Hinkley Point C



Sizewell C



Westinghouse



Moorside



Hitachi-GE



Wylfa



Oldbury



GNS Ltd



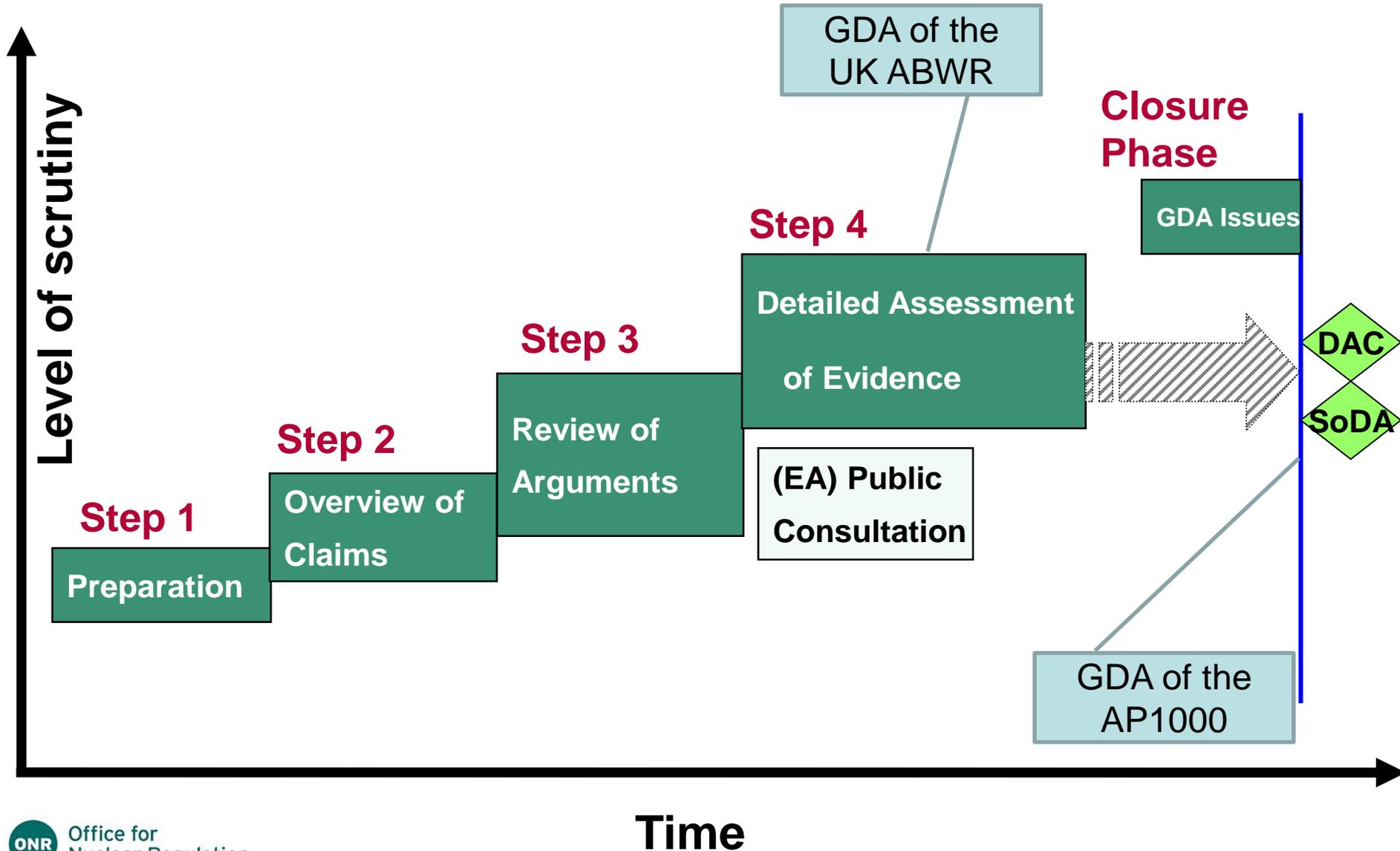
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Generic Design Assessment (GDA)

- GDA is an upfront, step-wise assessment of a generic reactor design undertaken by joint Regulators (ONR/EA/NRW).
- Clear benefit in identifying and resolving key issues and design changes long before build – effective and efficient use of regulatory resources, whilst reducing construction cost and time risks.
- Enabling Approach – able to give clarity on regulatory requirements, reducing project commercial risks whilst optimising the safety of the design.
- Openness, transparency and public input – building public confidence.

Why does GDA take so long?



ALARP and Relevant Good Practice

- In most cases demonstrating ALARP is not done through explicit comparison of costs and benefits, but by applying established **relevant good practice (RGP)**.
- **RGP** is those standards for controlling the risk **judged and recognized by ONR** as satisfying the law, when applied appropriately.
- **RGP** is the starting point in any ALARP demonstration:
 - Focus on appropriate engineering, operations and management of safety,
 - Defence-in-depth / hierarchy of control measures: **1** Prevent the hazard → **2** Protect → **3** Mitigate.
- Sources of **RGP** are, for example ONR's SAPs & TAGs, IAEA Standards, what is done in similar facilities.

Licensing

- Cannot conduct prescribed nuclear activities without a nuclear site licence
- Granted by ONR for indefinite period
- To corporate body only
- Not transferable
- Licence has 36 standard Conditions
 - ✓ compliance enforced by ONR

Licensing

Prior to granting licence, ONR needs to be satisfied that:

- the applicant's choice of site is suitable,
- that it understands the hazards and risks of the activities that it proposes to carry out,
- that it has a suitable schedule of safety submissions leading through to the pre-construction safety case,
- also need to gain confidence that the applicant has the organisational capability to lead and manage for safety effectively,
- This means that we must be satisfied with the applicant's governance arrangements, resources, competencies and management processes before we grant a licence.

Design and safety case

- Full site-specific Pre-Construction Safety Report
 - **not** required for licensing
 - **is** expected to support permission for first nuclear island concrete
- ONR focus during licensing is on how the Aspirant Licensee:
 - Plans to develop site-specific design & safety case
 - “GDA delta”; e.g. external hazards; civil engineering, fault studies
 - Grows capability

Construction

- Once the nuclear site licence has been granted, the licensee must comply with the relevant provisions of NIA65 and all the conditions that ONR has attached to the licence.
- ONR's activity focuses on equipment procurement, construction, design modification and pre-commissioning issues and the development of the licensee's organisation.
- ONR expects the licensee to provide a PCSR to support the start of nuclear safety related construction – takes credit for activity provided in GDA.
- Staged permissioning of construction, commissioning and operation through series of 'hold-points' provides regulatory control.

Small Modular Reactors (SMRs)

- Wide range of potential designs
- Regulatory activity would broadly be as for full scale reactors: Initial generic assessment, licensing, construction...
- Potential for activities to run in parallel, licensing, site specific assessments...

Potential Regulatory Challenges for SMRs

Selected Issues...

- Regulatory oversight of off-site modular construction
- Potential for resource sharing between companies
- Potential to license separate construction and operating companies
- Prospect of separate ownership of modules on a single site
- Potential for multi-module operation by small number of operators from centralised facility

Conclusions

- Number of regulatory challenges around nuclear new build
- ONR has reorganised to focus on this as a priority activity
- GDA is an enabling approach that de-risks construction
- Makes efficient and effective use of resources through lifecycle of GDA, licensing, construction...
- ONR has capability and flexibility to meet these challenges

Any Questions

Open Scientific Meeting

Developments in Nuclear Fusion 60 Years on from ZETA

Wednesday 14 June 2017

University of Birmingham, Birmingham, UK

Synopsis

ZETA, the 'Zero Energy Thermonuclear Assembly', was a major experiment in the early history of fusion power research. It was much larger and more powerful than any fusion experiment in the world when it went into operation in 1957. Whilst not achieving fusion (despite the famous claims and press coverage), ZETA would go on to have a long experimental lifetime and produce numerous important advances in the field that have paved the ways for today's fusion research machines.

60-years on from ZETA, leaders from the UK nuclear fusion community meet to discuss the historical advances made by ZETA, and other devices, and the very latest in fusion research – in both the magnetic and inertial confinement fields, as attention turns to the design of future fusion power plants.

Speakers

We are delighted to host four leaders representing the strength and depth of the UK nuclear fusion community:

- **60 Years on from ZETA**
(13:00 to 13:50)
Chris Warrick, Head of Communications, UKAEA
- **Inertial Confinement Fusion**
(14:00 to 14:50)
Kate Lancaster, Research Fellow for Innovation and Impact, York Plasma Institute
- **Compact Tokamaks with High-Temperature Superconducting Magnets**
(15:00 to 15:50)
David Kingham, Chief Executive, Tokamak Energy
- **The Path to Delivering Fusion Power**
(16:00 to 16:50)
Ian Chapman, Chief Executive Officer, UKAEA