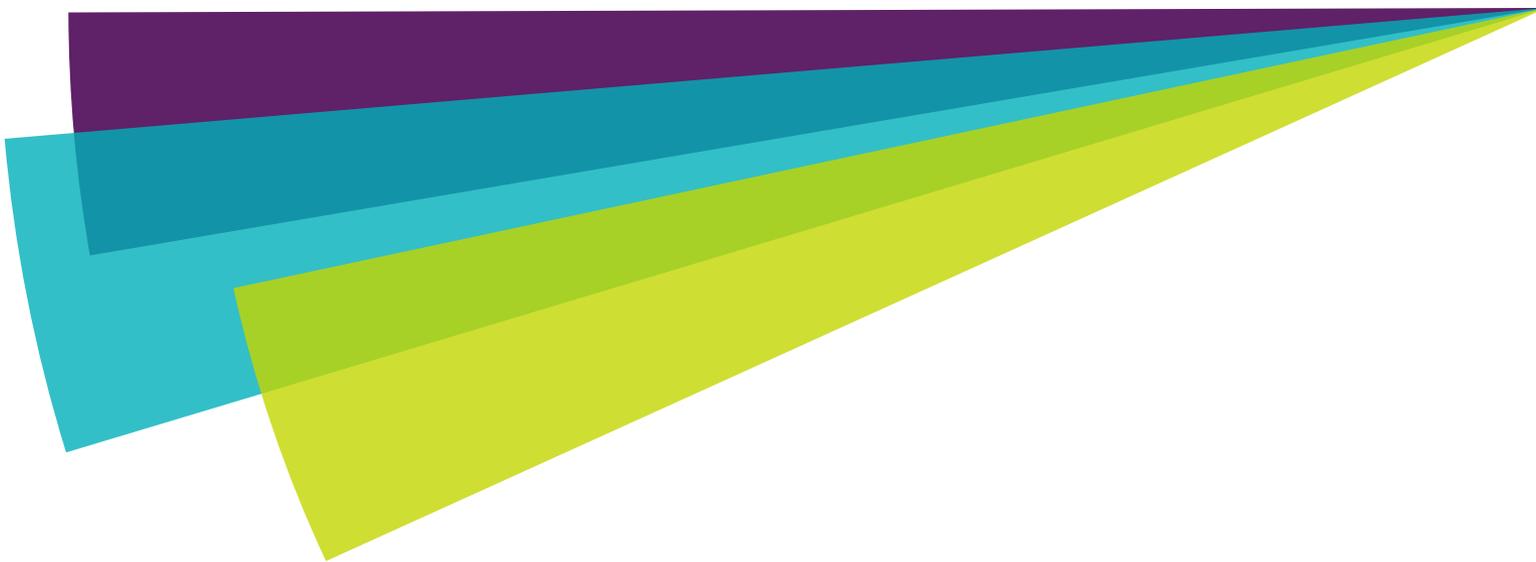




Dr Kefah Naom  
New Nuclear Build Safety Case Oversight Lead



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# Pre-licensing – An international perspective

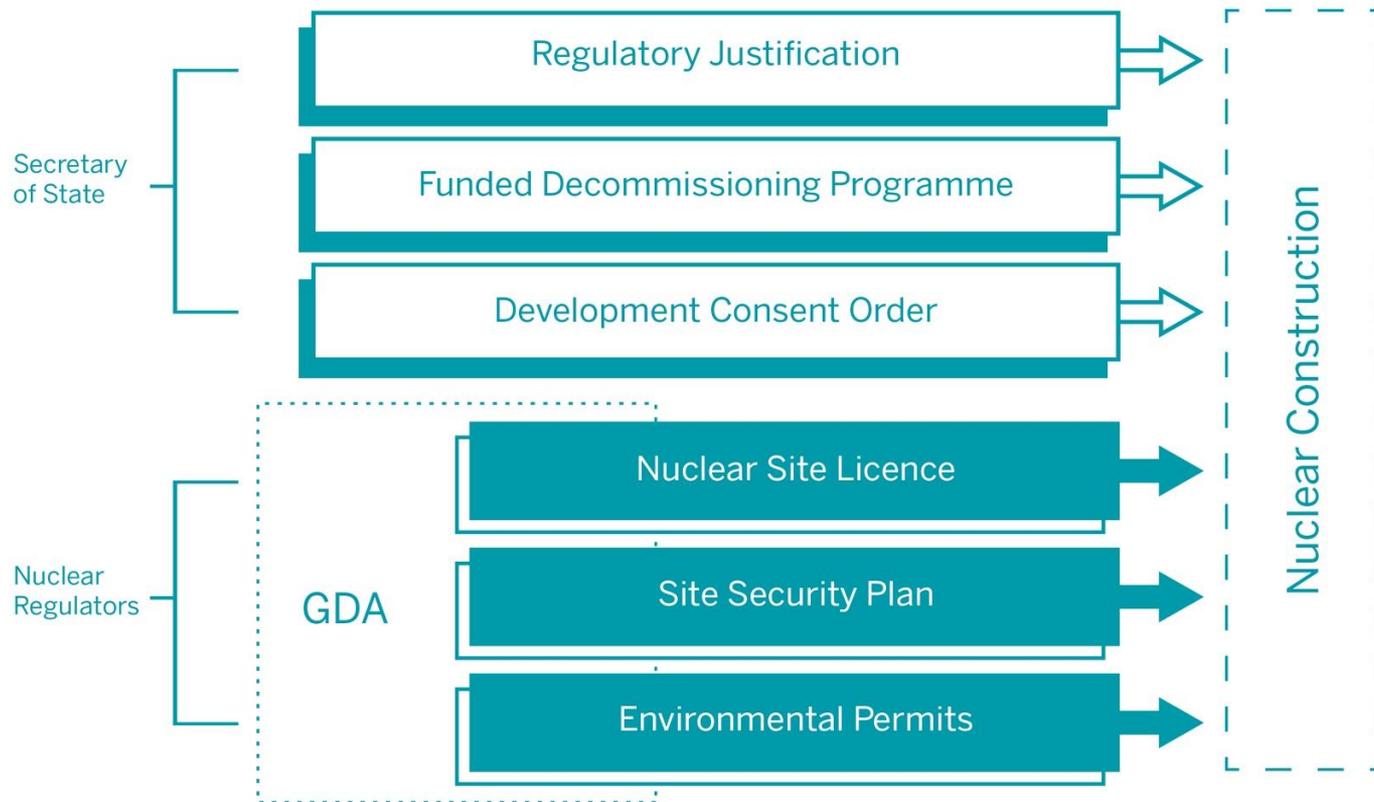
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***“Pre-licensing is generally seen by the nuclear industry as an effective means of enhancing predictability” WNA***

- ▶ **US NRC “Design Certification and Early Site Permit” – most clear cut and well known and have certain legal and binding effect**
- ▶ **Canada – Regulator can be asked to perform a pre-design review of a new reactor design to establish compliance with national regulatory requirements and identify fundamental barriers to licensability (not very formal nor legally binding)**
- ▶ **UK – The Generic Design Assessment (GDA) was created by the regulator without national legislation. Aims to improve predictability by reviewing potential designs and assess their licensability once site-specific factors have been taken into account (less binding than US design certification)**
- ▶ **France – Regulator (ASN) undertakes a “review of safety options” which is not binding.**
- ▶ **Czech Republic – the site license is the first step of the legal licensing procedure of any particular nuclear plant**

# Nuclear Power Plant Construction (UK Perspective)

## Pre-requisites





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## GDA – UK Regulator Perspective?

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*“We want our GDA assessment to be more complete than these overseas assessments so that it can be wide ranging and as final as possible. This will minimise the design review work that will be needed if any of the designs are submitted for site licensing assessment. We will therefore deal with as many significant issues as possible within the scope of GDA” UK Nuclear Regulator*



# Generic Design Assessment (GDA) - Background

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## What is GDA?

**Assessment of a Generic Reactor Design – single unit, independent of site**

- ▶ 1<sup>st</sup> stage of a 2-step licensing process
- ▶ 2<sup>nd</sup> stage is Site Specific Licensing

**Joint Regulatory Process through contract ; Office of Nuclear Regulation (ONR) and The Environmental Agency (EA)**

## Purpose

Introduced to reduce the risk inherent in the licensing process - to give more certainty to utilities that designs are licensable in the UK

## Process

Application by Requesting Party (ies) (RPs) – e.g. EDF and AREVA, HGNE, Westinghouse  
Assessment :

- ▶ Safety (ONR → DAC\*) ; Security (CNS) ; Environment (EA → SoDA\*\*)  
Assessment – Steps 1 to 4 (increasing level of detail), and post-Step 4  
Assessment is ~< level appropriate to allow NI safety-related construction to proceed BUT does not provide the Approval for such.

\* Design Acceptance Confirmation

\*\* Statement of Design Acceptability

# Why GDA and Pre-GDA?

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## Why GDA?

- ▶ Mitigates the risk of major investment and high cost momentum only to find fundamental flaws in reactor technology / application of technology

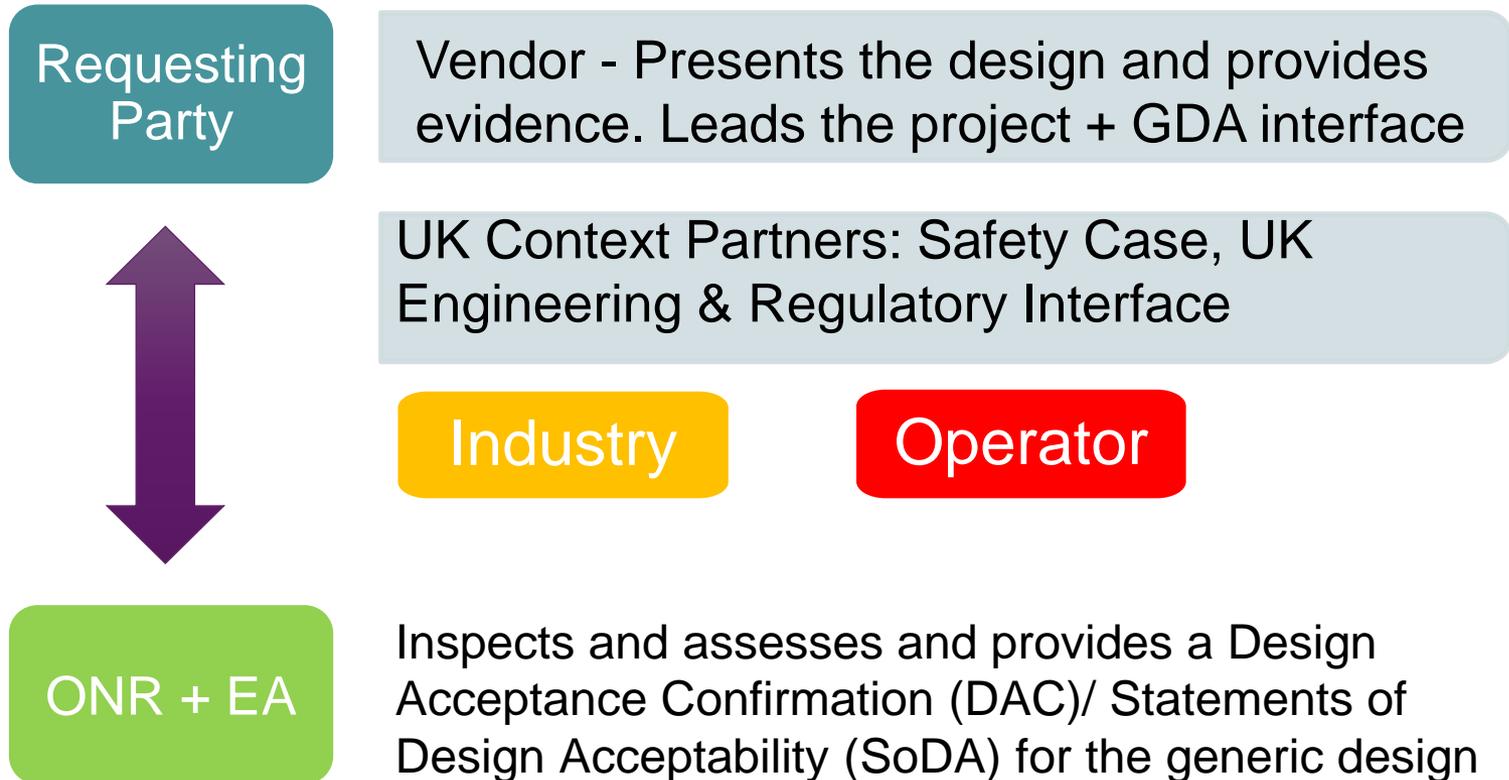
## Why a De-Risking Process by UK Industry prior to GDA?

- ▶ UK context can be VERY different
- ▶ Recognised by ONR/EA that Pre-GDA is good LFE\* from early GDAs
- ▶ More efficient use of regulatory resources
- ▶ Prepares for improved engagement on GDA
- ▶ GDA is fully open and transparent
- ▶ De-links commencement of (pseudo) Regulatory process from site acquisition
- ▶ Pre-GDA will reduce GDA costs, duration and risks (no surprises)
- ▶ Pre-GDA will reduce overall programme costs, duration and risks

\*Learning From Experience

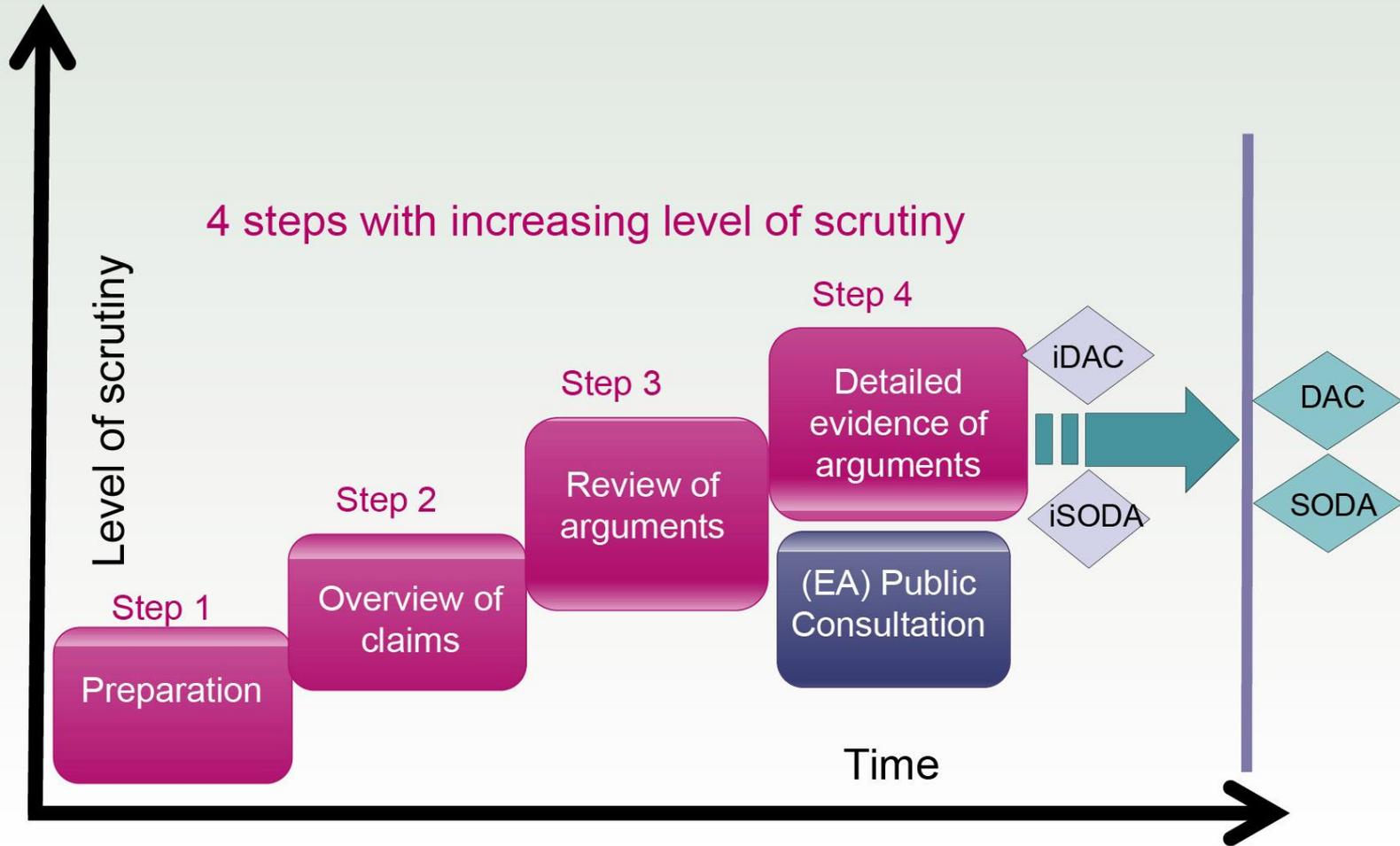


# The Actors in a Typical GDA process





# Generic Design Assessment (GDA) - Process



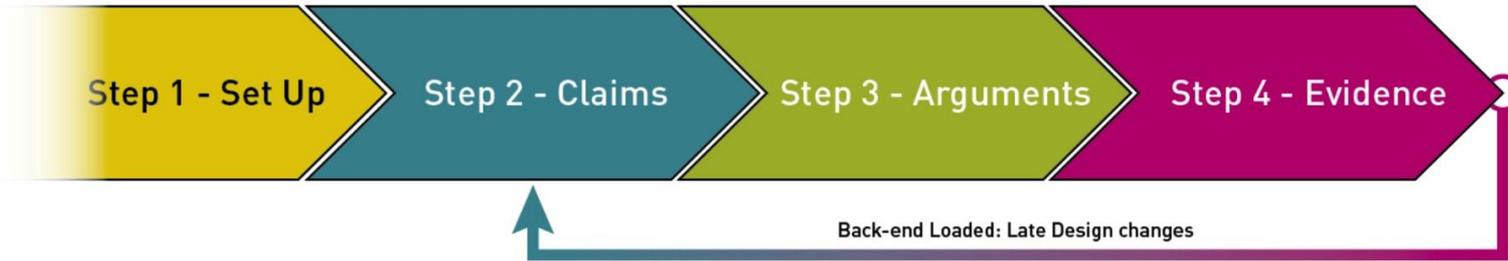




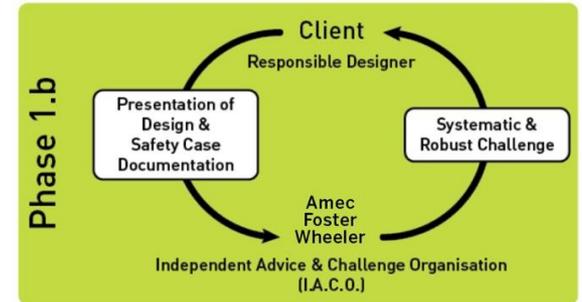
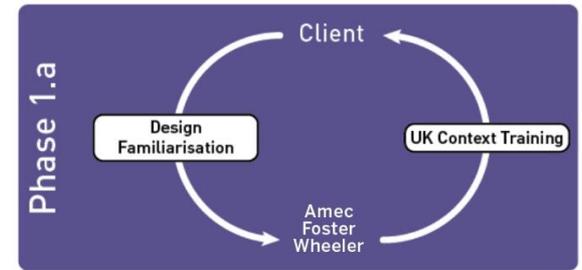
# General Principles of Pre-Licensing and GDA

## Optimisation of GDA through early support activities from Amec Foster Wheeler

GDA EPR/AP1000 - Case History



GDA Regulatory Guidance



Phase 1: Pre-GDA





# Provisional Approach to future GDA

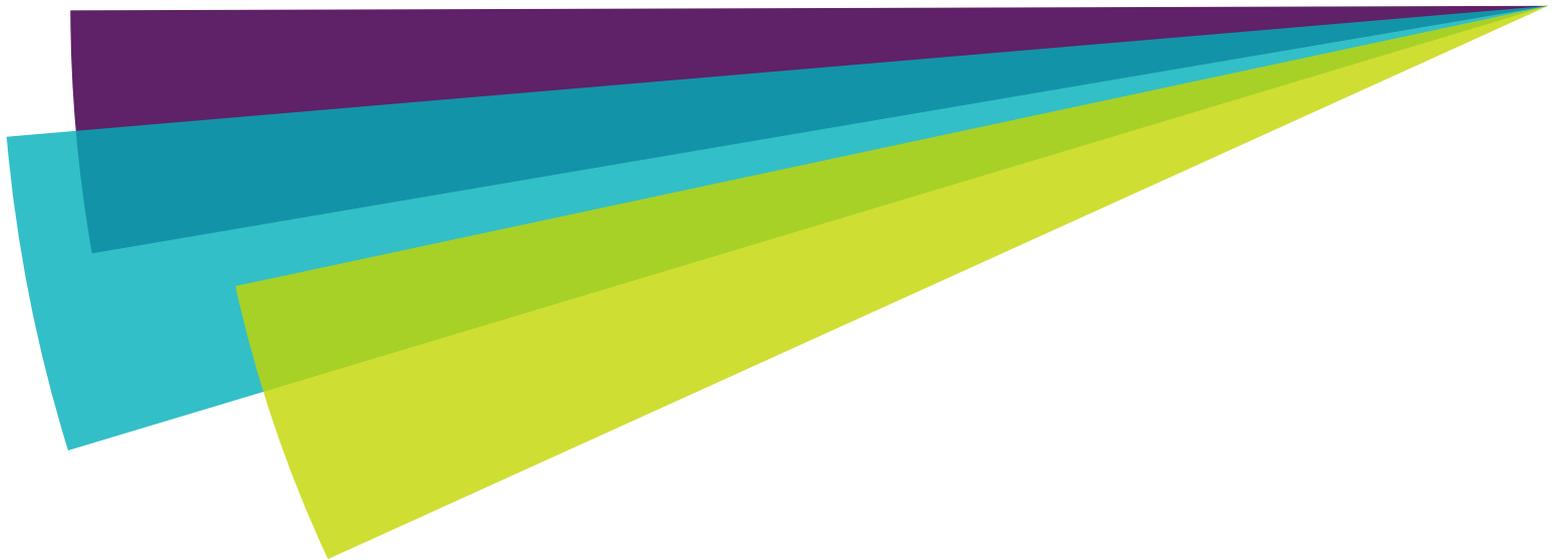
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# The Nuclear Site License (NSL) Phase

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# UK Safety Legislation

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- ▶ The operator is legally responsible for reducing the risk to employees and to others, so far as is reasonably practicable.  
(Thus reducing the risk As Low as is Reasonably Practicable [**ALARP**]  
or So Far As Is Reasonably Practicable [**SFAIRP**])
- ▶ Vendors must supply equipment that is capable of being operated to achieve this.
- ▶ It follows that the nuclear regulatory system is non-prescriptive. It is the Licensee who must fully understand the hazards, and define how this hazard is managed to reduce the risk.



# Nuclear Site Licence (NSL)

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The 36 Licence conditions are non-prescriptive – they set **high-level** goals that apply throughout the life of the installation

The licensee can develop arrangements to comply with the licence conditions that best suit its business – but **must** demonstrate proper management of safety.

These Compliance arrangements form the basis for the Licensee's Safety and Quality Management System – **must** demonstrate application of detailed safety standards and safe procedures

ONR assesses whether the licence holder has demonstrated it understands the hazards associated with its activities and how to control them adequately – this is based largely on the **Licensee's** safety case

ONR assesses the licensee's safety case against the Safety Assessment Principles for Nuclear Facilities - SAPs

# 36 Nuclear Site Licence Conditions

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## The main basis for regulation of nuclear activities: each Licensee develops their own arrangements

1. Interpretation
2. Marking of the site boundary
3. Restriction on dealing with the site
4. Restrictions on nuclear matter on the site
5. Consignment of nuclear matter
6. Documents, records, authorities and certificates
7. Incidents on the site
8. Warning notices
9. Instructions to persons on the site
10. Training
11. Emergency arrangements
12. Duly authorized and other suitably qualified and experienced persons
13. Nuclear safety committee
14. Safety documentation
15. Periodic review
16. Site plans, designs and specifications
17. Management systems
18. Radiological protection
19. Construction or installation of new plant
20. Modification to design of plant under construction
21. Commissioning
22. Modification or experiment on existing plant
23. Operating rules
24. Operating instructions
25. Operational records
26. Control and supervision of operations
27. Safety mechanisms, devices and circuits
28. Examination, inspection, maintenance and testing
29. Duty to carry out tests, inspections and examinations
30. Periodic shutdown
31. Shutdown of specified operations
32. Accumulation of radioactive waste
33. Disposal of radioactive waste
34. Leakage and escape of radioactive material and radioactive waste
35. Decommissioning
36. Organisational capability

## Nuclear Site Licence (NSL) – cradle to grave

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- ▶ the three key themes ONR addresses in assessing a licence application are:
  - ▶ the capability, organisation and resources of the applicant corporate body;
  - ▶ the nature of the prescribed activities and the relevant safety case;
  - ▶ the nature and location of the site.

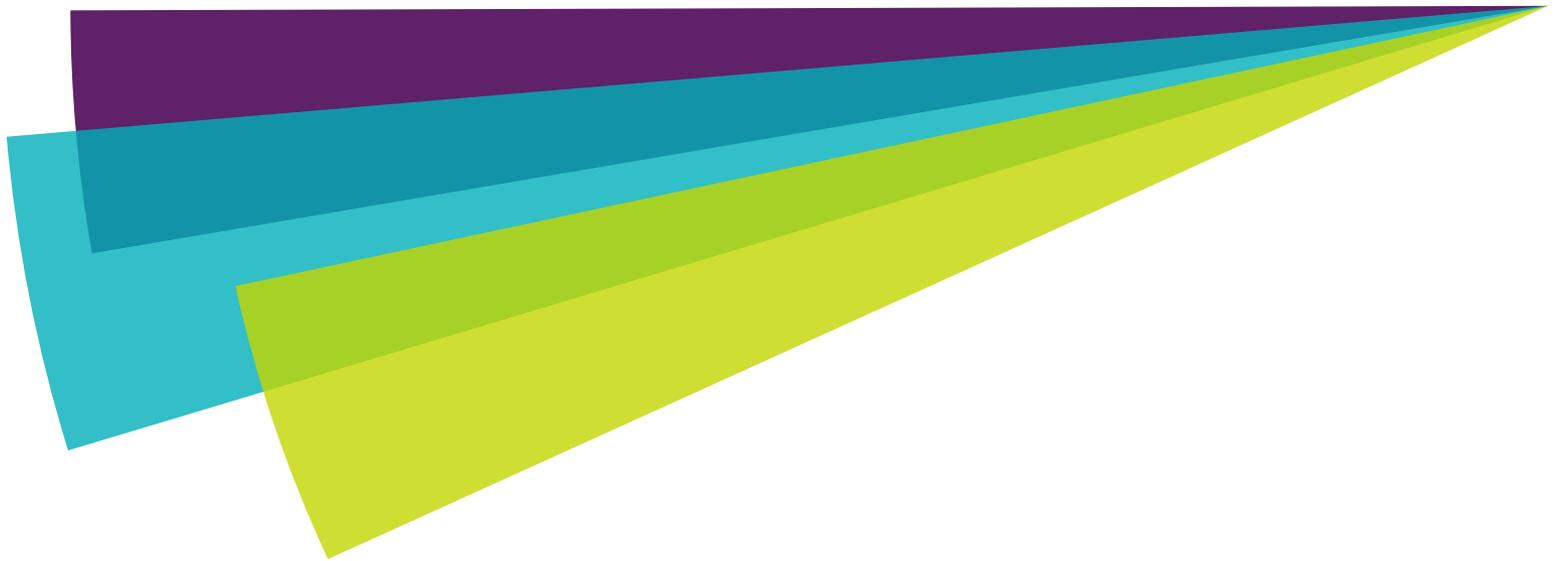
### **Granting** the NSL does **not** constitute permission to start construction of nuclear safety related plant, which also requires:

- ▶ Permission from ONR (LC19 says ‘the licence holder shall not commence construction of new safety related plant without the consent of the Executive’)
- ▶ Permits from the Environment Agency
- ▶ Planning consent from the Secretary of State (more later)



# GDA and NSL Licensing

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# Taking the GDA output forward to the site-specific Stage

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- ▶ A successful GDA outcome does not guarantee that ONR will permit the construction of the nuclear power station based on that design.
- ▶ Final GDA submission documentation need to be incorporated largely unchanged within site-specific Pre-construction Safety and Security Reports
- ▶ A programme to address the Assessment Findings (if applicable) from the GDA must be in place during the ongoing design, procurement, construction, testing and commissioning programme
- ▶ Aspects of the GDA submission may require re-assessment if they are affected by subsequent significant design changes
- ▶ GDA DAC will be used to underpin the regulatory permissions needed by operators to construct a fleet of reactors based on common design.

## Points to take away

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- ▶ International consensus to the advantages and benefits of pre-licensing
- ▶ A number of national models exist of how to undertake pre-licensing
- ▶ There is room for improvement and the pre-licensing process continues to evolve as a living organism
- ▶ Cross-fertilisation across national boundaries helps to improve the process
- ▶ Knowledge transfer and information exchange between countries (regulators, vendors, licensees and operators) are vital for streamlining the pre-licensing process



# Any questions?

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