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| ONR Technical Assessment Guide  Function and content of the Nuclear Baseline |



ONR Technical Assessment Guide (TAG)

Function and content of the Nuclear Baseline

**Head of Profession**: Human and Organisational Capability

**Authored by**: Nuclear Inspector

**Approved by**: Head of Profession

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| Issue | Description of update(s) |
| 5.1 | Minor update to align key definitions across all organisational capability guidance and amplify guidance on:   * The purpose of the Nuclear Baseline (NB). * Processes to plan for medium and long-term NB staffing requirements. |
| 5.2 | Minor updates to incorporate the need to identify nuclear baseline roles |

Contents

[1. Introduction 4](#_Toc188620037)

[2. Purpose and scope 5](#_Toc188620038)

[3. Relationship to licence and other relevant legislation 8](#_Toc188620039)

[4. Relationship to Safety Assessment Principles, WENRA Reference Levels, and IAEA Safety Standards and Guides 10](#_Toc188620040)

[5. Advice to Inspectors 16](#_Toc188620041)

[References 35](#_Toc188620042)

[Glossary and abbreviations 36](#_Toc188620043)

# Introduction

1. ONR has established its [Safety Assessment Principles](http://www.onr.org.uk/saps/saps2014.pdf) (SAPs) (ref. [1]) which apply to the assessment by ONR inspectors of safety cases for nuclear facilities that may be operated by potential licensees, existing licensees, or other duty-holders. The principles presented in the SAPs are supported by a suite of guides to further assist ONR’s inspectors in their technical assessment work in support of making regulatory judgements and decisions. This technical assessment guide (TAG) is one of these guides.

# Purpose and scope

1. The Nuclear Baseline (NB) is the means by which the licensee demonstrates that its organisational structure, staffing and competencies are, and remain, suitable and sufficient to manage nuclear safety throughout the full range of the licensee’s business. It also provides the foundation from which organisational changes can be assessed in accordance with the licensee’s arrangements made under Licence Condition (LC) 36.
2. This TAG sets out ONR’s expectations for existing and prospective licensees’ development and maintenance of their NBs. It should be read in conjunction with ONR’s Technical Inspection Guide (TIG),   
   ‘LC 36 - Organisational Capability’ (ref. [2])
3. The nuclear industry [Safety Directors’ Forum](https://nuclearinst.com/Safety-Directors-Forum) (SDF) (ref. [3]) has also published a guide directly relevant to the nuclear baseline. ONR considers this guide to be consistent with guidance within this TAG.
4. The following definitions are applicable to this TAG:

Table 1 - Table of definitions

| Term/acronym | Definition |
| --- | --- |
| Contractor | Any organisation or individual person that provides a product or service for a licensee under a commercial contract that is: not in the licensee’s direct employment or formally seconded to the licensee from the licensee’s parent company, are subject to licensee's IC oversight and are employed by companies external to the licensee/licensee's parent company |
| Core Safety Capability | This capability is a subset of the Nuclear Baseline and should reside within the licensee organisation, but does not necessarily require direct employment by the licensee organisation (for example, embedded contractors).  Core Safety Capability is the knowledge, experience and resources that the licensee should maintain within its own organisation in order to be able to ensure enduring control and oversight of nuclear safety at all times.  The licensee’s ‘Intelligent Customer’ (IC) and ‘Design Authority’ (DA) functions should form part of the core safety capability. |
| Embedded contractor | Individuals or members of contractor organisations that are subject to the licensees onboarding and competency processes and are trained and work to the licensees arrangements and established organisational culture. These personnel do not need to be subject to supervision different from that of a normal employee. Embedded Contractors can be part of the core safety capability and can act as an Intelligent Customer. For further guidance regarding contracts of employment, refer to the HSE Enforcement Guide (ref. [4]). |
| Intelligent Customer (IC) | IC enables the organisation to maintain a clear line of sight to the safety case and underpinning justification for products or services bought on its behalf.  IC is the capability of an organisation to understand where and when work is needed; specify what needs to be done; understand and set suitable standards; supervise and control the work; and review, evaluate and accept the work carried out on its behalf; and own the outputs. |
| Nuclear Baseline (NB) | The Nuclear Baseline (NB) is the means by which the licensee demonstrates that its organisational structure, staffing and their competencies are, and remain, suitable and sufficient to manage nuclear safety throughout the full range of the licensee’s business. It also provides the foundation from which organisational changes can be assessed in accordance with the licensee’s arrangements made under LC 36. **The nuclear baseline should contain all posts/ roles that could have a direct or indirect impact on nuclear safety, both immediate and latent.** |
| Nuclear safety | The achievement of proper operating conditions, prevention of accidents and mitigation of accident consequences, resulting in protection of workers, the public and the environment from undue radiation risks. |
| Organisational capability | The concept of organisational capability relates to the combination of organisational structures (shape and size), functional specialisms, competence (both individual and collective) and resource capacity to conduct defined activities. Organisational capability is defined in the context of multiple factors including the operating lifecycle stage of the facility. |
| Post (Job) | A position identified on an organisational structure. |
| Role | A specific work activity/responsibility  Note:   * Licensees may choose to break down a post into constituent roles which are assigned to that post profile/ job description;   Or,   * Limit roles to additional activities/ responsibilities assigned to an individual. |
| Utilisation factor | A business planning assumption of the proportion of time that an individual is available to conduct their accountabilities and responsibilities.  This factor should take account of factors (such as leave, training and sickness) that reduce the individual’s availability to conduct their accountabilities and responsibilities.  Note; the utilisation factor is the assumed availability of an individual to conduct all activities. Should the post holder have non-nuclear safety accountabilities and responsibilities, their availability for nuclear safety related activities should be reduced accordingly. |

# Relationship to licence and other relevant legislation

## The Management of Health and Safety at Work Regulations 1999

* Health and Safety Arrangements - Regulation 5 requires employers to have arrangements as appropriate, having regard to the nature of activities and the size of the undertaking, for the effective planning, organisation, control, monitoring and review of the preventive and protective measures;
* Health and Safety Assistance - Regulation 7 requires an employer to appoint one or more competent persons to assist him in undertaking the measures he needs to comply with the requirements and prohibitions imposed on him, ensuring that the number of persons, the time available to them and the means at their disposal are adequate for the size of the task and associated risk; and
* Capabilities and Training - Regulation 13 requires an employer to ensure his employees are provided with adequate health and safety training.

## The Health and Safety at Work Act 1974

* Health and Safety Responsibilities – Under Section 2 and Section 3, the employer is responsible for the health and safety of its employees and others who may be affected by its activities.

## Nuclear Site Licence Conditions

* **LC 6 – Documents, Records, Authorities and Certificates**.   
  The licensee shall make adequate records to demonstrate compliance with any of the conditions attached to the nuclear site licence. The NB should be regarded as an important record to demonstrate that the licensee’s organisational structure, staffing and competencies are, and will remain, suitable and sufficient to manage nuclear safety throughout the full range of the licensee’s business.
* **LC 10 – Training**. The licensee shall make and implement adequate arrangements for suitable training of all those on site who have responsibility for any operations which may affect safety. Staff fulfilling NB roles, as roles which may affect safety, shall be suitably trained to fulfil those roles.
* **LC 12 – Duly Authorised and Other Suitably Qualified and Experienced Persons**. The licensee shall make and implement adequate arrangements to ensure that only suitably qualified and experienced persons perform any duties which may affect the safety of operations on the site. Persons fulfilling Design Authority (DA) or Responsible Designer roles, as roles which may affect the safety of operations, shall be suitably qualified and experienced to fulfil those roles.
* **LC 17 – Management Systems**. The licensee shall establish and implement adequate quality management arrangements in respect of all matters which may affect safety.
* **LC 36 – Organisational Capability**. The licensee shall provide and maintain adequate human resources to ensure the safe operation of the licensed site. The licensee shall also make and implement adequate arrangements to control any change to its organisational structure or resources which may affect safety. The Design Authority (DA) and Intelligent Customer (IC) capability should be an integral part of a licensee’s NB and any changes to that capability should be assessed for safety significance.

# Relationship to Safety Assessment Principles, WENRA Reference Levels, and IAEA Safety Standards and Guides

## Safety Assessment Principles

1. The Safety Assessment Principles (SAPs) for Nuclear Facilities (ref. [1]) provide a framework to guide regulatory decision making in the nuclear permissioning process. It is supported by TAGs which further aid the decision-making process. The following principles are of relevance to this TAG:

* **MS.1. - Leadership**. Identifies the need for directors, managers and leaders to focus the organisation on achieving and sustaining high standards of safety and on delivering the characteristics of a high reliability organisation.
* **MS.2. - Capable Organisation**. Identifies the need for an organisation to have the capability to secure and maintain the safety of its undertakings;
* **MS.3. - Decision Making**. Identifies the need for decisions at all levels that affect safety to be informed, rational, objective, transparent and prudent;
* **MS.4. - Learning**. Identifies the need for lessons learned from internal and external sources to continually improve leadership, organisational capability, the management system, safety decision making and safety performance.
* **EHF.5. – Task Analysis**. Identifies the need to conduct proportionate analysis of all tasks important to safety to justify the effective delivery of the safety functions to which they contribute. The analysis should be applied to all actions identified as impacting safety and the administrative controls needed to remain within operating rules for normal operation or return back to normal operations. The workload of personnel required to undertake these actions and controls should be analysed and demonstrated to be reasonably achievable. The analysis should help define operator roles and responsibilities, staffing levels, personnel competence and training needs and communication networks.   
  The workload of personnel and its impact on the effective completion of tasks important to safety should be reviewed in periodic safety reviews and as part of emergency demonstration exercises.
* **EHF.11. – Staffing Level**s. Specifies that there should be sufficient competent personnel available to operate the facility in all operational states.
* **DC.7. – Decommissioning Organisation**.Identifies that the safety case should demonstrate an appropriate management organisation, and adequate personnel resources, to ensure that decommissioning can be completed safely. The continued suitability of these should be demonstrated through an organisation and staffing baseline.   
  The design of the organisational structure will depend upon the activities to be carried out and will need to be determined on a case-by-case basis.
* **AM.1. - Planning and Preparedness**. Specifies that the accident management strategy should identify the number of operators and other site staff needed to address different types of accidents and the skills that they need.

## Technical Assessment Guides

1. The following TAGs are applicable to this TAG:

* **NS-TAST-GD-027 – Training and Assuring Personnel Competence**   
  (ref. [5]) – sets out how the licensee demonstrates that it has a systematic approach to both the identification and delivery of personnel competence and its training processes. Additionally, it outlines ONR’s expectations for the licensee’s arrangements for assuring personnel competence.
* **NS-TAST-GD-048 – Organisational Capability** (ref. [6]) - sets out the broad principles which underpin ONR’s expectations of a licensee’s arrangements to provide and maintain adequate financial and human resources and to control changes to its organisation structure or resources which may affect safety.
* **NS-TAST-GD-049 – Licensee Core Safety and Intelligent Customer Capabilities** (ref. [7]) - sets out some broad principles which underpin ONR’s expectations of a licensee’s arrangements for the use of contractors and for retaining control of nuclear safety.
* **NS-TAST-GD-061 - Staffing Levels and Task Organisation** (ref. [8]) – provides detailed guidance to support the assessment of the approaches and methods used by applicants and licensees to derive, validate and monitor staffing arrangements; and to specify task organisation, in particular, the design of shift work systems and team design.
* **NS-TAST-GD-072 – Function and Content of a Safety Management Prospectus** (ref. [9]) - Element 7 of this TAG expects a licensee to understand its processes and plant, and to ensure that knowledge is captured and managed.
* **NS-TAST-GD-077 – Supply Chain Management Arrangements for the Procurement of Nuclear Safety Related Items or Services**   
  (ref. [10]) – specifies that the licensee should maintain an ‘Intelligent Customer’ capability for all work carried out on its behalf by suppliers that may impact upon nuclear safety
* **NS-TAST-GD-079 – Licensee Design Authority Capability** (ref. [11]) - sets out the broad principles which underpin ONR’s expectations of a licensee’s arrangements to provide and maintain an adequate Design Authority (DA) capability.
* **NS-TAST-GD-080 – Nuclear Safety Advice and Independent Challenge** (ref. [12]) – provides guidance to support the assessment of the adequacy of organisational capability for nuclear safety advice and independent challenge.

## Licensing of Nuclear Installations

1. ONRs ‘Licensing Nuclear Installations’ (ref. [13]) sets out ONRs expectations of a licensee’s NB as a demonstration that the licensee has suitable and sufficient organisational structures, staffing and competences in place to effectively and reliably carry out those activities which could impact on nuclear safety.
2. It also sets out ONR’s expectation that the organisational and management structures set out in the NB will not be static and that they should evolve as the licensee’s organisation develops.

## WENRA Reactor Safety Reference Levels

1. The objective of the Western European Nuclear Regulators Association (WENRA) is to develop a common approach to nuclear safety in Europe by comparing national approaches to the application of IAEA safety standards. The Reactor Harmonisation Working Group Report represents good practices in the WENRA member states (ref. [14]).
2. This TAG is consistent with the Safety Reference Levels for Existing Reactors (ref. [14]). The Issues of relevance to this TAG are:

* Para B1.1 addresses a justified organisation:

“The organisational structure for safe and reliable operation of the plant, and for ensuring an appropriate response in emergencies, shall be justified and documented.”

* Para B1.2 requires management of change:

“The adequacy of the organisational structure, for its purposes according to B1.1, shall be assessed when organisational changes are made which might be significant for safety.”

* Para B3.1 states that a resource assessment for the organisational structure is needed:

“The required number of staff for safe operation, and their competence, shall be analysed in a systematic and documented way”.

* Para B3.5 addresses employee/ contractor resource balance:

“The licensee shall always have in house, sufficient competent staff to understand the licensing basis of the plant (e.g. Safety Analysis Report or Safety Case and other documents based thereon), as well as to understand the actual design and operation of the plant in all plant states”.

* Para B3.6 addresses the intelligent customer (IC) role:

“The licensee shall maintain, in house, sufficient and competent staff and resources to specify, set standards, manage and evaluate safety work carried out by contractors”.

* Para C3.1 requires an integrated management system:

“The main aim of the integrated management system shall be to achieve and enhance nuclear safety. Other demands on the licensee and the licensee’s management system shall be considered in unison with nuclear safety, in order to help preclude their possible negative impact on nuclear safety.”

## IAEA Safety Standards

1. The IAEA Safety Standards (Requirements and Guides) are the benchmark for the SAPs and are recognised by ONR as relevant good practice.   
   They should therefore be consulted, where relevant, by the inspector, although it should be appreciated that they are design standards rather than regulatory standards.
2. Fundamental Safety Principle Number 1 states:

“The prime responsibility for safety must rest with the person or organization responsible for facilities and activities that give rise to radiation risks.”

1. This principle cites the responsibility of the licensee for safety throughout the lifecycle of a facility or activity. It affirms the licensee’s responsibility for establishing and maintaining the right skills and competences.
2. In addition, IAEA Safety Guide SSG-72 – The Operating Organisation for Nuclear Power Plants (ref. [15]) includes some elements that are embodied in the NB or Safety Management Prospectus (SMP) as a means of justifying and describing the organisation.
3. IAEA documents of relevance include:

* Specific Safety Guide SSG-72 – The Operating Organisation for Nuclear Power Plants (ref. [15])
* Specific Safety Requirements SSR-2/2 – Safety of Nuclear Power Plants: Commissioning and Operation (ref. [16])
* General Safety Requirements GSR Part 2 - Leadership and Management for Safety (ref. [17])
* General Safety Guide GS-G-3.1 – Application of the Management System for Facilities and Activities (ref. [18])
* General Safety Guide GS-G-3.5 - The Management System for Nuclear Installations (ref. [19])

1. SSG-72 and SSR-2/2 include key elements of the management system and the structure of the operating organisation that are embodied in the NB or SMP:

* Requirement 3 of the SSR 2/2 – Structure and functions of the operating organization states:

“The structure of the operating organization and the functions, roles and responsibilities of its personnel shall be established and documented.”

* SSR 2/2, Para 3.8 considers responsibilities, authority and lines of communication for the safe operation of the plant:

“Functional responsibilities, lines of authority, and lines of internal and external communication for the safe operation of a plant in all operational states and in accident conditions shall be clearly specified in writing.”

* SSR 2/2, Para 3.9 considers the organisational structure and organisational change:

“The structure of the operating organization shall be specified so that all roles that are critical for safe operation are specified and described. Proposed organizational changes to the structure and associated arrangements, which might be of importance to safety, shall be analysed in advance by the operating organization.”

1. GSR Part 2 defines the requirements for establishing, assessing, sustaining and continuously improving leadership and management for safety in organisations. Requirement 9 focuses on provision of resources and requirement 12 focuses on fostering a culture for safety.

* The GSR Part 2 requires that:

“Provision is made in the management system to identify any changes (including organisational changes) that could have significant implications for safety and to ensure that they are appropriately analysed.”

“Planned reviews of the management system take account of changes in the organisation.”

1. GS-G-3.1 and GS-G-3.5 provide generic guidance to aid in establishing, implementing, assessing and continually improving a management system.

# Advice to Inspectors

## Purpose of a NB

1. The NB’s principal purpose is to provide a demonstration that the licensee has suitable and sufficient organisational structures, staffing and competences in place to effectively and reliably carry out those activities which could impact on nuclear safety.
2. The licensee needs to show that it can maintain nuclear safety, remain in control of activities that could impact on nuclear safety under all reasonably foreseeable circumstances throughout the life cycle of the facility, and remain legally compliant. This should not be a significant additional burden to the licensee, since any organisation needs to know what resources, competencies and processes it needs to have in place to operate its business.
3. The NB articulates the design intent for the nuclear safety organisation and provides a formal expression of the people safety case. It provides the overall demand for nuclear safety-related training (LC 10), with LC 12 providing the means to demonstrate the duty holder’s achievement of competent persons to meet the NB design intent.
4. A second, important purpose is to provide a clear description of the current intended staffing levels as a reference point or ‘baseline’ against which the licensee can assess the potential impact upon nuclear safety of proposed organisational changes.
5. In preparing its NB, the licensee should therefore consider all activities which have the potential to impact upon nuclear safety (i.e., those activities with a positive impact and those which, if inadequately conceived or executed, could lead to an immediate or latent (direct but not immediate) detriment to nuclear safety). This includes, for example, the governance of nuclear safety, IC capability and drafting of safety related documents, as well as frontline work. It should also include roles which have a positive contribution to nuclear safety.
6. The licensee should be able to show that it understands the nuclear safety roles that need to be delivered, and that these roles will be carried out by suitable and sufficient competent resource. It is not sufficient just to show that all roles are ‘covered’, but that those individuals in post can realistically carry these roles out to the required standard and capacity.
7. Short-term absences (i.e., sickness, leave, training, etc.) should be taken into account in considering sufficiency of resources through the application of an appropriate utilisation factor, and the articulation of associated assumptions, constraints and limitations. The utilisation factor should be a generic organisational design criterion that is generally defined at the business level. The use of a utilisation factor in organisational design does not remove ONR’s expectation that, once the organisational change has been implemented, the licensee will monitor the sufficiency of resources through the use of appropriate leading and lagging indicators.
8. For longer-term absences (i.e., greater than four weeks), the licensee should consider the impact on nuclear safety related accountabilities and responsibilities by conducting a formal risk assessment.

## Principles of a NB

1. Licensees may derive their NBs in different ways, but there are some broad principles which underpin ONR’s expectations of a licensee’s NB in the following sections of this TAG:
2. The NB should consider the delivery and oversight of all activities which have the potential to impact upon nuclear safety. This includes activities with a positive impact and those which, if inadequately conceived or executed, could lead to an immediate or latent detriment to nuclear safety;
3. The NB should address the requirements of steady state conditions, periods of change and potential emergency situations at the current phase of the licensed facility’s life cycle;
4. The NB should demonstrate that the licensee’s organisation has sufficient staff and competencies to discharge its responsibilities for delivery and oversight of nuclear safety under the nuclear site licence;
5. The licensee shall have in place a process to plan the medium and long-term NB staffing requirements.
6. The licensee must demonstrate that it remains in control of nuclear safety. The governance of nuclear safety and IC capability are an intrinsic part of this demonstration;
7. Contract staff should appear as part of the NB resource when they are embedded within the licensee’s organisation or meet the criteria for holding IC roles on behalf of the licensee;
8. The licensee should have arrangements in place to manage contract staff who do not meet the criteria for inclusion in the NB, and in these cases the NB should include those employees who discharge the associated IC functions;
9. Licensees should develop a set of indicators that provide evidence that the NB has the right organisation, staffing levels and competences and that it is being managed effectively;
10. The Licensee should have in place a process through which the NB is derived and managed; and,
11. The NB should be maintained as a living document and provide an accurate, current reference point against which nuclear safety implications of proposed modifications to staffing levels/structures, workloads, and changed competence requirements can be assessed, in accordance with the licensee’s arrangements made under LC 36.

## NB methodology

### Principles one and two

1. The NB should be an evidence-based demonstration that the licensee has an organisational structure, staffing levels and competencies in place that enable it to maintain, and remain in control of, nuclear safety throughout the full range of activities for which it is licensed.
2. This includes all activities with a positive impact and those which, if inadequately conceived or executed, could lead to an immediate or latent (direct but not immediate) detriment to nuclear safety, including showing that all the safety related roles set out in the Safety Management Prospectus (SMP) are adequately populated. In determining the structure of the operating organisation and its staffing requirements, consideration should be given to the functions of the management system. Where relevant, licensee’s should consider specific guidance such as:

* WENRA Safety Reference Levels for Existing Reactors (ref. [14]);
* IAEA SSG-72 for Nuclear Power Plants (ref. [15]).

1. The descriptions of the structure of the operating organisation, the lines of responsibility, authority and communication, as well as the functions to be performed by individual departments (and by individuals in those departments, as appropriate) should be unambiguous and should leave no scope for improvisation in normal conditions It is recognised however that responders may need to improvise in abnormal/accident conditions. Functions to be performed by external organisations or consultants should also be described, together with the related lines of communication and authority.
2. Staffing requirements of the NB:

* Should reflect all nuclear safety-related roles needed to carry out the full range of activities for which the site is licensed. This will include policy making for all areas of safety as well as the operating, support and review functions necessary to ensure that design integrity is maintained. The governance of nuclear safety, IC and Design Authority (DA) capabilities are an intrinsic part of this demonstration.
* Should not be restricted to those roles set out in the site’s minimum staffing arrangements nor those roles identified by the licensee as necessary to maintain the facility in an inactive or quiescent shutdown state.

1. The licensee should put in place processes through which it identifies the roles that should be included in the NB. These processes should be such that they provide for the identification of roles which are related to nuclear safety and licence condition compliance. For example, they should include roles which involve:

* Carrying out or supporting operations as defined in the Nuclear Site Licence (LC 1);
* The design and manufacture of nuclear safety related plant and equipment;
* The management, control and supervision of processes and people which maintain licence compliance;
* Contributing to the preparation of the nuclear safety case and advising on modern safety standards, including Design Authority responsibilities;
* Responding to nuclear incidents and emergencies;
* Roles carried out by manpower substitutes or agency supplied workers, if they are embedded contractors, that can impact on nuclear safety;
* Control and supervision of contractors involved in project based work that can impact on nuclear safety; i.e. when not an embedded contractor.
* Oversight of tenant organisations carrying out licensable activities;
* Governance arrangements for the oversight of nuclear safety.

1. Roles that should be included in the NB should not be hierarchically determined (i.e., they should not purely reflect their responsibilities for making managerial or supervisory decisions; the NB should include all those roles which have the potential to impact upon nuclear safety, both positively and negatively).
2. To ensure that the NB has the correct depth, it should identify the licensee’s organisation down to the level where no impact on nuclear safety is observed. It is not appropriate simply to take a managerial position, such as supervisors, as the cut-off point beneath which others do not appear in the baseline. People beneath this managerial level may carry out work which has the potential to impact on nuclear safety for example control room staff, staff working on systems/components important to nuclear safety, maintainers of nuclear plant, safety case authors, independent peer assessors etc.
3. The licensee should decide which functions should be performed: (i) on site; (ii) off site but within the licensee organisation; and, (iii) outside the operating organisation. Consequently, the NB should include roles carried out off-site, such as at corporate headquarters, as well as those on the licensed site.
4. The NB should identify the staffing levels and competencies needed in each of these areas but need not further distinguish between groups of individuals who carry out the same roles.
5. ONR acknowledges that some organisations may wish to extend the concept of the NB by including roles which are beyond the scope of nuclear safety, including conventional safety, security and environmental. Where a licensee chooses to do this, they should ensure that they can filter out those non-nuclear safety roles from the NB data so that the status of nuclear safety organisational capabilities can be readily analysed and vulnerabilities understood. These non-nuclear roles are outside the scope of this TAG.
6. The Inspector should consider whether:

* The licensee has defined the criteria used to identify roles that should be included in the NB;
* The criteria include all roles that involve the discharge of duties which, if inadequately conceived or executed, could lead to an immediate or latent effect both positive and negative to nuclear safety, including the delivery and oversight of the full range of activities, projects or operations that have this potential, whether directly or indirectly;
* It is clear to whom the responsibilities of the nuclear site licence, and other key nuclear safety requirements including legal issues such as the IRRs, are allocated. This could include responsibility matrices, organisational charts, role profiles etc. and/or explicit links to the SMP;
* The NB reflects the organisational structure detailed in the SMP;
* The NB considers relevant off-site activities, including corporate functions and those outside of the operating organisation, as well as on-site activities;
* The NB breaks down the organisation into nuclear safety roles to a point at which further re-description does not add value.
* Non-nuclear roles can be filtered out from the NB data so that the status of nuclear safety organisational capabilities can be readily analysed and vulnerabilities understood.

### Principles three and four - Nuclear Baseline resource level and competence

1. The NB should demonstrate that the licensee’s organisation has sufficient staffing and competencies to discharge its responsibilities for delivery and oversight of nuclear safety under the nuclear site licence.
2. The licensee shall have in place a process to plan the medium and long-term NB staffing requirements.

#### Resource level

1. The NB should include either a description, with rationale, of the staffing levels that the licensee needs to carry out roles that have the potential to impact on nuclear safety, and how this compares to actual staff in post which may be higher, or a description of the levels of staff currently in post with an explanation as to how this is known to be adequate.
2. For existing, well-established organisations this may be simple evidence of adequate operational and safety performance at the stated staffing levels but should not merely be a statement of the status quo presented without suitable evidence as to why this is considered adequate. Nor should the NB be just the level of resource to maintain the licensed site in a non-operational state unless that is the licensee’s purpose.
3. The licensee should set out the number of individuals which it needs within its organisation to discharge the nuclear safety roles identified through application of Principles one and two. It should be noted that one post-holder may carry out several roles, so there is unlikely to be a one-to-one relationship between roles and posts. In allocating multiple roles to a post or an individual, the licensee should demonstrate that:

* There are no conflicting responsibilities (for example, a postholder should not concurrently be performing both an operational role and a governance/ oversight role for the same activity)
* The postholder has the capacity to discharge effectively all roles that may be discharged concurrently.

1. The licensee should then set out the number of individuals which it has in place, and their competence, to carry out these roles. The licensee should be able to show that the roles are all covered by competent staff and that the post holder(s) has sufficient resource available to meet the demands of these roles.
2. If actual resource levels fall beneath those identified as necessary in the NB (i.e., there are gaps between the numbers and/or competence levels of staff needed and the numbers of competent persons in post), nuclear safety may be affected. The licensee should be able to show that it understands where such gaps exist and that it has contingency measures in place to address the potential consequences of any shortfall and credible recovery plans to fill the gaps. These plans may involve recruitment or redeployment of staff, reducing or delaying work, or the use of contract resource.
3. There may be risks to nuclear safety if resource demands increase without an adequate increase in staffing. There should be arrangements in place to identify and deal with this potential too.
4. Where contract support is used, this must be overseen by the licensee’s competent IC capability. The alternative option of addressing resource gaps through reprioritisation of the work programme based on nuclear safety should also be explicitly defined.
5. While the NB should define the design intent to demonstrate that the licensee’s organisation has sufficient staffing and competencies to discharge its responsibilities for delivery and oversight of nuclear safety under the nuclear site licence, LC 36(1) requires the licensee to provide and maintain adequate financial and human resources to ensure the safe operation of the licensed site. Licensees should, therefore, recognise that, due to factors such as changes in operational requirements or business strategy, resource demands are likely to vary with time. Consequently, licensees should demonstrate an adequate process (or adequate processes) for planning staffing levels to meet both current and future requirements.   
   Such arrangements may be contained within wider business management arrangements for strategic resource planning but it should be clearly demonstrated how they are applied to the NB.
6. The Inspector should consider whether the licensee:

* Has defined, and given a clear rationale for, the number of individuals required for each NB post/role, for example does the rationale reflect the full breadth of the licensee’s activities and does it take consideration of the licensee’s work programmes;
* Has a process in place to monitor the adequacy of its resource levels;
* Is able to demonstrate that it understands where and why its staffing levels fall short of the levels identified as being necessary to maintain nuclear safety, and can it justify carrying out its activities during periods with such a shortfall in place;
* Has put measures in place to address any shortfalls in resource levels;
* Has management of change arrangements which include a consideration of the impact of changes in resource levels or levels of demand on staff as part of the assessment;
* Has a contingency plan in place to deal with resource shortfalls.
* Has a process in place to plan the medium and long-term NB staffing requirements.

#### Competence

1. LC 12 requires each person who carries out activities which may affect the safety of operations on a nuclear site to be a suitably qualified and experienced person (SQEP). This extends to and includes Director/Board level. For some roles it may also be necessary to designate persons who control and supervise operations which may affect safety as Duly Authorised Persons (DAPs). The licensee should have a competence framework to control, develop and maintain competence.
2. The NB should demonstrate that the licensee understands its competence needs, and that its staff are competent to discharge roles that impact upon nuclear safety, it is expected that reference will be made to the licensee’s competence management system to support the NB. The licensee should be able to extract information which provides it with corporate assurance that its staff are competent to fulfil the nuclear safety roles that they take on.
3. The responsibilities of the roles that a person undertakes determine whether the role is part of the NB not the attributes of the individual post/role holder.   
   If any of the responsibilities held by individual role holders can affect, have oversight or control nuclear safety then they should be included in the NB. Whilst the NB should have explicit links to the licensee’s competence assurance records, for example a ‘SQEP register’ or similar, it does not have to replicate them.
4. The licensee should ensure that there is an audit trail for competence requirements for NB roles and evidence that individuals in NB roles meet the required standard.
5. The licensee should be able to identify and maintain the core capability that it needs to maintain effective management for nuclear safety. ONR expects the licensee to, within its own organisation, have sufficient competent persons to be able to maintain control and oversight of safety at all times.
6. This core safety capability will include technical (i.e., design authority, engineering, safety case capabilities), operational, managerial and IC elements. Together they combine to ensure that the safety case for the installation is understood and maintained, and that the site, and plants or projects are operated in accordance with the safety case and the conditions of the nuclear site licence (refer to ref. [7]).
7. The NB should include a vulnerability assessment which addresses competence aspects.
8. The Inspector should consider whether:

* The NB (either directly or through reference to related documentation) provides evidence that the competence needs of NB roles have been identified;
* The NB (either directly or through reference to related documentation) provides evidence that persons carrying out NB roles meet the competence requirements to hold those roles;
* The licensee has a mechanism for addressing gaps in competence in existing the NB organisation and future needs in succession planning;
* The licensee has put in place and implemented a process to identify all the core competencies it requires, as set out in the SMP, and captured them in the NB.

### Principle five - Nuclear safety governance, DA and IC capabilities

1. Under UK legislation the holder of a nuclear site licence is responsible for nuclear safety on the Licensed Site. Additionally, under Sections 2 and 3 of the Health and Safety at Work Act 1974, the employer is responsible for the health and safety of its employees and others who may be affected by its activities. This overarching requirement is built into the SAPs in Fundamental Principle 1 as follows:

“The prime responsibility for safety must rest with the person or organisation responsible for the facilities and activities that give rise to radiation risks.”

1. Nuclear safety governance relates to the competence, arrangements and practices that determine whether the organisation is in control of the nuclear safety of its business in a clear line down from the corporate body that holds the licence. Both the SMP and the NB have roles to play in demonstrating the organisation’s nuclear safety governance capability.
2. The SMP should describe the process in place to ensure that the organisation has the capability to be in control of day-to-day operations and governance of the licensed site. The NB should refer to the statements made in the SMP and demonstrate that relevant roles are properly identified and resourced with competent persons. The Health and Safety at Work Act 1974, and the Management of Health and Safety at Work Regulations 1999 also require adequate organisational arrangement for implementing policy and preventive and protective measures.
3. Staff seconded from parts of a parent company and selected embedded contractors may be included in a licensee’s core safety capability. Consideration should be given, however, to the balance, and underpinning justification, of direct employed staff, to staff employed by other means, that make up the core safety capability.
4. The Inspector should consider whether:

* Those roles which have nuclear safety governance responsibilities have been clearly identified in the NB.
* There are mechanisms for determining those roles contributing to nuclear safety governance that may be held by contract staff.
* Succession planning and resource strategies take account of the nuclear safety governance, DA and IC capabilities.
* The NB and supporting documentation demonstrate that there are enough direct employees of the Licensee to retain the nuclear safety governance capability at the right level without degradation as described in the SMP.

1. The Licensee is responsible for demonstrating, through the NB, that it has enough people with the right competences to discharge its legal duties. Where this involves the support of others outside its own organisation then the licensee must demonstrate that it is and remains an IC for these skills and services.
2. Licensees should assess the roles in the NB which undertake an IC or DA function in line with their policy for IC, DA and staffing as described in the SMP. Ref. [7] defines the characteristics and breadth of the IC concept and should be referred to in assessing whether the licensee has an effective IC organisation. Ref. [11] defines the principles for a licensee’s DA capability and should be referred to when undertaking assessments of a licensee’s DA capability.
3. The licensee should ensure that the breadth and depth of NB assessment includes identification of IC and DA roles providing oversight of contract staff.
4. The licensee should ensure that the process for the management of change includes an assessment of implications for delivery of the IC and DA capability.
5. The Inspector should consider whether:

* The Nuclear Baseline identifies the IC and DA capability across the breadth of the organisation’s business.
* The IC and DA roles identified match the interfaces described in the SMP.
* The IC and DA roles are included in the succession planning arrangements.
* The NB and supporting documentation demonstrate that there are enough licensee employees in the licensee organisation to retain the IC and DA capability at the right level without degradation.

#### The NB and contract staff

1. Licensees may choose to call upon the support of staff outside their own organisation for several reasons including:

* To supplement their own organisational capability in response to planned changes in workload
* To carry out specific projects
* Through partnership arrangements
* To supplement in-house capability for scarce skills.

1. In determining whether it is appropriate to utilise contractor resource, licensees should ensure the decision-making process includes a review of the impact on the NB. This should include the effect on core safety capability to deliver licence condition compliance.
2. It should also address the potential for creating an organisation where the balance of roles held by employees and contract staff places an unacceptable risk on the licensee’s ability to discharge its IC responsibilities and maintain nuclear safety governance.
3. Where contractors are used, and their activities have the potential to impact on nuclear safety, they should be considered as part of the NB.   
   ONR recognises that including all such contractors within the NB could make the NB difficult to manage and maintain and potentially compromise its effectiveness. ONR will therefore adopt a pragmatic approach to the treatment of contractors regarding the NB.
4. This position is set out in the following two sub-sections.

### Principle six - Contract staff within the scope of the NB

1. Contract staff should, for example, appear as part of the NB resource when the conditions of their employment are such that they meet the criteria set out in Ref. [7] for working as an IC on the licensee’s behalf. Such contractors may have continuing roles within the licensee’s organisational structure and, for practical purposes, can be regarded as part of the licensee’s staff complement.
2. The licensee should be able to demonstrate that these individuals are subject to the licensee’s processes for competence assurance, line management, discipline, succession planning etc.
3. The NB should identify where NB roles are held by contractors in order for it to show that it understands where it is vulnerable to loss of contract resource, and to demonstrate that the balance of staff-contractors is suitable.
4. The Inspector should consider whether

* The licensee has included within its NB those contractors who are embedded within its organisation and who carry out necessary functions on the licensees’ behalf.
* The NB identifies which nuclear safety roles are held by such contractors.
* The number of baseline roles held by non-licensee staff is kept under review and managed so that the profile is acceptable.
* The licensee has included succession planning and vulnerability analysis for NB roles held by contract staff.

### Principle seven - Contract staff outside the scope of the NB

1. The licensee may make use of contractors who do not meet the criteria for inclusion within the NB for example contractors utilised on a project basis, and this is likely to be the case for most contractors.
2. In such cases, it is expected that the contractors will be managed using robust project management arrangements through which the licensee will ensure that the work of the contractors is properly specified, that arrangements to manage the contract are in place, that the contractor uses enough competent people to carry out the work, and that the contractors’ work is subject to appropriate levels and forms of scrutiny and supervision.
3. The project management arrangements, and their application, should provide a demonstration that work which could impact upon nuclear safety is properly organised and resourced by competent persons, as per the expectations of NB roles.
4. The NB should include those roles which are in place to manage contractors and to provide the licensee’s IC, DA and oversight functions. The licensee should refer to the activities that are carried out by contractors outside the NB, and to the project management arrangements that ensure that the expectations of the NB are met.
5. The Inspector should consider whether:

* The licensee has identified those activities performed by contractors which are outside the criteria for inclusion in the NB which have the potential to impact upon nuclear safety.
* There are project management arrangements in place for such contracts which demonstrate that the key principles of the NB are met (i.e., that work is adequately organised, resourced and controlled by competent people).
* The NB includes those IC and control and supervision roles which provide the oversight of contractors carrying out work which has the potential to impact on nuclear safety.
* The licensee can demonstrate that the range of IC roles is suitable and sufficient to cover the breadth of the contractors’ activities.

### Principle eight - Justification of the NB

#### NB indicators

1. The NB should demonstrate that the licensee’s organisation and its staffing levels and competencies enable it to discharge its nuclear safety responsibilities.
2. ONR does not expect detailed task analysis to underpin the resource/ competence allocation for all activities within the scope of the NB because this would not be practicable (although task analysis may be expected to understand and support some actions claimed within the safety case). ONR places greater emphasis on the use of meaningful performance indicators to monitor the health of the licensee’s organisation, staffing levels and competence.
3. Performance indicators should provide reassurance that nuclear safety roles are being delivered effectively. The indicators should include leading measures of performance prior to potential failure. They should address aspects such as quality and timeliness of work activities that could impact on nuclear safety. It is acceptable for the licensee to use some lagging measures as retrospective learning tools, but these should be in addition to leading indicators. Indicators can also be used to monitor vulnerabilities identified in the NB.
4. In determining appropriate indicators, licensees should consider the likely outcomes of both positive and inadequate delivery of nuclear safety functions. Whilst the exact nature of the indicators and the types of data available will vary from licensee to licensee the broad areas for performance measurement are likely to remain the same. For example, measures of:

* Backlog of work, including maintenance activities
* Excessive hours
* Quality of work output

1. This type of information may already be gathered by the licensee in order that it can understand how well its business activities are being delivered.   
   In such circumstances, the NB may therefore provide a draw upon the way in which the information is collected and used to provide confidence that nuclear safety activities are adequately organised and resourced with competent people.
2. The licensee’s indicators should address the following aspects:

* **Complement** – to show that the organisation has enough resource, at the right time and that the NB resource level is in line with programme need, for example demonstration that individuals are not overloaded;
* **Competence** – to show that it has the right skills and competences to match the need;
* **Nuclear safety achievement** – to show that the NB achieves the goal of maintaining nuclear safety.

1. The Inspector should consider whether:

* The adequacy of the NB is demonstrably supported by evidence rather than an assumption that the current organisation is adequate.
* The licensee has established a set of indicators that demonstrate the adequacy of its organisation, resource and competence to carry out those activities which have the potential to impact on nuclear safety.
* The licensee has established a process for monitoring the NB indicators at a suitable frequency and ensuring action is taken when appropriate.
* The indicators are being used to inform judgements on the organisation’s capability.
* There is an appropriate emphasis on leading measures of performance.
* The indicators provide a basis for confidence that the licensee’s organisation, staffing levels and competencies are suitable and sufficient to effectively deliver nuclear safety.

#### Vulnerability analysis

1. The licensee should undertake some form of analysis to assess the vulnerability of its resource and competence profile. This should identify where it may be vulnerable due to a potential shortage of competent resource such as singleton roles, where staff hold multiple and potentially conflicting roles or where NB roles are held by contractors etc. ONR expects the licensee to take account of its demographics in this assessment, such that the implications of impending retirements are considered.
2. The licensee should be able to show that, where vulnerabilities are identified, it has succession plans and, where appropriate, contingency arrangements, in place.
3. The Inspector should consider whether:

* The licensee has undertaken some form of vulnerability analysis of the resource profile.
* The vulnerability analysis has identified where the licensee is vulnerable to loss of role-holders with nuclear safety responsibilities, such as singletons.
* Appropriate contingency arrangements, including succession planning, have been put in place where vulnerabilities have been identified.
* A forward action programme exists where mitigating actions have been identified.

### Principle nine - The NB process

1. The licensee should be able clearly to demonstrate that it has arrangements in place to derive and maintain an organisation, staffing levels and competences which enable it to understand, deliver and oversee activities which have the potential to impact on nuclear safety. The arrangements should show:

* How the licensee determines the nuclear safety functions that it needs to discharge;
* How the licensee identifies the staffing levels and competencies required to deliver these nuclear safety functions
* That the licensee’s organisation, staffing levels and competencies are adequate to meet these needs. This should include sufficient resource to work safely and to deliver an appropriate work programme
* That the licensee maintains effective IC and supervisory capabilities to oversee the work of contractors
* That an appropriate vulnerability analysis is carried out which highlights where the licensee is vulnerable to loss of resource or capability.   
  For example, where it relies upon singleton expertise or a limited pool of in-house or contract resource.
* That succession plans are put in place where appropriate.

1. Where the NB addresses the above elements, it is likely to draw upon current processes within the wider business management system such as competence management, project management and resource planning.   
   The NB may therefore not exist as a single stand-alone document.
2. The NB is likely to include statements setting out the elements of the NB and showing how these elements are addressed. In this case, it should clearly describe how wider business processes are drawn upon to demonstrate how the expectations of the NB are being delivered.
3. The NB should draw together the findings of these processes in order that an overview of the licensee’s organisational adequacy can be established. This should include plans to address gaps and weaknesses where they are identified.
4. ONR expects that the licensee’s HR, project planning and other processes explicitly identify NB roles in order that they are clearly understood and that proposals to change them are flagged up for consideration as part of the licensee’s LC 36 arrangements.
5. ONR expects that the licensee will have in place corporate processes to make its senior management aware of the status of the NB in order that they are able to take steps to ensure that the organisation is suitably structured and resourced to deliver continued nuclear safety.
6. Where a licensee has projects and programmes (for example, new nuclear build, which require changing staffing levels, competencies and organisational structures), ONR recognises that a single, fixed, NB may not be suitable. In such circumstances, ONR would expect the licensee to acknowledge the need to link its work programme with its staffing levels and competence needs at each stage such that a valid NB is available to underpin its work at any time.
7. Prior to starting a new phase in the work programme, it may be appropriate to have ‘hold points’ to confirm that suitable and sufficient skills and competences are in place for the tasks ahead. This could be achieved through an overall NB assessment for all stages, linked to any project manpower plans, or through a series of phased NB’s reflecting changes to structures, resources and competencies managed through the licensee’s   
   LC 36 arrangements. This type of logic could be applied as part of the work approval arrangements to instances where there is a potential change in the NB organisation, resource or competence needs.
8. The Inspector should consider whether:

* The licensee has adequate arrangements for defining, producing and maintaining a NB
* The NB clearly describes the philosophy and methodology for how it is constructed and how assessments regarding the need for nuclear safety roles, and the adequacy of their delivery, are carried out.
* The licensee has a process for keeping the baseline up to date and undertaking periodic reviews.
* The NB provides a ‘route map’ to show those parts of the licensee’s management system which are referenced by the NB.
* The NB enables conclusions to be drawn from the referenced business processes regarding the condition and adequacy of the elements identified in this TAG.
* The licensee’s management system processes ensure that the its senior management are aware of the status of the NB in order that they can continue to ensure that the organisation is suitably structured and resourced to deliver continued nuclear safety.
* NB roles have been explicitly identified so that they are clearly understood, and that proposals to change NB roles are being considered under the licensee’s LC 36 arrangements.
* There is evidence that the NB has been integrated into the licensee’s management system.

### Principle ten – A ‘living baseline’

1. The NB should be updated as changes are made to the organisational structure, staffing levels and competence requirements using the licensee’s arrangements for management of change under LC 36. Where the licensee uses a database as part of its position management system, changes to the NB may be made concurrent with organisational changes such that the NB remains live. In other circumstances, the licensee should put in place a process to review periodically and consolidate changes to the NB   
   (for example, on an annual basis, and generally no less than that). Even if the company has seen few or no changes, the licensee should conduct an annual review to ensure that NB anomalies are identified and addressed.   
   In this way, the NB continues to reflect the state of the licensee’s organisation.
2. Licensees should ensure that their management systems ensure that the NB is referred to and if necessary reviewed when considering changes brought about by factors such as:

* Applications for a new licence or change in parent body organisation.
* Step changes in project requirements as projects move from one part of the programme to the next or change in lifecycle.
* Proposed staffing change, for example the use of contract support in Nuclear Baseline roles previously held by licensee employees.
* Changes in the scope of work.
* Changes in the competence of baseline post holders or training and competence needs of the role.
* Cumulative effects of low category changes.
* Non-NB post changes that have an impact on NB posts (for example, re-distribution of responsibilities and accountabilities that impact capacity to deliver nuclear implicated responsibilities and accountabilities).

1. It should be noted that replacing one post holder with another post holder who meets the competence criteria need not constitute a trigger for the application of LC 36 arrangements, and consequent NB review except in the case where the replacement is a contractor.
2. Direct like-for-like replacement should be addressed though the arrangements made under LC 12. Licensees can use their LC 36 arrangements as a flexible risk assessment tool for major staffing changes such as a change in parent body organisation, arising from a competition process.
3. Licensees should ensure that NB improvement actions are included in work plans to address gaps in capability and deliver the NB to meet future needs.
4. The Inspector should consider whether:

* The licensee has a process in place to assure the continued currency, and periodic review, of the NB.
* There is evidence that the NB is maintained and up to date reflecting the current organisation.
* There are triggers for NB review as part of the licensee’s management of change process.
* The licensee has arrangements to confirm that the NB needs are met prior to transitioning to a new stage in the operating lifecycle or starting a new phase of a major project with differing NB requirements.
* The NB provides an appropriate reference point for the licensee’s management of change arrangements made under LC 36.

# References

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# Glossary and abbreviations

DA Design Authority

DAP Duly Authorised Personnel

IAEA International Atomic Energy Agency

IC Intelligent Customer

NB Nuclear Baseline

NIA Nuclear Installations Act (1965)

SAP Safety Assessment Principle(s)

SMP Safety Management Prospectus

SQEP Suitably Qualified and Experienced Personnel

SSG Specific Safety Guide(s)

TAG Technical Assessment Guide(s)

WENRA Western European Nuclear Regulators’ Association