

COGNMAS5

Identify and incorporate nuclear material accountancy and safeguards requirements in designs



Overview

This NOS forms part of a suite of standards which cover the activities carried out by individuals working within and on behalf of nuclear site licensed companies to meet nuclear material accountancy, control and safeguard (**NMAS**) requirements.

What is the NOS about?

A nuclear licensed site must ensure that nuclear materials are accounted for, controlled and safeguarded in order to demonstrate; good governance arrangements; meeting international safeguards commitments; and compliance with legal requirements and any voluntary undertakings. This NOS describes the standard expected of individuals who are responsible for incorporating NMAS requirements in new plant, equipment and software design.

Who is the NOS for?

This NOS is primarily for Design Project Managers and the NMAS Manager who are responsible for incorporating NMAS requirements in the design of new or refurbished plant or equipment at a project, site or organisational level.

The main outcome of this activity is the incorporation of NMAS requirements in the design of a new or refurbished plant or equipment.

Where text is highlighted in bold, it is more fully defined in the Glossary section of this NOS.

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Performance criteria

You must be able to:

- P1 obtain sufficient information from all available sources and **Stakeholders** to enable **NMAS** assessment of design proposals for new or refurbished plant, equipment, IT systems or radiometric instruments
- P2 identify the **NMAS requirements** relevant to the design proposal
- P3 liaise with Safeguard Inspectorates to ensure that independent safeguard requirements are incorporated into the design provisions at an early stage, along with any equipment **branching** provisions
- P4 establish the need for and obtain suitable specialist support, commensurate with the volume and complexity of information, to ensure effective design assessment for compliance with NMAS requirements
- P5 assess the design proposal and associated instrumentation against the relevant NMAS requirements and identify any shortfalls
- P6 conduct an **NMAS risk assessment** of the design
- P7 benchmark against good practice and similar plant, systems or equipment
- P8 produce an impact assessment of the design under consideration and also for adjacent or interfacing plant, systems or equipment
- P9 establish if the proposed control measures are suitable and sufficient to meet NMAS requirements
- P10 provide clear feedback on the extent to which plans comply with NMAS requirements and implications of any non-compliance
- P11 develop options to counter any shortfalls in the design against NMAS requirements
- P12 document all important decisions and communications relating to the production of an overall assessment report
- P13 produce and communicate a report detailing technical and administrative options available to ensure that the design intent complies with NMAS requirements
- P14 continually assess the adequacy of NMAS measures, where further information becomes available
- P15 produce, communicate and handover to the commissioning teams **design intent documentation**

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Knowledge and understanding

You need to know and understand:

- K1 the NMAS regulatory and technical requirements.
- K2 organisational procedures relating to designs and option assessment for NMAS requirements, including production of technical reports and documenting of major decisions and communications with key Stakeholders.
- K3 sources of specialist support, good practice, advice and information and how to access these for the design proposal.
- K4 the requirement for the conduct of NMAS risk assessments.
- K5 the concept and application of '**Safeguards in depth**' and '**Safeguards by design**'.
- K6 **the international non proliferation regime.**
- K7 how to read and interpret technical drawings and plans.
- K8 application and assessment of designs and administrative measures to ensure compliance with NMAS requirements.
- K9 the likely and possible consequences of inappropriate design options.

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Additional Information

Glossary

Branching: an independent off-take from operating equipment used for regulatory verification.

Design Intent Documentation: includes

- 1 the project approved NMAS specification of design features and capabilities
- 2 the catalogue of design documents exchanged with the safeguards inspectorates
- 3 the approach agreed with the safeguards inspectorates detailing the independent equipment, installation requirements, data provision/access requirements, inventory requirements, and design verification requirements
- 4 the project commissioning and engineering plans with NMAS requirements integrated
- 5 the NMAS Commissioning specification
- 6 the initial measurement control programme and material balance capability expectations.

International Non Proliferation Regime: is a system of international controls to prevent the spread of nuclear weapons and includes export controls, physical protection and safeguards verification. It supports the nuclear Non Proliferation Treaty (NPT) to which the UK is a signatory.

NMAS: taken to include nuclear materials accountancy, nuclear materials control and nuclear material safeguards.

NMAS requirements: comprise mandatory requirements set down in binding legal contracts, set, set down in UK policy and commitments, and set down in national and international Treaties and Regulations (particularly the safeguards reporting regulations and associated implementation guidelines). They also include optional requirements to which the site voluntarily subscribes.

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NMAS risk Assessment: the analysis of the risk of diversion of nuclear material and involves postulating unauthorised removal scenarios and assessing the controls required to mitigate the risk. It also includes assessing the risk of various material forms and flows and measurement limitations to the overall capability and quality of the NMAS system.

Measurement Control Programme: a system to ensure the effectiveness of measurement and analytical systems and the quality and validity of resulting data that is generated for nuclear material accountancy and safeguards purposes. Quality controls include performance monitoring, testing and analysis, calibration and certification, control of certified reference materials and sources.

Safeguards by design: an approach to the design and construction of nuclear plant or equipment in which nuclear safeguards provisions and features are designed into the plant, system or equipment from the very beginning of the design process.

Safeguards in Depth: a range or hierarchy of techniques deployed to ensure multiple systems of detection and prevention and avoid over reliance on a single NMAS component. Safeguards in depth are needed to provide an assurance of non-diversion in circumstances where plant throughput and measurement complexity mean that nuclear material accountancy may not achieve International Target Values.

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Stakeholders: include:

- 1 contacts within the site, the organisation, the parent company, the site owner.
- 2 customers and contractors
- 3 public groups,
- 4 national bodies with responsibilities for NMAS including the Department for Energy and Climate Change (DECC), the Office for Nuclear Regulation (ONR) Safeguards function and the Ministry of Defence.
- 5 regulators including:
 - 5.1 the ONR Safety function, the ONR Security function, and the ONR Transport function (Radioactive Materials).
 - 5.2 environmental (EA, SEPA)
 - 5.3 the International Safeguard Inspectorates (the European Commission's Euratom Safeguards Inspectorate and the International Atomic Energy Agency Safeguards Inspectorate)

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