



ONR GUIDE			
<b>(DRAFT) Assessment of Basic Technical Characteristics</b>			
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## 1. INTRODUCTION

1.1 The Office for Nuclear Regulation (ONR) is the independent regulator of nuclear safety, civil nuclear security, transport, conventional health and safety, and nuclear safeguards across the United Kingdom. Guidance in the form of Technical Assessment Guides (TAGs) has been derived from ONR's role as the regulator to guide regulatory judgements and recommendations when undertaking assessments of operator submissions on Nuclear Material Accountancy and Control and Safeguards (NMAC&S) such as Basic Technical Characteristics (BTC) and Nuclear Material Accountancy and Control Plans (ACPs). Underpinning the requirement for these submissions, and ONR's role in their regulation, are the legal duties placed on organisations subject to the Nuclear Safeguards (EU Exit) Regulations 2019 (hereafter referred to as "The Regulations").

## 2. PURPOSE AND SCOPE

2.1 This TAG contains guidance to advise and inform ONR staff in the exercise of its regulatory judgment during assessment activities relating to an operator's declared BTC. It provides advice and guidance to ONR inspectors on assessing a submitted BTC's compliance with ONR's regulatory requirements, as set out in The Regulations.

2.2 This guide sets out the scope and purpose of activities to be performed by ONR inspectors during assessment of BTC, provides a framework for these assessment activities, and the expectations against which the inspector should exercise discretion, in proportionate application of this guidance in relation to the particular circumstances of the facility and/or Material Balance Area (MBA) under inspection. This framework is provided to facilitate a consistent approach to assessment of BTCs submitted under The Regulations.

2.3 This guidance does not prescribe methodologies for operators to follow in delivering the contents of a BTC or on how to address ONR's regulatory expectations. It is the operator's responsibility to determine and describe this detail and for ONR to assess whether BTCs are adequate and whether they demonstrate good practice.

## 3. RELATIONSHIP TO RELEVANT LEGISLATION

3.1 The term 'operator' is used throughout this guide as defined in The Regulations as "a person or undertaking setting up, operating, closing down or decommissioning a qualifying nuclear facility for the production, processing, storage, handling, disposal or other use of qualifying nuclear material".

3.2 The Regulations require the operator to produce a BTC document for each qualifying nuclear facility using the relevant questionnaire in Part 1 of schedule 1 of the Regulations:

3 (1) *In the case of a qualifying nuclear facility existing immediately before commencement day the operator must declare to the ONR the basic technical characteristics of the qualifying nuclear facility, using the relevant questionnaire shown in Part 1 of Schedule 1, before the end of the period of 30 days beginning with commencement day.*

3 (2) *In the case of a new qualifying nuclear facility, which comes into existence on or after commencement day, the operator must declare to the ONR—*

*(a) the preliminary basic technical characteristics of the facility as soon as the decision to construct or authorise construction has been taken;*

*(b) the basic technical characteristics of the facility, based on the final design for the qualifying nuclear facility, using the relevant questionnaire shown in Part 1 of Schedule 1, not later than 200 days prior to and ending on the day on which construction is started;*

and

*(c) the basic technical characteristics of the facility as built, using the relevant questionnaire shown in Part 1 of Schedule 1, not later than 200 days before the day on which—*

*(i) qualifying nuclear material is first received at the facility;*

*(ii) in the case of a qualifying nuclear facility, which only treats or stores conditioned or retained waste, the treatment or storage begins; and*

*(iii) in the case of a qualifying nuclear facility, whose principal activity is the extraction of ores in the United Kingdom, the operations start.*

3 (3) *An operator must inform the ONR of a change in the basic technical characteristics within the period of 30 days beginning with the day on which the change is completed unless advance notification to the ONR of such a change is required by any particular safeguard provisions imposed on the operator by regulation 5.*

3 (4) *The reference in paragraph (3) to a change in the basic technical characteristics of a qualifying nuclear facility includes a change in respect of a qualifying nuclear facility which is in the process of being closed down or decommissioned until such time as the ONR has confirmed in writing to the operator that the qualifying nuclear facility has been fully decommissioned.*

3 (5) *On a written request by the ONR, an operator must supply further details, explanations, amplifications or clarifications of any information set out in the relevant questionnaire within the period of 15 days beginning with the day on which the operator receives the request from the ONR.*

3.3 Regulation 5 (1) states that:

*“Acting on the basic technical characteristics, submitted by an operator under regulations 3 or 31, and having, where necessary, discussed the relevant technical characteristics with the operator, the ONR may impose particular safeguard provisions on an operator in respect of a qualifying nuclear facility, which—*

*(a) relate to the matters set out in paragraph (4); and*

*(b) take account of any relevant operational and technical constraints on the operator and the qualifying nuclear facility.”*

3.4 Schedule 4 (1) of The Nuclear Safeguards (EU Exit) Regulations 2019 states that:

*“An operator of a qualifying nuclear facility, which exists on commencement day, may satisfy the requirement of regulation 3(1) (to provide the ONR with a declaration of basic technical characteristics) by providing to the ONR, within the period of thirty days beginning on commencement day written confirmation that the information concerning basic technical characteristics which was provided by the operator to the Commission under Article 3 of Commission Regulation (EURATOM) 302/2005 is still correct on commencement day.”*

- 3.5 Basic Technical Characteristics (BTC) is a safeguards term (ONR Basic Safeguards Glossary, <http://www.onr.org.uk/safeguards/glossary.htm>) used to describe safeguards-relevant design information on nuclear installations. The BTCs include a description of the installation, the form, quantity, location and flow of nuclear material being used, the layout of the installation, containment features and procedures for Nuclear Material Accountancy, Control & Safeguards (NMAC&S). The information is used, by ONR and the International Atomic Energy Agency (IAEA) (for MBAs which they select from the designated facilities list), to develop and prepare the safeguards approach for the installation.
- 3.6 Under The Agreement Between The United Kingdom Of Great Britain And Northern Ireland And The International Atomic Energy Agency For The Application Of Safeguards In The United Kingdom Of Great Britain And Northern Ireland In Connection With The Treaty On The Non-Proliferation Of Nuclear Weapons, ONR must provide the IAEA with preliminary design information in the form of the relevant BTC on any new nuclear facility as soon as the decision is taken to construct or to authorise construction of, any nuclear facility; as well as developed and updated forms of this design information in line with the timeliness requirements agreed under Regulation 42(1) of The Regulations.<sup>1</sup>
- 3.7 ONR must also provide, on iterative basis, further information on the features of the facility design relevant to NMAC&S early in the stages of the project definition, preliminary design, construction and commissioning (Regulation 42 of The Regulations, and Code 3 of the Subsidiary Arrangements).

#### **4. RELATIONSHIP TO ONR GUIDANCE FOR THE ASSESSMENT OF NUCLEAR MATERIAL ACCOUNTANCY CONTROL & SAFEGUARDS, AND OTHER RELEVANT DOCUMENTATION**

- 4.1 The ONR Guidance for the Assessment of Nuclear Material Accountancy Control & Safeguards (ONMACS) are a set of guidance and assessment expectations pertaining to operators' NMAC&S, and provide the essential foundation for outcome focussed regulation of Nuclear Material Accountancy, Control & Safeguards (NMAC&S). This philosophy of outcome-focussed regulation is aligned with the regulatory framework for NMAC&S and provides operators with a coherent regulatory approach applied by the ONR across the UK civil nuclear industry. ONMACS is guidance for inspectors, not a national policy document, though it does provide ONR with a framework for making consistent regulatory judgments on the adequacy of operators' NMAC&S arrangements.
- 4.2 Sections of ONMACS will be of relevance to ONR inspectors when assessing an operator's BTC submission, specifically NMACE 7.2 – Identification of Nuclear Material, in support of FSSACE 7 – Nuclear Material Tracking.

Fundamental Expectation for Nuclear Material Accountancy and Control	Organisational Culture	FSSACE 2
Operators must encourage and embed an organisational culture that recognises and promotes the importance of Nuclear Material Accountancy, Control and Safeguards.		

<sup>1</sup> Under the Transitional Arrangements detailed in Schedule 8 of The Regulations, BTC can be submitted to the Agency in lieu of the Design Information Questionnaire (DIQ)

While both nuclear safety and nuclear security consider the risk of inadvertent human error, NMAC&S culture requires attitudes and behaviours, such as multidisciplinary collaboration between NMAC&S specialists, analytical specialists and operational personnel, correctness and completeness of data and leadership and management for NMAC&S. Accordingly, assurance of good safety and security culture cannot be considered to provide assurance of good NMAC&S culture, and vice versa.

<b>FSSACE 7 Nuclear Material Tracking</b>	<b>Identification of Nuclear Material</b>	<b>NMACE 7.2</b>
Operators should ensure that procedures are in place to enable the unique identification of all nuclear material within the facility.		
<b>Fundamental Expectation for Nuclear Material Accountancy and Control</b>	<b>Measurement Programme and Control</b>	<b>FSSACE 6</b>
Where measurements are performed, operators must implement and maintain robust arrangements to ensure the appropriate performance of measurement systems that provide data for the purposes of nuclear material accountancy and control.		
<b>Fundamental Expectation for Nuclear Material Accountancy and Control</b>	<b>Reliability, Resilience and Sustainability</b>	<b>FSSACE 5</b>
Operators must design and support their nuclear material accountancy and control regime to ensure it is reliable, resilient and sustained throughout the entire lifecycle of the facility.		
<b>Fundamental Expectation for Nuclear Material Accountancy and Control</b>	<b>Nuclear Material Tracking</b>	<b>FSSACE 7</b>
Operators must implement and maintain a nuclear material accountancy and control system that is able to provide identification, quantity, characteristics and track any nuclear material in their facilities at any time.		

## 5. ADVICE TO INSPECTORS

- 5.1 The assessment of BTC involves activities carried out by ONR to determine that the operator has provided all relevant descriptive and technical information required by The Regulations and that this information is kept up to date and supplied to the ONR at the intervals required by the regulations. Inspectors may wish to utilise the document review dates, as well as intelligence from other ONR specialisms concerning the relevant facility in judging whether this information is up to date.

- 5.2 Inspectors should also consider other relevant documents such as the Facility Attachment (FA), previous Euratom Particular Safeguards Provisions (PSPs) and Nuclear Co-operation Agreements (NCAs) in their assessment of BTC submissions, as there may be additional regulatory requirements attached to the aforementioned documents.
- 5.3 BTC assessment includes a review of the content and adequacy of design and operating information contained in the BTC and other NMAC&S information available to ONR. It is considered good practice to request relevant accompanying information to the BTC (e.g. facility blueprints or engineering drawings). If such requests are made, the information should be supplied in line with the timing requirements of regulation 3 (5) of The Regulations.
- 5.4 A “desk-based” familiarisation with key processes at a particular facility utilising available information, during assessment and prior to inspection, might aid inspectors in forming the respective outputs of both activities. Such familiarisation topics might include:
- key process technology involving nuclear material;
  - Nuclear Material flow routes and storage locations.
- 5.5 Assessment of the information included in a BTC should support the development of preparations for BTC inspection activities (where confirmation of the information within the BTC takes place), as well as the wider safeguards approach.
- 5.6 When utilising design information and accompanying information (e.g. blueprints or engineering drawings) in order to aid in establishing the ONR assurance approach at a particular facility, inspectors should utilise an integrated approach that draws on the knowledge and expertise from ONR’s other regulatory activities/purposes through means such as appropriate consultation with staff from these areas, in order to better understand the available material.
- 5.7 Inspectors should, as part of the BTC assessment, consider whether an ONR PSP needs to be created for the facility.
- 5.8 During their assessment of the BTC, ONR inspectors may wish to review the list of ‘Essential Equipment’ compiled by the IAEA . Essential Equipment<sup>2</sup> is an IAEA term that refers to important items of equipment, systems and structures necessary for the declared operation of a facility (refer to the Department for Trade and Industry’s document - Definition of Essential Equipment for Facility Operation - An Operator’s Perspective). This part of BTC assessment should be used to help inform ONR’s approach to regulating compliance with the Regulations, including confirming the decommissioned status of a facility

### **BTC Assessment**

The breadth and depth of BTC assessment shall be established by the inspector at the start of their assessment. The following factors may be taken into account:

- the level of confidence ONR has in the operator’s NMAC&S system;
- the quality and completeness of the information presented;
- the type of qualifying nuclear facility and its operational status;
- the category, quantity, and use of Qualifying Nuclear Material (QNM);

<sup>2</sup> The EEL may be used by an inspector during any BTC inspection when confirming the information in a BTC, and during inspection to confirm the decommissioned status of a facility for safeguards purposes.

- the degree of change since the previous assessment; and
- recent events, incidents or operating experience, safeguards-specific and otherwise at the qualifying nuclear facility, or similar facilities.

5.9 BTC submissions should be proportionate and appropriate for the facility. As mentioned in Section 3.5 of this TAG, ONR must provide the IAEA with preliminary design information in the form of the relevant BTC under Code 3 of the Subsidiary Arrangements for those qualifying nuclear facilities which are subject to the UK/IAEA Voluntary Offer Agreement. This design information is used by the IAEA to aid in establishing the safeguards approach as well as in all inspections they undertake, and as such, inspectors need to establish whether the BTC is fit for purpose in their assessment.

### Regulatory Requirements

- 5.10 The inspector should ensure the correct questionnaire from Schedule 1 of the regulations has been utilised, as described in Regulation 3(1)
- 5.11 Any BTC submissions or changes to BTC that have been made should be in line with the timeliness requirements of regulation (3) of The Nuclear Safeguards (EU Exit) Regulations 2019, as well as those of any Facility Attachment, PSPs, or relevant international agreements.
- 5.12 Amendments of a BTC that relate to the Accountancy and Control Plan (ACP) should be captured in the subsequent amendment of the ACP; inspectors may wish to assess whether this has occurred, and whether the operator has complied with the requirements of Regulation (8).
- 5.13 Assessing whether the declared timings for the operator's physical inventory taking (PIT) for ONR accounting purposes are in line with Regulation 15 (3) of the Nuclear Safeguards (EU Exit) Regulations 2019.
- 5.14 The inspector should determine whether any further details, explanations, amplifications or clarifications of any information are required from what is declared in the Schedule 1 questionnaire.
- 5.15 During the BTC assessment the inspector should determine whether all of the requirements within a PSP and / or FA have been complied with (as identified in section 5.2 of this document.)

### Good Practice

- 5.16 The BTC should be intelligible and structured logically (including in terms of the questionnaire in Schedule 1 of the Regulations) to meet the needs of those who will use it (e.g. operators, maintenance staff, technical staff, and managers accountable for safeguards).
- 5.17 All terms and descriptions used in the BTC should be understandable to the key users, utilising standard safeguards terminology throughout the document, and where it is present, clarifying/explaining novel terminology.
- 5.18 The BTC should be clearly owned by both those who are accountable for compliance with The Regulations and those who rely on the BTC for accurate and objective information on accountancy and control measures to make informed decisions.
- 5.19 The information within the BTC should be complete.

- 5.20 There should be a sufficient description of the facility, its purpose, current lifecycle stage/status, any Qualifying Nuclear Material (QNM), and its operation. Inspectors should note that the facility type will affect exactly what details will be included in the BTC, as evident in the questionnaire in Schedule 1.
- 5.21 All references and supporting information should be identified, along with the method for access to them.
- 5.22 The BTC should accurately represent the current status and design of the facility in all physical, operational and managerial aspects.
- 5.23 The BTC should reflect changes that have arisen from previous modifications, revised operating methods, operating experience and for new facilities or modifications, it should accurately represent the design intent i.e. characteristics such as the declared quantity and form of material, type and size of facility safeguards equipment currently installed at the facility, etc. should reflect an accurate representation of the type of facility, its designed function and its current lifecycle phase within that function.
- 5.24 The BTC should identify the features of facilities and QNM that are relevant to the application of NMAC&S, in sufficient detail to facilitate ONR assurance activity.
- 5.25 The BTC should document the expected nuclear material routes and their locations within the facility, the accountancy points at which transfer of nuclear material custody occurs, and methods for determining the quantity of nuclear material transferred. Where possible relevant evidence (i.e. documented, measurable, etc.) for the definition of these methods should be identified.

FSSACE 7 Nuclear Material Tracking	Identification of Nuclear Material	NMACE 7.2
Operators should ensure that procedures are in place to enable the unique identification of all nuclear material within the facility.		

- 5.26 *NMACE 7.2 – Identification of Nuclear Material (ONMACS)* advises that the locations in which nuclear material can be held should be defined and identified in the NMAC&S documentation.
- 5.27 The BTC should define and identify all locations where nuclear material can be held and declare those that will be the basis for recording the location and transfers of material.
- 5.28 The BTC should enable the inspector to assess the accountancy arrangements established by the operator to be used for operator and ONR accounting purposes, and assess which of the QNM flow and inventory measurement points should be identified as Key Measurement Points (KMPs), and whether these provide adequate coverage. In assessing such accountancy arrangements, ONR inspectors may among other things:
- Assess that the declared extent of the installation allows for adequately accurate and precise accountancy and control of QNM (IAEA International Target Values 2010 for Measurement Uncertainties in Safeguarding Nuclear Materials)
  - Assess that any declared use of operator safeguards equipment & measures to help ensure the completeness of flow measurements (and thereby simplify the application of NMAC&S measures) are appropriate for the MBA.

### **Re-Assessment of BTC**

5.29 BTCs should be re-assessed throughout the lifetime of a facility (according to the lifecycle phases defined in ONMACS) in order to maintain a valid ONR assurance approach. The frequency of this re-assessment should factor in variables including:

- sensitivity and quantity of Nuclear Material;
- strategic importance and configuration of the facility;
- the Quality of the operator's NMAC&S system;
- the operator's Programme of Activities;
- NMAC&S regulatory performance.

5.30 In doing so ONR inspectors must consider the following in their assessment:

- confirm that information provided by the operator is complete, and consistent with the design of the facility "as-built" or as modified, based on regulatory intelligence and previous inspections. Inspectors should address any discrepancies between the declared information and the current "as-built" knowledge at the next BTC Inspection;
- assess whether the information provided by the operator is consistent with the information from ONR's other regulatory activities in respect of the QNF concerned. Inspectors may also consider whether addition to, or clarification of the design information provided by the operator is required for the purposes of their assessment;
- assess whether the NMAC&S approach and ONR assurance methods for the facility continue to be valid.

5.32 As part of the outcomes of BTC re-assessment, ONR inspectors may:

- consider whether a PSP is required under Regulation (5), and whether any such PSP made under Regulation (5) for the particular facility requires amendment or update;
- identify whether new operator methods for NMAC&S assurance (e.g. including arrangements for material containment, sealing and/or surveillance) are required;
- identify whether the list of essential equipment for safeguards purposes needs to be reviewed or updated.

## 6. REFERENCES

THE NUCLEAR SAFEGUARDS (EU EXIT) REGULATIONS 2019 -  
<http://www.legislation.gov.uk/uksi/2019/196/contents/made>

ONR GUIDANCE OF NUCLEAR MATERIAL ACCOUNTANCY, CONTROL & SAFEGUARDS  
(ONMACS) – **CM9 REF. 127276**

Subsidiary Arrangements Made under the UK-IAEA Voluntary Offer Agreement – **CM9 Ref.  
66072**

ONR Guidance for the Assessment of Accountancy and Control Plans (ACP) – **CM9 Ref.  
2019/47012**

Department of Trade and Industry - Definition of Essential Equipment for Facility Operation -  
An Operator's Perspective

IAEA International Target Values 2010 for Measurement Uncertainties in Safeguarding  
Nuclear Materials

## 7. GLOSSARY AND ABBREVIATIONS (EXAMPLE LIST)

BTC	Basic Technical Characteristics
CNSS	Civil Nuclear Security & Safeguards (Office for Nuclear Regulation)
IAEA	International Atomic Energy Agency
NMAC	Nuclear Material Accountancy & Control
ONMACS	ONR Guidance on Nuclear Material Accountancy, Control & Safeguards
PSP	Particular Safeguards Provisions
QNM	Qualifying Nuclear Material
TIG	Technical Inspection Guide(s)
TAG	Technical Assessment Guide(s)

## 8. APPENDICES

*Where Required – This section should include any appendices.*

### APPENDIX 1: EXAMPLE APPENDIX 1

A1.1.

A1.2.

A1.3. etc.

## APPENDIX 2: EXAMPLE APPENDIX 2