



ONR GUIDE			
THE NUCLEAR SAFEGUARDS (EU EXIT) REGULATIONS 2019			
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1. INTRODUCTION

1.1 The Nuclear Safeguards (EU Exit) Regulations 2019 ('The Regulations') require operators to make arrangements to comply with obligations under the Regulations. ONR inspects compliance with the Regulations, and also with the arrangements made under them, to judge the suitability of the arrangements made and the adequacy of their implementation. Parts of the Regulations are prescriptive, however there are elements which are goal-setting and do not prescribe in detail what the operator's arrangements should contain, this is the responsibility of the operator. To support inspectors undertaking compliance inspection, ONR produces a suite of guides to assist inspectors to make regulatory judgements and decisions in relation to the adequacy of compliance on the site. This inspection guide is one of the suite of documents provided by ONR for this purpose.

2. PURPOSE AND SCOPE

2.1 This guide has been prepared as an aid to inspection activities at operator's sites. It is to be used by ONR predominantly in judging the operator's compliance with the requirements of the Nuclear Safeguards (EU Exit) Regulations 2019. This guidance provides a framework for these inspection activities, within which the inspector is expected to exercise their discretion. This framework is provided to facilitate a consistent approach to compliance inspection of the Nuclear Safeguards (EU Exit) Regulations 2019.

2.2 This guide also contains additional advice on the activities surrounding, and opportunities presented by, the facilitation of verification by the International Atomic Energy Agency (IAEA) as the global safeguards inspectorate.

2.3 Note that the requirements of the Nuclear Safeguards (EU Exit) Regulations 2019 relate only to those activities undertaken for civil purposes. Activities for defence purposes are excluded from the UK nuclear safeguards regime.

2.4 Safeguards inspections undertaken by ONR will fall into at least one of four key categories:

1. Accountancy based inspections for assessing and inspecting operator declarations and resolving anomalies, e.g. during PIT activities
2. Safeguards systems based inspections of an operator's arrangements for compliance with the Nuclear Safeguards (EU Exit) Regulations 2019, e.g. accountancy and control plan inspections;
3. Integrated inspections in conjunction with ONR's other regulatory regimes, e.g. inspections alongside nuclear safety or security inspectors and;
4. ONR inspection and assessment activities alongside the facilitation of verification by the IAEA as the global safeguards inspectorate

2.5 The guidance is for use by all inspectors in ONR undertaking nuclear safeguards inspections. The guidance does not indicate when or to what extent inspections of the requirements of the Nuclear Safeguards (EU Exit) Regulations 2019 should be carried out as these matters are covered in individual inspector's inspection plans the scope and content of which are determined using the Inspection planning guidance "ONR Nuclear Material Accountancy, Control and Safeguards Inspection Principles"(CM9-2019/53481).

2.6 The guidance provided is split into three main elements:

1. Section 4 - Purpose of the Nuclear Safeguards (EU Exit) Regulations 2019;
2. Section 5 - A summary of the regulations and the requirements they place on operators and;
3. Section 6 - Guidance on inspection of arrangements for the Nuclear Safeguards (EU Exit) Regulations 2019 and their implementation.

2.7 It is not anticipated that all the topics recommended for consideration by the site nuclear safeguards inspector will be covered in a single inspection. Some aspects (e.g. operator declarations or documentary information) need not necessarily be inspected on site.

2.8 Where relevant, ONR inspectors should note that aspects of the Nuclear Safeguards (EU Exit) Regulations 2019 compliance can also be delivered in planned compliance inspections within other ONR regulatory regimes, for instance nuclear safety licence condition (LC) inspections (e.g. LC 4 – Restrictions on nuclear matter on site) or security arrangements inspections (e.g. those concerned with preventing theft).

3. THE NUCLEAR SAFEGUARDS (EU EXIT) REGULATIONS 2019

3.1 The Nuclear Safeguards (EU Exit) Regulations 2019 can be found on legislation.gov.uk. Additional guidance on nuclear safeguards in the UK can be found in the following ONR documents available at: <http://www.onr.org.uk/safeguards/draft-guidance-for-inspectors-and-nuclear-material-accountants.html>

3.2 Guidance produced by Euratom which still has relevance for sections of the Nuclear Safeguards (EU Exit) Regulations 2019 which mirror Commission Regulation (Euratom) 302/2005 should also be consulted, such as Commission Recommendations 2006/40 and 2009/120. Hereafter referred to as 302/2005.

3.3 ONR inspection guidance for all disciplines on how to plan, prepare, deliver, and write-up an inspection should be used in conjunction with this guidance document. The reference for this document is: General Inspection Guide – ONR-INSP-GD-064, current version.

4. PURPOSE OF THE NUCLEAR SAFEGUARDS (EU EXIT) REGULATIONS 2019

4.1 Simplistically, the Nuclear Safeguards (EU Exit) Regulations 2019 require the operator to have arrangements in place and to provide information on its qualifying nuclear material to ONR.

4.2 In turn, ONR will then transmit this information to the IAEA and others, as appropriate, in fulfilment of the obligations of the United Kingdom under the agreement between the United Kingdom and the IAEA dated 7th June 2018 and other relevant international agreements as set down in the Nuclear Safeguards (Fissionable Material and Relevant International Agreements) (EU Exit) Regulations 2019.

4.3 Currently, 302/2005 sets out nuclear safeguards reporting requirements for civil activities with which the operators of nuclear installations are required to comply. This is supplemented by Commission Recommendations 2006/40 and 2009/120, on the implementation of a nuclear material accountancy and control system by the operators of nuclear installations. The Nuclear Safeguards (EU Exit) Regulations 2019 replace the EU Regulation and Recommendation on commencement day.

4.4 How the operator complies with its requirements under the new UK regulations is predominantly for it to determine. However, ONR must judge the adequacy of this compliance and ultimately provide assurance that all operators comply. ONR carries out this function through both assessment and inspection.

5. A SUMMARY OF THE NUCLEAR SAFEGUARDS (EU EXIT) REGULATIONS 2019 REGULATIONS AND THE REQUIREMENTS THEY PLACE ON OPERATORS

5.1 The operator is required to have arrangements in place to demonstrate compliance with the Nuclear Safeguards (EU Exit) Regulations 2019. The requirement for arrangements and procedures is explicitly detailed in Regulation 7 (4) concerning accountancy and control plans which do not come into force until January 2021. However, there is a requirement for operators to produce basic technical characteristics (BTCs) using the relevant questionnaire shown in Part 1 of Schedule 1 of the Regulations. Within these BTCs, the questionnaire requires the operator to state specific arrangements and procedures for elements of their nuclear material

accountancy, control and safeguards (NMACS) system. So until accountancy and control plans come into force in January 2021, ONR safeguards inspectors will consider the arrangements and procedures specified in the BTCs for the material balance area of interest when undertaking inspection. Once ACPs come into force, the operator will need to provide a much more comprehensive description of all aspects of arrangements for NMACS.

- 5.2 The following list considers aspects of those requirements and what good practice from the operator is, at the general level, and what would be expected to be demonstrated during any inspection. The list is neither exclusive nor exhaustive and will be subject to review and revision in the light of operational experience.
- 5.3 Whilst it is for the operator to define the format and way they comply with the Nuclear Safeguards (EU Exit) Regulations 2019, evidence of good practice would include the following:
- Adequate arrangements and procedures are in place to demonstrate compliance with the Nuclear Safeguards (EU Exit) Regulations 2019, in that:
 - They are readily available and accessible, up-to-date, be owned, authorised appropriately and controlled under the operator's management system;
 - They use clear and consistent terminology and define important terms used;
 - The arrangements are implemented on site;
 - The procedures documentation layout is consistent;
 - The procedures are valid, up-to-date and have appropriate change control;
 - There are identified responsible persons, and;
 - These procedures are being followed, including instructions, methods and quality assurance requirements.
 - In circumstances where individual sites have generic arrangements produced by the company as corporate documents, the individual site can justify either the use of or any deviation from, the corporate documents.
 - Similarly, where an operator has differing methods of compliance which do not align with the expectations above they should be able to justify their use.
- 5.4 Brief guidance is given below for the requirements on operators in each part of the Nuclear Safeguards (EU Exit) Regulations 2019 and, thus, the features the inspector should target for understanding and compliance during inspections.

Part 1 (Introduction - Regulations 1 and 2)

- 5.5 This defines the terms used in the Regulations. For the purposes of the regulations, a qualifying nuclear facility means a facility (including associated buildings) in which qualifying nuclear material is produced, processed, used, handled, stored or disposed of.
- 5.6 Qualifying nuclear material means:
1. Fissionable material specified in regulations under subsection (7) of the Nuclear Safeguards Act 2018;
 2. Source material in the form of:
 - 1) Uranium metal, alloy or compound;
 - 2) Thorium metal, alloy or compound, or;

3. Ore containing a substance from which a source material falling within paragraph 2. is capable of being derived.

Part 2 (Accountancy and control, records and the provision of information by an operator - Regulations 3 - 20)

5.7 The Regulations:

1. Require the operator to declare BTCs for a qualifying nuclear facility, including for those facilities in existence prior to the commencement of the regulations, using the relevant questionnaire shown in Part 1 of Schedule 1 of The Regulations (Regulation 3);
2. Require the operator to send an outline programme of activities of a qualifying nuclear facility to ONR using the information described in Part 8 of Schedule 1 of The Regulations. This must be completed annually and be received by ONR by 30th September of each year (Regulation 4);
3. Allow ONR to impose particular safeguard provisions on an operator in respect of a qualifying nuclear facility. Should particular safeguard provisions be imposed on an operator, the operator must comply with the requirements of the provisions (Regulation 5);
4. Require an operator of a qualifying nuclear facility to maintain a system of accountancy and control of the relevant qualifying nuclear material in each qualifying nuclear facility (Regulation 6);
5. Require an operator of a qualifying nuclear facility to produce, implement and comply with an ACP which sets out the accountancy and control system for the qualifying nuclear material in that facility.
An operator must, unless informed in writing by ONR that that matter is, in the ONR's opinion, unlikely to be prejudicial to the maintenance of the system of safeguards (Regulation 9(2)), implement and comply with the arrangements and procedures described in the ACP.
ACPs will not be inspected until they come into force on 1st January 2021 (Regulations 7 - 9).
They may, in rare circumstances, be approved by ONR, whereupon any changes to that ACP must thereafter be approved;
6. An operator must ensure that the operating records and accounting records for each material balance area satisfy the requirements detailed in Regulations 10 and 11;
7. Regulations 11 – 19 set out the reporting requirements, including the format and timescales, placed upon the operator. These reporting requirements should be captured in the operator's arrangements.

Part 3 (Exports and imports - Regulations 21 - 24)

- 5.8 In certain circumstances, the regulations require the operator to give advance notification to the ONR if any qualifying nuclear material is exported from or imported into the UK (Regulations 21 and 22).

- 5.9 Should there be loss or delay during transfer, then the operator must send a special report to the ONR (as specified in Regulation 16) as soon as the operator becomes aware (Regulation 23).
- 5.10 Should there be any changes in the dates for packing before transfer, transport or unpacking of qualifying nuclear material, which has been given in the notifications under Regulations 21 and 22, then the operator must inform ONR of this (Regulation 24).

Part 4 (Carriers and temporary storage agents - Regulations 25 and 26)

- 5.11 The Regulations require that any person or undertaking engaged, in the UK, in transporting, or temporarily storing during transport, qualifying nuclear material must accept or hand over such material only against a duly signed and dated receipt (Regulation 25).
- 5.12 Regulation 26 covers intermediaries taking part in the conclusion of any contract for the supply of qualifying nuclear material. These intermediaries must keep all records relating to the transactions performed by them, or on their behalf, for at least 5 years beginning on the day the contract is concluded.
- 5.13 Regulations 25 and 26 are derived from Articles 26-28 of Euratom Regulation 302/2005, for which there is no history of application in the UK.

Part 5 (Ores - Regulations 27 and 28)

- 5.14 The Regulations:
 - 1. State that the requirements set out in Regulations 4 and 10 – 15 do not apply to an operator of a qualifying nuclear facility whose principal activity is the extraction of ores in the UK. Instead, the operator must follow the requirements set out in Regulation 27;
 - 2. State that the requirements in Regulations 21 – 24 do not apply to an operator of a qualifying nuclear facility whose principal activity is the extraction of ores in the UK. Instead, the operator must follow the requirements set out in Regulation 28.
- 5.15 Regulations 27 and 28 are derived from Articles 24-25 of Euratom Regulation 302/2005, for which there is no history of application in the UK.

Part 6 (Qualifying nuclear material in the form of conditioned and retained waste - Regulations 29 and 30)

- 5.16 The Regulations:
 - 1. State that Regulations 10 to 15 do not apply to an operator of a qualifying nuclear facility in respect of retained or conditioned waste that is stored or treated at the qualifying nuclear facility. Instead, the operator is to keep accounting records for the conditioned and retained waste which satisfy the requirements of Regulation 29.
 - 2. Set out the reporting requirements placed on the operator when transferring conditioned waste. The requirements on the operator are outlined in Regulation 30.

Part 7 (Qualifying nuclear facility with limited operation and exemption - Regulations 31 and 32)

- 5.17 A qualifying nuclear facility with limited operation is defined as:

1. A qualifying nuclear facility in which less than one effective kilogram of qualifying nuclear materials is produced, processed, stored, handled, disposed of or otherwise used; and
 2. Is not a reactor, a critical facility, a conversion plant, a fabrication plant, a reprocessing plant, an isotope separation plant nor a separate storage installation.
- 5.18 If an operator of a qualifying nuclear facility believes that the facility satisfies the definition of a qualifying nuclear facility with limited operation they can apply to the ONR to be allowed to deliver a reduced reporting regime. If the ONR grants the request/approves the application, then, in this instance, it is unnecessary for the operator to comply with all the requirements in the Nuclear Safeguards (EU Exit) Regulations 2019 and, instead, the operator shall comply with the requirements of Regulation 31.
- 5.19 ONR may impose additional requirements concerning the form and frequency of reports under Regulation 31. The operator should supply evidence to show compliance with any additional requirements imposed upon it by ONR. The requirements for this will be set down in more detailed guidance for Small Holders of Nuclear Material (SHNM).
- 5.20 Regulation 32 sets out two exemptions:
1. The Regulations do not apply to a person who holds only end products which are used for non-nuclear purposes and which incorporate qualifying nuclear material which is in practice irrecoverable;
 2. The Regulations do not apply to a relevant educational institution which holds an amount equal to 0.01 effective kilograms or less of uranium or thorium where, in the case of uranium, the isotopes 235 and 233 comprise 1% or less of the total mass of uranium.

Part 8 (Civil activities - Regulations 33 and 34)

- 5.21 The Regulations impose duties on the operator if the operator wishes to remove qualifying nuclear material from civil activities. Before qualifying nuclear material can be removed from civil activities, written consent from ONR must have been received. The operator must use the form set out in Part 12 of Schedule 1 to provide advanced notification to ONR of the proposed withdrawal. This application must be received by ONR at least 14 days before the day on which the qualifying nuclear material is to be withdrawn (Regulation 33).
- 5.22 Regulation 34 clarifies the scope of the Nuclear Safeguards (EU Exit) Regulations 2019 for qualifying nuclear facilities which are partly used for civil activities. The Regulations apply to qualifying nuclear material used in civil activities but they do not apply to anything done for defence purposes.

Part 9 (Communication - Regulation 35)

- 5.23 Regulation 35 specifies the ways in which an operator can communicate the information required by these Regulations to the ONR.

Part 10 (Safeguards equipment - Regulations 36 - 38)

- 5.24 The Regulations require the operator to install suitable safeguards equipment in each qualifying nuclear facility if so requested by the ONR. The inspector should note that a PSP may impose particular requirements on an operator in relation to safeguards equipment (Regulation 36).
- 5.25 If safeguards equipment is installed in a qualifying nuclear facility, the operator must permit ONR inspectors to have reasonable access to that equipment.

Part 11 (The ONR - Regulations 39 - 42)

5.26 This section of the Regulations outlines the activities ONR can undertake on site to assess compliance with the requirements by the operator. The ONR may:

1. Examine records kept by the operator;
2. Make independent measurements of qualifying nuclear material;
3. Apply and make use of surveillance and containment measures;
4. Observe the taking of samples at key measurement points;
5. Observe the treatment and analysis of samples and obtain duplicates of samples;
6. Verify the functioning and calibration of an operator's equipment; and
7. Make such observations or measurements as necessary to verify the accuracy of BTCs.

It should be noted that the above list has been taken from Part 11 of the Regulations and is not exhaustive. The inspector may use their discretion to determine what is necessary in order to assess an operator's compliance. Schedule 8 of The Energy Act 2013 (TEA 2013) provides further detail on the powers that ONR inspectors have been legally authorised with.

5.27 The Regulations require the operator, if so instructed by ONR, to send any samples of qualifying nuclear material which have been taken for ONR's use to a location specified by ONR.

Part 12 (Offences - Regulation 43)

5.28 If an operator fails to comply with the regulations stated in Regulation 43 then an offence will have been committed.

5.29 ONR will utilise the Enforcement Management Model (EMM) to determine the response to an operator failing to comply with the regulations, including committing an offence under Regulation 43. Additional internal guidance on the ONR EMM, general compliance gaps for safeguards and the enforcement decision making process will be available when the Regulations are in force.

Part 13 (Notification to the Secretary of State - Regulations 44 - 49)

5.30 Regulations 44 to 49 govern the provision of information to the Secretary of State concerning non-nuclear material, equipment and technology to which a relevant international agreement, as defined in the Nuclear Safeguards (Fissionable Material and Relevant International Agreements) (EU Exit) Regulations 2019, applies. Regulation 45 sets out the requirements on an operator of a qualifying nuclear facility or other person to inform the Secretary of State of the receipt, production or transfer of the relevant non-nuclear material, equipment or technology. Regulation 46 sets out the time period for the notification and Regulation 47 requires an operator to notify the Secretary of State of any relevant change. Regulation 48 sets out the circumstances in which regulations 45 to 47 cease to apply and regulation 49 sets out interpretation provisions for Part 13.

5.31 Part 13 should be considered in conjunction with the memorandum of understanding between ONR and the government department, BEIS.

Part 14 (General - Regulations 50 - 56)

5.32 The final part of the the Nuclear Safeguards (EU Exit) Regulations 2019 is the general part and brings into effect all that is contained within the Schedules of The Regulations.

6. GUIDANCE ON INSPECTION OF ARRANGEMENTS AND THEIR IMPLEMENTATION

- 6.1 Part 6 of this guidance is to assist inspectors in judging the adequacy of the operator's arrangements, in particular whether the arrangements address the requirements of Section 5 of this guidance. The following list is neither exclusive nor exhaustive and will be subject to review and revision in light of operational experience. It does, however, provide a list of aspects of the Nuclear Safeguards (EU Exit) Regulations 2019 that can be examined during inspections. For completeness, some aspects covered in Part 5 of this document are repeated.
- 6.2 In the majority of cases, for inspections announced in advance, it is good practice to furnish the operator with as much information about the scope and nature of the inspection as is practicable. This ensures that the operator is given every opportunity to provide a true and accurate demonstration of compliance. Any recent modifications to arrangements and procedures made by the operator should undergo additional scrutiny to determine that the modification has been truly embedded.
- 6.3 Part 6 is divided into four key inspection categories:
1. Accountancy based inspections;
 2. Safeguards systems based inspections;
 3. Integrated inspections, and;
 4. ONR inspection and assessment activities alongside the facilitation of verification by the IAEA as the global safeguards inspectorate.
- 6.4 Certain inspections will be concentrated around groups of regulations in the Nuclear Safeguards (EU Exit) Regulations where there is obvious interrelation.
- 6.5 It is for inspectors to apply their experience and discretion to determine the extent and depth of a particular inspection, taking due account of a number of factors such as safeguards significance, complexity and use of the qualifying nuclear material in that facility. Safeguards specific guidance on the planning principles which should be applied to determine the extent and depth of a NMACS inspection is available, entitled "ONR Nuclear Material Accountancy, Control and Safeguards Inspection Principles". This document is currently in draft form. Further guidance on the planning and scope of inspections is provided in the ONR compliance inspection guide ONR-INSP-GD-059, current revision.
- 6.6 When planning the scope of the intervention, the site inspector should consider whether the presence of an ONR Nuclear Material Accountant (NMA) at the inspection will be beneficial.
- 6.7 Guidance is given here on some of the key requirements. In deciding which relevant arrangements to sample, inspectors should consider reported information, events or previous enforcement action taken on the site or at other sites. Where relevant, the findings of related safety or security compliance inspections should also be taken into consideration.
- 6.8 The detail of how an inspector goes about assessing compliance for qualifying nuclear facilities with limited operations is yet to be developed. Once produced, it will be published as additional guidance.
- 6.9 Where site inspection indicates that an operator's arrangements fall significantly short of the Nuclear Safeguards (EU Exit) Regulations 2019 requirements, and especially where enforcement action appears to be warranted under the EMM, the site nuclear safeguards inspector should seek advice from the ONR Safeguards Delivery Lead.

Accountancy Based Inspections

- 6.10 Accountancy based inspection incorporates ONR assessment and inspection of operator declarations and resolving any anomalies through site inspections. Facility

records are examined to establish a correct set of data and to provide confidence to ONR that the operator has an adequate nuclear material accountancy and control system established. Furthermore, accountancy inspection provides ONR with confidence that the declarations submitted by operators and transmitted by ONR to the IAEA are complete and correct.

- 6.11 The basis of an accountancy inspection is the information provided in the Physical Inventory Listings (PILs), Material Balance Reports (MBRs) or Inventory Change Reports (ICRs). These form the starting point for the inspector when planning the scope of an accountancy focussed inspection. For example, an inspector will look for inventory change codes describing movement, loss, gain or transformation of nuclear material.
- 6.12 As well as inspecting the information in the declarations, the inspector will examine the specific arrangements and procedures in place for nuclear material accountancy. This helps build overall confidence in the adequacy of the operator's nuclear material accountancy process.
- 6.13 Those arrangements and procedures should be in compliance with the Nuclear Safeguards (EU Exit) Regulations 2019. For instance:
- The BTC for the facility should describe the relevant procedures in place for accountancy and control of material.
 - Procedures should be internally consistent with each other, valid, have an up-to-date review or change control history and identify the appropriate responsible persons.
 - It should be possible to establish instructions, methods and quality assurance requirements claimed in procedures have been followed and whether any changes that have been made have been correctly incorporated and validated.
 - The arrangements should be readily available, up-to-date, approved by an appropriate authority, implemented on site and adequately controlled under a suitable system.
- 6.14 The arrangements should show awareness of the reporting requirements placed on the operator as specified in the Nuclear Safeguards (EU Exit) Regulations 2019. These arrangements should make reference of the different requirements for the following, as a minimum:
- ICR (Regulation 14)
 - MBR and PIL (Regulation 15)
 - Special report (Regulation 16)
- 6.15 When planning for an accountancy based inspection, the inspector should first liaise with the ONR NMA designated to the relevant facility/site. The NMA will inform the inspector of any unresolved anomalies and discrepancies or unusual inventory changes. These should include any which have been recorded as regulatory issues on the ONR Regulatory Issues Database (RID).
- 6.16 An operator must ensure that, for each material balance area, the accounting records show all inventory changes, measurement and accounting results used to determine the physical inventory, and all adjustments and corrections that have been made in respect of inventory changes, book inventories and physical inventories. The accountancy records form the basis for the preparation of declarations by operators to ONR.
- 6.17 Ledgers summarising inventory changes and providing the book inventory for a given period, inventory change journals, inventory change documents and internal transfer forms are examples of accounting records which can help with verification. Typically

there is a general ledger for the Material Balance Area (MBA) and a number of subsidiary ledgers for each key measurement point (KMP) and nuclear material categories. The inspector should obtain the most recent closing date for which the book inventory has been established and recorded in the general ledger (i.e. the date up to which the accounts are complete).

- 6.18 Check that the reports, and any other notifications received, correspond to the actual on-site conditions. Special attention should be paid where changes in inventories have occurred. The information in the declarations should be compared with the source documentation, history file, general ledgers and subsidiary ledgers. Accounting records are vital for tracking material flow on site as not all movements will be captured in the operator's declarations.
- 6.19 As an example, an operator may move waste drums to a waste reprocessing facility which is captured in the ICR. However, within the waste facility the drums undergo super-compaction and are placed into an ISO container for disposal. This process step is not captured in the ICR. The operator should make available facility records and other relevant supplementary information, upon request by the inspector, in order to assist ONR to track the material.
- 6.20 Inspectors should cross-check supporting documents for consistency with the accountancy reports. Supporting documents include those primary documents used for capturing data at the operating points where the data originate. They should provide an audit trail between data in the ledgers and the original data, namely those due to measurements, calibration or other operating activity in the facility. The following types of information may be recorded in supporting documents and could be helpful to the inspector in seeking consistency:
- Change in Inventory type e.g. powder to pellet;
 - Date of change;
 - Type of change;
 - Material description;
 - Information on material movement;
 - Batch identity;
 - Number of items in a batch;
 - Batch data and the batch data basis, and;
 - Origin of weight information.

Examples of supporting documents include movement documents, weight or volume records, laboratory records and power production records.

- 6.21 From the evidence obtained through the on-site inspection, the inspector shall assess the appropriateness of the inventory change codes used and discuss the outcome with the operator.
- 6.22 If accidental losses, accidental gains or new measurements have been declared by the operator then the inspector should request for any evidence and supporting documentation outlining the magnitude and cause of these changes.
- 6.23 The operator shall have an established measurement system for determining quantities of nuclear material received, produced, shipped, lost or otherwise removed from the inventory. The system should include measurement arrangements that are appropriate for each KMP. This measurement system will be used to determine overall inventory quantities.
- 6.24 The operator shall have arrangements and procedures for all measurement activities conducted for accountancy purposes. At item facilities, such as reactor sites, it may be that only very basic measurements, such as counting and item identification, and

nuclear material transformation calculations are required. More complex facilities may require dedicated in-plant equipment and laboratories for measurements.

- 6.25 Measurement results should meet relevant international standards (see Section 6.35 below). As such they should be validated, traceable and approved by a responsible person. Where the accountancy data is based on calculations from models, both this data and the models should be validated, traceable and approved by a responsible person.

Safeguards Systems Based Inspections

- 6.26 Safeguards systems based inspections are those activities involving inspection of an operator in relation to their arrangements for compliance with the Nuclear Safeguards (EU Exit) Regulations 2019. It is recognised that for an operator of a qualifying nuclear facility with limited operation compliance inspections would be of a reduced scope.
- 6.27 The following have been identified as the main subjects for safeguards systems based inspections:
- Accountancy and control plan;
 - Basic technical characteristics;
 - Particular safeguard provisions, and;
 - Procedures allied to Physical Inventory Taking (PIT).
- 6.28 Inherently, compliance of an operator's arrangements and their implementation on site is assessed to some degree through accountancy based inspections. However, the inspections in this section involve a more in depth examination of the operator's arrangements in comparison to accountancy based inspections, and focus more on the control aspect of the operator's arrangements.

Accountancy and Control Plan (ACP) Inspection

- 6.29 Operators must produce and send to ONR within 30 days of 1st January 2021, an ACP for a qualifying nuclear facility which sets out the accounting and control system for the qualifying nuclear material in that facility. Whilst there is a delay period to allow for the production and implementation of that first ACP, it is ONR's expectation that the operator will already be operating with elements expected to be found within it.
- 6.30 Until ACPs come into force, ONR will inspect arrangements and procedures as described within the relevant BTC document. The requirements for arrangements and procedures in ACPs are both more detailed and wider ranging; however Schedule 1 Part 1 describes the information an operator has to provide in the BTC, including specific arrangements and procedures.
- 6.31 The purpose of an ACP inspection is to ensure that the operator has established a robust accountancy and control system and that their implementation on site complies with the requirements specified in The Regulations. However, elements of an operator's ACP may be routinely inspected through the other safeguards inspection approaches depending on the frequency of inspections undertaken at that facility or site. Hence, for completeness, some inspection aspects covered here are repeated throughout Part 6 of this guidance. Further guidance on the factors used to judge inspection frequency is available in ONR Nuclear Material Accountancy, Control and Safeguards Inspection Principles which is currently in draft form.
- 6.32 ONR guidance has been produced for the assessment of accountancy and control plans. Assessment of ACPs is outside of this inspection guidance, but the safeguards inspector will inspect elements of an ACP along with its implementation on site.
- 6.33 The operator must implement and comply with the arrangements and procedures described in the ACP. The implementation of the arrangements should be examined periodically by the safeguards inspector. ONR uses a sampling approach in deploying

its resources. As such, it may not be necessary to assess every aspect of an ACP in full. The breadth and depth of the inspection is established by the inspector as part of the inspection plan, however, the operator should be able to accommodate any deviations from the initial plan as the inspection progresses, if required.

- 6.34 Schedule 2 of The Regulations sets out the components of an accountancy and control system. These are based on existing guidance (e.g. Commission Recommendation 2006/40 and UK Safeguards Office guidance from 2010), and should be in place already thus, the ACP should reflect the following but in a more coherent way.

Expectations concerning the following list (paragraph 6.31) have been published in the ONR Guidance for the Assessment of Nuclear Material Accountancy, Control and Safeguards (ONMACS) and the ONR Guidance for the Assessment of Accountancy and Control Plans. Additional technical assessment and inspection guidance (TAG and TIG) will be provided (delivered in due course in 2019/2020) to further assist the inspector.

- 6.35 An inspector may wish to look for evidence of and determine the adequacy of the following:
- A structure of MBAs in which the physical inventory of qualifying nuclear material in that area and the transfers of qualifying nuclear material into and out of that area can be determined.
 - Defined roles and responsibilities that are assigned and communicated to the staff of a qualifying nuclear facility.
 - Quality assurance and quality control measures that detect, describe, address and reduce sources of errors in and poor performance of the system.
 - A programme of measurements that provides accurate, suitably precise and representative information that quantifies and characterises qualifying nuclear material.
 - A measurement control programme that validates and provides traceability for measurement results and their uncertainties and ensures that measurements comply with the relevant international standards or are equivalent in quality to those standards. Regulation 2 of the new UK regulations defines “relevant international standards” as “those international standards which are both published by third parties and listed by the ONR on their website. .
 - The inspector should familiarise themselves with the IAEA International Target Values (ITVs) 2010 document referenced in the Further Reading section. Appendix 1 provides a brief overview of the purpose of ITVs.
 - The ability to track and document the movement of qualifying nuclear material through receipts, packaging, re-packaging, processing, storage, and shipment in a timely manner. The system should show the location, characteristics, and containment of all qualifying nuclear material.
 - The ability to unambiguously identify batches of qualifying nuclear material in whatever containers, process vessels, or equipment they may be located in. The locations in which qualifying nuclear material can be held, as well as positions within these areas, should also be identifiable.
 - An inventory control system to regularly check the agreement between records of qualifying nuclear material, and between those records and the physical reality, and take appropriate action to manage discrepancies as they arise by investigating, documenting, reporting, and resolving such discrepancies.
 - The ability to address anomalies consistent with the loss or gain of qualifying nuclear material, or any other situation corresponding with Regulation 17

(unusual occurrences), in a timely manner by, for example, recognising, investigating, and documenting such anomalies.

- The system should define personnel responsibilities and authorities to carry out the actions required by Regulation 16 (special reports).
 - Data processing procedures that store, trace, identify, and produce the information required by these Regulations, and that are required to facilitate the checking of data against the physical reality.
 - Reporting and notification procedures that transmit the information required by these Regulations through appropriate channels to the ONR and according to appropriate deadlines.
 - Receipt and shipment procedures that check the quantity and characteristics of qualifying nuclear material entering or leaving a qualifying nuclear facility against the accountancy information that must accompany such receipts and shipments. These procedures should also allow for the introduction or extraction of qualifying nuclear material to or from the tracking, identification, and inventory control processes described above.
 - A Physical Inventory Taking (PIT), that is carried out in accordance with Regulations 15(3) and 31(4)(b) at least every calendar year, with the period between two successive physical inventory takings not exceeding 14 months.
 - Procedures for a PIT that describe the responsibilities of those involved, the methods they should use, the records that should be kept, the associated measurement uncertainties and material balance tests (where appropriate), the reporting that must be made to the ONR, and the steps for authenticating any information made available to inspectors under these Regulations.
 - A List of Inventory Items (LII), generated from a PIT, that facilitates inspector verification of information provided to ONR against the physical reality. The LII should include information on the mass and composition of qualifying nuclear material per item, as well as its location, containment, identity, and type
- 6.36 Although not explicitly defined in Schedule 2 of the regulations it is deemed relevant good practice for the operator to minimise the potential for human error so far as is reasonably practicable.
- 6.37 The operator should also have in place a programme of training for all operational personnel who play a role in the management and control of nuclear material. Adequate records of training shall be maintained.

Basic Technical Characteristics (BTC) Inspection¹

- 6.38 The Regulations require the operator to produce a BTC document for each qualifying nuclear facility using the relevant questionnaire shown in Part 1 of Schedule 1 of the Regulations. Such design information must be provided at least 200 days before qualifying nuclear material is introduced into the new facility
- 6.39 Furthermore, the operator is obliged to provide ONR with preliminary design information on any new nuclear facility as early as possible after the decision has been taken to construct, or authorise construction of a facility, in the form of the relevant BTC as detailed in Regulation 3(2).
- 6.40 BTC inspection activities shall be carried out in a manner designed to avoid hampering or delaying the construction, commissioning or operation of facilities, or affecting their safety.

¹ Please note BTCs are referred to by the IAEA as Design Information (DI) and inspections are known as Design Information Verification (DIV). Operators who are also inspected by the IAEA may use different language when referring to BTCs. As noted later in this document ONR will produce detailed guidance on inspection and assessment during the facilitation of IAEA inspections in due course.

- 6.41 As referred to in ONR General Inspection Guide ONR-INSP-GD-064, the inspector should determine the objective(s) of the inspection to be performed prior to notification to site. A review of ONR regulatory intelligence incorporating intervention records from ONR nuclear safety and security colleagues may aid the safeguards inspector when determining the scope of intervention.
- 6.42 ONR safeguards inspectors should review the operator's arrangements for provision and review of BTCs to establish validity and whether any changes have been made to the facility since the last review. If changes have been made to the facility, then check that the operator has complied with the requirements set out in the Regulation 3(3). Furthermore, any changes to a BTC which is relevant to the accountancy and control plan will require amendment of the accountancy and control plan. The inspector should verify that the requirements of Regulation 8(1) have been complied with.
- 6.43 Some aspects which may help the inspector judge operator compliance against Regulation 3 of the Nuclear Safeguards (EU Exit) Regulations 2019 are provided below:
- An inspector may wish to examine evidence of declarations from the operator to ONR within the appropriate timeframe as specified in the Regulations. The declarations shall be complete, accurate and consistent, in line with Part 1 of Schedule 1 of The Regulations.
 - BTC inspections will be carried out at various phases of a facility lifecycle; from the early planning stage until ONR considers it decommissioned for safeguards purposes. This means that BTCs are to be revised and provided by an operator in respect of any nuclear material accountancy and control relevant modifications or changes in operating condition throughout a facility's lifecycle.
 - Accompanying these modifications and changes will be facility blueprints or drawings. These can be used by an inspector to assess that the utilities, support systems, auxiliary buildings and their locations are consistent with the declared function and capabilities. It is important to confirm that the latest issue of the facility blueprints have been provided by the operator.
 - The inspector may wish to take measurements of physical dimensions and cross-reference these with those given in the facility diagrams.
 - An inspector may examine construction, commissioning, operation, maintenance and modification, shut-down, closed-down and/or decommissioning plans and schedules.
 - Under licence conditions 20 (Modification to design of plant under construction) and 22 (Modification or experiment on existing plant), the operator shall have arrangements for compiling and maintaining a list of all modifications implemented, or intended to be implemented, that clearly shows the status of each modification. When considering which facilities to target, an inspector should consider the relevance of the modifications made to NMAC and the findings from previous LC 20/22 inspections. Furthermore, the compiled list of modifications can be used for BTC targeting and verification purposes.
 - Where maintenance or modification has been undertaken, there should be a record of the task, possible modification to the BTC and the date it was completed. The record shall be signed by the suitably qualified and experienced person appointed by the operator to control and supervise such activities. The inspector should ask for evidence of maintenance/modification records related to NMAC and verify their accuracy and completeness.
 - It may not be possible for an inspector to take along all essential documentation when visiting the facility. Where appropriate, and with the necessary permissions, an inspector may wish to request photographs be

taken in order to perform a desk-based examination. Furthermore, the photographs can be used for comparison purposes at future BTC inspections.

- 6.44 If relevant, site inspectors should review the operator's own arrangements for regularly auditing compliance with the duties imposed by the Nuclear Safeguards (EU Exit) Regulations 2019.

Particular Safeguard Provisions (PSPs)

- 6.45 PSPs may be imposed on an operator by ONR. Where PSPs have been imposed then the safeguards inspector may wish to undertake a compliance inspection to verify the requirements in the PSP are being fulfilled. PSPs may for instance include the expected condition of the facility at certain accountancy periods.

- 6.46 The inspector should:

- Examine the arrangements documentation and that procedures are in place to demonstrate compliance with the requirements detailed in the PSP and confirm that those arrangements are implemented on site.
- Examine the procedures for consistency. Review the procedures to establish validity, whether any changes have been made since the last review and whether the identified responsible persons are correct. Note whether instructions, methods and quality assurance requirements claimed in procedures have been followed and whether any changes that have been made have been correctly incorporated and validated.

- 6.47 The arrangements should be readily available, up-to-date, signed by an appropriate person and adequately controlled under a suitable system.

Physical Inventory Taking (PIT) Evaluation

- 6.48 A PIT for each MBA must be carried out every calendar year by the operator unless otherwise specified in the PSP for the qualifying nuclear facility. The period between successive PITs must not exceed 14 months (Regulation 15(3)).

- 6.49 When taking the physical inventory, the operator will account for all the batches of nuclear material in the MBA by identifying, counting or measuring them. An itemised list will be prepared for all batches of qualifying nuclear material in the MBA. This is then compared to the book inventory which will have been determined by summing all the changes in the MBA during the material balance period. The inventory difference will then be determined.

- 6.50 For bulk handling facilities the inspector should:

- Assess the inventory difference (ID), commonly referred to as material unaccounted for (MUF) declared by the operator.
 - The ID should be justified by legitimate measurement uncertainties.
- Examine the procedures documentation for calculating ID and check that it is consistent.
 - Where historical information or modelling data has been used for estimates of in-process material, this should be clearly described in a technical document.

- 6.51 Assessing the cumulative ID for a given MBA across multiple inventory periods is / should be used to assist in detecting protracted measurement bias or nuclear material control issues.
- Cumulative ID is also a useful measure for the inspector in determining inspection scope and focus - the assessment of cumulative ID is outside of this guidance and is likely to be included in future detailed ONR guidance.

- When an ID exceeds a plant's Inventory Difference Action Level (IDAL) receive / request the operators report into any subsequent investigation which takes place
 - an ONR safeguards investigation should be considered by the inspector according to the safeguards enforcement management model (included in further detailed guidance)

6.52 In item facilities the inspector should:

- Assess the ID declared by the operator
 - ID should be zero
 - For all instances of a non-zero ID declared by an item facility an ONR safeguards investigation should be considered by the inspector according to the safeguards enforcement management model (included in further detailed guidance)
- Examine the arrangements documentation and that procedures are in place to demonstrate compliance with the Nuclear Safeguards (EU Exit) Regulations 2019.
 - The arrangements should be readily available, up-to-date, authorised by an appropriate person and adequately controlled under a suitable system.

6.53 For all facilities the inspector should:

- Examine the PIT procedures for consistency
- Review the procedures to establish validity, whether any changes have been made since the last review and whether the identified responsible persons are correct.
- Note whether instructions, methods and quality assurance requirements claimed in procedures have been followed and whether any changes that have been made have been correctly incorporated and validated.
- Check the implementation of the arrangements and procedures to determine the adequacy of the PIT process.
 - As an example, in facilities where the operator takes measurements to determine the nuclear material inventory, the inspector may wish to examine the relevant procedures document in order to determine the suitability of the measurement basis (see 6.35). In this instance, previous ONR findings from ACP inspections focussing on the operator's measurement control programme could be used by the inspector as evidence of suitability.

6.54 The inspector should make all reasonable efforts to ensure that the inspection has minimal impact on the work of the operator during the PIT or any other operational activity.

6.55 For operators with large and complex inventories, the PIT may be scheduled when qualifying nuclear material inventories in the facility are such that the uncertainties in measurement are as low as reasonably practicable. This most likely will be when the plant can be emptied and cleaned to an extent as low as reasonably practicable.

6.56 Nuclear material that is held up in the plant at the time of the PIT should be in a location that allows for sampling and analysis of the material for the determination of nuclear material mass.

6.57 The arrangements should detail the operator's defined condition of the plant when undertaking a adequate PIT and the reasons for that definition.

- 6.58 The operator should be able to demonstrate to the inspector that the plant is in that condition at its commencement.

Physical Inventory Verification (PIV)

- 6.59 A PIV is carried out where the regulator was not present during the PIT and has a need to confirm / verify that the operators accountancy submissions related to the PIT are correct.
- 6.60 PIV is an activity undertaken, primarily by the IAEA Safeguards Inspectorate, at the closing of a material balance period after the completion of the PIT by the operator.
- 6.61 However, as ONR may also choose to carry out PIV activities, this section provides guidance on the scope and detail of possible assessment and inspection activities. It will also provide guidance for the expectations during an IAEA PIV.
- 6.62 Following the PIT, the operator shall prepare a PIL along with an MBR, which shall be submitted to ONR within the specified timeframe and in the specified format detailed in Regulation 15 of the Nuclear Safeguards (EU Exit) Regulations 2019. The PIL is supplemented by detailed information in the form of a list of inventory items (LII) produced by the operator. The PIV should ideally be carried out as soon as possible after the PIT to ensure the validity of the LII.
- 6.63 In advance of verification activities the inspector should request the LII. The LII should be:
- Complete and define all items in a MBA or a specified location within a MBA
 - Include identities and locations of the items or batches
 - Grouped such that Items with similar physical and chemical characteristics and within the same measurement uncertainties are together
 - Optionally, but considered best practice, grouped according to location. This can also speed up verification activities and thus reduce the burden on the operator
 - Clear on stating which qualifying nuclear material within the MBA the operator has not been able to physically verify with the reason as to why provided
- 6.64 If any change in inventory took place after the PIT, the LII may still be used on a case by case basis for PIV provided that:
- Increases of the qualifying nuclear material inventory subsequent to the PIT are kept physically separate and are clearly distinguishable from the qualifying nuclear material on inventory at the PIT date, or if they result from nuclear production.
 - Decreases of the qualifying nuclear material inventory subsequent to PIT meet the following conditions:
 - If adequate inspection or assessment of qualifying nuclear material subject to removal from inventory was performed by ONR, or
 - If confirmation of the receipt of such material has been obtained from the receiver of the qualifying nuclear material, or
 - If they are measured discards or nuclear losses.
- 6.65 Inspectors should select a sample of items from the LII for verification in advance of the inspection. This will reduce the overall burden placed on the operator. The inspector should notify site which items they wish to verify as part of the inspection scope.

- 6.66 The operator should provide adequate justification for any qualifying nuclear material indicated on the LII which has been either removed from the inventory after the PIT without adequate assessment, or which cannot be inspected or verified during the PIV due to its specific properties or location.
- 6.67 Changes in the LII due to handling of qualifying nuclear material or to reorganisation of the inventory, may be accepted by ONR if the reconciliation between the PIT results as indicated in the LII and the actual status at the time of the PIV can be done effectively, and without delay, and if valid conclusions can still be drawn by ONR inspection and assessment.
- 6.68 There may be cases where the LII contains “unmeasured” items (using nominal data for qualifying nuclear material content) or items for which the operator reserves the right to change their values for qualifying nuclear material content when their own measurements become available (e.g. destructive analysis (DA) results). In such cases, any LII changes should be appropriately tracked using version control and ONR can reserve the right not to draw PIV conclusions until after the operator has declared their final data. Best practice would be for the operator to have all final measurement results in place by the PIV. Any delay in ONR drawing PIV conclusions due to late measurement data should be taken into account in the PIV evaluation process.
- 6.69 During the PIV the inspector should utilise the expectations set down in the section on the inspection of a PIT to establish the ONR expectations with regards to the information and condition of the facility that is being verified.
- 6.70 It is conceivable that a declared PIL does not agree with a book report generated by ONR’s Safeguards Information Management and Record System, for the same time period. This does not necessarily mean there are issues with the declarations received from the operator. It may simply be a result of ONR not having all available information. Supplementary information should be made available by the operator, upon request of the inspector, to reconcile any apparent disparity.
- 6.71 Material Balance Evaluation will be undertaken as an assessment away from site. Analysis of MUF and σ_{MUF} will highlight areas of statistical significance and whether or not the facility measurement system is adequate. Where there are areas of statistical significance, an inspector should seek justification and clarification from the operator, this may be achieved through further site inspection. IAEA standards of accountancy expected for closing a material balance in a bulk handling facility are provided in Appendix I of this document.
- 6.72 Where it is considered impractical to verify all items at a facility, a representative sample of items should be verified instead with appropriate justification recorded (e.g. where the items are part of a large inventory or where there are items that require significant effort to retrieve due to storage configurations).

Integrated Inspections

- 6.73 Integrated inspections will be undertaken by safeguards inspectors in conjunction with inspectors from the ONR’s other regulatory regimes e.g. nuclear safety or security. The guidance in this section is aimed at all ONR inspectors who participate in integrated inspections that are either safeguards-focussed or have a safeguards element. Integrated inspections should be considered for incorporation into each of the respective Annual Intervention Plans at the planning stage.
- 6.74 Integrated inspections can only occur where ONR inspectors have the relevant legal vires for all components of the inspection. For instance:
- LC inspections only apply to those operators who are part of a nuclear licensed site;
 - integrated inspections with nuclear security inspectors, are applicable wherever Nuclear Industries Security Regulations (NISR) 2003 apply (e.g. including where sensitive nuclear information is held); and

- where operators are not nuclear licenced sites but are subject to ONR's transport regulation or where the use is qualifying nuclear material in the form of shielding.
- 6.75 Integrated or cross-ONR inspections exploit the synergies between the specialisms. For example, an inspection of the control of nuclear material on site can cover compliance inspections of both the Nuclear Safeguards (EU Exit) Regulations 2019 and site licence condition 4 (Restrictions on nuclear matter on site).
- 6.76 Some operators, particularly where they are smaller and staff have responsibilities covering multiple disciplines, may have limited resource to facilitate inspections covering different aspects of the specialisms.
- 6.77 Conversely, an integrated inspection approach may in fact limit the burden on the operator by reducing the number of inspections on site.
- 6.78 It is therefore important to consider the benefits an integrated approach may have, but it is also important to consider operator resource requirements when planning interventions.
- 6.79 Before undertaking an integrated inspection, the inspector should consult the ONR Guide "Guidance for Intervention Planning and Reporting", reference: ONR-INSP-GD-059, to understand the objectives of the different inspection types and specialisms.
- 6.80 Further detailed guidance will be produced in the future for each integrated inspection type. However, generically, when considering an integrated ONR inspections with safeguards relevance the following points should be followed by the safeguards inspectors:
- the site safeguards lead will use knowledge and experience of their site to coordinate the inspections. Ideally these will be captured in advance in the relevant integrated inspection plan
 - The vires for both ONR regulatory arms should be clear at the facility to be inspected
 - The guidance associated with both regulatory vires for the integrated topic should be reviewed, differing expectations noted and safeguards expectations embedded within the inspection plan

ONR inspection and assessment activities alongside facilitation of the IAEA

- 6.81 Although ONR, as part of meeting international safeguards obligations, must facilitate IAEA's verification activities agreed under the Voluntary Offer Agreement (VOA), those international obligations do not require it to inspect or assess the safeguard activities in the facilities of interest to the IAEA.
- 6.82 However, the presence of ONR inspectors on facilities at any time provides opportunities for assurance of the NMACS. Particularly, in relation to the obligation of facilitation by ONR and the operator. This assurance would be predominantly inspection rather than assessment.
- 6.83 ONR inspection opportunities related to facilitation will be of two forms, those undertaken by safeguards inspectors whilst facilitating the inspection of the international safeguards inspectorate (IAEA) and those where ONR solely inspects the arrangements in place to meet the obligations set down in the international agreement.
- 6.84 The guidance in this section is aimed at all ONR inspectors involved in facilitation of IAEA verification activities. Inspections during facilitation should be considered for incorporation into each of the respective Annual Intervention Plans at the planning stage.
- 6.85 For the second type of inspection in particular (i.e. assessment of operator arrangements for IAEA verification), further, detailed, safeguard specific technical inspection guidance (TIG) is in development. This guidance will explain in greater

detail the requirements for facilitating IAEA inspection activities than the overview presented below.

- 6.86 Prior to the IAEA inspection the ONR inspector should establish or confirm:
- the scope and content of the IAEA inspection
 - that all IAEA inspectors and other officials (e.g. equipment technicians) have approval to access the site and the facility, as well as a clear understanding of where access may be restricted and/or need to be managed (e.g. for safety or security reasons)
 - the scope of the work of the IAEA under the relevant international agreement, particularly, their rights and obligations
 - the previous history of the operator with respect to international safeguards verification and ONR
- 6.87 For an IAEA inspection the inspector should
- Attend and facilitate understanding at both opening and closing meetings, which should be led by the IAEA, to
 - Ensure that the scope of the inspection is clear
 - Ensure the roles and responsibilities of all participants are clear and understood including access restrictions
 - Ensure that the outcomes, actions and recommendations are clear on closure
 - Monitor operator activities in support of the IAEA inspection
 - Confirm that all activities are safe and in line with reasonably acceptable NMACS operations
 - Ensure that the operator responds effectively to reasonable requests from the IAEA (access to certain areas of plant and information)
 - Note any operations that appear to fall outside safety or security acceptable practice
 - Challenge with the operator supervisor immediately any behaviours / activities that would appear to result in clear and present danger
 - Where activities appear to be unsafe / represent poor security behaviour report these to the relevant ONR inspector
 - Ensure that the operator responds effectively to any relevant observations made by the IAEA and / or ONR during the inspection
 - Monitor and record IAEA behaviours, extent of requests and physical activities (including sampling and other evidence gathering)
 - Ensure that the IAEA does not work outside the scope of the relevant international agreement including access and information requests
 - Challenge requests for any activities that appear to result in a danger or are outside local rules
 - Challenge any unacceptable behaviour
 - Act as the UK and ONR representative with respect to outcomes and conclusions of the IAEA inspection. I.e. receive the IAEA report on the inspection outcomes and conclusions as the VOA specifies.
 - Share any observations and conclusions that the ONR has reached with the operator and where appropriate the IAEA
 - Discuss the outcomes and conclusions of the IAEA inspection in the presence of the operator and ensure the correct level of understanding
 - Post inspection share the formal report from the IAEA
 - Utilise the outcomes of the inspection to inform future ONR regulatory activities

- Ensure follow of outcomes of inspection and close out of issues raised
- Ensure LFE is shared within ONR and with the operator at close out meeting and post the inspection

7. FURTHER READING

Further reading includes:

- Nuclear Safeguards (EU Exit) Regulations 2019
- The Nuclear Safeguards (Fissionable Material and Relevant International Agreements) (EU Exit) Regulations 2018
- ONR Guidance for the Assessment of Nuclear Material Accountancy, Control and Safeguards 2019 Edition (Version DRAFT) (2019/127276)
- ONR Guidance for the Assessment of Accountancy and Control Plans (ACP) (2019/47012)
- General Inspection Guide, ONR Guide. Ref. ONR-INSP-GD-064, current revision
- Guidance for Intervention Planning and Reporting, ONR Compliance Inspection Guide Ref. ONR-INSP-GD-059, current revision
- ONR Nuclear Material Accountancy, Control and Safeguards Inspection Principles (version draft) (2019/53481)
- IAEA Nuclear Material Handbook
- IAEA STR-368 - International Target Values 2010 for Measurement Uncertainties in Safeguarding Nuclear Materials
- IAEA service series 30 – Safeguards implementation practices guide on facilitating IAEA inspection activities

8. DEFINITIONS

ACP	Accountancy and Control Plan
BTC	Basic Technical Characteristics
DA	Destructive Analysis
DI	Design Information
DIV	Design Information Verification
EMM	Enforcement Management Model
FA	Facility Attachments
IAEA	International Atomic Energy Agency
ICR	Inventory Change Report
ID	Inventory Difference
IDAL	Inventory Difference Action Level
ITVs	International target Values
KMP	Key Measurement Point
LC	Licence Condition
LII	List of Inventory Items
LOFs	Locations Outside Facilities
MBA	Material Balance Area
MBR	Material Balance Report
MUF	Material Unaccounted For
NISR 2003	Nuclear Industries Security Regulations 2003
NMA	Nuclear Material Accountant
NMACS	Nuclear Material Accountancy, Control and Safeguards
ONR	Office for Nuclear Regulation
PIL	Physical Inventory Listing
PIT	Physical Inventory Taking
PIV	Physical Inventory Verification
PSP	Particular Safeguard Provisions
RID	ONR Regulatory Issues Database
TEA 2013	The Energy Act 2013
TIG	Technical Inspection Guidance

9. APPENDICES

Appendix I

International Target Values (ITVs)

The ITVs are uncertainties to be considered in judging the reliability of analytical techniques applied to industrial nuclear and fissile material, which are subject to safeguards verification. The use of ITVs can be beneficial for statistical inferences regarding the significance of uncertainties reported in practice.

Tabulated values set down in IAEA STR-368 represent estimates of the 'state of the practice' which should be achievable under routine measurement conditions. They are based on actual practical measurement experiences and are intended to be used as a reference for routinely achievable measurement quality by operators, the IAEA and other safeguards bodies. The ITVs are periodically updated with the current version dating from 2010.

International Standards of Accountancy

Safeguarding nuclear material involves a quantitative verification of the accountancy of fissile materials by independent measurements. The effectiveness of these verifications depends to a great extent upon the quality of the accountancy measurements achieved by both the facility operator and the safeguards inspectorate.

The IAEA had defined in the 1970s a set of international standards of nuclear material accountancy, which lists the „values of measurement uncertainty expected for closing a material balance“ for five different types of nuclear facilities.

In the absence of relevant international standards of measurements, safeguards evaluators, as well as plant measurement specialists, need references regarding the performance capabilities of measurement methods used for the determination of the volume or mass of a material, for its sampling, and for its elemental and isotopic assays. Such information is needed for the various nuclear materials encountered in the nuclear fuel cycle.

Table 1 outlines the values of measurements uncertainty, σ_E (relative standard deviation) expected for closing a material balance across a bulk handling facility - the uncertainty has also been expressed as a percentage in the table.

These values are taken from the IAEA Safeguards Glossary 2001 Edition and are based on operating experience at various types of bulk handling facilities. As such, they are considered achievable under the condition of normal operation.

For calculating the international standard for uncertainty of a material balance, the standard from Table 1 (expressed as a relative standard deviation) is multiplied by the throughput.

The σ_E values can be used along with the International Target Values to determine whether a facility's measurement system meets international standards.

Table 1. Expected measurement uncertainty σ_E associated with closing a material balance

<i>Bulk handling facility type</i>	σ_E	<i>% Uncertainty</i>
Uranium enrichment	0.002	0.2
Uranium fabrication	0.003	0.3
Plutonium fabrication	0.005	0.5
Uranium reprocessing	0.008	0.8
Plutonium reprocessing	0.010	1
Separate scrap storage	0.040	4
Separate waste storage	0.250	25

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