Office for Nuclear Regulation

ONR GUIDE			
Inspection Against Basic Technical Characteristics			
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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 those Regulations. ONR carries out inspections to determine compliance with The Regulations, judging the suitability of arrangements made under The Regulations and the adequacy of their implementation.

1.2 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. It is the inspector's role to judge the adequacy of those arrangements, the degree to which they comply with the regulations and how they have been implemented during compliance inspections.

1.3 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 The purpose of this document is to provide guidance for ONR inspectors when planning and carrying out inspection activities related to an operator's Basic Technical Characteristics (BTC).

2.2 This guidance has been prepared as an aid for use during inspection activities carried out by ONR nuclear safeguards inspectors at civil nuclear facilities subject to The Regulations. It is to be predominantly used in judging the operator's compliance with The Regulations.

2.3 This guide sets out the scope and purpose of activities to be performed by ONR inspectors during BTC inspections, and provides a framework for these inspection activities, within which the ~~i~~Inspector is expected to exercise discretion, proportionately applying this guidance in relation to the particular circumstances of the safeguarded facility under inspection.

2.4 This guidance does not indicate the frequency or scope for inspections of the operator's BTC under The Regulations. This is 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 http://www.onr.org.uk/documents/2019/draft-planning-principles.pdf).

2.5 Note that the requirements of The Regulations relate only to those activities undertaken for civil purposes; activities for defence purposes are excluded from the UK nuclear safeguards regime.

3 LEGAL REQUIREMENT : NUCLEAR SAFEGUARDS (EU EXIT) REGULATIONS 2019, PART II, SECTION 3 – DECLARATION OF BASIC TECHNICAL CHARACTERISTICS

3.1 The Regulations require the operator to declare (i.e. provide to ONR) a BTC document for each qualifying nuclear facility using the relevant questionnaire shown in Part 1 of schedule 1 of the Regulations (see the appendix to this guidance):

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.

4 PURPOSE OF THE NUCLEAR SAFEGUARDS (EU EXIT) REGULATIONS 2019, REGULATION 3

4.1 Regulation 3 requires operators to declare Basic Technical Characteristics (BTC) for a qualifying nuclear facility, using the relevant questionnaire shown in Part 1 of Schedule 1 of The Regulations.

4.2 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 Material Balance Areas ((MBAs)) which they select from the designated facilities list), to develop and prepare the safeguards approach for the installation.

4.3 Regulation 42 requires that the ONR provides this information to the IAEA in fulfilment of the obligations of the United Kingdom under the agreement between the United Kingdom and the IAEA dated 7 June 2018.[1]

5 GUIDANCE ON PLANNING THE INSPECTION AGAINST BASIC TECHNICAL CHARACTERISTICS

5.1 This section is to assist inspectors in judging the adequacy of the licensee's arrangements, in particular whether they meet the requirements of The Regulations. The following list is neither exclusive nor exhaustive and will be subject to review and revision in the light of operational experience. It does, however, provide a list of aspects of BTCs made under The Regulations that can be examined during inspections.

5.2 When a new BTC has been submitted for a planned facility, or one under construction, inspection activities should begin at the earliest possible time (preferably during site preparation for new construction) and well before qualifying nuclear material is introduced into the facility, as this may be the only possible period in which to verify the design and construction of key NMAC&S-related features of the facility (including equipment, containment, flow routes, inventory locations etc.) prior to them being sealed or shielded from access for the duration of the facility's remaining life cycle.

5.3 When a revised BTC is submitted which indicates changes to an operating facility already subject to safeguards regulation by the ONR, BTC inspection activities may be carried out before, during, or after the changes, as is appropriate for the particular facility to ensure the facility is designed, configured and operated as declared in the BTC.

5.4 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. This planning should include review of the regulatory intelligence available from across all of ONR's activities (e.g. assessment reports, intervention records, contact reports and otherwise from wider ONR engagement relevant to the facility concerned), and should aid the safeguards inspector when determining the scope of intervention. Inspectors should also consider if there are any ONR staff from other specialisms they may wish to accompany them on an inspection e.g. Civil Engineer, Process Engineer

5.5 Some of the following activities may help the inspector when planning for BTC inspection at a Qualifying Nuclear Facility (QNF) subject to The Regulations:

- determining the specific objectives to be fulfilled by the inspection. For example, whether what has been submitted in the BTC is in line with The Regulations and is consistent with the facility type. Some specific objectives and methods may also result from consideration of the particular facility and its lifecycle phase. Examples of lifecycle-specific objectives are included in appendix 2. In consideration of these specific objectives relating to lifecycle phase, inspectors may wish to include other ONR specialisms in support of BTC assessment and inspection.

[1] 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)

- gathering all information, including the BTC documentation, operator declarations, and any other information regarding the facility that is relevant to the inspection. For example, such information could include accountancy records for the particular facility, and may provide an opportunity to check these against information declared in the BTC. Inspectors should make this request for supplementary information in writing, if they determine this to be required.

- additional documents and drawings can provide valuable information when attempting to identify a nuclear material flow route or storage location on-plant: inspectors may wish to ask for operator assistance in this aspect;

- identifying and planning to have access to key personnel with the required knowledge (e.g. Designers, Safety Case Managers, etc.) should be determined early in the inspection planning;

- liaising with the relevant ONR colleagues e.g. safety personnel regarding the understanding of key plant engineering processes - this may benefit inspectors in being able to identify and follow nuclear material flow routes or storage locations on-plant, or security inspectors regarding arrangements for containment of and access to nuclear material;

- selecting the locations to which access is required; taking into account the complexity, sensitivity and size of the facility. Inspectors should inform the operator of selected locations as early as possible to allow the necessary measures and facilitation arrangements to be put in place;

- determining any other key personnel on-site whom access to may be required and arranging contact with them through the operator representative;

- confirming whether or not the information provided by the operator is consistent with the information that results from regulatory intelligence, or other relevant information;

5.5 As part of planning, safeguards inspectors should discuss and prepare briefing information for any inspection support staff from other ONR specialisms, in order to address internal aspects to ONR. The briefing material should include, but not necessarily be limited to:

- the purpose of the BTC inspection, objectives, and methods to be used;

- the reasoning and logic behind location selection within the facility;

- identification of relevant operator contacts.

5.6 In preparing for a BTC inspection, inspectors may find that there are a large number of operator documents, blueprints or drawings associated with information provided in the BTC. When planning to bring operator's documents into a facility as an aide to inspection, inspectors may find it useful to bring only those necessary to meet the objectives of the particular inspection.

6 GUIDANCE ON INSPECTION AGAINST BASIC TECHNICAL CHARACTERISTICS AND THEIR IMPLEMENTATION

6.1 BTC inspection involves a set of activities carried out by ONR inspectors at a facility to assure themselves of the correctness and completeness of the design information provided by the operator in the BTC.

6.2 Design information is verified to confirm that the as-built design of the facility is as declared and that it operates as declared by the operator. If changes in design information are declared to have taken place, such changes may be confirmed by ONR, including as a possible basis for changing the ONR approach to regulating compliance against The Regulations.

6.3 A BTC inspection contributes to the cumulative knowledge of the facility design; its operation; and the continued validity of ONR's approach to regulating compliance. Early consideration of safeguards requirements for any new project (known as Safeguards by Design) has benefits for all stakeholders. Examples of these benefits include minimising the risk associated with project scope, schedule, budget and licensing; and in reducing the cost of safeguards implementation to the operator, the national SSAC and the IAEA safeguards inspectorate.

6.4 BTC inspections are performed throughout the lifetime of a facility. The lifecycle phases of a facility are primarily determined by its operating capabilities. The BTC inspection activities to be carried out are determined not only by the type of facility, but also by the lifecycle phase noting different parts of a facility may be in different lifecycle phases.

6.5 Due to specific conditions at a facility it may be useful to prepare a BTC inspection strategy for the facility, to underpin the inspection planning. Inspectors should consider the operator's plan of key activities to identify any such activities where ONR would seek to integrate as part of this strategy, as well as prepare for reactive inspections corresponding to changes in the operator's planned schedule. The technical and specific objectives of the BTC inspection and any methods and activities to be used should be discussed with the operator in advance of the inspection.

6.6 The intensity of BTC inspection during the lifecycle phases of construction and commissioning may be higher than other phases. BTC inspection activities shall be planned and carried out in a manner designed to avoid hampering or delaying the construction and commissioning of facilities. It is considered good practice to review the operator's construction/commissioning plans to aid in this regard, with the aim of developing an integrated plan which includes safeguards activities alongside those planned by other ONR specialisms.

6.7 BTC inspection activities shall be planned and carried out in a manner designed to avoid hampering the operation of facilities, or affecting their safety.

Key Considerations

6.8 As part of a BTC inspection, ONR inspectors may wish to consider some of the following activities in order to help them judge the operator's compliance against Regulation 3 of The Regulations:

- confirming that the correct questionnaire from Part 1 of Schedule 1 has been utilised and that it is appropriately maintained, and that
- the design information submitted to ONR is correct and complete;
- confirming the non-nuclear operations in the facility are as declared (e.g. size of cooling towers, auxiliary lines). Inspectors may wish to utilise the accompanying information e.g. facility drawings to confirm the location, function, and capability of declared auxiliary/support systems and utilities are consistent with the declared type and scale of operation;
- confirming the nuclear operations in the facility are as declared. In undertaking this activity, ONR inspectors might look to physically identify the major nuclear

material flow routes and storage locations as declared in the BTC as part of their inspection. Inspectors may make such observations or measurements necessary to verify the accuracy of the BTC and any changes to them declared under regulation 3 or 31. Inspectors may also wish to ascertain the category and quantity of Qualifying Nuclear Material (QNM) inventory present at the facility;

- checking for undeclared design changes relevant to NMAC&S. Inspectors might wish to verify the design and functioning of the instruments or equipment in the facility used to control QNM, to ensure it has not been modified from design drawings or specifications in a manner that affects its NMAC&S capability;

- confirming the use and installation of operator accountancy equipment /measures is as described in the BTC and continues to be fit for purpose moving forward. Inspectors may wish to see the installation, maintenance and servicing schedules/requirements of installed accountancy equipment/measures, and procedures that assure the control of QNM during such periods, as well as review calibration records against international good practice;

- confirming that declared accounting records and relevant operating records are being managed appropriately including being correct, appropriate and up to date, and can be made available to ONR upon request;

- confirming the physical nuclear material throughput and capacity of the facility, and comparing this with declared throughput and capacity (e.g. inspectors may wish to request the operator to provide the current plant status of the facility);

- confirming that the operator's nuclear material flow and inventory verification methods continue to be fit for purpose.

- inspectors may wish to obtain the statistical information from the operator that justifies their declared measurement uncertainties, and confirm whether these are valid, including through involvement of other specialisms from ONR;

- assess the adequacy of the ONR assurance approach; factoring in facility design, capabilities and life cycle status as well as available assurance approaches;

- where inconsistencies arise, inspectors should seek to resolve these through addressing appropriate questions to the operator.

Should the inspector require introduction or familiarisation to a new facility, it may be advisable to request the operator to provide an overview of the process description through an appropriate medium (e.g. presentation, video).

Additional Considerations

6.9 The lifecycle phases of a facility are primarily determined by its operating capabilities; different parts of the facility may themselves be in different lifecycle phases. ONRs inspection of the BTC should be throughout all lifecycle stages of a facility as defined in ONMACS.

6.10 This means that the BTC must 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.

6.11 Lifecycle phases during which ONR may choose to perform a BTC inspection include:

- **Pre-Construction Phase** – this commences as soon as the plan for constructing a nuclear facility or site is decided. This phase includes the planning, design and engineering activities which precede the actual construction of the facility or site. Activities during this phase may fall under BTC assessment, guidance on which is available in the BTC TAG document;

- **Construction Phase** - the construction phase of a facility begins with preparation of the site for construction and continues until the entire facility is constructed and ready for commissioning. This includes manufacturing and assembling the components of a nuclear facility, the erection of civil works and structures, the installation of components and equipment, and the performance of associated tests;

- **Commissioning Phase** - the commissioning phase of a facility begins after completion of construction and before the facility is considered to be functional. During commissioning, the facility systems and equipment undergo extensive acceptance testing by the operator to ensure that the facility functions as designed. This stage may include the use of nuclear material for testing;

- **Operating Phase** – this begins after commissioning is completed and when nuclear material has been introduced to the facility such that it functions for its designed purpose;

- **Maintenance/Modification Phase** – this phase may involve all or part of a facility and may coincide with other phases, such as operating or shut-down phases. The phase may include design changes to the facility, and therefore if relevant changes to the design information are made during this phase, the operator should inform ONR of such changes in line with the timeliness requirements of Regulation 3 of The Regulations, or any PSP pursuant to The Regulations;

- **Shut-down Phase -** the shut-down phase of a facility involves interrupting the operation of a facility for a period of time significantly exceeding that of normal outages. During this phase, the facility is not in operation, contains nuclear material and could be restarted in a short time should the operator choose to do so;

- **Closed-down Phase** – this begins when operations have been stopped and nuclear material has been removed, but the facility has not yet been decommissioned for safeguards purposes. Closed down facilities may undergo Post Operational Clean Out (POCO) which is the process of removing bulk radioactive material (not de-fuelling) and contamination from process plant and equipment, usually carried out at the end of operations using the existing installed equipment and, if required, ad hoc additional arrangements (e.g. more aggressive decontamination than a usual plant wash-out / clean-down);

- **Decommissioned (for Safeguards Purposes) -** ONR has been informed of the decommissioned status, where the removal/rendering inoperable of essential equipment has been completed so that the facility is not used to store and can no longer be used to handle, process or utilise nuclear material.

6.12 Methods that inspectors may wish to employ in carrying out some of the previously defined example activities can include:

- visual observation and (where appropriate) requesting the operator take photographs;
- facility walk-through and confirmation of floor plan layouts;
- physical identification and follow-through of nuclear material flow routes and inventory locations, including areas where material may be difficult to access and/or measure;
- examination of records, blueprints, engineering drawings, and any other information related to the facility and associated NMAC&S;
- establishing that facility equipment which is essential for safeguards purposes is as described in the BTC (e.g. by the confirming of its physical dimensions, checking its functionality and operation of facility equipment that is essential for safeguards purposes); and
- engagement with the relevant key knowledgeable operator personnel.

6.13 During their inspection of the BTC, ONR inspectors may encounter an Essential Equipment List (EEL). Essential Equipment is an IAEA term that refers to important items of equipment, systems and structures necessary for the declared operation of a facility.

6.14 The EEL is used primarily during the first BTC inspection when confirming the information in a new BTC, and when verifying the removal or inoperability of essential equipment to establish and confirm the decommissioned status of a facility for safeguards purposes The EEL may also be used by an inspector during any BTC inspection when confirming the information in a BTC, and during inspections to confirm the decommissioned status of a facility for safeguards purposes..

7 FURTHER READING

7.1 **The Nuclear Safeguards (EU Exit) Regulations 2019** – http://www.legislation.gov.uk/uksi/2019/196/contents/made

7.2 **The Nuclear Safeguards (Fissionable Material and Relevant International Agreements) Regulations 2019** - http://www.legislation.gov.uk/uksi/2019/195/contents/made

7.3 **NX-INSP-GD-0XX Guidance on the nuclear Safeguards (EU Exit) Regulations 2019**

7.4 **ONR-INSP-GD-064** – CM9 Ref. 2019/144229

7.5 **ONR Nuclear Material, Accountancy, Control and Safeguards Inspection Principles** - (CM9-2019/53481)

7.6 **Assessment of Basic Technical Characteristics of Safeguards Facilities TAG** – CM9 Ref TBC

8 DEFINITIONS

BTC	Basic Technical Characteristics
C/S	Containment / Surveillance
IAEA	International Atomic Energy Agency
NMAC&S	Nuclear Material Accountancy & Control
ONMACS	ONR Guidance on Nuclear Material Accountancy, Control & Safeguards
POCO	Post Operational Clean Out
PSP	Particular Safeguards Provisions
QNM	Qualifying Nuclear Material
TIG	Technical Inspection Guide(s)
TAG	Technical Assessment Guide(s)

9 APPENDIX

Appendix 1

SCHEDULE 1 Regulation 3

PART 1

QUESTIONNAIRE FOR THE DECLARATION OF THE BASIC TECHNICAL CHARACTERISTICS OF A QUALIFYING NUCLEAR FACILITY

I-A. REACTORS

Date: …….
NB:

1. The reply ‘not applicable’ can be given to questions which are not applicable. The ONR is still entitled to request any additional information it considers necessary in connection with the relevant questionnaire in accordance with regulation 3(5).
2. The declaration, duly completed and signed, should be forwarded to the ONR in electronic form in accordance with regulation 35.

IDENTIFICATION OF THE QUALIFYING NUCLEAR FACILITY

1. Name
2. Location, exact address with telephone and fax numbers and e-mail address.
3. Owner (legally responsible body or individual).
4. Operator (legally responsible body or individual).
5. Present status (e.g. under construction, in operation or closed down).
6. Purpose and type.
7. Operating mode influencing its production (shift system adopted, approximate dates of operating periods in year, etc.).
8. Area layout (map showing the installation, boundaries, buildings, roads, rivers, railways, etc.).
9. Layout of qualifying nuclear facility:
   (a) structural containment, fences and access routes;
   (b) storage area for incoming qualifying nuclear material;
   (c) reactor area;
   (d) test and experiment area, laboratories;
   (e) storage area for outgoing qualifying nuclear material;
   (f) disposal area for qualifying nuclear material declared as retained or conditioned waste.
10. Additional data per reactor:
    (a) nominal thermal output;
    (b) material that is either source material or fissionable material;
    (c) initial core enrichments;
    (d) moderator;
    (e) coolant.

GENERAL ARRANGEMENTS AT THE QUALIFYING NUCLEAR FACILITY, INCLUDING THOSE RELATING TO MATERIAL USE AND ACCOUNTANCY, CONTAINMENT AND

SURVEILLANCE

Description of qualifying nuclear material

11. Description of the use of qualifying nuclear material.
12. Outline drawings of fuel assemblies, fuel rods/pins, fuel plates etc., in sufficient detail to indicate general structure with overall dimensions. (Provisions for pin exchange should be described, if applicable, and an indication given if this is a routine operation.).
13. Fuel material (including material in control or shim assemblies, if applicable):
    (a) chemical composition or main alloy constituents;
    (b) average enrichment per assembly;
    (c) nominal weight of qualifying nuclear material per assembly, with design tolerances.
14 Cladding material.
15. Method of identifying individual assemblies, rods/pins, plates etc., if applicable.
16. Other qualifying nuclear material used in the qualifying nuclear facility (briefly state material, purpose and method of use, e.g. as booster rods).

Flow of qualifying nuclear material

17 Flow sheet showing: points where qualifying nuclear material is identified or measured; material balance areas and inventory locations used for material accountancy; and the estimated range of qualifying nuclear material inventories at these locations under normal operating conditions.
18. Expected nominal fuel cycle data, including:
    (a) reactor core loading;
    (b) expected burn-up;
    (c) annual refuelling amount;
    (d) refuelling interval (on-load or off-load);
    (e) forecast of throughput and inventory, and of receipts and shipments.

Handling of qualifying nuclear material

19. Layout of the fresh fuel storage area, drawings of fresh fuel storage locations, and description of packaging.
20. Drawings of fresh fuel preparation and/or assay room and reactor loading area.
21. Drawings of transfer equipment for fresh and irradiated fuel, including refuelling machines or equipment.
22. Drawings of reactor vessel showing location of core and openings in vessel; description of method of fuel handling in vessel.
23. Drawing of core showing: general layout, lattice, form, pitch and dimensions of core; reflector; location, shapes and dimensions of control devices; experimental and/or irradiation positions.
24. Number and size of channels for fuel assemblies and control devices in the core.
25. Spent fuel storage area:
    (a) drawing of storage area;
    (b) method of storage;
    (c) design storage capacity;
    (d) drawing of equipment for handling irradiated fuel;
    (e) minimum cooling time before shipment of spent fuel;
    (f) drawing and description of shipping cask for spent fuel (e.g. to determine whether sealing is possible).
26. Qualifying nuclear material testing area (if applicable):
    (a) brief description of the activities performed;
    (b) description of main equipment (e.g. hot cell, fuel assembly decladding and dissolving equipment);
    (c) description of shipping containers for qualifying nuclear material and of waste and scrap packaging (e.g. to determine whether sealing is possible);

(d) description of storage area for non-irradiated and irradiated qualifying nuclear material;
(e) drawings of the above, if not covered elsewhere.

Coolant data

27. Coolant flow diagrams as required for heat balance calculations (indicating pressure, temperatures and mass flow rates at main points).

ACCOUNTANCY AND CONTROL OF QUALIFYING NUCLEAR MATERIAL

Accountancy system

28. Description of accountancy and control system for qualifying nuclear material (describe item and/or mass accountancy system, including assay methods used and assessed accuracies, supplying specimen blank forms used in all accountancy and control procedures). Period during which such records must be retained should be stated.

Physical inventory

29. Description of: procedures, scheduled frequency and methods for operator's physical inventory taking (both for item and/or mass accountancy, including main assay methods and expected accuracy); access to qualifying nuclear material in the core and to qualifying nuclear material which is irradiated and outside the core; expected radiation levels.

OTHER INFORMATION RELEVANT TO APPLICATION OF SAFEGUARDS

30. Organisational arrangements for accountancy and control of qualifying nuclear material.
31. Information on the health and safety rules which have to be observed at the qualifying nuclear facility, and with which the inspectors must comply.

I-B. CRITICAL AND ZERO ENERGY INSTALLATIONS

Date: …….

IDENTIFICATION OF THE QUALIFYING NUCLEAR FACILITY

1. Name
2. Location, exact address with telephone and fax numbers and e-mail addresses.
3. Owner (legally responsible body or individual).
4. Operator (legally responsible body or individual).
5. Present status (e.g. under construction, in operation or closed down).
6. Purpose and type.
7. Operating mode (shift system adopted, approximate dates of operating periods in year, etc.).
8. Area layout (map showing the installation, boundaries, buildings, roads, rivers, railways, etc.).
9. Layout of qualifying nuclear facility:
    (a) structural containment, fences and access routes;
    (b) qualifying nuclear material storage area(s);
    (c) fuel element assembling area, laboratories, etc.;
    (d) critical assembly.
10. Additional data:
    (a) maximum expected operating power and/or neutron flux;
    (b) main type(s) of qualifying nuclear material and their enrichment;
    (c) moderator;
    (d) reflector, blanket;
    (e) coolant.

GENERAL ARRANGEMENTS AT THE QUALIFYING NUCLEAR FACILITY, INCLUDING THOSE RELATING TO MATERIAL USE AND ACCOUNTANCY, CONTAINMENT AND SURVEILLANCE

Description of qualifying nuclear material

11. Description of the use of qualifying nuclear material.
12. Outline drawings of fuel assemblies, fuel rods/pin, fuel plates etc., in sufficient detail to indicate general structure with overall dimensions.
13. Fuel material (including material in control or shim assemblies, if applicable):
    (a) chemical composition or main alloy constituents;
    (b) form and dimensions;
    (c) enrichment of fuel rods/pins, fuel plates etc.;
    (d) nominal weight of nuclear material, with design tolerances.
14. Cladding material.
15. Method of identifying individual assemblies, rods/pins, plates etc., if applicable.
16. Other qualifying nuclear material used in the qualifying nuclear facility (briefly state material, purpose and method of use, e.g. as booster rods).

Location and handling of qualifying nuclear material

17. Description, including layout drawings, of:
    (a) storage and assembly areas and critical assembly (assemblies) proper (inventory locations) for the qualifying nuclear material;
    (b) the estimated range of inventories of qualifying nuclear material in these locations;
    (c) the physical arrangement of equipment used for assembling, testing and measuring qualifying nuclear material; and
    (d) the routes followed by the qualifying nuclear material.
18. Sketch of critical assembly core showing core support structure, shielding and heat removal systems, with description (to be provided for each critical assembly if more than one in the qualifying nuclear facility).

ACCOUNTANCY AND CONTROL FOR QUALIFYING NUCLEAR MATERIAL

Accountancy system

19. Description of accountancy and control system for qualifying nuclear material (describe item and/or mass accountancy system, including assay methods used and assessed accuracies, supplying specimen blank forms used in all accountancy and control procedures). Period during which such records must be retained should be stated.

Physical inventory

20. Description of: procedures, scheduled frequency and methods for operator's physical inventory taking (both for item and/or mass accountancy, including main assay methods and expected accuracy); access to qualifying nuclear material in the core and to qualifying nuclear material, which is irradiated and outside the core; expected radiation levels.

OTHER INFORMATION RELEVANT TO APPLICATION OF SAFEGUARDS

21. Organisational arrangements for accountancy and control of qualifying nuclear material.
22. Information on the health and safety rules which have to be observed at the qualifying nuclear facility and with which the inspectors must comply.

I-C. QUALIFYING NUCLEAR FACILITIES WHERE CONVERSION, FABRICATION AND REPROCESSING ARE CARRIED OUT

Date: ……

IDENTIFICATION OF THE QUALIFYING NUCLEAR FACILITY

1. Name.
2. Location, exact address with telephone and fax numbers and e-mail addresses.
3. Owner (legally responsible body or individual).

4. Operator (legally responsible body or individual).
5. Present status (e.g. under construction, in operation or closed down).
6. Purpose and type.
7. Operating mode influencing its production (shift system adopted, approximate dates of operating periods in year, etc.).
8. Area layout (map showing the qualifying nuclear facility, boundaries, buildings, roads, rivers, railways, etc.).
9. Layout of qualifying nuclear facility:
    (a) structural containment, fences and access routes;
    (b) routes followed by qualifying nuclear material;
    (c) storage area for qualifying nuclear material which is incoming;
    (d) each main processing area and process laboratory;
    (e) test or experimental areas;
    (f) storage area for qualifying nuclear material which is outgoing;
    (g) nuclear waste disposal area;
    (h) analytical laboratory.

GENERAL ARRANGEMENTS AT THE QUALIFYING NUCLEAR FACILITY, INCLUDING THOSE RELATING TO MATERIAL USE AND ACCOUNTANCY, CONTAINMENT AND SURVEILLANCE

Flow, location and handling of qualifying nuclear material

10. Flow sheet showing: points where qualifying nuclear material is identified or measured; material balance areas and inventory locations used for material accountancy; and the estimated range of nuclear material inventories at these locations under normal operating conditions. The description should include (if applicable):
    (a) batch size or flow rate;
    (b) method of storage or packing;
    (c) storage capacity;
    (d) general forecasts of throughput and inventory and of receipts and shipments.
11. In addition to point 10 above, a description and a layout drawing should be provided of feed storage areas for a qualifying nuclear facility where reprocessing is carried out, indicating:
    (a) locations for fuel elements and handling equipment;
    (b) type of fuel elements including the content and enrichment of qualifying nuclear material.
12. In addition to point 10 above, the description of the recycling stage of the process should include, if available:
    (a) duration of temporary storage;
    (b) schedules for external recycling (if applicable).
13. In addition to point 10 above, the description of the discard stage of the process should include the discard method (disposal or storage).
14. Under steady-state conditions, for each flow sheet referred to in points 10 and 17 and assuming the modes of operation in point 7, state:
    (a) the nominal throughput per year;
    (b) the in-process inventory based on design capacity.
15. Description of the normal procedures adopted for complete or partial clean-out of the process plant. Include description of special sampling and measurement points associated with the clean-out procedure and subsequent physical inventory taking, if not described in point 10 above.

Description of qualifying nuclear material

16. Description of the use of qualifying nuclear material.
17. Description, by means of flow sheets or otherwise, of estimated flow and inventory of all qualifying nuclear material for storage and process areas. The description should include:

(a) physical and chemical form;
(b) content range or expected upper limits for each category of solid or liquid discard material;
(c) enrichment range.

ACCOUNTANCY AND CONTROL FOR QUALIFYING NUCLEAR MATERIAL

Accountancy system

18. Description of the accountancy system used to record and report accountancy data and establish material balances, supplying specimen blank forms used in all procedures. Period during which such records must be retained should be stated.
19. Indicate when and how often material balances are established, including those established
during campaigns. Description of method and procedure for adjusting accounts after a physical inventory taking.
20. Description of procedure for handling shipper/receiver differences and method of adjusting accounts.
21. Description of procedure for correcting accounts following procedural or clerical errors and its effect on shipper/receiver differences.

Physical inventory

22. Refer to point 15. Identify items of equipment on the flow sheets referred to in points 10 and 17 that are to be regarded as containers for qualifying nuclear material under physical inventory conditions. State the schedule of physical inventory taking during the campaign.

Methods for measurement, sampling and analysis

23. Description of method for establishing each measurement at the point indicated; equations or tables used and calculations made to determine actual quantities of weights or volumes should be identified. Indicate whether data are recorded automatically or manually. Method and practical procedures for sampling at each point indicated should be described.
24. Description of analytical methods used for accountancy purposes. Refer to a manual or report, if possible.

Control of measurement accuracy

25. Description of: measurement quality control programme needed for material accountancy purposes, including programmes (together with accuracy values) for the continuing appraisal of analytical, weight, volume and sampling precisions and biases, and for the calibration of associated equipment; method of calibrating the measuring equipment referred to in point 24; type and quality of standards used for analytical methods referred to in point 24; type of analytical equipment used, indicating method and frequency of calibration.

Statistical evaluation

26. Description of methods for statistical evaluation of data collected in measurement control programmes for evaluating the precision and the accuracy of measurements and for estimating measurement uncertainties (i.e. determination of the standard deviations of random and systematic error in the measurements). Also description of statistical procedures used to combine individual error estimates to obtain the standard deviations of overall error for shipper/receiver differences, the book inventory, the physical inventory and material unaccounted for.

OTHER INFORMATION RELEVANT TO APPLICATION OF SAFEGUARDS

27. Organisational arrangements for accountancy and control of qualifying nuclear material.
28. Information on the health and safety rules which have to be observed at the qualifying nuclear facility and with which the inspectors must comply.

I-D. QUALIFYING NUCLEAR FACILITIES USED FOR STORAGE

This form may only be used in respect of a separate qualifying nuclear facility which is not associated with reactors, with enrichment, conversion, fabrication or reprocessing.
Date: ……

1. Name.
2. Location, exact address with telephone and fax numbers and e-mail addresses.
3. Owner (legally responsible body or individual).
4. Operator (legally responsible body or individual).
5. Present status (e.g. under construction, in operation or closed down).
6. Purpose and type.
7. Area layout (map showing the qualifying nuclear facility, boundaries, buildings, roads, rivers, railways, etc.).
8. Layout of qualifying nuclear facility, showing structural containment, fences and access routes.

GENERAL ARRANGEMENTS AT THE QUALIFYING NUCLEAR FACILITY, INCLUDING THOSE RELATING TO MATERIAL USE AND ACCOUNTANCY, CONTAINMENT AND SURVEILLANCE

Description of qualifying nuclear material.

9. Description of the use of qualifying nuclear material.
10. Description, by means of drawings or otherwise, of all qualifying nuclear material in the qualifying nuclear facility, showing:
    (a) all types of items, including normal handling equipment;
    (b) chemical composition or main alloy constituents;
    (c) form and dimensions;
    (d) enrichment;
    (e) nominal weight of qualifying nuclear material, with design tolerances;
    (f) cladding materials;
    (g) methods of identifying items.

Location and handling of qualifying nuclear material

11. Description, by means of layout drawings or otherwise, of:
    (a) storage areas (inventory locations) for qualifying nuclear material;
    (b) the estimated range of inventories of qualifying nuclear material in these locations;
    (c) storage and/or shipping containers of qualifying nuclear material;
    (d) the routes and equipment used for movement of qualifying nuclear material, if applicable.

ACCOUNTANCY AND CONTROL FOR QUALIFYING NUCLEAR MATERIAL

Accountancy system

12. Description of accountancy and control system for qualifying nuclear material (describe item and/or mass accountancy system, including assay methods used and assessed accuracies, supplying specimen blank forms used in all accountancy and control procedures). Period during which such records must be retained should be stated.

Physical inventory

13. Description of procedures, scheduled frequency and methods for operator's physical inventory taking (both for item and/or mass accountancy, including main assay methods), and expected accuracy.

OTHER INFORMATION RELEVANT TO APPLICATION OF SAFEGUARDS

14. Organisational arrangements for accountancy and control of qualifying nuclear material.
15. Information on the health and safety rules which have to be observed at the qualifying nuclear facility and with which the inspectors must comply.

I-E. QUALIFYING NUCLEAR FACILITIES WHERE ISOTOPES ARE SEPARATED
Date: ……

IDENTIFICATION OF THE QUALIFYING NUCLEAR FACILITY

1. Name.
2. Location, exact address with telephone and fax numbers and e-mail address.
3. Owner (legally responsible body or individual).
4. Operator (legally responsible body or individual).
5. Present status (e.g. under construction, in operation or closed down).
6. Building schedule (if qualifying nuclear facility not in operation):
    (a) date building starts;
    (b) date of acceptance for the qualifying nuclear facility;
    (c) commissioning date.
7. Purpose and type (nominal separation capacity, enrichment facilities, etc.).
8. Operating mode influencing its production (shift system adopted, approximate periods of operating times in year, etc.).
9. Area layout (map showing the qualifying nuclear facility, boundaries, buildings, roads, rivers, railways, etc.).
10. Layout of qualifying nuclear facility:

(a) structural containment, fences and access routes;
(b) containment of certain parts of the qualifying nuclear facility;

(c) routes followed by qualifying nuclear material;
(d) storage area for qualifying nuclear material which is incoming;
(e) each main processing area and process laboratory, including weighing and sampling area, decontamination, purification and feed areas, etc.;
(f) test or experimental areas;
(g) storage area for qualifying nuclear material which is outgoing;
(h) nuclear waste disposal area;
(i) analytical laboratory.

GENERAL ARRANGEMENTS AT THE QUALIFYING NUCLEAR FACILITY, INCLUDING THOSE RELATING TO MATERIAL USE AND ACCOUNTANCY, CONTAINMENT AND SURVEILLANCE

Description of qualifying nuclear material.

11. Description of the use of qualifying nuclear material.
12. Description, by means of flow sheets or otherwise, of estimated flow and inventory of all qualifying nuclear material for storage and process areas. The description should include:
(a) physical and chemical form;
(b) enrichment range for feed, product and tails;
(c) content range or expected upper limits for each category of solid or liquid discard material.

Flow, location and handling of qualifying nuclear material

13. Description, by means of diagrams or otherwise, of storage and process areas. The description should include:
(a) sampling and measuring points;
(b) batch size and/or flow rate;
(c) method of storage or packing;
(d) storage capacities.
14. In addition to point 13 above, the description of the installation should include:
(a) separation capacity;
(b) enrichment techniques or methods;
(c) possible points for feed, product and tails;
(d) recycling facilities;
(e) type and size of UF6 cylinders used, filling and emptying methods.
15. Power consumption should be given, where necessary.
16. Each diagram should indicate, under steady-state conditions:
(a) nominal throughput per year;
(b) physical inventory of in-process qualifying nuclear material;
(c) material loss rate owing to leakage, decomposition, deposition, etc.;
(d) arrangements for regular plant maintenance (periodic shutdown or continuous component replacement, etc.).
17. Description of special sampling and measurement points associated with decontamination of equipment that is off-process and is to be maintained or replaced.
18. Description of process waste disposal point, including disposal method, storage period, type of disposal, etc.

ACCOUNTANCY AND CONTROL FOR QUALIFYING NUCLEAR MATERIAL

Accountancy system

19. Description of the accountancy system used to record and report accountancy data and to

establish material balances, supplying specimen blank forms used in all procedures. Period during which such records must be retained should be stated.
20. Indicate when and how often material balances are established, including any established during campaigns. Description of method and procedure for adjusting accounts after a physical inventory taking.
21. Description of procedure for handling shipper/receiver differences and method of adjusting accounts.
22. Description of procedure for correcting accounts owing to procedural or clerical errors and the effect on shipper/receiver differences, if applicable.

Physical inventory

23. Identification of items of equipment mentioned in the description referred to in points 13 and 18 that are to be regarded as containers for qualifying nuclear material under physical inventory conditions. State the timing of physical inventory taking.

Methods for measurement, sampling and analysis

24. Refer to the information given under points 13 and 17 for location of sampling and measurement points.
25. Description of method for establishing each measurement at the point indicated; equations or tables used and calculations made to determine actual quantities of weights or volumes should be identified. Indicate whether data are recorded automatically or manually. Method and practical procedures for sampling at each point indicated should be described. Indicate number of samples taken and rejection criteria.
26. Description of analytical methods used for accountancy purposes. Refer to a manual or report, if possible.

Control of measurement accuracy

27. Description of programmes for the continuous appraisal of weight, volume and sampling precision and biases, and for the calibration of associated equipment.
28. Descriptions of type and quality of standards used for analytical methods referred to in point
26, type of equipment which is used for analysis together with the method and frequency of calibration.

Statistical evaluation

29. Description of methods for statistical evaluation of data collected in measurement control programmes for evaluating the precision and the accuracy of measurements and for estimating measurement uncertainties (i.e. determination of the standard deviations of random and systematic error in the measurements). Also description of statistical procedures used to combine individual error estimates to obtain the standard deviations of overall error for shipper/receiver differences, the book inventory, the physical inventory and material unaccounted for.

OTHER INFORMATION RELEVANT TO APPLICATION OF SAFEGUARDS

30. Organisational arrangements for accountancy and control for qualifying nuclear material.
31. Information on the health and safety rules which have to be observed at the qualifying nuclear facility, and with which the inspectors must comply.

I-F. QUALIFYING NUCLEAR FACILITY USING QUALIFYING NUCLEAR MATERIAL IN QUANTITIES EXCEEDING ONE EFFECTIVE KILOGRAM
Date:…….

NB This form/questionnaire must only be used for a qualifying nuclear facility using qualifying nuclear material in quantities exceeding one effective kilogram which are not reactors (I-A), critical or zero energy installations (I-B), qualifying nuclear facilities where conversion, fabrication or reprocessing are carried out (I-C), qualifying nuclear facilities used for storage (ID), or qualifying nuclear facilities where isotopes are separated (I-E).

IDENTIFICATION OF THE QUALIFYING NUCLEAR FACILITY

1. Name.
2. Location, exact address with telephone number and fax numbers and e mail addresses.
3. Owner (legally responsible body or individual).
4. Operator (legally responsible body or individual).
5. Type of qualifying nuclear material.
6. Description of containers used for storage and handling (e.g. to determine whether sealing is possible).
7. Description of the use of qualifying nuclear material.
8. The current status (e.g. under construction, in operation or closed down).

ACCOUNTANCY AND CONTROL OF QUALIFYING NUCLEAR MATERIAL

9. Description of the accountancy and control system for qualifying nuclear material, including inventories for physical inventory taking.
10. Organisational arrangements for accountancy and control of qualifying nuclear material.

OTHER INFORMATION RELEVANT TO THE APPLICATION OF SAFEGUARDS

The information required under these headings is, where applicable, the same as that required for
the types of qualifying nuclear facility coming under sections C, D and E of Part 1 of Schedule 1.

I-G. QUALIFYING NUCLEAR FACILITY FOR THE TREATMENT AND STORAGE OF WASTE

Date: ……

This form may only be used by a separate qualifying nuclear facility engaged solely in the handling, storing or processing of waste materials (not forming a part of enrichment, conversion, fabrication, chemical reprocessing and recovery facilities or of reactors).

IDENTIFICATION OF THE QUALIFYING NUCLEAR FACILITY

1. Name.
2. Location, exact address with telephone and fax numbers and e-mail addresses.
3. Owner (legally responsible body or individual).
4. Operator (legally responsible body or individual).
5. Present status (e.g. under construction, in operation or closed down).
6. Purpose and type.
7. Area layout (map showing the qualifying nuclear facility, boundaries, buildings, roads, rivers, railways, etc.).
8. Layout of qualifying nuclear facility:
    (a) structural containment, fences and access routes;
    (b) routes followed by qualifying nuclear material;
    (c) nuclear waste disposal areas;
    (d) each main processing area and process laboratory;
    (e) test or experimental areas;
    (f) analytical laboratory.

GENERAL ARRANGEMENTS AT THE QUALIFYING NUCLEAR FACILITY, INCLUDING THOSE RELATING TO MATERIAL USE AND ACCOUNTANCY, CONTAINMENT AND

SURVEILLANCE

Locations and handling of qualifying nuclear material

9. Description of the use of qualifying nuclear material.
10. Description, by means of drawings or otherwise, of:
    (a) storage areas (inventory locations) for qualifying nuclear material;
    (b) the estimated range of inventories of qualifying nuclear material in these locations;
    (c) storage and/or shipping containers for qualifying nuclear material;
    (d) the routes and equipment used for movement of qualifying nuclear material, if applicable.

ACCOUNTANCY AND CONTROL OF QUALIFYING NUCLEAR MATERIAL

Accountancy system

11. Description of the accountancy and control system for qualifying nuclear material, supplying specimen blank forms used in all accountancy and control procedures. Period during which such records must be retained should be stated.

Physical inventory

12. Description of procedures, scheduled frequency and methods for operator's physical inventory taking (both for item and/or mass accountancy including main assay methods) and expected accuracy.

OTHER INFORMATION RELEVANT TO APPLICATION OF SAFEGUARDS

13. Organisational arrangements for accountancy and control of qualifying nuclear material.
14. Information on the health and safety rules which have to be observed at the qualifying nuclear facility and with which the inspectors must comply.

I-H. OTHER QUALIFYING NUCLEAR FACILITY OR A QUALIFYING NUCLEAR FACILITY WITH LIMITED OPERATION

Date: …….

IDENTIFICATION OF THE QUALIFYING NUCLEAR FACILITY AND OF THE QUALIFYING NUCLEAR MATERIAL

1. Name
2. Location, exact address with telephone and fax numbers and e-mail addresses.
3. Owner (legally responsible body or individual).
4. Operator (legally responsible body or individual).
5. Type of qualifying nuclear material.
6. Description of containers used for storage and handling (e.g. to determine whether sealing is possible).
7. Description of the use of qualifying nuclear material.
8. In the case of ore producers, the potential annual production of the qualifying nuclear facility.
9. The current status (e.g. under construction, in operation or closed down).

ACCOUNTANCY AND CONTROL FOR QUALIFYING NUCLEAR MATERIAL

10. Description of the accountancy and control system for qualifying nuclear material, including procedures for physical inventory taking.
11. Organisational arrangements for accountancy and control of qualifying nuclear material.

The relevant questionnaire, duly completed and signed, must be sent to the ONR in accordance with regulation 35.

Appendix 2: Specific Objectives of BTC Inspection Relating to Lifecycle-Phase of the Facility

1. Facility Lifecycle Phases and Objectives

The lifecycle phases of a facility are primarily determined by its operating capabilities. It may be that different parts of the facility are in different lifecycle phases. ONR's authority to examine and inspect design information is a continuing right throughout the lifecycle of a facility i.e. from the decision to construct 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.

1.1. Pre-construction phase

The pre-construction phase for a facility begins as soon as the plan for constructing a nuclear facility or site is decided. This phase includes the planning, design and engineering activities which precede the actual construction of the facility or site.

During the pre-construction phase, preliminary design information is made available to ONR (and the IAEA as required by Code 3.1 of the Subsidiary Arrangements to the UK/IAEA VOA) for examination. This information provides ONR with a basis to plan for financial, equipment if required and human resources. An assurance approach can be prepared using this preliminary information. As the design of the facility progresses, more detailed design information may be provided to allow ONR refinement of their assurance approach. The preliminary design information is also assessed against the facility's declared function and capability.

Assessing BTC information from the outset assists inspectors to determine whether facility design makes adequate provision for NMAC&S by the operator (including ONR's ability to inspect the implementation of those arrangements).

Inspectors may use BTC submissions on new facilities in this phase to establish and maintain suitable dialogue with the IAEA regarding their appetite for possible designation of the new facility concerned, and therefore the need to provide for IEA verification activities and any equipment involved in them

1.1.1. Objectives

- Assess the correctness, completeness, consistency and timeliness of the preliminary information supplied to ONR
- Assess the possible financial, technical and human resource requirements for ONRs assurance implementation.
- Become informed as to the planned function and capability of the facility.
- Identify the essential utilities, support systems, auxiliary buildings and their planned locations.
- Identify the planned buildings and locations relevant to the facility's declared operations.
- Establish a preliminary approach for ONR to regulate compliance against the [safeguards] Regulations (eg including the proposed MBA and KMP structures).
- Identify any nuclear material accountancy and control relevant features to be built into the facility.
- Determine if a longer term BTC inspection plan is required and / or if an essential equipment list (EEL) is warranted.

1.2. Construction phase

The construction phase of a facility begins with preparation of the site for construction and continues until the entire facility is constructed and ready for commissioning. The construction phase of a facility includes manufacturing and assembling the components of a nuclear facility, the erection of civil works and structures, the installation of components and equipment, and the performance of associated tests. During the construction phase, the BTC may continue to be updated as changes to the design occur.

As construction progresses, BTC inspection activities may be carried out on the structural design and the installation of systems and equipment. Initially, BTC inspection activities may consist of verifying the floor plan at each elevation of the facility to ensure that all rooms are built as declared on construction drawings. BTC inspection activities are performed, as applicable, covering rooms, cells, vessels, wall penetrations, process piping, sampling systems and measurement equipment. With process piping, for example, in reprocessing and enrichment plants, it is crucial to ensure that as built is as declared. These activities continue throughout the construction phase or are performed as soon as possible after construction is completed on a particular part of the facility. Continuity of knowledge is essential at this point to ensure that BTC inspection measures performed will still be valid when the facility begins operations. ONR is a sampling organisation, and changes to the design information during the construction phase may be deemed necessary for examination by the inspector in accordance with the principles of enforcement and, if relevant, the nuclear material accountancy and control approach and supplementary documents such as a BTC inspection plan and the essential equipment list should be modified.

1.2.1. Objectives

For lifecycle phase-specific objectives, the following activities do not provide an exhaustive list, and it is for the inspector to apply discretion in determining which of the following (and any other objectives) are to be applied to the facility.

- Assess the correctness, completeness, consistency and timeliness of the design information supplied to ONR.
- Assess whether the overall design of the process and / or containment is appropriate for the declared use.
- Confirm that the as-built structures and installed systems and equipment are as designed and are for the declared purpose and use.
- Confirm that the utilities, support systems, auxiliary buildings and their locations are consistent with the declared function and capabilities.
- Identify areas of the facility for which confidence about material containment will be particularly important (eg storage areas) and where measures to control and monitor access may be used.
- Finalise flow and inventory KMPs within the MBA and verify their declared design.
- Confirm the use, function and capacity of the essential equipment are as declared.
- Determine if equipment should be added to the EEL.
- Finalise the ONR approach to regulating compliance against the [safeguards] Regulations.

1.3. Commissioning phase

The commissioning phase of a facility begins after completion of construction and before the facility is considered to be functional. During commissioning, the facility systems and equipment undergo extensive acceptance testing by the operator to ensure that the facility functions as designed. This stage may include the use of nuclear material for testing.

ONR's (as well as the IAEA's, where necessary, to support possible designation of the facility for inspection under the UK/IAEA Voluntary Offer Agreement) participation in the testing

activities should be arranged jointly with the operator to enable ONR to verify the design and performance effectively while minimising the interference on the facility's commissioning phase. The approach taken to commissioning must ensure that ONR can make an independent assessment.

It is likely that observations and results from the acceptance and commissioning tests will be used as reference data for later BTC examination and inspection activities. This intelligence will be important at later stages and thus should be captured and stored appropriately

1.3.1. Objectives

For lifecycle phase-specific objectives, the following activities do not provide an exhaustive list, and it is for the inspector to apply discretion in determining which of the following (and any other objectives) are to be applied to the facility.

- Assess the correctness, completeness, consistency and timeliness of the design information supplied to ONR.
- Confirm that the as-built structures and installed systems and equipment are as designed and are for the declared purpose and use
- Assess that the supporting infrastructure is appropriate for the declared function and capability.
- Confirm that the operation of the facility components and systems is tested in accordance with design assumptions and performance criteria.
- Confirm the applicability of any measures for material containment and monitoring.
- Confirm that the identified flow and inventory Key Measurement Points (KMPs) and other strategic points within the MBA remain appropriate, and operator arrangements for measuring or estimating the nuclear material involved also remain appropriate
- Confirm that the material flow routes are constructed as declared and are appropriate for the declared purpose.
- Confirm that the material inventory locations are constructed as declared and are appropriate for the declared purpose.
- Assess and confirm uncertainties for the operator's measurement systems (including, where appropriate, by comparison with the appropriate KMPs and whether the measurement systems are appropriate as mentioned previously. Inspectors may also refer to the TIG on Safeguards Inspection of NMACS Systems for information on International Target Values for safeguards purposes).
- Identify nuclear material accountancy and control relevant accounting and operating records and procedures.
- Confirm that declared accounting and relevant operating procedures are correct, appropriate and up-to-date.
- Confirm the validity of the ONR approach to regulating compliance against the [safeguards] Regulations.
- Confirm that the use, function and capacity of the essential equipment are as declared.

1.4. Operating phase

The operating phase (routine operations) of a facility begins after commissioning is completed and when nuclear material has been introduced to the main facility, or support facility, so that it may function for its designed purpose. During the operating phase the major objective of BTC examination and inspection activities is to ensure that the facility is operating in accordance with the declared design information. This is achieved through re-examination of BTC information and BTC inspections which also assess the continued validity of the ONR approach to regulating compliance against the [safeguards] Regulations and any supplementary documents, such as a specific BTC inspection plan or EEL. It should be noted that access to some parts of the facility may be difficult or impossible once nuclear materials has been introduced.

1.4.1. Objectives

For lifecycle phase-specific objectives, the following activities do not provide an exhaustive list, and it is for the inspector to apply discretion in determining which of the following (and any other objectives) are to be applied to the facility.

- Assess the correctness, completeness, consistency and timeliness of the design information supplied to ONR.
- Confirm that the as-built structures and installed systems and equipment are as designed and are for the declared purpose and use
- Assess if the utility and support design is appropriate for the declared function and capability.
- Assure that the installation and use of any Containment & Surveillance (C/S) measures continue to be appropriate.
- Assure that nuclear material flow and inventory verification methods continue to be appropriate.
- Assure that declared accounting and relevant operating procedures are correct, appropriate and up-to-date (inspectors may wish to obtain the statistical information from the operator that justifies their declared measurement uncertainties, and confirm whether these are valid, including through involvement of other specialisms in ONR)
- Confirm the validity of the ONR approach to regulating compliance against The Regulations.

1.5. Maintenance / modification phase

The maintenance-/-modification phase may involve all or part of a facility. It may also coincide with other phases, such as operating or shut-down phases. The maintenance-/-modification phase may include design changes to the facility. The major objective of BTC examination and inspection activities during this phase is to ensure the facility's design, function, operation, capability, and essential equipment, have not been changed.

If nuclear materials accountancy and control relevant changes to the design information are made during this phase, the operator should inform ONR of such changes in line with requirements for providing BTC updates in The Regulations. Good practice would be that such notice should reach ONR well in advance to allow ONR to perform BTC examination and inspection activities as well as to participate in the facility's acceptance testing, as appropriate. If prior notice cannot be made, then information should be provided as soon as possible.

1.5.1. Objectives

For lifecycle phase-specific objectives, the following activities do not provide an exhaustive list, and it is for the inspector to apply discretion in determining which of the following (and any other objectives) are to be applied to the facility.

- Assure correctness, completeness, consistency and timeliness of the design information supplied to ONR.
- Assess whether the maintenance and/or modifications were appropriate for the declared purpose.
- Assure the correctness and completeness of the declared work plan relative to the maintenance / modification work performed.
- Verify that the declared function and capabilities of the facility have not been changed.
- Assure that the integrity of the containment for any C/S measures has not been compromised and that they remain appropriate.

- Assess the impact of maintenance / modification work on nuclear material verification methods.
- Determine whether the use, function, capacity and operational status of essential equipment have been modified.

1.6. Shut-down phase

The shut-down phase of a facility involves interrupting the operation of a facility for a period of time significantly exceeding that of normal outages. During this phase, the facility is not in operation, contains nuclear material and could be restarted in a short time should the operator choose to do so.

During the shut-down phase, ONR continues with BTC examination and inspection activities to ensure that the operational status of the facility is as declared and that no undeclared changes are being made to the facility.

1.6.1. Objectives

For lifecycle phase-specific objectives, the following activities do not provide an exhaustive list, and it is for the inspector to apply discretion in determining which of the following (and any other objectives) are to be applied to the facility.

- Assure correctness, completeness, consistency and timeliness of the design information supplied to ONR.
- Assure that the integrity of the containment is adequate and cannot / has not been compromised.
- Confirm the applicability of selected C/S measures, if appropriate.
- Establish the installation, testing, authentication and servicing needs of selected C/S measures, if any.
- Confirm the declared shut-down status of the facility.

1.7. Closed-down phase

The closed-down phase of a facility begins when operations have been stopped and nuclear material has been removed, but the facility has not been decommissioned for safeguards purposes. A facility which has been built but never operated and which has no nuclear material inventory may also be considered to be in a closed-down phase. ONR should still be performing BTC examination and inspection activities during the closed-down phase.

A closed-down facility may be in either a state of preservation or a state of decommissioning.

1.7.1. Post-POCO Care & Maintenance Phase

A closed-down facility is in a state of preservation when:

- Major process operations were never started or have been declared as stopped.
- Nuclear material inventory was never received or have been removed or cleaned out to the extent possible.
- The installation is not in a decommissioning stage, nor has it been decommissioned.

BTC inspections are performed during the preservation state to ensure that the facility is not operating.

1.7.2. Objectives

For lifecycle phase-specific objectives, the following activities do not provide an exhaustive list, and it is for the inspector to apply discretion in determining which of the following (and any other objectives) are to be applied to the facility.

- Assure correctness, completeness, consistency and timeliness of the design information supplied to ONR.
- Assure the integrity of the containment is adequate and cannot / has not be compromised.
- Confirm the applicability of selected C/S measures if appropriate.
- Establish the installation, testing, authentication and servicing needs of selected C/S measures, if any.
- Verify the declared closed-down status – preservation state of the facility.

1.7.3. State of decommissioning

A closed-down facility is in a state of decommissioning when:

- It is closed-down as defined for a state of preservation;
- ONR has been informed of the decision to begin decommissioning; and
- The removal or rendering inoperable of essential equipment has begun.

BTC inspection activities are performed during this state to ensure that the facility is not operating and to confirm the declared decommissioning activities. ONR verifies the removal and / or rendering inoperable of the essential equipment. An assessment should be made of the relative difficulty (time and cost) of re-activating or misusing the facility undergoing decommissioning. The BTC inspection activities are performed according to the decommissioning schedule as declared by the operator.

1.7.4. Objectives

For lifecycle phase-specific objectives, the following activities do not provide an exhaustive list, and it is for the inspector to apply discretion in determining which of the following (and any other objectives) are to be applied to the facility.

- Evaluate and prioritise the EEL with respect to the need for removal or rendering inoperable.
- Assure the removal and/or rendering inoperable of essential equipment as declared by the operator.
- Assure correctness, completeness, consistency and timeliness of the design information supplied to ONR.
- Confirm the applicability of selected C/S measures, if appropriate.
- Verify the declared closed-down status – decommissioning state – of the facility.

1.8. Decommissioned for safeguards purposes

The regulations include a definition of “Decommissioned” in relation to a Qualifying Nuclear Facility as meaning *‘a Qualifying Nuclear Facility for which it has been confirmed to the satisfaction of the ONR that residual structures and equipment essential for its use have been removed or rendered inoperable so that it is not used to store and can no longer be used to produce, handle, process, dispose of or utilise Qualifying Nuclear Material’*.

Removal of Qualifying Nuclear Material is therefore an important factor in determining that a facility has been decommissioned for safeguards purposes; and this should have already occurred during POCO and have been evident at the Post-POCO Care & Maintenance phase.

The operator should provide ONR with the updated information specifying the decommissioned status of the facility. BTC examination and inspection activities will be scheduled by ONR to confirm that the facility has been decommissioned as specified by confirming that sufficient declared essential equipment has been removed or rendered inoperable. Once ONR is able to determine that the facility can no longer be used for its declared purpose, the facility is considered decommissioned for safeguards purposes. ONR can then formally inform the operator of its determination that the facility is decommissioned for safeguards purposes.

ONR will cease to perform BTC examination and inspection activities once they have concluded that the facility has been decommissioned for safeguards purposes. However, as the UK has the Additional Protocol in force, further access will be possible for the IAEA through complementary access arrangements if they deem it necessary.

1.8.1. Objectives

For lifecycle phase-specific objectives, the following activity does not provide an exhaustive list, and it is for the inspector to apply discretion in determining which of the following (and any other objectives) are to be applied to the facility.

- Confirm that the facility has been decommissioned for safeguards purposes.