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APPROVED BY OMB: NO. 3150-0056 EXPIRES: MM/DD/YYYY



**INTERNATIONAL ATOMIC ENERGY AGENCY**
**DEPARTMENT OF SAFEGUARDS AND INSPECTION**

# DESIGN INFORMATION QUESTIONNAIRE *

**(CONTINUED)**

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* Questions which are not applicable may be left unanswered.

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## RESEARCH AND POWER REACTORS

### GENERAL REACTOR DATA

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|---|---|
| 13. FACILITY DESCRIPTION | GENERAL FLOW DIAGRAM(S) ATTACHED UNDER REF. NOS. |
| 14. RATED THERMAL OUTPUT, ELECTRICITY OUTPUT (for power reactors) | |
| 15. NUMBER OF UNITS (REACTORS) AND THEIR LAYOUT IN THE NUCLEAR POWER PLANT | |
| 16. REACTOR TYPE | |

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| 17. TYPE OF REFUELING (on- or off-load) | |
| 18. CORE ENRICHMENT RANGE AND PU CONCENTRATION (at equilibrium for on-load reactors, initial and final for off-load reactors) | |
| 19. MODERATOR | |
| 20. COOLANT | |
| 21. BLANKET, REFLECTOR | |
| 22. TYPES OF FRESH FUEL | |
| 23. FRESH FUEL ENRICHMENT (U-235) AND/OR PU CONTENT (average enrichment per each type of assembly) | |
| 24. NOMINAL WEIGHT OF FUEL IN ELEMENTS/ASSEMBLIES (with design tolerances) | |
| 25. PHYSICAL AND CHEMICAL FORM OF FRESH FUEL (general description) | |

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| 26. REACTOR ASSEMBLIES*<br>(indicate for each type)<br><br>-- types of assemblies;<br>-- number of fuel assemblies, control and shim assemblies, experimental assemblies in the core, in blanket zone(s);<br>-- number and types of fuel rods/elements**<br>-- average enrichment and/or Pu content per assembly;<br>-- general structure;<br>-- geometric form;<br>-- dimensions;<br>-- cladding material | DRAWING(S) ATTACHED UNDER REFERENCE NUMBERS: |
| 27. DESCRIPTION OF FRESH FUEL ELEMENTS<br>(indicate for each type)<br><br>-- physical and chemical form of fuel;<br>-- nuclear material and fissionalbe material and its quantity (with design tolerances);<br>-- enrichment and/or Pu content;<br>-- geometric form;<br>-- dimensions;<br>-- number of slugs/pellets per element;<br>-- composition of alloy;<br>-- cladding material (thickness, composition of material, bonding) | DRAWING(S) ATTACHED UNDER REFERENCE NUMBERS: |

* Assembly is the combination of elements or handling units such as cluster or bundle.
** Element is the smallest contained fuel unit.

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| 28. PROVISION FOR ELEMENT EXCHANGE IN ASSEMBLIES OF EACH TYPE (indicate whether this is foreseen to become a routine operation) | |
| 29. BASIC OPERATIONAL ACCOUNTING UNIT(S) (fuel elements/assemblies, etc.) | DRAWING(S) ATTACHED UNDER REFERENCE NUMBERS: |
| 30. OTHER TYPES OF UNITS | |
| 31. MEANS OF NUCLEAR MATERIAL/FUEL IDENTIFICATION | |

| NUCLEAR MATERIAL DESCRIPTION | |
|---|---|
| 32. OTHER NUCLEAR MATERIAL IN THE FACILITY (each separately identified) | |

| NUCLEAR MATERIAL FLOW | |
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| 33. SCHEMATIC FLOW SHEET FOR NUCLEAR MATERIAL (identifying measurement points, accountability areas, inventory locations, etc.) | DIAGRAM(S) ATTACHED UNDER REFERENCE NUMBERS: |

| NUCLEAR MATERIAL FLOW | |
|---|---|
| 34. INVENTORY<br>STATE QUANTITY RANGE, NUMBER OF ITEMS, AND APPROXIMATE URANIUM ENRICHMENT AND PLUTONIUM CONTENT FOR<br>(under normal operating conditions): | |
| i) Fresh Fuel Storage | |
| ii) Reactor Core | |
| iii) Spent Fuel Storage | |
| iv) Other Locations | |
| 35. LOAD FACTOR<br>(power reactor only) | |
| 36. REACTOR CORE LOADING<br>(number of elements/assemblies) | |

| NUCLEAR MATERIAL FLOW | |
|---|---|
| 37. REFUELING REQUIREMENTS (quantity, time interval) | |
| 38. BURN-UP (average/maximum) | |
| 39. IS THE IRRADIATED FUEL TO BE REPROCESSED OR STORED? (if stored, indicate site) | |

| NUCLEAR MATERIAL HANDLING | |
|---|---|
| 40. FRESH FUEL<br>i) Packaging (description) | |
| ii) Layout, General Arrangements, and Storage Plan | DRAWING(S) ATTACHED UNDER REFERENCE NUMBERS: |

| NUCLEAR MATERIAL HANDLING | |
|---|---|
| 40. FRESH FUEL (Continued)<br><br>iii) Capacity of Store | |
| (iv) Fuel Preparation and Assay Room, and Reactor Loading Area (description and indication of layout and general arrangement) | DRAWING(S) ATTACHED UNDER REFERENCE NUMBERS: |
| 41. FUEL TRANSFER EQUIPMENT (including refueling machines) | DRAWING(S) ATTACHED UNDER REFERENCE NUMBERS: |
| 42. ROUTES FOLLOWED BY NUCLEAR MATERIAL (fresh fuel, irradiated fuel, blanket, other material) | |

| NUCLEAR MATERIAL HANDLING | |
|---|---|
| 43. REACTOR VESSEL<br>(showing core location, access to vessel, vessel openings, fuel handling in vessel) | DRAWING(S) ATTACHED UNDER REFERENCE NUMBERS: |
| 44. REACTOR CORE DIAGRAM<br>(showing general disposition, lattice, form, pitch, dimensions of core, reflector, blanket; location, shapes, and dimensions of:<br>fuel elements/assemblies:<br>control elements/assemblies;<br>experimental elements/assemblies) | DRAWING(S) ATTACHED UNDER REFERENCE NUMBERS: |
| 45. NUMBER AND SIZE OF CHANNELS FOR FUEL ELEMENTS OR ASSEMBLIES AND FOR CONTROL ELEMENTS IN THE CORE | |
| 46. AVERAGE MEAN NEUTRON FLUX IN THE CORE:<br><br>Thermal: | |
| Fast: | |

| NUCLEAR MATERIAL HANDLING | |
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| 47. INSTRUMENTATION FOR MEASURING NEUTRON AND GAMMA FLUX | |
| 48. IRRADIATED FUEL<br><br>i) Layout, Spent Fuel Storage Plan, and General Arrangements (internal and external) | DRAWING(S) ATTACHED UNDER REFERENCE NUMBERS: |
| ii) Method of Storage | |
| iii) Design Capacity of Storage | |
| iv) Minimum and Normal Cooling Period Prior to Shipment | |

| NUCLEAR MATERIAL HANDLING | |
|---|---|
| 48. IRRADIATED FUEL (Continued)<br><br>v) Description of Irradiated Fuel Transport Equipment and Shipping Cask (if no information on site, where is it held?) | DRAWING(S) ATTACHED UNDER REFERENCE NUMBERS: |
| 49. MAXIMUM ACTIVITY OF FUEL/BLANKET AFTER REFUELING (at the surface and at a distance of 1 metre) | |
| 50. METHODS AND EQUIPMENT FOR HANDLING IRRADIATED FUEL (except for that already given under Qs. 41, 48.v) | |

## NUCLEAR MATERIAL HANDLING

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| 51. NUCLEAR MATERIAL TESTING AREAS (except as already given under Q. 40) For each such area, briefly describe:<br><br>i) Nature of Activities | |
| ii) Major Equipment Available (e.g., hot cell, fuel element decladding, and dissolution equipment) | |
| iii) Shipping Containers Used (main material, scrap, and waste) | |
| iv) Storage Areas for Both Unirradiated and Irradiated Materials | |
| v) Layout and General Arrangement | DRAWING(S) ATTACHED UNDER REFERENCE NUMBERS: |

| COOLANT DATA | |
|---|---|
| 52. FLOW DIAGRAM (indicating mass flow, temperature and pressure at major points, etc.) | DRAWING(S) ATTACHED UNDER REFERENCE NUMBERS: |

| PROTECTION AND SAFETY MEASURES | |
|---|---|
| 53. BASIC MEASURES FOR PHYSICAL PROTECTION OF NUCLEAR MATERIAL | |

| PROTECTION AND SAFETY MEASURES | |
|---|---|
| 54. SPECIFIC HEALTH AND SAFETY RULES FOR INSPECTOR COMPLIANCE (if extensive, attach separately) | |

## NUCLEAR MATERIAL ACCOUNTANCY AND CONTROL

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| 55. SYSTEM DESCRIPTION<br>Give a description of the nuclear material accounting system, of the method of recording and reporting accountancy data, the procedures for account adjustments after inventory, and correction of mistakes, etc., using the following headings:<br><br>i) General<br>(This section should also state what general and subsidiary ledgers will be used, their form (hard copies, tapes, microfilms, etc.), as well as who has the responsibility and authority. Source data (e.g., shipping and receiving forms, the initial recording of measurements and measurement control sheets) should be identified. The procedures for making adjustments, the source data and records should be covered as well as how the adjustments are authorized and substantiated.) | SPECIMEN FORMS USED IN ALL PROCEDURES ATTACHED UNDER REFERENCE NUMBERS: |

## NUCLEAR MATERIAL ACCOUNTANCY AND CONTROL

55. SYSTEM DESCRIPTION (Continued)

ii) Receipts

iii) Shipments

## NUCLEAR MATERIAL ACCOUNTANCY AND CONTROL

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|---|---|
| 55. SYSTEM DESCRIPTION (Continued)<br><br>iv) Physical Inventory<br>Description of procedures, scheduled frequency, methods of operator's inventory taking (both for item and/or mass accountancy) including relevant assay methods and expected accuracy, access to nuclear material, possible verification method for irradiated nuclear material, methods of verification of nuclear material in the core | LIST OF MAJOR ITEMS OF EQUIPMENT REGARDED AS NUCLEAR MATERIAL CONTAINERS ATTACHED UNDER REFERENCE NUMBERS: |
| v) Nuclear loss and production (estimation of limits) | |

| NUCLEAR MATERIAL ACCOUNTANCY AND CONTROL | |
|---|---|
| 55. SYSTEM DESCRIPTION (Continued)<br><br>vi) Operational Records and Accounts (including method of adjustment or correction and place or preservation and language) | |
| 56. FEATURES RELATED TO CONTAINMENT AND SURVEILLANCE MEASURES (general description) | |

## NUCLEAR MATERIAL ACCOUNTANCY AND CONTROL

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| 57. FOR EACH MEASUREMENT POINT OF ACCOUNTABILITY AREAS, IDENTIFIED IN PARTICULAR UNDER QS. 13, 33, 34, GIVE THE FOLLOWING (IF APPLICABLE)*<br><br>i) Description of Location, Type, Identification | IF NECESSARY, ATTACH DRAWING(S) |
| ii) Anticipated Types of Inventory Change and Possibilities to Use This Measurement Point for Physical Inventory Taking | |
| iii) Physical and Chemical Form of Nuclear Material (with cladding materials description) | |

* For each measurement point, fill in separate sheet.

## NUCLEAR MATERIAL ACCOUNTANCY AND CONTROL

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|---|---|
| 57. FOR EACH MEASUREMENT POINT OF ACCOUNTABILITY AREAS, IDENTIFIED IN PARTICULAR UNDER QS. 13, 33, 34, GIVE THE FOLLOWING (IF APPLICABLE)* (Continued)<br><br>iv) Nuclear Material Containers, Packaging | |
| v) Sampling Procedures and Equipment Use | |
| vi) Measurement Method(s) and Equipment Use (item counting, neutron flux, power level, nuclear burn-up and production, etc.) | |

* For each measurement point, fill in separate sheet.

| NUCLEAR MATERIAL ACCOUNTANCY AND CONTROL | |
|---|---|
| 57. FOR EACH MEASUREMENT POINT OF ACCOUNTABILITY AREAS, IDENTIFIED IN PARTICULAR UNDER QS. 13, 33, 34, GIVE THE FOLLOWING (IF APPLICABLE)* (Continued)<br><br>vii) Source and Level of Accuracy | IF NECESSARY, ATTACH DRAWING(S) |
| viii) Technique and Frequency of Calibration of Equipment Used | |
| ix) Programme for the Counting Appraisal of the Accuracy of Methods and Techniques Used | |

* For each measurement point, fill in separate sheet.

## NUCLEAR MATERIAL ACCOUNTANCY AND CONTROL

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|---|---|
| 57. FOR EACH MEASUREMENT POINT OF ACCOUNTABILITY AREAS, IDENTIFIED IN PARTICULAR UNDER QS. 13, 33, 34, GIVE THE FOLLOWING (IF APPLICABLE)* (Continued)<br><br>x) Methods of Converting Source Data to Batch Data (standard calculative procedures, constants used, empirical relationships, etc.) | IF NECESSARY, ATTACH DRAWING(S) |
| xi) Anticipated Batch Flow Per Year | |
| xii) Anticipated Number of Items Per Flow and Inventory Batches | |

* For each measurement point, fill in separate sheet.

## NUCLEAR MATERIAL ACCOUNTANCY AND CONTROL

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|---|---|
| 57. FOR EACH MEASUREMENT POINT OF ACCOUNTABILITY AREAS, IDENTIFIED IN PARTICULAR UNDER QS. 13, 33, 34, GIVE THE FOLLOWING (IF APPLICABLE)* (Continued)<br><br>xiii) Type, Composition and Quantity of Nuclear Material Per Batch (with indication of batch data, total weight of each element of nuclear material and, in the case of plutonium and uranium, the isotopic composition when appropriate, form of nuclear material) | IF NECESSARY, ATTACH DRAWING(S) |
| xiv) Access to Nuclear Material and its Location | |
| xv Features Related to Containment-Surveillance Measures | |

* For each measurement point, fill in separate sheet.

## OPTIONAL INFORMATION

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| 58. OPTIONAL INFORMATION (that the operator considers relevant to safeguarding the facility) | |

Signature of Responsible Officer:

Date: