

# SPENT FUEL ENCAPSULATION PLANTS



**IAEA**  
International Atomic Energy Agency

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## INTERNATIONAL ATOMIC ENERGY AGENCY DEPARTMENT OF SAFEGUARDS

# DESIGN INFORMATION QUESTIONNAIRE \*

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The purpose of this document is to obtain the facility design information required by the Agency in order to discharge its safeguards responsibilities. It will also serve as a checklist for examination of design information by Agency inspector(s). If, in any area, insufficient space is available add further sheets to the extent necessary.

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<b>COUNTRY</b>	
<b>COUNTRY OFFICER</b>	
<b>TYPE</b>	<b>Spent Fuel Encapsulation Plants</b>
<b>DATE OF INITIAL DATA</b>	
<b>VERIFICATION</b>	
<b>LAST REVIEW AND UPDATING</b>	

## ALL FACILITIES

### GENERAL INFORMATION

<b>1. Name of the facility</b> (include usual abbreviation)			
<b>2. Location and postal address</b>			
<b>3. Owner</b> (Legally responsible)			
<b>4. Operator</b> (Legally responsible)			
<b>5. Description</b> (Main features only)			
<b>6. Purpose</b>			
<b>7. Status</b> (e.g., planned; under construction, in operation; shut down; closed down; decommissioned)			
<b>8. Construction schedule dates</b> (if not in operation)	<b>Start of Construction (MM/DD/YYYY)</b>	<b>Commissioning (MM/DD/YYYY)</b>	<b>Operation (MM/DD/YYYY)</b>
<b>9. Normal operating mode</b> (days only, two shift, three shift; number of days/annum, etc.)			
<b>10. Facility layout</b> (structural containment, fences, access, nuclear material storage areas, laboratories, waste disposal areas, routes followed by nuclear material, experimental and test areas, etc.)	DRAWING(S) ATTACHED UNDER REF. NOS.		
<b>11. Sitting of facility</b> (Maps showing in sufficient detail: location, premises and perimeter of facility, other buildings, roads, railways, rivers, etc.)	DRAWING(S) AND/OR MAPS ATTACHED UNDER REF. NOS.		
<b>12. Names and/or titles and address of responsible officers</b> (for nuclear material accountancy and control and contact with the Agency. If possible attach organization charts showing position of officers)			

## OVERALL PROCESS PARAMETERS

<b>13. Facility description</b> (indicating important items of equipment which use, produce or process nuclear material, all process stages, storage areas and points as pertaining to the measurement, control and accountancy of nuclear material)	GENERAL FACILITY DIAGRAM(S) ATTACHED UNDER REF. NOs.) <div style="border: 1px solid black; height: 60px; width: 100%;"></div>
<b>14. Process description</b>	PROCESS FLOW SHEET ATTACHED UNDER REF. NOs.) <div style="border: 1px solid black; height: 60px; width: 100%;"></div>
<b>15. Design capacity</b> (e.g. number of spent fuel assemblies or CANDU bundles, other quantities of nuclear material in metric tons)	<div style="border: 1px solid black; height: 60px; width: 100%;"></div>
<b>16. Anticipated annual disposals</b> (e.g. number of spent fuel assemblies or CANDU bundles, other quantities of nuclear material in effective kilograms)	<div style="border: 1px solid black; height: 60px; width: 100%;"></div>
<b>17. Other important items of equipment processing nuclear material, if any</b>	<div style="border: 1px solid black; height: 40px; width: 100%;"></div>

## NUCLEAR MATERIAL DESCRIPTION AND FLOW

<b>18. Main material description</b> i) Main types of nuclear materials and accountability units to be handled in the facility	<div style="border: 1px solid black; height: 60px; width: 100%;"></div>
ii) Physical (mechanical) form, cladding, and overall dimensions of spent fuel assemblies or CANDU bundles	DRAWING(S) ATTACHED UNDER REF. NOs. <div style="border: 1px solid black; height: 60px; width: 100%;"></div>
iii) Physical (mechanical) form, overall dimensions, and capacity of disposal canisters	DRAWING(S) ATTACHED UNDER REF. NOs. <div style="border: 1px solid black; height: 60px; width: 100%;"></div>
iv) Physical form and overall dimensions of other types of containers and packaging	DRAWING(S) ATTACHED UNDER REF. NOs. <div style="border: 1px solid black; height: 80px; width: 100%;"></div>
v) Means of item identification	<div style="border: 1px solid black; height: 60px; width: 100%;"></div>
vi) Range of initial weights of heavy metal and initial enrichments of uranium in fuel assemblies	<div style="border: 1px solid black; height: 40px; width: 100%;"></div>
vii) Range of spent fuel burn-ups, cooling times, and Pu contents of fuel assemblies	<div style="border: 1px solid black; height: 40px; width: 100%;"></div>
viii) Means of batch identification, batch size, flow rate, and campaign period	<div style="border: 1px solid black; height: 40px; width: 100%;"></div>

## NUCLEAR MATERIAL DESCRIPTION AND FLOW

ix) Range of radiation levels in nuclear material storage and process areas

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x) Range of radiation and heat levels at exterior of transport and disposal containers

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xi) Frequency of receipt and shipment (batches/units per month)

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**19. Other nuclear material in the facility and its location, if any**

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**20. Schematic flowsheet for nuclear material**  
(identify flow and inventory measurement points, accountability areas, inventory locations, etc.)

DRAWING(S) ATTACHED UNDER REF. NOS.

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**21. Nuclear material flow quantities for each nuclear material handling area**

(including range and maximum quantities of nuclear material at one time) i.e.:

- process area (handling cell)
- storage area (input fuel assemblies; disposal canisters)
- other locations

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**22. Design range of inventories of nuclear material in each storage area and process area**

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## NUCLEAR MATERIAL HANDLING

**23. Container and packaging description**

DRAWING(S) ATTACHED UNDER REF. NOS.

i) Describe containers and packaging in which nuclear material is received:

- TYPE:
- MATERIAL:
- CAPACITY (In terms of spent fuel assemblies or CANDU bundles and other nuclear material):
- IDENTIFICATION FEATURES:
- SIZE:

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ii) Describe containers and packaging in which nuclear material is shipped: (Inner container and over pack container:

- TYPE:
- MATERIAL:
- CAPACITY (In terms of spent fuel assemblies or CANDU bundles and other nuclear material):
- IDENTIFICATION FEATURES:
- SIZE:

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iii) Range of radiation and heat levels at exterior of storage and transport packages and disposal canisters

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**NUCLEAR MATERIAL HANDLING**

<b>24. Description of each nuclear material storage and process area</b> (Including range of radiation levels in nuclear material storage and process areas)	DRAWING(S) ATTACHED UNDER REF. NOS. <div style="border: 1px solid black; height: 40px;"></div>
<b>25. Shielding</b> (for storage and transfer)	<div style="border: 1px solid black; height: 40px;"></div>
<b>26. Methods and means of handling and transport of nuclear material</b> (Including loading into disposal containers)	<div style="border: 1px solid black; height: 60px;"></div>
<b>27. Transportation routes followed by nuclear material</b> (With reference to plant layout)	<div style="border: 1px solid black; height: 40px;"></div>

**PLANT MAINTENANCE**

<b>28. Maintenance, decontamination</b> i) Normal plant maintenance	<div style="border: 1px solid black; height: 40px;"></div>
ii) Plant and equipment decontamination	<div style="border: 1px solid black; height: 40px;"></div>
iii) Plant start-up and plant shutdown procedures if different from normal operation	<div style="border: 1px solid black; height: 40px;"></div>

**PROTECTION AND SAFETY MEASURES**

<b>29. Basic measures for physical protection of nuclear material</b>	<div style="border: 1px solid black; height: 40px;"></div>
<b>30. Specific health and safety rules for inspector compliance</b>	<div style="border: 1px solid black; height: 40px;"></div>

**NUCLEAR MATERIAL ACCOUNTANCY AND CONTROL**

<b>31. System description</b> Give a description of the nuclear material accountancy system, the method of recording and reporting accountancy data and establishing material balances, procedures for account adjustment after plant inventory, mistakes, etc., under the following headings:	SPECIMEN FORMS USED IN ALL PROCEDURES ATTACHED UNDER REF. No. <div style="border: 1px solid black; height: 100px;"></div>
i) General (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, internal transfer documents, physical inventory 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)	<div style="border: 1px solid black; height: 150px;"></div>



**NUCLEAR MATERIAL ACCOUNTANCY AND CONTROL**

ii) Receipts  
(including method of dealing with account corrections; the checks and measurements used to confirm spent fuel items, and the persons responsible for those determinations should be defined)

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iii) Shipments

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iv) Physical inventory  
(Description of procedures and methods of operator's inventory taking (for item accountancy), frequency, estimated distribution and accessibility of nuclear material, and verification method, and expected accuracy for nuclear material measurements. In particular, the description of procedures should also provide the basic inventory approach to be used, i. e. planning, organizing, and conducting the inventory, prelisting, use of prior measurement data; who has the primary responsibility for the inventory)

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v) Operational records and accounts  
(including logbooks, general ledgers, internal transfer forms, method of adjustment or correction and retention location, and languages; control measures and responsibility for records)

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**32. Features related to containment and surveillance measures**  
(general description of applied or possible measures in reference to floor plan or plant layout)

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**33. For each flow and inventory measurement point identified under Question 20, Give the following:**

SEPARATE SHEET(S) CAN BE ATTACHED FOR EACH MEASUREMENT POINT. IF NECESSARY, ATTACH DRAWING(S)

For each measurement point fill in separate sheet.  
Number of measurement points: 1

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i) Description of location, type identification

ii) Types of inventory change at this measurement point

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iii) Possibilities to use this measurement point for physical inventory taking

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**NUCLEAR MATERIAL ACCOUNTANCY AND CONTROL**

iv) Description of nuclear material (including physical and chemical form, cladding, initial and final heavy metal weight, initial and final uranium isotopic composition, burn-up, cooling time, and Pu content)

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v) Nuclear material containers, packaging, and method of storage

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vi) Item identification and containment-surveillance measures (including special identifying features and radiation and heat characteristics of disposal canisters)

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vii) Measurement equipment used and corresponding accuracies (including radiation measurements of fuel assemblies in handling cell)

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viii) Measurement control, including technique and frequency of calibration of equipment used, and standards used

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ix) Method of converting source data to batch data

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x) Means of batch identification

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xi) Anticipated batch flow rate per year

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xii) Anticipated number of inventory batches

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xiii) Anticipated number of items per flow and inventory batches

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xiv) Type, composition and quantity of nuclear material per batch (with indication of batch data, total weight of each element of nuclear material, and form of nuclear material)

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**POST-OPERATION INFORMATION**

**34. Decommissioning schedule dates**

End of operations (MM/DD/YYYY)

Decommissioned (MM/DD/YYYY)

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**35. Facility decommissioning plan**

PLAN(s) ATTACHED UNDER REF. NOs

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**POST-OPERATION INFORMATION**

i) Key events of the decommissioning plan

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ii) Removal and recovery of nuclear material

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iii) Removing or rendering inoperable of essential equipment

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**OPTIONAL INFORMATION**

**36. Optional information**  
(that the operator considers relevant to safeguarding the facility)

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**Signature of Responsible Officer**

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**Date (MM/DD/YYYY)**

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