

REPROCESSING PLANTS



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INTERNATIONAL ATOMIC ENERGY AGENCY DEPARTMENT OF SAFEGUARDS

DESIGN INFORMATION QUESTIONNAIRE *

IAEA USE ONLY

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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.

| IAEA USE ONLY | |
|---------------------------------|---------------------|
| COUNTRY | |
| COUNTRY OFFICER | |
| TYPE | Reprocessing plants |
| DATE OF INITIAL DATA | |
| VERIFICATION | |
| LAST REVIEW AND UPDATING | |

ALL FACILITIES

GENERAL INFORMATION

| | | | |
|---|---|-----------------------------------|-------------------------------|
| 1. Name of the facility (include usual abbreviation) | | | |
| 2. Location and postal address | | | |
| 3. Owner (Legally responsible) | | | |
| 4. Operator (Legally responsible) | | | |
| 5. Description (Main features only) | | | |
| 6. Purpose | | | |
| 7. Status (e.g., planned; under construction, in operation; shut down; closed down; decommissioned) | | | |
| 8. Construction schedule dates (if not in operation) | Start of Construction (MM/DD/YYYY) | Commissioning (MM/DD/YYYY) | Operation (MM/DD/YYYY) |
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| 9. Normal operating mode (days only, two shift, three shift; number of days/annum, etc.) | | | |
| 10. Facility layout (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. | | |
| 11. Sitting of facility (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. | | |
| 12. Names and/or titles and address of responsible officers (for nuclear material accountancy and control and contact with the Agency. If possible attach organization charts showing position of officers) | | | |

OVERALL PROCESS PARAMETERS

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|---|---|
| 13. Facility description (indicating important items of equipment which use, produce or process nuclear material, all process stages, storage areas and feed, product and waste points as pertaining to the measurement, control and accountancy of nuclear material) | GENERAL FLOW DIAGRAM(S) ATTACHED UNDER REF. NOs. (The diagram(s) should also indicate equipment, hoods, cells, and those areas which contain nuclear material as those specific areas where hold-up of nuclear material can occur.) <div style="border: 1px solid black; height: 60px; margin-top: 5px;"></div> |
| 14. Process description (Also indicating the modification of physical and chemical forms) | <div style="border: 1px solid black; height: 80px; margin-top: 5px;"></div> |
| 15. Design capacity (In weight of principal products per annum) | <div style="border: 1px solid black; height: 30px; margin-top: 5px;"></div> |
| 16. Anticipated annual throughput (in the form of a forward programme (if applicable), indicating the proportion of various feeds and products) | <div style="border: 1px solid black; height: 60px; margin-top: 5px;"></div> |
| 17. Other important items of equipment using, producing or processing nuclear material (such as testing and experimental equipment) | <div style="border: 1px solid black; height: 60px; margin-top: 5px;"></div> |

NUCLEAR MATERIAL DESCRIPTION AND FLOW

| 18. Main material description | Feed | Product (Uranium, Plutonium) | |
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| i) Main types of accountability units to be handled in the facility | <div style="border: 1px solid black; height: 30px;"></div> | <div style="border: 1px solid black; height: 30px;"></div> | <div style="border: 1px solid black; height: 30px;"></div> |
| ii) Chemical and physical form (for feed include types of fuel element/ assemblies, give detailed description indicating general structure and overall dimensions of fuel element/ assemblies, including nuclear material content and enrichment) Attach drawing(s) | <div style="border: 1px solid black; height: 100px;"></div> | <div style="border: 1px solid black; height: 100px;"></div> | <div style="border: 1px solid black; height: 100px;"></div> |
| iii) Throughput, enrichment ranges and Pu contents (for normal flowsheet operation indicating if blending and/or recycling takes place) | <div style="border: 1px solid black; height: 80px;"></div> | <div style="border: 1px solid black; height: 80px;"></div> | <div style="border: 1px solid black; height: 80px;"></div> |
| iv) Batch size/flow rate and campaign period, means of batch identification | <div style="border: 1px solid black; height: 30px;"></div> | <div style="border: 1px solid black; height: 30px;"></div> | <div style="border: 1px solid black; height: 30px;"></div> |
| v) Storage and plant inventory (indicating any change with throughput) | <div style="border: 1px solid black; height: 30px;"></div> | <div style="border: 1px solid black; height: 30px;"></div> | <div style="border: 1px solid black; height: 30px;"></div> |
| vi) Frequency of receipt or shipment (batches/units per month) | <div style="border: 1px solid black; height: 30px;"></div> | <div style="border: 1px solid black; height: 30px;"></div> | <div style="border: 1px solid black; height: 30px;"></div> |

NUCLEAR MATERIAL DESCRIPTION AND FLOW

19. Waste material

(including contaminated equipment, measured discards and retained waste)

Describe for each waste stream:

i) Major contributions (sources)

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ii) Type of waste after waste processing

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iii) Chemical and physical form (liquid, solid, etc.) of waste feeds, intermediate storage and waste product after processing

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iv) For each material in point (iii), uranium and its enrichment ranges/ plutonium content

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v) Estimated quantities per year, period of storing

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vi) Waste generated rates (as % of input/ throughput, quantities per month)

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vii) Store inventory range and maximum capacity

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viii) Method and frequency of recovery/disposal

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20. Waste treatment system

DIAGRAM(S) ATTACHED UNDER FIG. NOs.

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21. Other nuclear material in the facility and it's location, if any

DIAGRAM(S) ATTACHED UNDER REF. NOs.

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22. Schematic flowsheet for nuclear material

(identifying sampling points, flow and inventory measurement points, accountability areas, inventory locations, etc.)

DIAGRAM(S) ATTACHED UNDER REF. NOs.

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23. Types, form, ranges of nuclear material content (Including enrichment, as applicable), ranges of quantities of nuclear material flow for each nuclear material handling area, i. e.:

- process area
- storage area
- other locations

(Also indicate maximum quantities of nuclear material to be handled in accountability areas at the one time.)

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NUCLEAR MATERIAL DESCRIPTION AND FLOW

24. Recycle processes
(briefly describe any such processes giving source and form of material, method of storage, normal inventory, frequency of processing, duration of temporary storage, schedules for any external recycling, measurement method of fissile content of recycle material)

DIAGRAM(S) ATTACHED UNDER REF. NOS.

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25. Inventory
i) In-process
(within plant and equipment during normal operation; indicate quantity, range of enrichment, Pu content, form and principal locations and any significant change in time or throughput; indicate anticipated residual hold-up and mechanism)

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ii) Feed and product storages

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iii) Other locations
(quantity, range of enrichment, Pu content, form and location of inventory not already specified)

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NUCLEAR MATERIAL HANDLING (FOR EACH ACCOUNTABILITY AREA)

26. Containers, packaging and storage area description

DRAWING(S) ATTACHED UNDER REF. NOS.

SEPARATE NOTE TO BE ATTACHED.

Describe for feeds, products and wastes: the type and size of storage and shipping containers and packaging used (including nominal capacity and capacity for normal operation, and type of material); method of storage or packing, filling and emptying procedures, shielding; and any special identification features.

27. Methods and means of transfer of nuclear material
(describe also equipment used for handling of feed, product, waste)

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28. Transportation routes followed by nuclear material
(with reference to plant layout)

DRAWING(S) ATTACHED UNDER REF. NOS.

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29. SHIELDING
(for storage and transfer)

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PLANT MAINTENANCE

30. Maintenance, decontamination, clean-out

SEPARATE NOTE TO BE ATTACHED.

Describing plans and procedures for decontamination and clean-out of equipment containing nuclear material, defining all sampling and measurement points associated with:
(In cases where clean-out and/or sampling is not possible, indicate how the hold-up of nuclear material is measured or calculated.)

i) Normal plant maintenance

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PLANT MAINTENANCE

ii) Plant and equipment decontamination and subsequent nuclear material recovery

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iii) Plant and equipment clean-out including means of ensuring vessels are empty

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iv) Plant start-up and and plant shut-down (If different from normal operation)

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PROTECTION AND SAFETY MEASURES

31. Basic measures for physical protection of nuclear material

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32. Specific health and safety rules for inspector compliance
(if extensive, attach separately)

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NUCLEAR MATERIAL ACCOUNTANCY AND CONTROL

33. System description

Give a description of the nuclear material accountancy system, the method of recording and reporting accountancy data and establishing material balances, frequency of 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.

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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.)

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ii) Receipts
(including method of dealing with shipper/receiver differences and subsequent account corrections; the checks and measurements used to confirm nuclear material content and the persons responsible for those determinations should be defined)

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iii) Shipments
(products, waste, measured discards)

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NUCLEAR MATERIAL ACCOUNTANCY AND CONTROL

iv) Physical inventory
 Description of procedures, scheduled frequency, estimated distribution of nuclear material, methods of operator's inventory taking (both for item and/or bulk accountancy, including relevant assay method), accessibility and possible verification method for nuclear material, expected accuracy, and access to nuclear material. (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; how process clean-out is accomplished; the accountancy of process residual hold-up.)

LIST OF MAJOR ITEMS OF EQUIPMENT REGARDED AS NUCLEAR MATERIAL CONTAINERS ATTACHED UNDER REF. NOS.

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v) Measured discards
 (method of estimation of quantities per year/month, method of disposal)

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vi) Retained waste
 (method of estimation of quantities per year, method and envisaged period of storage; indicate also possible subsequent uses of retained waste)

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vii) Unmeasured losses
 (indicate the methods used to estimate unmeasured losses)

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viii) 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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34. Features related to containment and surveillance measures
 (general description of applied or possible measures)

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35. For each flow and inventory measurement and sampling points of accountability areas, identified in particular under Qs. 13, 22, 23, Give the following:

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

i) Description of location, type, identification

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ii) Type 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) Physical and chemical form of nuclear material (including enrichment range, Pu content, and cladding materials description)

v) Nuclear material containers, packaging and method of storage

vi) Sampling procedure and equipment used (including number of samples taken, frequency and rejection criteria)

vii) Measurement/analytical method(s) and equipment used and corresponding accuracies

viii) Source and level of random and systematic errors for feed, product, scrap, waste (weight, volume, sampling, analytical)

ix) Calculative and error propagation techniques

x) Technique and frequency of calibration of equipment used, and standards used

xi) Programme for the continuing appraisal of the accuracy of weight, volume, sampling and analytical techniques and measurement methods

xii) Programme for statistical evaluation of data from (x) and (xi)

xiii) Method of converting source data to batch data (standard calculative procedures, constants and empirical relationships for feed, products in sub-accounting areas, waste and scrap)

xiv) Means of batch identification

xv) Anticipated batch flow rate per year

xvi) Anticipated number of inventory batches



NUCLEAR MATERIAL ACCOUNTANCY AND CONTROL

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| xvii) Anticipated number of items per flow and inventory batches | |
| xviii) 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) | |
| xix) Features related to containment-surveillance measures | |
| 36. Overall limit of error Describe procedures to combine individual measurement error measurements to obtain the overall limit of error for: | |
| i) S/R differences | |
| ii) Book inventory | |
| iii) Physical inventory | |
| iv) MUF | |

POST-OPERATION INFORMATION

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|---|---------------------------------|-----------------------------|
| 37. Decommissioning schedule dates | End of operations (MM/DD/YYYY) | Decommissioned (MM/DD/YYYY) |
| | | |
| 38. Facility decommissioning plan | PLAN(s) ATTACHED UNDER REF. NOs | |
| i) Key events of the decommissioning plan | | |
| ii) Removal and recovery of nuclear material | | |
| iii) Removing or rendering inoperable essential equipment | | |

OPTIONAL INFORMATION

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| 39. Optional information (that the operator considers relevant to safeguarding the facility) | |
| Signature of Responsible Officer | |
| Date (MM/DD/YYYY) | |