



IAEA/ANL
Interregional Training Course



**Technical and Administrative Preparations
Required for Shipment of Research Reactor
Spent Fuel to Its Country of Origin**

Argonne National Laboratory
Argonne, IL
13 - 24 January 1997

Lecture L.3.2

**TRIGA Fuel Classification
Spent Nuclear Fuel Transfer Data Form**

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TRIGA Fuel Classification Spent Nuclear Fuel Transfer Data Form

APPENDIX A

Presented by

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Appendix A, Section 1.1

Fuel Name and Type: -

Fuel Producer: -

Reactor Name: -

Location: -

Contact Name: -

Telephone: -

Telefax: -

E-mail: -

Appendix A, Section 1.2: New Fuel Description

Physical Description

1. Fuel Dimensions and Shapes
2. Fuel Components
3. Fuel Configuration as Shipped
4. Fuel Weights

Appendix A, Section 1.2

Drawings and physical description of fuel rods

The following are preferences of acceptable drawings/descriptions of spent nuclear TRIGA fuels:

1. Fabrication schematics with tabularized physical data
2. Summation drawings (examples follow) with physical data documented in margins
3. Tabularized physical data with written descriptions

Appendix A, Section 1.3: Shipping Package Description

Description of Shipping Process

The information need not be provided if you are using any cask for which facility safety documentation exists at the INEL:

Appendix A, Section 1.3: Shipping Package Description

If you are planning to use a different Spent Nuclear Fuel Cask, then two (2) copies of each of the following documentation must be provided:

1. Copy certificate of compliance or certificate of competent authority
2. Safety analysis report for packaging (SARP)
3. Poison, poison inserts, spacers and related certificates
4. Decontamination procedures and precautions

Appendix A, Section 1.3: Shipping Package Description (continued)

5. Load test certification of lifting/handling components
6. Detailed drawings of package showing at least the following information:
 - a. Dimensions
 - b. Weights
 - c. Surface finish (roughness, painting, coatings,...etc.)
 - d. Materials of construction
 - e. Other information pertinent to handling and unloading

Appendix A, Section 1.3: Shipping Package Description (continued)

7. Drawings of package handling devices showing the following information:

- a. Type of load bar or lifting yoke
- b. Lid removal tools, sizes and description of lid bolts
- c. Special fuel removal tools, if any
- d. Crane attachment details
- e. Other information pertinent to handling and unloading

Appendix A, Section 1.3: Shipping Package Description (continued)

8. Descriptive photographs of the package
9. List of handling and loading/unloading equipment furnished
10. Diagrams involving lifting/handling configurations of the cask container including lifting points, boxes, spacers, tie downs
11. Loading/unloading and handling procedures

Appendix A, Section 2.1: New Fuel, Fuel Materials Description

1. Fuel Type (Rod, Pellet, etc.)
2. Chemical form and fabrication (UZrH_x , UO_2 , etc.)
3. Initial fissile material enrichment U-235, Pu-, Th, etc. material & weight, % enrichment

Material 1 _____
Weight _____ % _____ Uncertainty _____

Material 2 _____
Weight _____ % _____ Uncertainty _____

Appendix A, Section 2.1: New Fuel, Fuel Materials Description (continued)

4. Fuel additives (Alloys, organics, poisons, etc), weight

Material 1 _____ Weight _____ % _____

Material 2 _____ Weight _____ % _____

Provide weight basis per element

Appendix A. Section 2.2: New fuel, Cladding Materials Description

1. Cladding Material (Zr, Al, Stainless Steel,...etc.)
-

2. Cladding thickness (mm):
-

Appendix A, Section 2.3: Other Materials of Construction

Material 1 _____ Weight _____ or
% _____ Characteristic _____

Material 2 _____ Weight _____ or
% _____ Characteristic _____

Appendix a, Section 3.1: Spent Fuel, Operation History

1. Unit identification (ID NO.)_____

2. Unit burnup (Cumulative Fission)_____

Provide as megawatt-days/metric ton of fissile material

3. Operating or burn-up history of the fuel

4. Isotopic listing contributing top 95% of radiation

5. Date of last criticality:_____

Appendix a, Section 3.2: Spent fuel, Operating History

Physical condition of the fuel elements:

1. Pictures/videos
2. Estimated cladding corrosion with water chemistry

Appendix A, Section 3.3: Description of Canned/Recanned Fuel

If you are planning to use a can, or if the spent fuel is already canned, the information and documentation listed under items 1 through 6 of this section (Section 3.3) must be provided.

1. All canned fuel will be opened and repackaged
2. Can must be certified with SARP plus receipt and shipping facility acceptable