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

Argonne National Laboratory
Argonne, IL
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Lecture L.3.2

TRIGA Fuel Classification
Spent Nuclear Fuel Transfer Data Form

Kraig M. Wendt
Lockheed Martin Idaho Technologies of the INEL

International Atomic Energy Agency
Vienna, Austria

Argonne National Laboratory
Illinois, USA
TRIGA Fuel Classification
Spent Nuclear Fuel Transfer Data Form

APPENDIX A

Presented by

Kraig M. Wendt
of
Lockheed Martin Idaho Technologies of the INEL
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
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

<table>
<thead>
<tr>
<th>Material 1</th>
<th>Weight</th>
<th>%</th>
<th>Uncertainty</th>
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<table>
<thead>
<tr>
<th>Material 2</th>
<th>Weight</th>
<th>%</th>
<th>Uncertainty</th>
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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

<table>
<thead>
<tr>
<th>Material 1</th>
<th>Weight (or %)</th>
<th>Characteristic</th>
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<table>
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<tr>
<th>Material 2</th>
<th>Weight (or %)</th>
<th>Characteristic</th>
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</table>
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