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.3.1

MTR Fuel Classification
Savannah River Site Appendix A Agreement
Preparation Guidelines

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MTR FUEL CLASSIFICATION

SAVANNAH RIVER SITE APPENDIX A AGREEMENT PREPARATION GUIDELINES

L.3.1

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Appendix A

- **Contract/Agreement between the Department of Energy (i,e., U.S. Government) and Domestic or Foreign Reactor Facilities to assume ownership of specified materials to be received at the Savannah River Site.**
- **Provides detailed description of specified materials.**
- **Utilized by Savannah River Operations as the basis for safety analysis documentation (i.e., Criticality, Final Disposition, Facility Standards).**
- **Required 180 days prior to tentative shipping date.**

Appendix A Form Requires:

- **Customer (or Reactor Operator) contact information**

- **Drawing identification**

  Drawings typically include:

  - **Overall assembly**
  - **Fuel elements (plates or tubes)**
  - **Compacts**
  - **Side plates**
  - **End fittings**
  - **Spacers/combs**
  - **Dummy plates**
  - **Handles/grips**

Important: Six (6) copies of all drawings are required at time of Appendix A submittal.

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Appendix A Form Requires:

- **Material description**

Important: All dimensions are to be recorded in centimeters.
All weights are to be recorded in grams.

- Nominal fuel “element” description

- Nominal fuel “assembly” description

Nominal Fuel "Element" Description:

- **Fuel element type (plate or tube)**
- **Dimensions**
  - **Total element, fuel meat, cladding**
- **Weights**
  - **Total element, fuel meat, and constituents (U, ^{235}U, Matrix), cladding**
- **Chemical form of fuel meat**
  - **UAl_x-Al, U_3O_8-Al, U_3Si_x-Al**
- **Method of sealing cladding and fuel meat**

Nominal Fuel "Assembly" Description:

- **Total number of elements**
- **Dimensions**
  - Overall assembly, side plates, end boxes or fittings, spacers
- **Weights**
  - Overall assembly, total assembly U content, total assembly ^{235}U content, side plates, end boxes or fittings, spacers
  - Percentage of ^{235}U enrichment
  - Canning description

    Applicable for failed, distorted, or disassembled fuel assemblies

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Nominal Fuel "Assembly" Description:

Important:

If the assembly has been cropped/cut:

- **Drawings should indicate crop lines**
- **Dimensions and weights should be reflected in the descriptions**
- **Unique assembly identification numbers should be intact**

Sodium bearing assemblies are not authorized for storage at the SRS.

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Appendix A Form Requires (cont.):

- **Fuel identification**
  - **List of the specific identification numbers for assemblies described in this contract**
- **Fuel irradiation specifications**
  - **General history of the specified assemblies in terms of:**
    - **Time in reactor**
    - **Power level**
    - **Burn-up**
    - **Last date of criticality**
  - **Post-irradiation isotopics for the average fuel assembly**

Appendix A Form Requires (cont.):

- **Fuel irradiation history for the specific assembly**
- **Match specific assembly to its:**
  - **Pre-irradiation U and ^{235}U content**
  - **Post-irradiation isotopics**
  - **Operating history**
  - **Decay heat**

Appendix A Form Requires (cont.):

- **Specifications for failed/warped fuel assemblies**
  - **Notification shall be made to DOE of any fuels with questionable physical integrity. A minimum of 270 days notice in advance of the tentative shipping date is required.**
- **Cask and basket identification**
  - **List cask and basket combinations utilized in shipping the specified assemblies.**

Savannah River Contacts:

- **Jay Thomas, WSRC, (803) 557-9526**
- **Trent Andes, WSRC, (803) 557-9483**
- **Peggy Brooks, WSRC, (803) 557-9989**

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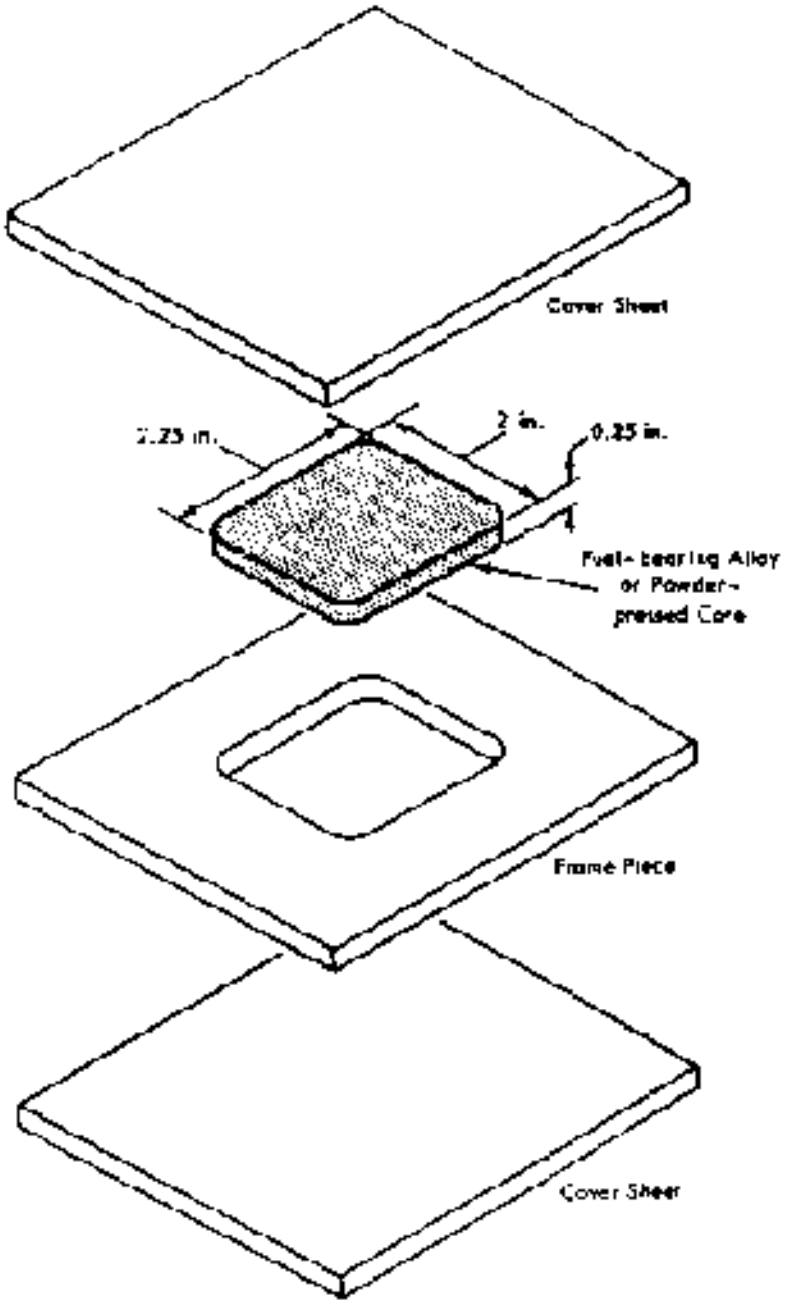
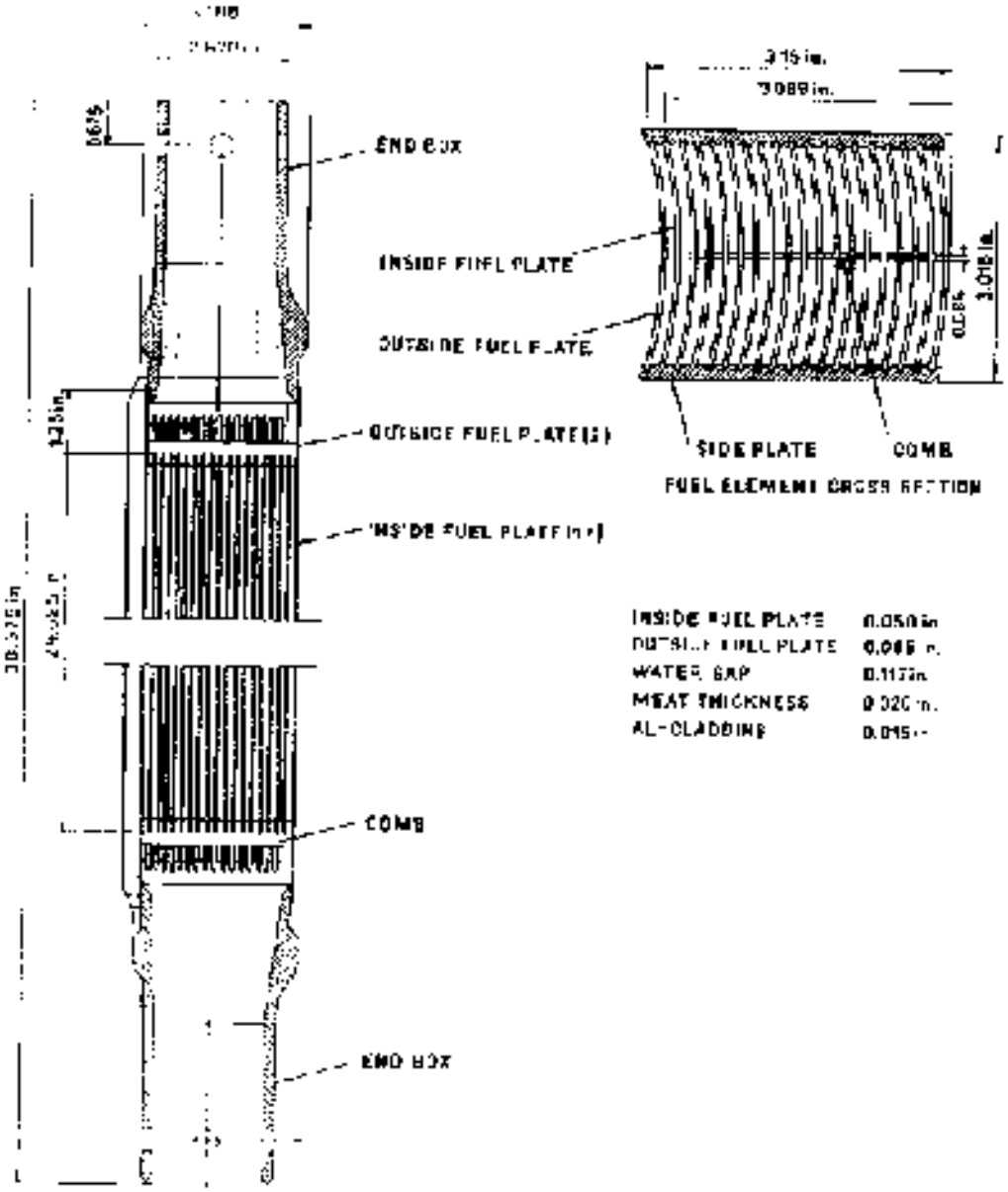


Fig. 15-28 Exploded view of MTF composite fuel plate prior to rolling.[23]


END BOX
INSIDE FUEL PLATE
OUTSIDE FUEL PLATE
OUTSIDE FUEL PLATE (2)
INSIDE FUEL PLATE (1)
COMB
END BOX
SIDE PLATE
COMB
FUEL ELEMENT CROSS SECTION
INSIDE FUEL PLATE 0.050 in
WATER GAP 0.117 in.
MEAT THICKNESS 0.020 in.
AL-CLADDING 0.015 in.

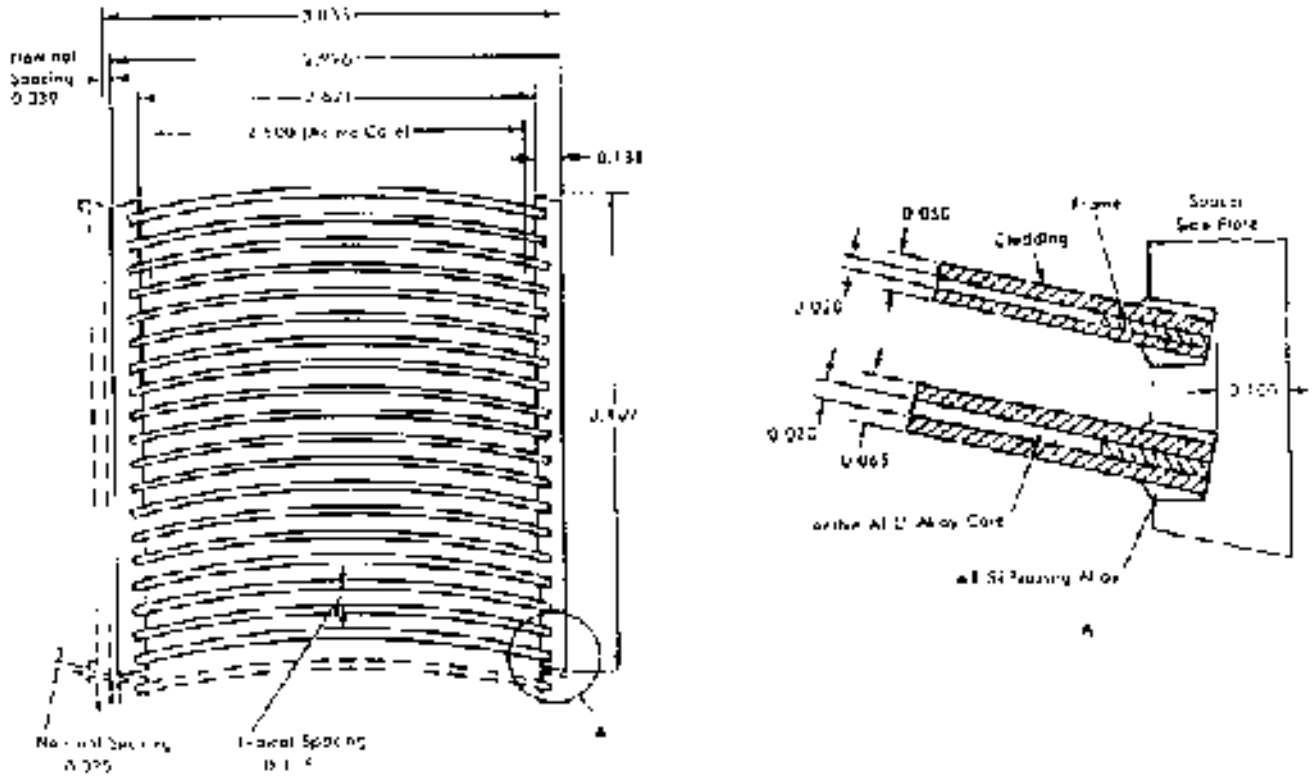
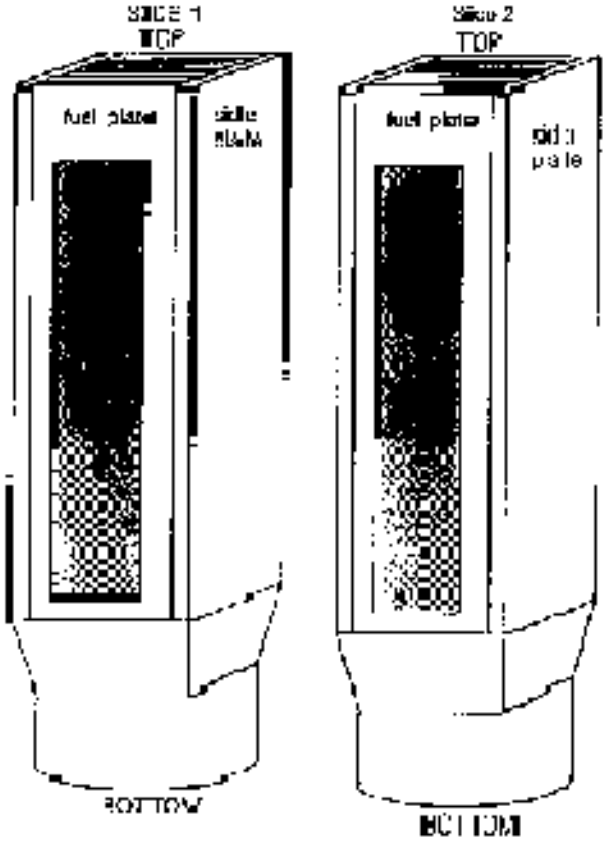


Fig. 15.20 Sketch of MTR fuel-element cross section.[3] Note that the two outer fuel plates are 0.065 in. thick and the internal fuel plates are 0.50 in. thick. Dimensions are in inches.

Visual Inspection Data Sheet

Assembly Number: _____



Indicate the location and type of anomalies or damages observed on the diagrams below using the following keys:

Key:
- Corrosion
- Corrosion nodules > 1/8" dia.
- Cracks or nodules > 1/8" dia.

Reference: Active fuel region

	Side 1	Side 2
Anomalies or damages	yes / no	yes / no
Corrosion nodules	yes / no	yes / no
Nodules > 1/8" dia.	yes / no	yes / no

ACCEPT REJECT (Circle one)

Comments: _____

Inspected by: _____
Signature / Date

Quality Verification: _____
Signature / Date